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D5.2

Report of execution and monitoring of interventions and actions.

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WHO WE ARE

The ECF consortium consists of ten partners. The project is coordinated by the Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT).

Name	Country	Logo
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas – CIEMAT	ES	
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Universidad de Sevilla USE	ES	
University of Jyväskylä JYU	FI	
Universitat Autònoma de Barcelona UAB	ES	
Meda Research Ltd MedaResearch	RO	
Instituto de Soldadura e Qualidade ISQ	PT	
Trebag Szellemi Tulajdon Es Projektmenedzser Korlatolt Felelossegu Tarsasag TREBAG	HU	
Enlitia Enlitia	Pt	
Que Technologies Kefalaiouchiki Etaireia QUE	GR	

ABOUT THE PROJECT

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.

Applying a novel hybrid participatory approach, rooted in participatory action research and citizen science, ECF4CLIM co-designs the ECF in selected schools and universities, by: 1) elaborating an initial ECF, supported by crowdsourcing of ideas and analysis of existing ECFs; 2) establishing the baseline of individual and collective competences, as well as environmental performance indicators; 3) implementing practical, replicable and context adapted technical, behavioural, and organisational interventions that foster the acquisition of competences; 4) evaluating the ability of the interventions to strengthen sustainability competences and environmental performance; and 5) validating the ECF.

The proposed ECF is unique in that it encompasses the interacting STEM-related, digital and social competences, and systematically explores individual, organisational and institutional factors that enable or constrain the desired change. The novel hybrid participatory approach provides the broad educational community with: an ECF adaptable to a range of settings; new ways of collaboration between public, private and third-sector bodies; and innovative organisational models of engagement and action for sustainability (Sustainability Competence Teams and Committees).

To encourage learning by doing, several novel tools will be co-designed with and made available to citizens, including a digital platform for crowdsourcing, IoT solutions for real-time monitoring of selected parameters, and a digital learning space. Participation of various SMEs in the consortium maximises the broad adoption and applicability of the ECF for the required transformational change towards sustainability.

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1. EXECUTIVE SUMMARY

This deliverable reports on the Execution and Monitoring of Interventions, providing a comprehensive account of the implementation phase of the ECF4CLIM interventions across the demonstration sites. It documents the planning, execution, troubles, and conclusions of the interventions finally implemented among those described in Deliverable 5.1, which were identified through the hybrid participatory methodology developed within the project. These 61 interventions aim to foster sustainability competences in the three domains of the ECF4CLIM analytical framework: individual, collective and technical and material competences in the diverse educational contexts of the project.

In the framework of the ECF4CLIM project, a total of 61 interventions across 13 educational institutions in four countries were successfully implemented. The interventions, aimed to address the strategic steps of the ECF4CLIM Roadmap – engagement, connections, change and action -, were co-designed by the participatory organizational structures created in the demonstrations sites, the Sustainability Competence Teams (SCTs) and Sustainability Competence Committees (SCCs) (SCT/SCC sessions 2). The implementation process was grounded in a co-implementation approach, with active participation from students, teachers, researchers, and external experts. The implementation of selected interventions was co-monitored during SCT/SCC sessions 3 and 4, while they were evaluated in SCT/SCC session 5.

A standardised monitoring framework, supported by digital tools (Microsoft Excel and Azure), has been applied to ensure consistent and systematic reporting during implementation. These tools enable partners to track progress and share results efficiently for internal monitoring purposes. Moreover, they have played a key role in facilitating a smooth implementation process by allowing timely detection of delays and issues

In this document, each intervention is described in terms of its objectives, targeted sustainability competences, critical preconditions and main risks and uncertainties, links with the ECF4CLIM roadmap, implementation tasks and milestones, comonitoring mechanisms, achieved outputs, and a final section on conclusions and lessons learnt.

The analysis of the interventions showed that they span multiple sustainability domains. Some interventions (37 out of 61) mainly targeted specific environmental areas including energy, waste, water, green infrastructure, sustainable transport, and indoor environmental quality; while others (34 out 61) adopt a more cross-cutting approach targeting the development of educational materials and resources including teaching materials, new courses or subjects, educational projects, visits and talks.

In terms of the type of sustainability competence that was initially intended to be addressed, interventions spanned trough the three domains of the ECF4CLIM analytical framework with some countries initially focused on the development of collective competences such as Finland and Portugal, while Spain primarily focused on individual competences. Romania, on the other hand, designed interventions mainly to improve technical and material competences. Interestingly, during the implementation and evaluation phases of the interventions, it became evident that interventions facilitated the development of competences extending beyond the initially established area of the analytical framework, illustrating the interconnected nature of the areas of competence in our analytical framework.

Challenges encountered included scheduling constraints, resource limitations, and variability in stakeholder engagement. However, these challenges were mitigated through adaptive planning, strong institutional support, and the integration of activities into both the formal and informal curricula.

Deliverable 5.2 serves as a key milestone in the ECF4CLIM project, demonstrating the potential of participatory, competence-based interventions to drive meaningful change in educational settings. The lessons learned and tools developed will support the replication and scaling of successful practices across Europe, contributing to the overarching goal of fostering a low-carbon and sustainable future through education.

2. CONTEXT, AIMS AND STRUCTURE

Deliverable 5.2 falls within **Work Package 5 (WP5)** of the project, which is dedicated to the implementation of interventions. It directly addresses the tasks within WP5: Task 5.1, focusing on "Behavioural Interventions (individual/organisational) to modify practices, routines, habits, and social norms concerning climate change and sustainability in education," and Task 5.2, dealing with "Structural/Environmental Interventions (energy, water, green procurement, green spaces, transport, indoor air quality, waste)." The University of Seville (USE) is the responsible partner for this deliverable, with contributions from other project organizations including CIEMAT, IST, JYU, UAB, Meda Research and QUE.

The primary aim of Deliverable 5.2 is to comprehensively document the **execution and monitoring of the diverse interventions** undertaken within the ECF4CLIM project's implementation phase. Specifically, the document seeks to:

- **Report on Intervention Implementation:** Detail how various behavioural and structural/environmental interventions, co-designed and implemented by the educational communities, were carried out across demonstration sites.
- **Describe Monitoring Mechanisms:** Outline the strategies and tools employed to monitor the progress, outputs, and initial impacts of these interventions, ensuring consistency and data collection for evaluation.
- **Present Achieved Outputs and Milestones:** Provide an account of the tangible results, completed tasks, and achieved milestones for each intervention.
- **Identify Challenges and Lessons Learned:** Document any difficulties encountered during the implementation process and extract valuable lessons.
- **Showcase Project Activities:** Serve as a public record of the practical activities undertaken to foster sustainability competences and improve environmental performance within educational settings, aligning with the project's dissemination level (Public).

Deliverable 5.2 is structured including the following epigraphs:

- **Overview of the interventions:** This section analyses the interventions executed during the project, in order to obtain a global vision of the main environmental area and ECF4CLIM analytical framework sphere that interventions work on.
- **Description of the Co-monitoring Mechanisms:** This section is detailing the systematic approach to how interventions were carried out and its progress monitored. This section would describe the use of specific monitoring tools and templates.
- **Detailed Intervention Descriptions:** This is the core of the report containing comprehensive descriptions of individual interventions. A standardized format in introduced for presenting each intervention's objectives, target competences, tasks, milestones, outputs, and specific co-monitoring strategies. Each intervention's entry also includes a section for "Troubles during implementation, conclusion and lessons learnt."

- **Motivation under disregarded interventions:** Motivation for disregarding 21 interventions, initially selected to be executed, is included in this section.
- **Conclusions and Lessons Learned:** In this final section a synthesis of the outcomes across all interventions, a discussion of broader impacts, challenges, and key insights gained from the implementation and monitoring phase is included

This structured approach ensures that Deliverable 5.2 serves as a comprehensive and transparent record of the execution of the interventions selected within the participatory approach of ECF4CLIM project.

3. OVERVIEW OF THE ECF4CLIM INTERVENTIONS.

This section analyses the interventions executed during the project, in order to obtain a global vision of the main environmental area and ECF4CLIM analytical framework sphere that interventions work on. Specifically, **61 interventions**, in **4 countries** and **13 demonstration sites**, are analysed in this section.

As a global view, 37 interventions targeted transformations with a main specific environmental area (energy, waste, water, air quality, transport, green areas, food). The rest (34) interventions took a more cross-cutting approach, focusing on developing sustainability competencies through conferences, talks, developing of educational materials, or creating new courses.

The list of intervention executed in the framework of the ECF4CLIM project are included in the following table:

DS code	Intervention title
SP-DS01-IN01	Revegetation. Measuring the impact of shading projected by trees
SP-DS01-IN03	Photovoltaics
SP-DS01-IN04	Environmental programs. Sustainability awareness. Dynamic awareness
SP-DS01-IN06	Pergolas with vegetation
SP-DS01-IN07	Garden box
SP-DS01-IN08	Proper use of sorting garbage containers
SP-DS01-IN09	Waste recycling
SP-DS01-IN10	Improving comfort temperature through an adiabatic bioclimatic system
SP-DS02-IN01	Umbralejo Field Trip - Experiential environmental education
SP-DS02-IN02	Linking the school garden with sustainable food styles
SP-DS02-IN03	CO2 & Water Market. Exchange T-shirts “Change things by changing things”
SP-DS02-IN04	Visit to the municipal composting plant + Promoting sustainable work in the school garden
SP-DS02-IN07	Planting trees in the school
SP-DS02-IN09	Expand the school garden: The garden as "Pride of the school"
SP-DS02-IN10	ECF4CLIM learning space
SP-DS03-IN01	Improving thermal insulation
SP-DS03-IN06	Improve the waste system management at Faculty level
SP-DS03-IN07	Facilitate transversal learning spaces
SP-DS03-IN09	Make visible data on environmental impacts
SP-DS03-IN11	Designing a more sustainable food system at the university
PT-DS01-IN02	Field trips related to water
PT-DS01-IN03	Implement solar panels at the school
PT-DS01-IN05	Implement double-glazed windows and thermal blinds
PT-DS01-IN06	Energy route: ADENE
PT-DS01-IN07	Integrate the assessment of energy consumption into the disciplines
PT-DS01-IN08	Implement more recycling bins inside the school according to the needs
PT-DS01-IN09	Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. Class waste production
PT-DS02-IN2	Learning how to drive a bicycle

PT-DS02-IN3	Reactivate the school's biological garden
PT-DS02-IN7	Energy route: ADENE
PT-DS02-IN8	Integrate the assessment of energy consumption into the disciplines
PT-DS02-IN9	Awareness actions on the correct selective separation of waste and the impact on the environment
PT-DS02-IN10	Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. School waste production
PT-DS03-IN01	Climate Crisis and Fair Transition
PT-DS03-IN02	Master and doctoral theses in the field of sustainability
PT-DS03-IN04	Installation of air quality sensors in classrooms
PT-DS03-IN05	Solar panels
PT-DS03-IN06	"Technical + Green" Project
PT-DS03-IN07	Communication and community involvement
PT-DS03-IN08	IST's activities and strategic plan
PT-DS03-IN09	"Bio Técnico" Project
PT-DS03-IN10	"Técnico makes the difference" Project
RM-DS01-IN01	(Solar panels in urban area) Installation of solar panels for green electricity production
RM-DS01-IN07	(Active) Supporting the activities of groups approaching sustainability
RM-DS02-IN01	(Solar panels in rural area) Installation of solar panels for green electricity production
RM-DS02-IN05	(Active) Supporting the activities of groups approaching sustainability
RM-DS03-IN01	(Water Sensors) Infrastructure improvement - water sensors at the sanitary facilities
RM-DS04-IN02	Development of educational materials for sustainability
FN-DS01-IN02	Attitude within the whole school towards sustainability
FN-DS01-IN03	Attitude: Information for students
FN-DS01-IN04	Food: Vegetarian cooking recipes contest Ruoka (served at school)
FN-DS01-IN06	Strategy for whole school sustainability education
FN-DS02-IN01	Recycling
FN-DS02-IN02	Food
FN-DS02-IN03	Sustainability strategy
FN-DS02-IN04	Pedagogy
FN-DS02-IN05	Transport
FN-DS02-IN06	Engagement of students
FN-DS03-IN01	DISCUSSIONS AND COACHING ON SUSTAINABILITY AND CURRICULA DEVELOPMENT WITH TEACHERS AND STUDENTS
FN-DS03-IN02	FROM SUSTAINABILITY COMPETENCES IN CURRICULA TO PRACTICE AND PEDAGOGY: Designing a transdisciplinary course on sustainability competences
FN-DS03-IN03	FROM SUSTAINABILITY COMPETENCES TO PRACTICE AND PEDAGOGY: Preparing concrete teaching and study materials of each step of the Roadmap

Table3.1.- List of interventions executed within ECF4CLIM project.

- Global analysis:

The observed diversity in the types of interventions implemented across the demonstration sites suggests that this non-uniformity may be attributed to context-specific factors within each educational community. In particular,

- Resource Availability and Prior Expertise: Existing staff with specialized knowledge (e.g., a biology teacher for school gardens, an engineer for energy efficiency) could have facilitated the selection of certain interventions. Also, the presence or absence of infrastructures (e.g., an advanced recycling system or renewable facilities) could have led to interventions focused on optimizing or expanding them.
- Ease of Implementation and Impact Measurement:
    - For their simplicity and ease of implementation at a small scale (e.g., recycling campaigns, the celebration of sustainable conferences on an environmental sector).
    - Measurable Impact: Quantifying results (e.g., SP-DS02-IN03) could make certain interventions more attractive for the project due to tangible, reportable outcomes.
- Educational Curriculum or National/Regional Pedagogical Priorities: These factors could have influenced intervention areas, or their cross-cutting Integration.
- Perceived urgency or specific local problems: The final intervention selection at each demonstration site was based on specific local needs (e.g., severe waste management issues, high energy consumption in a Spanish DS; low energy efficiency or water problems in Romania).
- The availability of external partners (e.g., Aldea program in Spain) with interests or available funds in specific areas (e.g., a renewable energy company, a waste management organization) could have influenced intervention choices.

This diversity and variety of contexts enriches the analysis of impacts, barriers, and challenges experienced in each setting. It allows for the observation of how similar interventions can lead to different outcomes depending on the context, highlighting how the specific characteristics of each environment can influence both the selection and the effectiveness of the interventions

- Analysis of the nature of the interventions according to the targeted environmental area

There are 37 interventions that are directly related to one of the areas of environmental sustainability (water, waste, green spaces, green procurement, transport, indoor air quality and energy), while the rest target the development of educational materials and resources.

The graph below illustrates how environmental interventions are distributed according to the main areas they target. Within those interventions related to concrete environmental areas, interventions based on energy, waste and green spaces stand out, as they enable tangible practices that are easily integrated into the daily routine of an educational centre, allowing for hands-on learning.



Figure 3.1.- Classification of interventions according to the targeted environmental area.

Ten out of thirty-seven interventions are targeted to energy issues, the same number as waste related interventions (10) and followed by green spaces interventions (7). The following graph shows how interventions carried out in each country are classified in relation to different areas of sustainability, based on the needs identified in each demonstration site.

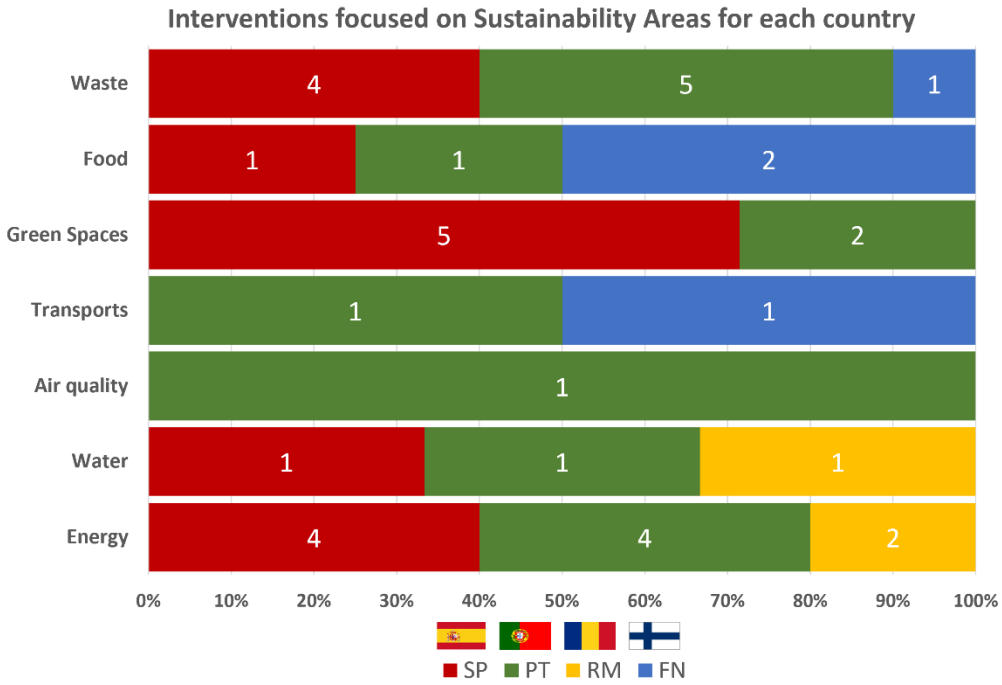


Figure 3.2.- Classification of interventions according to the targeted environmental area, per country.

Spain (SP - Red): Its interventions are quite uniformly distributed across several areas. Its notable participation stands out in Waste (27%), Energy (27%), and Green Spaces (33%).

Interventions related to food, and water are less represented, and none have been specifically designed to address air quality or transport. **Portugal (PT - Dark Green):** In general, demonstration sites in Portugal developed interventions covering all sustainability areas, highlighting Waste (33%), Energy (27%) and Green Spaces (13%) like Spain. It also has a presence in Food, Transports, Air Quality, and Water, showing a greater diversification in its actions.

Romania (RM - Yellow): This country shows a clear specialization. Most interventions were focused on Energy (67%), indicating a very high priority on implement and educate on renewable energy sources. It also has a notable presence in Water (33%).

Finland (FN - Dark Blue): Finland demonstrates a distinctive approach, with a strong inclination towards Food (50%) and Transports (25%). It also participates in Waste (25%). This could suggest particular attention to sustainability in consumption and mobility within its educational centers.

It is notable how Finland did not identify a need to develop water-focused interventions, and Spain and Portugal also implemented few interventions of this type. This does not necessarily imply a lack of importance placed on this environmental sector; rather, in some cases, could point to significant pre-existing awareness efforts or specific regulations, that could drive to select for implementation interventions in sustainability areas feels as more urgent. This could be the case of water in Spain or Portugal, where awareness campaigns to reduce water consumption are frequently in the media, due to frequent draught period.

The same applies to other sustainability areas. Another example would be the creation and improvement of Green Spaces, a sustainability area that saw a significant number of interventions from Spain and Portugal but was entirely absent in Romania and Finland. This difference is probably not only due to the urban character of the Spanish and Portuguese demonstration sites, but also to the context in countries like Finland, where the low population density and extensive natural landscapes—including forests and green areas—reduce the need for interventions specifically targeting access to green spaces. In such contexts, environmental benefits of green areas are already more readily available, which may partially explain the lower prioritisation of this type of intervention.

- Analysis of interventions not focused in a specific environmental area.

A significant portion of the interventions are not directly targeting a particular environmental issue but are instead designed to support educational processes including mainly the creation of educational materials (e.g. SP-DS03-IN07; PT-DS01-IN07; RM-DS04-IN02) and short training courses (e.g. SP-DS01-IN04; PT-DS01-IN06; RM-DS01-IN07). Once implemented, these types of interventions are easy to replicate in future school years and simpler to integrate into regular educational practices on an ongoing basis. Also, for the same reasons, educational talks and projects interventions (FN-DS01-IN03; FN-DS03-IN01; PT-DS03-IN06) were successfully completed.

Even though implementing these interventions may demand greater effort, four new subjects and courses were successfully integrated at various demonstration sites. This achievement directly enhanced students' curricula, fostering the development of more specifical sustainability knowledge. Given that these interventions were mainly established in universities, the content depth and student specialization involved were notably higher (PT-DS03-IN01; PT-DS03-IN02; FN-DS03-IN02).

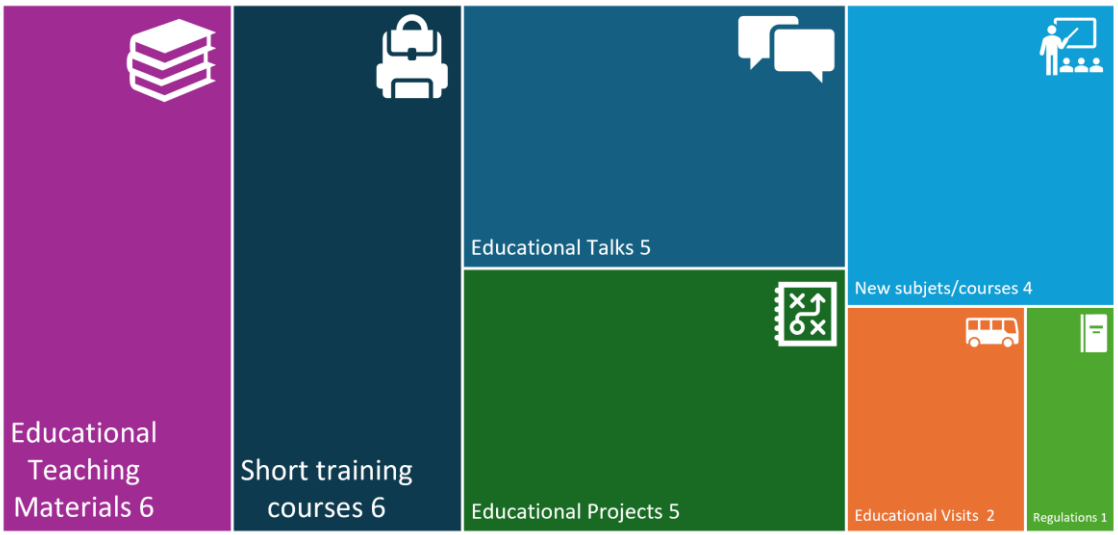


Figure 3.3.- Classification of transversals interventions per type.

The distribution of these interventions across the different countries is illustrated in the following figure.

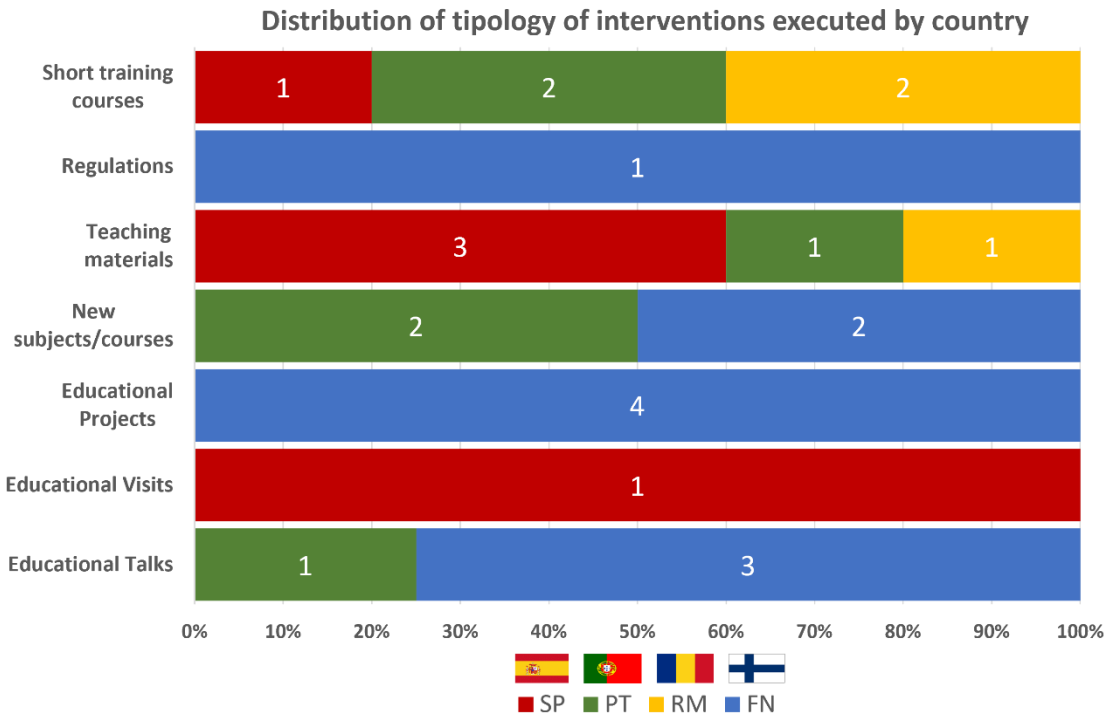


Figure3.4.- Classification of transversals interventions per type and country.

In relation to this type of interventions, all countries attempted to develop, in one way or another, educational interventions that could evolve and endure over time, either by repeating the intervention or by introducing lasting structural changes, such as new courses, teaching materials, or regulations.

The interventions and the ECF4CLIM Analytical Framework While the overall distribution of interventions related quite homogenously to the different areas of the ECF4CLIM analytical framework, demonstration sites in each country designed interventions to address the sustainable competence needs identified by their respective educational communities during the SCT1 to SCC2 meetings in different manners. As it can be seen in the graph below, Portuguese and Finnish demonstration sites emphasized the development of collective competencies. In Spain, more interventions were developed to promote individual competencies, whereas in Romania, the focus was on designing interventions to improve technical and material competences.

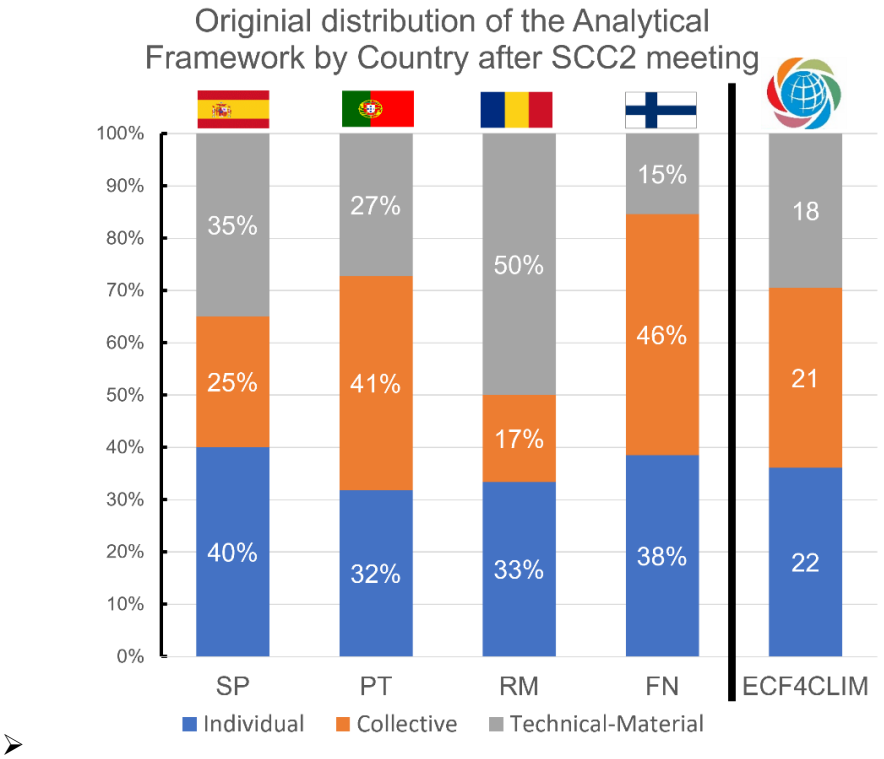


Figure 3.5.- Classification of interventions versus declared main AF sphere and country.

The following diagram shows the sphere of the analytical framework that interventions intended to develop and the environmental area they intended to improve.

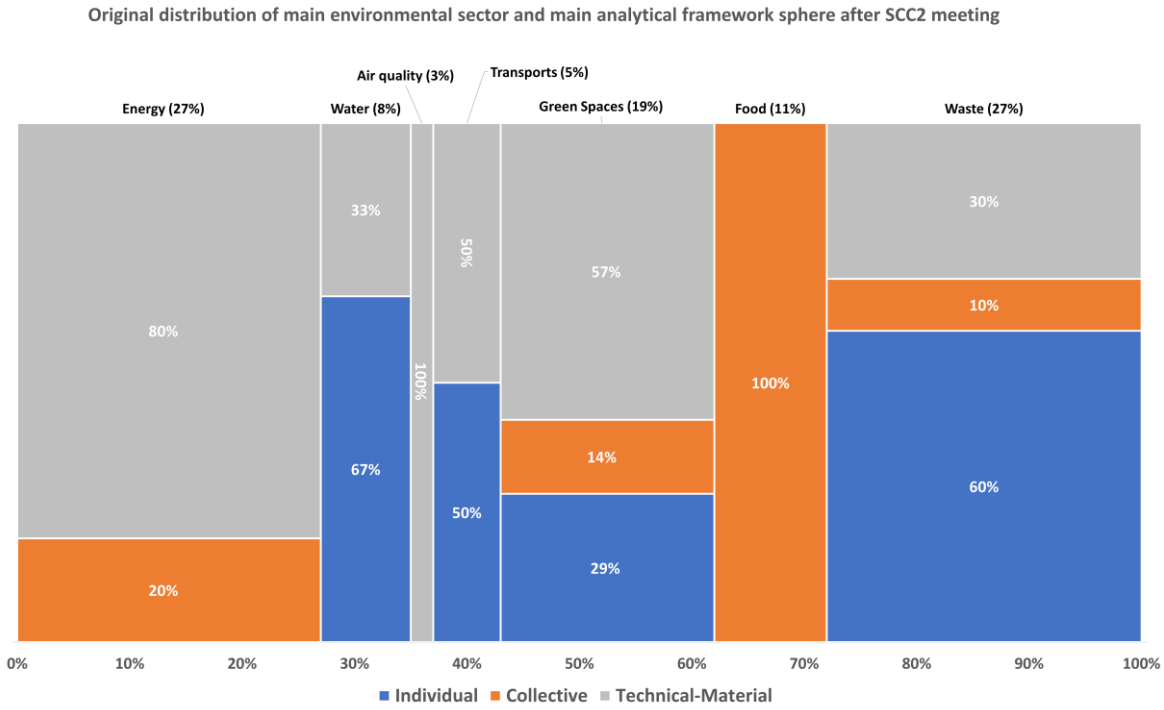


Figure 3.6- Classification of interventions versus declared main AF sphere and environmental area.

In most of the environmental areas targeted by the interventions, the primary focus within the analytical framework was on developing technical and material competences. However, the interventions were also expected to have an impact on both individual and collective competences. In the water and waste areas, the individual and collective competences together are higher than the technical and material ones. In the area of air quality, the interventions were initially designed solely to enhance technical and material competences. Interestingly, interventions related to food were originally aimed exclusively at strengthening collective competences.

However, during the implementation and evaluation phases of the interventions, it became evident that this design approach facilitated the development of unanticipated competences .

Most of the interventions in the energy area were designed to achieve reductions in energy consumption or install renewable energy sources (RM-DS01-IN01; PT-DS03-IN05) focused mainly on the development of technical-material competences. However, it was observed that during the implementation of these interventions, individual and collective skills were developed through the dissemination of results to raise awareness among the educational community and the inclusion of energy related contents in the school subjects. Other interventions initially designed to develop collective competences (PT-DS02-IN08; SP-DS01-IN10), achieved to develop technical-material competences.

The same thing happened with the water related interventions, initially designed to develop individual competencies such SP-DS02-IN03 that eventually managed to develop competences in all the other areas of the analytical framework.

Even in the case of waste related interventions originally designed to focus on the three spheres of the analytical framework, the implementation showed that other unanticipated competences developed (SP-DS01-IN08; PT-DS02-IN10; FN-DS02-IN01).

Regarding educational interventions (educational talks, educational visits, educational projects, etc), the original purpose in all of them was to develop individual or collective competencies, but in various cases (e.g. SP-DS03-IN07 or PT-DS01-IN07), technical-material competences were also improved.

- Relevant difficulties

Various challenges emerged during the co-design and co-implementation of the interventions, offering valuable insights for improving and replicating future actions. One of the main difficulties was sustaining motivation and commitment among students, teachers and the wider educational community over time, especially when results were not immediately visible. While some interventions initially relied on incentives to boost student engagement, it proved more difficult to sustain motivation through environmental awareness alone. Engagement tended to be stronger among groups who were already aware and extending that commitment to larger or more diverse communities proved challenging.

Logistical and coordination issues also played a significant role. Overloaded school schedules, resistance to change and difficulty fitting additional activities into tight timetables — especially when they required time outside of regular school hours — created tensions for families and organisers. Communication with external stakeholders, parents, and between departments (in the case of universities) was often limited due to time constraints and heavy workloads, which affected the smooth planning and execution of activities.

A lack of resources further hindered progress. The limited availability of staff, students and teachers delayed the implementation of interventions. Inadequate spaces and facilities were also a common issue. However, this limitation sometimes presented an opportunity, as some interventions focused on creating or adapting new spaces dedicated to sustainability. Ensuring the long-term continuity of these efforts was another concern, particularly due to staff turnover and the constant arrival of new students.

Curricular integration presented an additional challenge. Significant effort and coordination were required to adapt or create curricula that meaningfully incorporated sustainability topics. Furthermore, a lack of technical expertise for certain interventions, particularly those involving infrastructure or facilities, necessitate support from universities or external partners.

Finally, managing expectations emerged as a critical factor. Raising awareness of the importance of small-scale actions and incremental progress was essential to sustaining momentum and engagement.

- Main outcomes

Despite all these challenges, the evaluation of the interventions carried out in WP6 revealed the potential to promote a transformational change in the three spheres of our analytical framework.

As for the environmental sphere, findings from D6.3 show that the environmental key performance Indicators (KPIs) used captured quantifiable improvements in areas such as energy consumption, waste production, and water use. In addition, D6.3 through a qualitative analysis of long-term impacts, reflected the potential of the interventions to create enduring changes in environmental awareness, behavior, competencies, and institutional practices.

Finding from D6.1 on the evaluation of collective competences, it shows that ECF4CLIM interventions have catalyzed meaningful changes in the social dynamics of participating institutions. The interventions have enabled cross-role collaboration among students, teachers, and staff, and in some cases, have been integrated into existing structures such as Eco-Schools committees.

In terms of individual competences, findings from D6.2 shows that the interventions strengthened relationships and fostered a culture of collaboration within our educational communities, encouraging the active and equitable involvement of all participants. The interventions also promoted dynamic, motivating and real-world-connected learning. The process fostered a more integrated and holistic understanding of sustainability, embedding it as a frequent and visible topic in school life. Activities increased participants' awareness, encouraging the development of long-term sustainable habits and mindsets.

4. DESCRIPTION OF THE CO- MONITORING MECHANISMS.

Planification and execution monitoring appears as a critical factor to achieve a successful implementation of the interventions selected in previous steps of the ECF4CLIM project.

For this purpose, a mechanism was designed for the standardised control and monitoring of intervention execution. It was a key tool for compiling information on the intervention, providing a template that guides and standardises the activities and information compilation by the intervention work teams. The template is open and flexible, allowing it to be adapted and/or expanded as needed.

This template is designed to standardise data collection and presentation but also serves as a key tool for both continuous and ex post evaluation (WP6). This allows the creation of an integrated catalogue of the ECF4CLIM measures, their execution and impact, and also facilitates the transfer of lessons to other sites with similar needs.

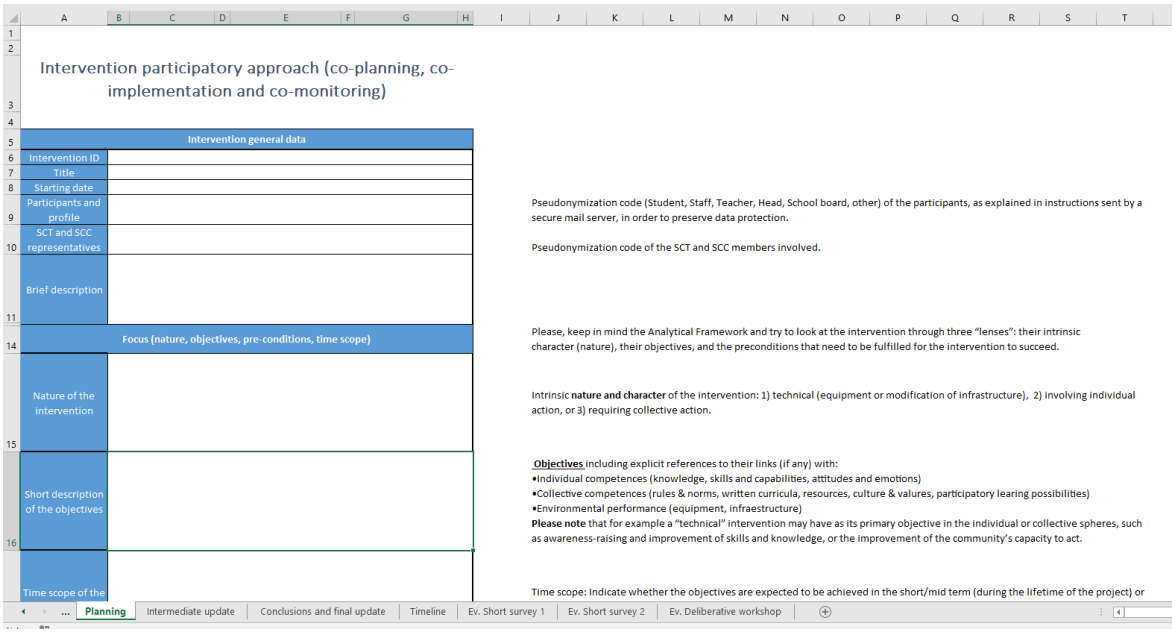


Figure 4.1.- View of the first part of the intervention template with guides on how to fill it.

This template includes, among other things, information on the tasks planned to carry out the intervention as well as the expected milestones and outputs and the results of the evaluation activities (short surveys and deliberative workshops). Before executing the intervention, the work team must complete the first part of the intervention template, which is dedicated to planning the intervention. The information included in the planning enables the establishment of an index of progress during the execution of the intervention. To this end, the partners responsible for the demonstartion sites had been regularly asked to evaluate, with the school team, the status of compliance with the tasks, milestones, and outputs of the interventions. These data were collected by the University of Seville team and incorporated into a project database.

PT-DS02: EB CAMARATE

Intervention	Intervention status Not started yet/Active/ Finished	Milestones and outputs	Milestone/ output status Done/Pending
PT-DS02-IN01: Improve the bus and bike lanes network	Discarded / Rejected – see notes at the end	Milestone 1:	
		Milestone 2:	
		Milestone 3:	
		Output 1:	
		Output 2:	
		Output 3:	
PT-DS02-IN02: Learning how to drive a bicycle	Active	Milestone 1: Agreement with the City Council	Done
		Milestone 2: Bike class calendar	Done
		Milestone 3:	-
		Output 1: Report	Pending
		Output 2: To be defined	Pending
		Output 3:	-
PT-DS02-IN03: Reactivate the school's biological garden	Active	Milestone 1: "Quinta do Charco" reactivation plan	Done
		Milestone 2: Partner involvement	Done
		Milestone 3: Final plan and approval by the City Council	Pending
		Milestone 4: Opening Session of "Quinta do Charco"	Pending
		Output 1: Report	Pending
		Output 2: Sketchs and drawings and a video	Pending
		Output 3: A new space called: "Quinta do Charco"	Pending

Figure 4.2.- View of the execution progress data that partners had been regularly invite to update.

Based on this monthly information, the project's progress data is updated in a couple of tools developed in Microsoft Azure and Microsoft Excel.

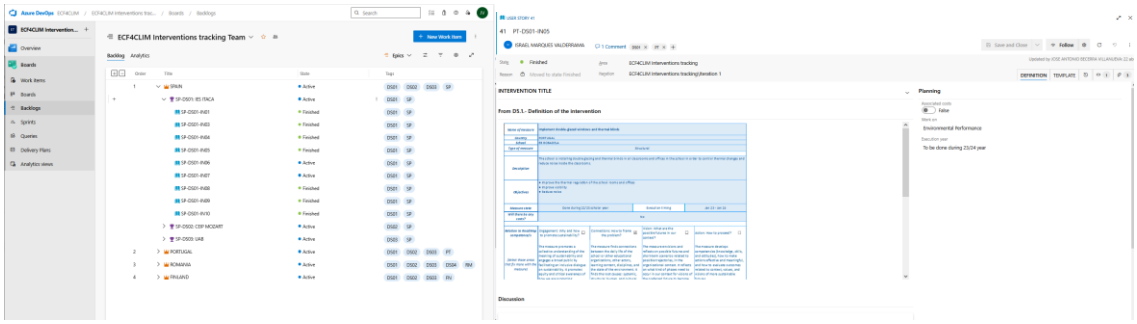


Figure 4.3.- Some screenshots from the ECF4CLIM platform developed in Microsoft AZURE.

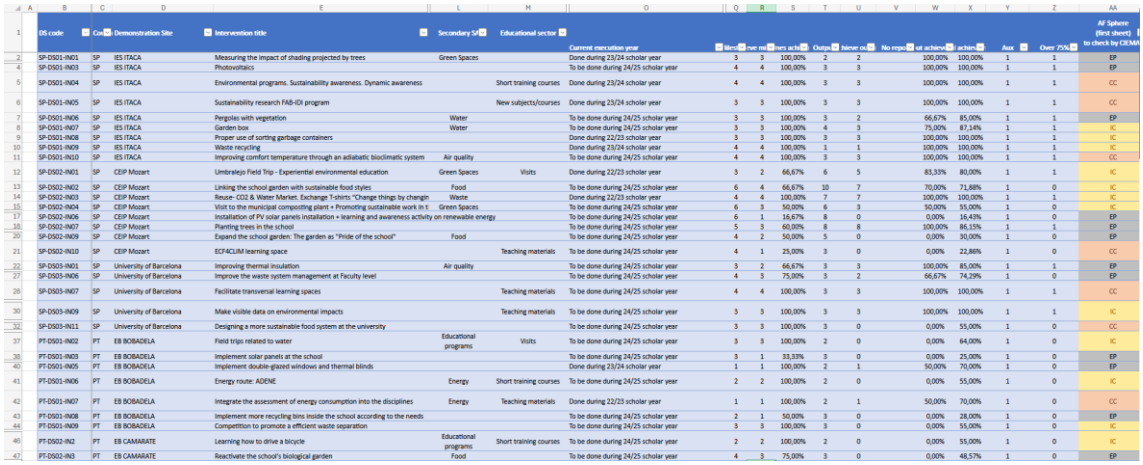


Figure 4.4.- Screenshot from the ECF4CLIM platform developed in Microsoft Excell.

The project progress analysis is available to partners involved in Work Package 5. A summary of the project implementation status is presented at each of the Work Package leaders' meetings, held every two months, as well as at the project's general assemblies.

Some of the graphs shown in the meetings are included below, such as the intervention status global overview and the overall achievement KPI.

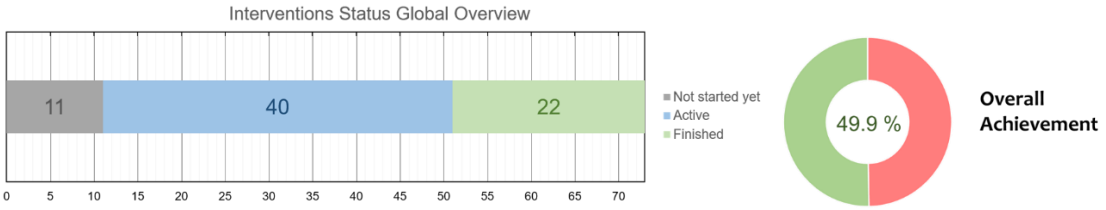


Figure 4.5.- Execution progress diagrams develop to disseminate between partners.

5. Report on Implemented Interventions in IES ITACA.

School brief description

IES Itaca is a public high school situated in Tomares County, Spain. The school has over 600 students and 50 teachers who are committed to developing sustainability-related courses and study programmes. Tomares is located to the west of Seville and is the fourth most populous town in the Aljarafe region, the largest urban agglomeration in southern Spain. The town has recently experienced significant population growth, tripling its population in the last thirty years. Thanks to its geographical location and regional development, Tomares has a good socioeconomic status.

IES Itaca has been actively engaged in sustainability initiatives for a considerable time. The school has participated in projects funded by the European Commission, such as ClimAct, and has promoted critical thinking through academic pathways via the Young Researchers program. The school's efforts demonstrate its strong commitment to promoting sustainability education in Seville and the surrounding areas.



Figure 5.1.- IES Itaca photographs.

Implemented Interventions Summary

The interventions implemented in the IES ITACA pilot centre are listed in the following table.

Measure Id	***Title***
SP-DS01-IN01	Revegetation. Measuring the impact of shading projected by trees
SP-DS01-IN03	Photovoltaics
SP-DS01-IN04	Environmental programs. Sustainability awareness. Dynamic awareness
SP-DS01-IN05	Sustainability research FAB-IDI program
SP-DS01-IN06	Pergolas with vegetation
SP-DS01-IN07	Garden box
SP-DS01-IN08	Proper use of sorting garbage containers
SP-DS01-IN09	Waste recycling
SP-DS01-IN10	Improving comfort temperature through an adiabatic bioclimatic system

Table 5.1.- Interventions in IES ITACA.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
SP-DS01-IN01	Revegetation. Measuring the impact of shading projected by trees	Energy	Green Spaces	
SP-DS01-IN03	Photovoltaics	Energy		
SP-DS01-IN04	Environmental programs. Sustainability awareness. Dynamic awareness	Educational programs		Short training courses
SP-DS01-IN05	Sustainability research FAB-IDI program	Educational programs		New subjects/courses
SP-DS01-IN06	Pergolas with vegetation	Green Spaces	Water	
SP-DS01-IN07	Garden box	Green Spaces	Water	
SP-DS01-IN08	Action plan for the proper use of sorting garbage containers	Waste		
SP-DS01-IN09	Waste recycling	Waste		
SP-DS01-IN10	Improving comfort temperature through an adiabatic bioclimatic system	Energy	Air quality	

Table 5.2.- Interventions main working areas in IES ITACA.

SP-DS01-IN01- Revegetation. Measuring the impact of shading projected by trees

General data

Description: Although initially design for measuring the impact of shading projected by trees, the intervention progress to a more general revegetation and green area topic.
The intervention included measuring the impact of the shade cast by trees on a school facade that can be an important aspect, especially in locations with a warm climate. To priorities sustainability and energy efficiency, understanding the impact of surrounding vegetation on the building's energy demand is a crucial aspect of responsible resource management.
In other hand, it included an analysis of the green areas in the schoolyard, its evolution, and a planting action where the children learnt about the benefits of plants and how to plant and care for a tree.

- **Participants and profile:** Students from different schools under a participatory and learning program

- **SCT and SCC representatives:** 2 SCT students, 2 SCT teachers

- **Focus (nature, objectives, pre-conditions, time scope)**

  - Nature of the intervention:

    Involving individual action + Requiring collective action for diagnosis, decision-making and developing the revegetation in the schoolyard

  - Short description of the objectives:

    The shade provided by trees can influence the comfort and well-being of occupants, reducing the need for cooling and saving economic resources, in turn, reducing the school's carbon footprint.

    - To understand the influence of good shade management on reducing school cooling demand.
    - Quantify the potential energy savings by minimising the need for cooling.
    - Identify the most effective trees in generating shade and their strategic location.
    - Establish guidelines for tree maintenance and pruning based on their impact on shade.
    - Create a regular reporting system for sustainable shade management on campus.

  - Time scope of the intervention:

    Medium term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collectively, fostering a culture of collaboration among students, teachers, and environmental and architectural experts is critical, ensuring informed and shared decision-making. Individually, students need to develop skills in data analysis, environmental impact measurement, and basic knowledge of trees and their role in reducing heat. Technically, the project requires access to tools for monitoring (such as temperature sensors) and scientific information about tree species best suited to local climate conditions. Additionally, support from experts in bioclimatic architecture and urban design is crucial for integrating these elements into the built environment, thereby maximising the benefits of shade and cooling.

      Understanding how these infrastructures will help promote the re-vegetation of school courtyards, thereby enhancing individual students' competencies by appreciating the impact of reducing the school's carbon footprint.

    - Main risks and uncertainties:

      The main risks and uncertainties include a lack of student engagement or improper training, which can lead to poor tree selection that may not thrive or provide adequate shade. Insufficient tools for data collection or inaccurate monitoring could also prevent measurable results. Failing to collaborate with experts in urban design or environmental science may result in poorly integrated solutions. Additionally, external factors such as budget constraints, maintenance issues, or extreme weather conditions could hinder the project's success. Without a long-term commitment from the school or community, its impact may not be sustained.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The main question that the intervention helps to address is:

How does tree shade in schoolyards affect indoor temperature and energy consumption?

By involving students in measuring the impact of increased shade on reducing indoor heat, the project aims to assess how natural shading can lower the need for air conditioning. This, in turn, is expected to lead to more efficient energy use, significant cost savings in operating the cooling systems, and a reduction in greenhouse gas emissions, directly contributing to both environmental and financial sustainability.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

People's engagement has been driven by the hands-on, student-led nature of the project, which connects learning to real-world environmental challenges. The potential to reduce energy costs and greenhouse gas emissions, along with collaboration with experts, has further sparked interest within the school community.

Have you encountered challenges in engaging people? What are they?

Challenges primarily stem from engaging people, particularly in helping students understand the long-term benefits of tree shade and its impact on reducing indoor temperatures. Ensuring consistent involvement and balancing the project with other school activities has also been a significant challenge.

How have you or could you overcome them?

These challenges are expected to be faced by integrating the project into the regular curriculum, emphasising the immediate effects of tree shade on comfort and energy savings. Hands-on workshops with experts and the use of interactive tools, such as temperature sensors, have also helped students engage with and understand the project's impact.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Relevant issues include local climate change impacts and community attitudes toward green spaces. Key actors not controlled by our organisation are local government agencies, environmental organisations, and the school community. Activities such as citywide tree planting initiatives and public awareness campaigns also influence our intervention.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with external stakeholders has involved collaborative workshops to align goals and share resources. We have partnered with the school administration for support and coordination, while researchers have provided expertise and outreach assistance. Engaging the school community has fostered ownership and broader support for the project.

What has enabled or could promote cooperation?

The teachers of the participating schools are expected to be fully committed to their roles. The predisposition and organisation of the environmental consultancy company. This type of activity is common in schools in the region, so at the planning level, the organisation of the visit is relatively simple.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The expected impact of the intervention is to promote learning about the importance of trees in urban environments and foster student responsibility for their surroundings. Additionally, it aims to enhance environmental performance by mitigating the urban heat island effect and fostering a more sustainable school environment.

How do you presume the change could happen?

Through active student engagement in planting and caring for trees, leading to increased awareness of their benefits. As students measure the effects of shade on temperature, they will develop a deeper understanding of environmental issues. This knowledge can inspire advocacy for more green initiatives within the school and community, fostering a culture of sustainability that extends beyond the project.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Engaging students in discussions about the benefits of increased shade has helped us envision the expected impact. Collaborative workshops with researchers have provided valuable insights into the long-term effects, while sharing success stories from similar projects has inspired our vision and motivated support for sustainable practices within our school environment.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Several factors have contributed to our achievement of our goals, including strong collaboration with the school administration and support from researchers who provided valuable expertise. Good relationships with the school community have fostered enthusiasm and participation, while remote sensing tools have facilitated simulation and informed decision-making. Engaging students through hands-on activities has promoted ownership of the project, and effective communication of its benefits has generated broader support.

What kind of challenges have you faced in your organisation?

Organising the sessions in the Architecture School in Sevilla, explaining the activity and obtaining permission for the students and teachers to access the centre. Search for a company to organise the visit, with dates available in accordance with the school's schedule. Additionally, maintaining consistent student engagement has been difficult, especially with competing interests and schedules. Resource constraints, including limited funding and materials, have also posed challenges in implementing the project effectively.

How have you found, or could you find time and space for the intervention in your organisation?

It is necessary to find a time when students do not have exams nearby so that they can focus on the session's development. This could be either at the beginning of the course or after the term of their exams.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1 - Introductory Session. Involvement in the school community, proposal of a research project, and organisation of the session schedule.

Description: The first task is to establish a collaborative environment between researchers and the school community, comprising both students and teachers. Defining the objectives of tree planting to increase shade and the benefits in terms of heat island impacts in schoolyards, and also receiving their feedback and intentions in order to shape the objectives of the revegetation project

Responsible: USE

External expert assistance: No

ECF4CLIM expert assistance: Researchers

Resources needed: Schoolyard diagnostic data sheets and scientific knowledge from ECF4clim researchers

Cost: 0 Euros

Task co-implementation participatory approach: All tasks were implemented by USE researchers and the school community

Task 2.- Diagnosis, multi-criteria assessment and decision-making for identifying tree areas in the schoolyard

Description: Develop a multi-criteria assessment and identify influencing criteria for decision-making. Tree species and potential revegetation areas in the schoolyard are expected to be identified, evaluating existing vegetation, shade coverage, and soil quality. Surveys and

participatory input from students, researchers, and teachers help prioritise locations that maximise shade and comfort for an effective planting strategy.

Responsible: USE and the school community

External expert assistance: Tree nursery suppliers

ECF4CLIM expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

Resources needed: Researchers from ECF4Clim, teachers and experts; remote-sensing software and information sheets on each species of tree and shrub.

Cost: 0 Euros

Task co-implementation participatory approach: Joint collaboration between all students, the school community and researchers from USE

Task 3.- Revegetation action in the schoolyard

Description: The revegetation action in the schoolyard aims to increase shade and mitigate the impact of global warming, while also enhancing environmental education. By planting trees and native plants, the initiative provides cooling relief during hot weather and mitigates the urban heat island effect. Students engage in selecting species and monitoring growth, fostering a sense of responsibility for their environment.

Responsible: USE and the school community

External expert assistance: Tree nursery suppliers and school maintenance staff

ECF4CLIM expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

Resources needed: Students themselves play a crucial role in the entire process, from the initial planting to regular upkeep, including watering, pruning, and monitoring tree health.

Cost: 2500 Euros

Task co-implementation participatory approach: Joint collaboration between all students, the school community and researchers from USE

Task 4.- Monitoring and tracking the benefits of shade in the schoolyard

Description: Aiming to follow a clear understanding of its positive impact on the environment and student well-being. Tree shade reduces playground temperatures, creating a safer, more comfortable space, especially in warmer months, and lowers UV exposure, which helps protect students' health. Additionally, shaded areas can reduce stress and improve focus, supporting both academic performance and emotional well-being. This monitoring fosters environmental awareness among students, highlighting the importance of natural surroundings in their daily lives.

Responsible: USE and the school community

External expert assistance: school maintenance staff

ECF4CLIM expert assistance: No

Resources needed: Watering, fertilising and tree care tasks carried out by maintenance staff and the students themselves.

Cost: 0 Euros

Task co-implementation participatory approach: Joint collaboration between all students involved in the revegetation plan and researchers from USE

- **Milestones**

Milestone 1: Diagnosis of the schools. Location of potential areas of tree planting in the schoolyard

Milestone 2: Exhibition of the diagnosis. Criteria for the intervention. Multi-criteria assessment with technical and social factors for decision-making and tree selection

Milestone 3: Designing and executing the tree planting intervention. Tree selection and identification of the plantation area

Milestone 4: Dissemination activities

- **Outputs:**

Output 1: Report on the diagnosis and evaluation of criteria in a schoolyard for the identification of planting areas

Output 2: Experimental tree planting activity in areas selected by both researchers and participating students from the educational community

Output 3: Communication in the Students' Congress

- **Cost (Equipment /consumables/others)**

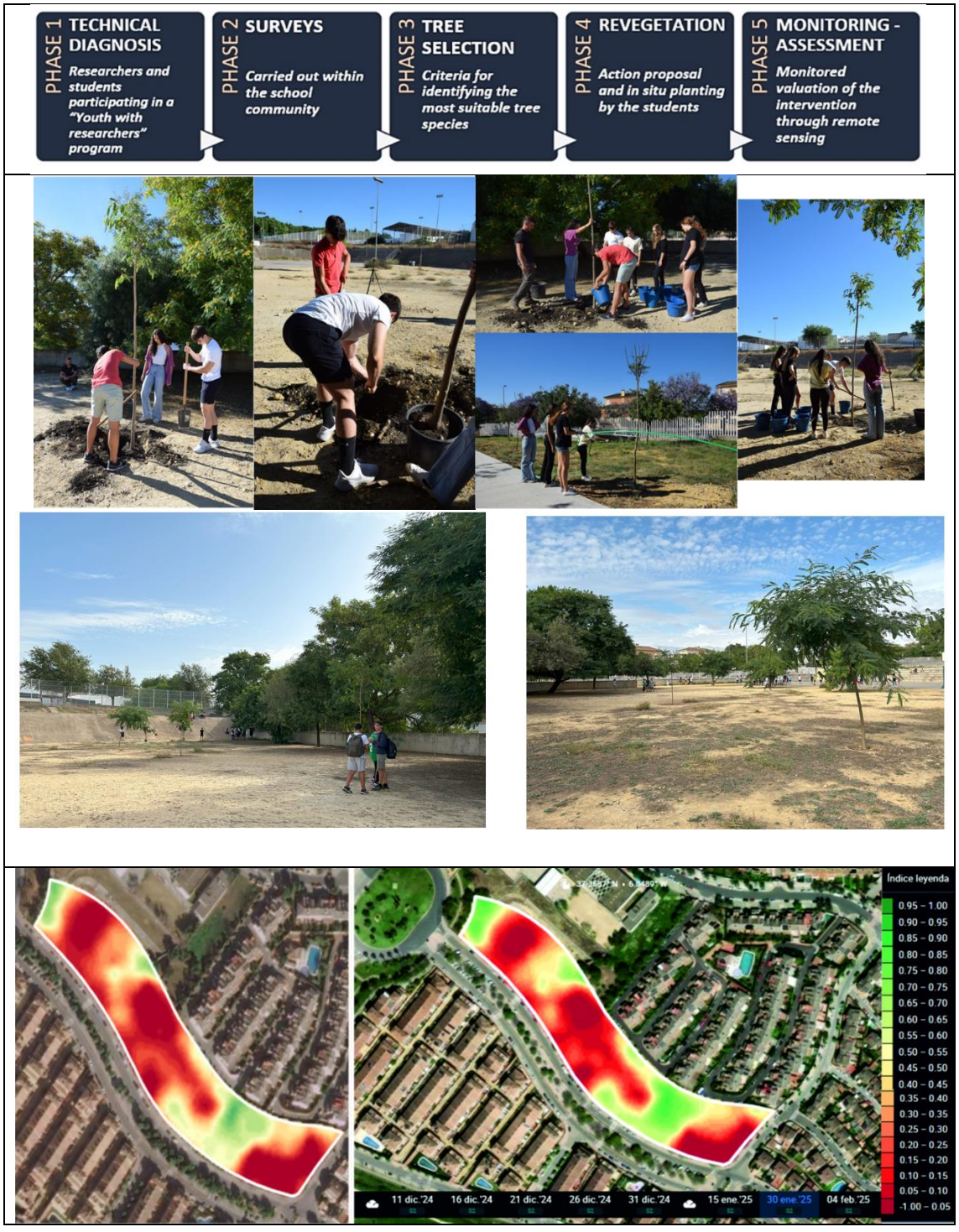
Total cost: 2500 Euros

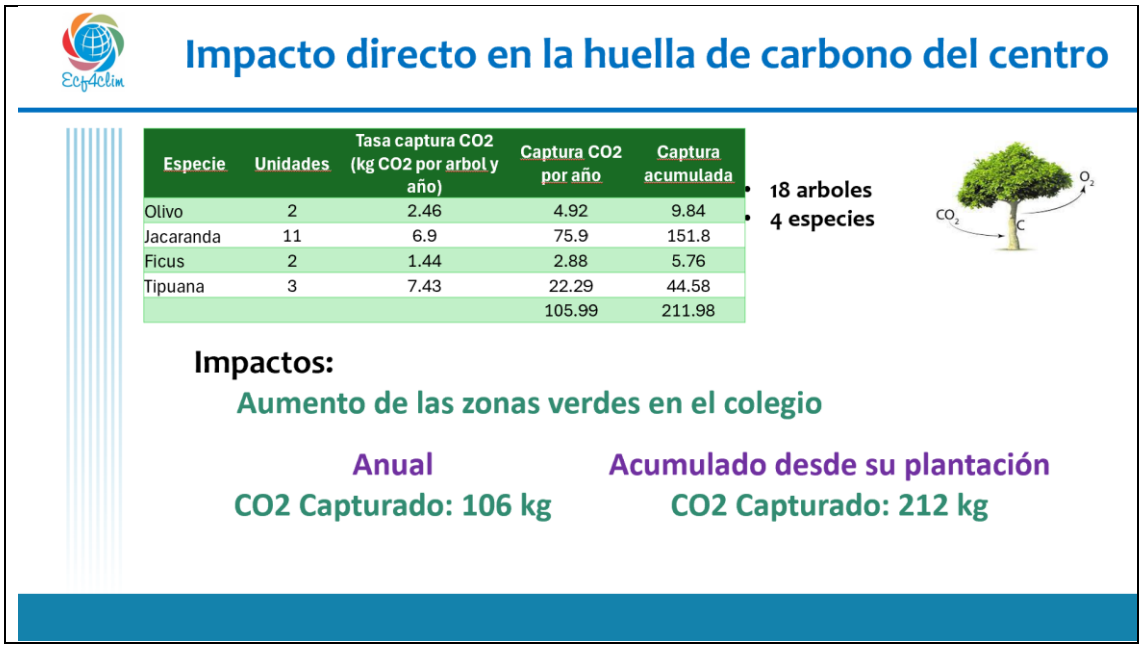
- **Intervention implementation and comonitoring strategy**

Implementation of the comonitoring approach: The implementation monitoring method involves using remote sensing technology to measure and analyse the shade coverage as the planted species grow. This approach enables the collection of data on changes in surface area shaded over time, helping to assess the effectiveness of the revegetation efforts. By integrating satellite imagery or drones, we can accurately track the growth of trees and their impact on reducing heat in the schoolyard. This method enables ongoing evaluation and adjustments to management practices, thereby ensuring the project's long-term success.

Responsible: ECF4clim Researchers - USE and students

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

Although initially design for measuring the impact of shading projected by trees, the intervention progress to a more general revegetation topic. The intervention surpassed initial expectations by significantly deepening students' understanding of the role of urban vegetation and simultaneously promoting their active engagement in the design, implementation, and maintenance of green spaces. This process not only strengthened environmental awareness across the school community but also cultivated a heightened sense of ownership and responsibility among students, while enhancing thermal comfort and contributing to a more sustainable and welcoming educational environment. Notably, the implementation sessions were held at both the Architecture School in Seville and on the school site itself, a dual-location approach that proved particularly effective. This strategy enriched the educational experience, fostered stronger collaboration, and stimulated greater enthusiasm among both students and teachers, successfully overcoming early logistical challenges related to scheduling and resource coordination.

SP-DS01-IN03.- Photovoltaics

General data

Description: The intervention aims to utilise the photovoltaic installation to enable students and the school community to acquire both individual and collective knowledge and skills related to solar energy and energy consumption within the school. At the same time, it aims to promote awareness of solar energy and its contribution to sustainability within the educational community.

- **Participants and profile:** 2 students, 1 teacher, school principal, 1 ECF4CLIM researcher
- **SCT and SCC representatives:** 1 student at SCT, teacher and director at SCC
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      The nature of the intervention primarily requires individual actions, although it necessitates the acquisition of new equipment to access the internal data of the PV installation.

    - Short description of the objectives:

      - Improving students' knowledge of solar energy technologies, and specifically Photovoltaic.
      - To provide tools to envision the sustainability impact of the PV system on the carbon footprint and reduction of energy cost for the school.
      - Raise students' awareness of sustainable energy production
      - Train staff and students in the monitoring of the solar PV installation at the institute.
      - Disseminate the sustainability impact of the PV solar system among the educational community.

    - Time scope of the intervention:

      Mid and long term

- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Individual competences:
      - Students (and teachers) acquire knowledge about photovoltaic technology systems

- Teachers acquire skills to use ECF4CLIM tools as pedagogical materials and to envision a sustainable future.
- Teachers and other staff acquire skills to monitor the production of PV panels.

Environmental/technical competences:
- Students and teachers should be able to monitor the internal data of the PV plant through new hardware that needs to be selected and purchased.

- Main risks and uncertainties:

The main risks of global failure
- Student and teacher engagement
- Negative attitudes of students, teachers and the school community towards sustainability

Main risks leading to partial failure
- Lack of time for the working group.
- Technical difficulties in accessing the operating and production parameters of the PV system.
- Lack of installation documentation
- Unavailability of the ECF4CLIM IoT platform
- Unavailability of the ECF4CLIM sustainability intervention tool

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

In the medium and long term, we aim to enhance the individual competencies of students and teachers. However, at the same time, we want to change the condition (environmental performance) by giving students and teachers access to data on the production of the PV system and the energy consumption in the building, in order to establish sustainable habits that reduce energy consumption.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

A new photovoltaic system was installed in the school last year, but little documentation was provided. Students, teachers and support staff need "more information" about the equipment that appears on the school roof. At the same time, if teachers and support staff have access to energy generation data from the system, along with a breakdown of energy consumption, they could realise the impact of the system on the building's energy cost.

Have you encountered challenges in engaging people? What are they?

In this initial phase, we see a high level of commitment from teachers and other school staff.

In the case of the students, it is difficult to assess their commitment until the intervention starts.

How have you or could you overcome them?

For students, training tasks are designed to increase student engagement within working groups. At the same time, dissemination activities are designed to reach the entire school community.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The regional government is the financier of the facility.

The regional authority was responsible for the construction of the facility.

An external company provides maintenance services on an annual basis, but these services should be financed from the school's budget.

How has the cooperation worked with other stakeholders and actors outside your organisation?

None of the external actors is expected to be involved in the implementation of the intervention.

What has enabled or could promote cooperation?

Perhaps the dissemination materials produced during the intervention could be reused by the regional agency in charge of the construction.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The recently installed equipment is, in itself, an improvement in environmental performance. However, to increase its impact in terms of individual skills, it is recommended that students and teachers be given access to production data. In parallel, intervention provides an opportunity to promote STEM learning.

How do you presume the change could happen?

The motivation of teachers and staff to reduce energy consumption in the school should be increased by tracking real energy and cost savings for the school.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Tools to assess progress in school sustainability, carbon footprint and energy cost reduction should be essential in this regard.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The commitment of teachers and school principals should be crucial to achieving the goals.

What kind of challenges have you faced in your organisation?

We believe that teachers' and students' lack of time should be a significant barrier to achieving the aims of the intervention.

How have you found, or could you find time and space for the intervention in your organisation?

We hope to capitalise on the new teaching subject of sustainability research, which was introduced last academic year as part of the FAB-IDI intervention.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1. Photovoltaic system documentation analysis

Description: Literature and documentation search about the photovoltaic system recently installed in the school.

Responsible: The training for monitoring solar PV installations aims to empower the educational community to understand and maximise the potential of solar energy. By establishing an effective monitoring system, it is expected that the school will be able to assess the performance of the installation and take proactive measures to optimise its energy efficiency. This will not only reduce electricity costs but also reduce reliance on non-renewable energy sources and reduce the school's carbon footprint.

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: The Principal is responsible for finding the system's official documentation.

The researcher is responsible for finding additional information about the system and analysing all the documentation.

Task 2.- Training on photovoltaic systems

Description: A lecture on photovoltaic systems should be prepared and taught to students in the intervention working group.

Tools to evaluate the carbon footprint and reduction in energy consumption from the net should be assessed.

Responsible: ECF4CLIM researcher

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: The co-implementation strategy involves enrolling the environmental delegate from each class in this training, who will be responsible for disseminating the content to their classmates.

Task 3.- Design, testing and commissioning of a system to access PV system operation data

Description: A system to access operational data of the PV facility should be designed, tested, and commissioned to allow teachers and students to monitor energy production from the PV system.

Responsible: ECF4CLIM researcher and school principal

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed: A USB dongle to connect to the inverter should be acquired

A PV system technician may be necessary

Cost: 88,1 Euros

Task co-implementation participatory approach: The members of the working group will be involved in selecting the appropriate hardware and will support researchers in designing and testing the system.

Task 4.- Dissemination

Description: Design and execute a dissemination campaign to spread the benefits of the new facility within the school community.

Responsible: Teacher

External expert assistance: no

ECF4CLIM expert assistance: no

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Material for use in the dissemination campaign will be prepared by students in the working groups with the assistance of researchers

- **Milestones**

  Milestone 1: Documentation available to researchers

  Milestone 2: Hardware received

  Milestone 3: System to monitor PV energy production running

  Milestone 4: Dissemination materials prepared, and campaign launched

- **Outputs:**

  Output 1: Summary sheet

  Output 2: System to monitor PV energy production

  Output 3: Dissemination materials

- **Cost (Equipment /consumables /others)**

  Total cost: 88,1 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Comonitoring will be assessed through periodic meetings with the school principal

  Responsible: School principal

- **Photographs of the intervention implementation**







- **Troubles during implementation, conclusion and lessons learnt.**

As part of the dissemination strategy, existing digital signage equipment—specifically a television screen located in the main hall—was adapted to display real-time data on the electricity produced by the photovoltaic (PV) system. This integration introduced a third dimension to the intervention: public visibility and awareness-raising through dynamic content. While most of the intervention's objectives were successfully achieved, dissemination faced notable challenges due to persistent technical issues that prevented the screen from functioning continuously.

From a collective competence perspective, the intervention contributed to curriculum enhancement by introducing technical knowledge on solar energy through research projects that involved calculating the impact of the PV system on the school's carbon footprint. It also fostered positive attitudes toward sustainability among students, teachers, and the broader school community—undoubtedly one of the most crucial preconditions for the initiative's success.

Nevertheless, several risks materialised during implementation. The absence of installation documentation significantly delayed the timeline, and technical difficulties—such as a malfunctioning TV remote control—hindered the use of the display screen as an effective dissemination tool. Despite these setbacks, the initiative offered a valuable opportunity to educate students on renewable energy systems, their operation, and their role in the transition to a low-carbon economy.

Due to time constraints and the academic schedule, only a limited number of students—primarily those involved in the "Young with Researchers" programme—were able to participate directly throughout the implementation phase. The dissemination of knowledge to the broader student body relied heavily on environmental coordinators; however, reaching all students proved to be challenging. To expand the intervention's impact, the strategy focused on using the hallway screen for public visibility, aiming not only to engage students but also to involve families and local community members.

The positive impact of the PV installation on the school's energy consumption and electricity bills has sparked interest among some students in adopting similar technologies at home, demonstrating the initiative's broader influence. However, sustaining the initial momentum proved challenging, particularly toward the final stages of implementation, as both teacher and

student engagement began to wane. Limited availability of time remained a significant barrier throughout the process.

To address these challenges, the project leveraged two key educational initiatives: the newly introduced "Sustainability Research" subject and continued collaboration through the "Young with Researchers" programme, both of which provided additional time and resources for student engagement.

Delays in receiving the PV system documentation—over six months—also impeded the planned schedule. Not all environmental coordinators could participate actively, and the students most involved were typically older, with the capacity to grasp the more technical and scientific aspects of the intervention.

Although the school now has access to operational data from the PV system, issues persist with the digital signage screen, limiting its use as a dissemination tool for the wider educational community. Nonetheless, students in the working groups, supported by researchers, prepared various dissemination materials using digital signage systems. Most of the communication activities were ultimately conducted through the “Young with Researchers” programme, providing a platform to share the outcomes and knowledge gained with other schools.

In conclusion, the intervention successfully produced a range of educational and dissemination materials, helping to embed sustainability competences while also highlighting areas for future improvement in visibility and outreach.

SP-DS01-IN04.- Participation in environmental training programmes. Sustainability awareness. Dynamic awareness

General data

Description: To provide training in a natural environment with the aim of improving students' knowledge of climate change and environmental issues, in particular to understand and provide tools to combat drought in the area.

- **Participants and profile:** 2Yj1%, 2Yp2%, 2Yj3#, 2Yi4#, 2Yi5%, 2Yi6%, 2Yi7%, 2Yi8#, 2Yi9%, 2Yi10%, 2Yi11%, 2Yi12#, 2Yi13#, 2Yi14#, 2Yi15%, 2Yi16%, 2Yi17%, 2Yi18%, 2Yj19#, 2Ya20%, 2Ya21#

- **SCT and SCC representatives:** 2Yj1%, 2Yp2%, 2Yj3#, 2Yi11%, 2Yi12#, 2Yi13#

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      2) involving individual action

    - Short description of the objectives:

      Awareness of the effects of excessive water use on the climate.
      Awareness of the impact of inadequate water consumption on the environment at the local level.
      Development of individual competences through the treatment of contents related to climate change (natural phenomena, causes, consequences, actions), from the point of view of water.

    - Time scope of the intervention:

      Short term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      This intervention requires the development of knowledge and skills (problem solving, communication of solutions at school, etc.). It also requires an attitude of attention and maximum involvement on the part of the students who participate, so that they are able to transfer the knowledge acquired in this training to the rest of their classmates.

    - Main risks and uncertainties:

Problems arise for trainees who need to invest 2 days during the course to complete the training.

Lack of communication between the participants and the rest of the class

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can schools raise awareness about using water more responsibly?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Conducting the training in a place surrounded by nature. The group of participants has a greater interest in being part of the intervention by visiting a farm school.

Have you encountered challenges in engaging people? What are they?

The chosen group of students included participants from all educational levels of the secondary school, that is, students aged 12 to 17 years. For the older students, it was initially difficult for them to get involved in the intervention because they focused their efforts on preparing for their university entrance exams and considered this activity to be a distraction.

How have you or could you overcome them?

The participating students are environmental coordinators (outcome from SP-DS01-IN08). These students show a greater predisposition to participate in these types of activities.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The team organises the training and contacts a farm school with overnight accommodation.

How has the cooperation worked with other stakeholders and actors outside your organisation?

It was challenging to find a suitable location for the training, given that in Andalusia, it is relatively usual for schools to visit such places, especially with younger students.

On the other hand, communicating with monitors to design the training theme has been challenging to follow, also due to the high demand for this kind of service in the region.

What has enabled or could promote cooperation?

Initiating contact with these entities between May and June, seeking to plan the activity before the start of the academic year, which is when schools begin to demand this type of activity.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

By generating awareness of sustainability and improving knowledge about the environmental impact of water use at all educational levels within the school, we promote interaction and participation among students of different ages.

How do you presume the change could happen?

Through the implementation of the awareness campaign that is intended to be developed at the end of the training, as well as the possible implementation of the interventions that the students may propose.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Maintaining awareness campaigns over time.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Motivate students of different ages. Find trainers who can engage all students. Find a natural space that serves as an attraction to carry out this activity, as well as to introduce students to the subject more quickly.

What kind of challenges have you faced in your organisation?

Selection of participating students: The group of students participating in this activity is limited to a maximum of 20 people, as it is intended that they will spend one night at the training site.

Choosing students from the same class would exclude students from the same class from participating in the activity, so it was decided to select students of different ages.

Finding a space for the training. It was challenging to find feasible dates for the school.

How have you found, or could you find time and space for the intervention in your organisation?

It was initially planned to implement this after the first evaluation exams. In this way, it is easier to count on the availability and motivation of the students, as these are dates on which they do not have to focus on their work.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Localisation of the formation team

Description: Identification of the team of environmental trainers and agreement related to the subject matter of the training. Contacts and preparation of materials.

Responsible: 2Yj1% in coordination with ECF4CLIM assistance

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: School staff and ECF4CLIM researchers

Cost: 1787,5 Euros

Task co-implementation participatory approach: Search and recruitment of environmental trainers.

Task 2.- Search for a farm school for training.

Description: The Location of a place in nature that is able to carry out the training.

Responsible: 2Yj1% in coordination with ECF4CLIM assistance

External expert assistance: No

ECF4CLIM expert assistance: Researchers

Resources needed: Money to close the reservation of the site, and to contract the displacement.

Cost: 990 Euros

Task co-implementation participatory approach: Subcontracting

Task 3. Determining the subject matter

Description: Session with students involved in the project determines the most suitable topic to be covered in the training.

Responsible: 2Yj1%, 2Yp2% in coordination with ECF4CLIM research team

External expert assistance: No

ECF4CLIM expert assistance: 2 researchers

Resources needed: A classroom to discuss the training topic. Graphical media.

Cost: 750 Euros

Task co-implementation participatory approach: All parties involved

Task 4.- Implementation of the training

Description: A 2-day training session where students will develop the necessary knowledge to analyse the possibility of implementing new interventions and the creation of awareness campaigns.

Responsible: School representatives 2Yj1% and 2Yp2%

External expert assistance: Yes, Argos training staff

ECF4CLIM expert assistance: No

Resources needed: 1 bus, accommodation, training staff

Cost: 1400 Euros

Task co-implementation participatory approach: All involved parties, with more active training staff participation

- **Milestones**

  Milestone 1: Localisation of training staff and place

  Milestone 2: Students' selection

  Milestone 3: Determination of the main training topic issue

  Milestone 4: Achievement of training

- **Outputs:**

  Output 1: Summary sheet

Output 2: Dissemination materials

Output 3: Development of sustainable skills (individual competences)

- **Cost (Equipment /consumables /others)**

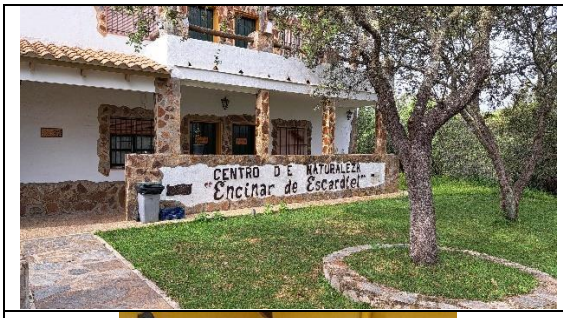
  Total cost: 4927,5 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: At the end of the intervention, the Argos trainers will conduct a short survey and deliberative workshops with the participants in the intervention, supervised by an ECF4CLIM researcher.

  Responsible: USE research team

- **Photographs of the intervention implementation**











- **Troubles during implementation, conclusion and lessons learnt.**

During the course of the intervention, new objectives emerged, including the development and proposal of additional measures aimed at enhancing sustainability within the school. These objectives were rooted in promoting a sustainable culture and were implemented through participatory learning activities involving a diverse group of students from various age groups.

This expanded focus led to the identification of new critical success factors. A key challenge identified was the difficulty in maintaining students' attention and engagement across a heterogeneous group, where varying levels of maturity and interests made it difficult to ensure that the content was equally relevant and accessible to all participants.

To address this, the intervention was strategically scheduled to take place after the completion of the second term's examinations. This period, characterised by a reduced academic workload, was selected to increase the availability and willingness of older students to participate meaningfully in the activities.

Originally planned for November, the intervention was ultimately conducted in March due to the high demand for similar training experiences at local educational venues, which limited earlier availability.

Additionally, a new and final task was incorporated during the intervention: the design of further sustainability measures and the preparation of related dissemination materials. Following an assessment of the school's performance in various sustainability areas, three new interventions were collaboratively designed by three working groups comprising students, teachers, ECF4CLIM researchers, and training staff. On the second day of the training, students developed dissemination materials to share their acquired knowledge and proposed actions with the broader school community upon their return, thereby reinforcing peer learning and multiplying the intervention's impact.

SP-DS01-IN06.- Pergolas with vegetation

General data

Description: Introducing pergolas with vegetation is a multifaceted measure that encompasses shading systems, bioclimatic study, and support for various activities. The careful integration of shading systems within the pergolas can provide a shaded space in the courtyard and can contribute to reducing indoor temperatures, depending on the pergolas' location. Simultaneously, the bioclimatic study associated with these structures examines the relationship between their location and energy efficiency. Beyond their climatic advantages, these pergolas can provide versatile spaces for various activities, thereby enhancing the overall functionality of the school grounds.

- **Participants and profile:** Students from different schools under a participatory and learning program

- **SCT and SCC representatives:** 2 SCT students, 2 SCT teachers

- **Focus (nature, objectives, pre-conditions, time scope)**

  - Nature of the intervention:

    Involving individual action + Requiring collective action for diagnosis, decision-making and developing the revegetation in the schoolyard

  - Short description of the objectives:

    - Improve the comfort by providing shade in the school playground and reducing temperatures in the areas near the pergolas.
    - Promote energy efficiency and sustainability in the design of educational spaces through the bioclimatic study of the location and configuration of the pergolas.
    - To offer versatile spaces that allow for a variety of activities, promoting the active participation of students and staff in outdoor activities.
    - Integrate nature into the school environment through the vegetation on the pergolas, which contributes to the biodiversity and aesthetics of the campus.
    - Facilitate the use of pergolas as spaces for outdoor educational activities, promoting an outdoor learning approach.
    - Create a regular reporting system for sustainable shade management on campus.

  - Time scope of the intervention:

    Medium term

- **Success factors: the critical preconditions for a successful intervention**

- Individual, collective and technical/material competences:

  Collectively, it is essential to foster a culture of collaboration among students, teachers, and experts, ensuring an intervention that considers all perspectives. Individually, students develop skills in analysing and diagnosing outdoor spaces, identifying trees, and designing landscapes.
  Technically, this intervention requires access to measurement tools, photography, drawings, and scientific information about the plant species that best adapt to climatic conditions for pergolas.

- Main risks and uncertainties:

  Lack of student participation or little commitment.
  In the project, a poor decision was made regarding the location of the pergola or the selection of design and plant species.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The main question that the intervention helps to address is:

How can a plant pergola enhance comfort and promote sustainability in the design of educational spaces?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The school's environmental coordinators felt motivated to visit the University to carry out the activity within the framework of the project. They perceived this activity as a reward for their commitment and work.

Have you encountered challenges in engaging people? What are they?

At first, the students were not very interested, as it was an unfamiliar activity, concepts, and unknown resources.

How have you or could you overcome them?

We have addressed these challenges by emphasising the benefits that a plant pergola would bring to the outdoor spaces of schools.

The use of plant species guides and mobile applications has also helped students participate in and understand the project's impact.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The implementation of the pergola in schools is beyond our control due to regulatory, security, and maintenance issues.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with agents outside our organisation has worked correctly.

What has enabled or could promote cooperation?

Environmental activities are relatively common in schools in our region.

Dissemination of the research project to all agents involved in environmental training could be very useful.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The expected impact of the intervention is to promote learning. Additionally, it aims to create a more sustainable school environment.

How do you presume the change could happen?

Involving students in monitoring and maintaining the school and the trees. Incorporating project activities into the subjects.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The students' excitement and enthusiasm. The commitment of school teachers and organisers.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The involvement and motivation of the students.

The dedication of the teachers and researchers of the project.

Being able to apply the project to students and see the results firsthand is a valuable experience.

What kind of challenges have you faced in your organisation?

Explain the activity to the students and review the work tasks of the sessions. Provide information so that they can develop the activity, planimetry and bibliography.

How have you found, or could you find time and space for the intervention in your organisation?

It is essential to schedule work sessions when students are not required to study for their exams or prepare assignments for their classes.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Training in the design of vegetal pergolas and choosing the most suitable species

Description: Three training sessions have been held on international policy analysis, sunlight, energy efficiency, shading devices such as pergolas, temperature reduction, pergola design, and the most suitable plant species, among other topics.

Responsible: USE

External expert assistance: No

ECF4CLIM expert assistance: Researchers

Resources needed: guides, regulations, examples, computer programs for drawing, and applications for identifying plant species.

Cost: 0 Euros

Task co-implementation participatory approach: All tasks were implemented by USE researchers and the school community

Task 2.- Diagnosis of the outdoor space and vegetation and determination of the location of the pergola. Proposal of plant species.

Description: A diagnosis of the school's outdoor space has been conducted, considering existing trees, orientation, sunlight, shadows cast by buildings and trees, prevailing winds, temperature, use, and activities, to determine the most suitable site for the school's pergola.

A proposal has been made for the most suitable species, taking into account climate, irrigation needs, and other factors.

Responsible: USE and the school community

External expert assistance: NO

ECF4CLIM expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

Resources needed: The software used was available in schools and USE, as well as a bibliography, an app for tree identification, cadastre web pages, and Google Maps. Schoolyard diagnostic data sheets and scientific knowledge from ECF4clim researchers were also utilised.

Cost: 0 Euros

Task co-implementation participatory approach: Joint collaboration between all students, the school community and researchers from USE

Task 3: Design of the pergola based on the previous tasks.

Description: Pergola design considering species and material, dimensions, execution and maintenance.

Responsible: USE and the school community

External expert assistance: NO

ECF4CLIM expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

Resources needed: Materials guides, manufacturers catalogues, tree guides, drawing programs.

Cost: 0 Euros

Task co-implementation participatory approach: Joint collaboration between all students, the school community and researchers from USE

Task 4.- Construction of the prototype.

Description: Construction and installation at the location of task 2. Construction of the pergola with materials selected based on the design. The location in the outside space of the school will be of special importance to guarantee a shaded space.

Responsible: USE and the school community

External expert assistance: Yes. Pergola assembly company.

ECF4CLIM expert assistance: No

Resources needed: Steel beams for assembly and awning material

Cost: 5.733 Euros

Task co-implementation participatory approach: Joint collaboration between all students and researchers from USE

- **Milestones**

  Milestone 1: School diagnosis sheets

  Milestone 2: Selection of material and species

  Milestone 3: Drawing or model of the pergola prototype

  Milestone 4: Pergola construction finished

- **Outputs:**

  Output 1: Manual of suitable species for pergolas

  Output 2: Plant pergola design with geometry, materials, and dimensions

  Output 3: Pergola

- **Cost (Equipment /consumables /others)**

  Total cost: 5.733 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Meetings with the school director to verify the location of the pergola.

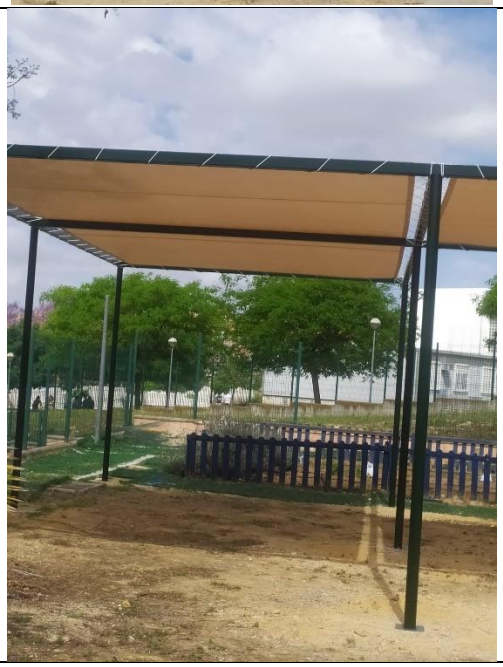
  Meetings with those responsible for school maintenance to verify the watering of the pergola species.

  Responsible: ECF4clim Researchers - USE and students

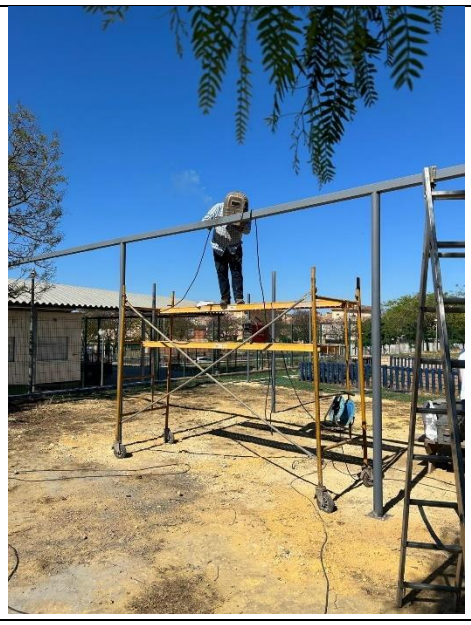
- **Photographs of the intervention implementation**













- **Troubles during implementation, conclusion and lessons learnt.**

The intervention underwent a strategic adjustment in its original roadmap, ultimately surpassing expectations by significantly enhancing students' understanding of the ecological value of urban trees. Moreover, it successfully promoted their active involvement in planning, creating, and maintaining green spaces. This participatory process not only deepened environmental awareness but also instilled a stronger sense of ownership among students, contributing to improved thermal comfort and a more sustainable, engaging, and welcoming school environment.

In terms of implementation, one of the key challenges encountered is related to scheduling and coordination. However, the decision to conduct the sessions across two locations—the Architecture School in Seville and the school itself—proved highly beneficial. This dual-location format fostered greater engagement, with students and teachers demonstrating increased motivation and commitment to the project. The blend of academic and practical settings enriched the learning experience, amplifying the overall impact of the intervention.

To accommodate the expanded scope and ensure the quality of implementation, a modest budget increase was required, bringing the total expenditure to €5,733. This additional investment supported the enhanced participation activities and logistical requirements associated with the dual-site strategy.

SP-DS01-IN07.- Training on Garden Box

General data

Description: The Activity objective is to design a Garden Box, a vegetable garden in the school courtyard.

This activity began in the 2023-24 academic year. It is considered an activity of interest to students that can lead to the development of individual competences (in the acquisition of skills, awareness, and attitudes) as well as collective competences, through a participatory learning process, and the development of a culture that advocates for the development and maintenance of green spaces.

- **Participants and profiles:** 6 students, 2 teachers, 3 researchers, and 1 expert.
- **SCT and SCC representatives:** None.
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      2) involving individual action + Requiring collective action
    - Short description of the objectives:

      Design a vegetable garden in the exterior area of the school.
      Provide students with practical learning opportunities in the care and development of green spaces.
      Promote education in ecological and sustainable agriculture among students, as well as its influence on the agricultural environment and ecosystems.
      Enhance the school environment's aesthetics and contribute to local biodiversity by establishing a green space.
      Transmit concepts of the supply of local and seasonal products.
    - Time scope of the intervention:

      Short term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Acquisition of individual competences and awareness of the students through the activity. Understanding the positive impact on biodiversity and the community will help students become involved in ecological and sustainable agriculture and gardening.

Understanding how these infrastructures will help promote the re-vegetation of school courtyards and gaining individual students' competencies by appreciating the impact of reducing the school's carbon footprint.

- Main risks and uncertainties:

The critical factors in the following categories are: 1. Individual competences: the lack of knowledge about the impact of the loss of biodiversity.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Raise awareness among the educational community about the importance of respecting the environment, visualising the environmental impact generated by the loss of biodiversity and the consumption of toxic substances in non-ecologically produced vegetables.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The environmental coordinators were motivated to leave the school for the activity. They perceived this activity as a reward for their work in the classroom.

Have you encountered challenges in engaging people? What are they?

Initially, some students found the activity uninteresting.

How have you or could you overcome them?

Researchers had to highlight the main negative impacts of not having a Garden Box at school. It was commented that the activity was part of their environmental competences training and that it would help them understand the relevance of future interventions in the community.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The organisation of the visit, the schedule of the sessions and the final production of the documents for the Congress.

How has the cooperation worked with other stakeholders and actors outside your organisation?

The cooperation worked with no incidents.

What has enabled or could promote cooperation?

The teachers were fully committed.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

It is expected to raise awareness of the group, as well as the school's commitment to the renaturalization of the plot.

How do you presume the change could happen?

If the results of the intervention are included in different subjects in the curricula.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Cooperation with teachers and the commitment of the students. Constructing the garden box this academic year.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The coordination with other activities regarding the revegetation of the school.

What kind of challenges have you faced in your organisation?

Organising the sessions in the Architecture School in Sevilla, explaining the activity and obtaining permission for the students and teachers to access the centre.

How have you found, or could you find time and space for the intervention in your organisation?

It is necessary to find a time when students do not have exams nearby so that they can focus on the session's development. This could be either at the beginning of the course or after the term of their exams.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1 - Environmental education activity about the Garden Box. Coordination with teachers to design the research proposal and organisation of the session schedule.

Description: Activity that fosters the involvement of school students in research projects. The preparatory task described here was carried out during the 2023/2024 academic year. The garden execution was due in mid-June 2025

Responsible: USE

External expert assistance: None.

ECF4CLIM expert assistance: Researchers

Resources needed: The researchers of ECF4CLIM were the staff. The software used was available in schools and USE, and the apps were available for free access**.**

Cost: 0 Euros

Task co-implementation participatory approach: All tasks were implemented by USE staff.

Task 2.- Training session

Description: Training in revegetation and renaturalization to restore the biodiversity of the school yard.

Responsible: USE

External expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

ECF4CLIM expert assistance: Angela Barrios Padura

Resources needed: Researchers, teachers, and experts; office software, app development; personal computers and electronic tablets.

Cost: 0 Euros

Task co-implementation participatory approach: Joint collaboration between USE and the School.

Task 3.- Diagnosis of the school courtyard

Description: Students analysed the school courtyard, geometry, solar path, and type of soil.

Responsible: USE

External expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

ECF4CLIM expert assistance: Angela Barrios Padura

Resources needed: Solar Path App

Cost: 0 Euros

Task co-implementation participatory approach: Joint collaboration between USE and the School.

Task 4.- Selection of plants regarding the seasons

Description: Research about the type of plants, suitability according to seasons and maintenance works.

Responsible: USE

External expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

ECF4CLIM expert assistance: Angela Barrios Padura

Resources needed: Personal computer, literature.

Cost: 0 Euros

Task co-implementation participatory approach: Joint collaboration between USE and the School.

Task 5.- Design of the Garden Box and planting

Description: Development of graphic material (sketches and pictures) and texts (Report) that define the Garden Box. Construction and planting.

Responsible: USE

External expert assistance: Rosa Ana Jiménez Expósito, Architect, collaborator

ECF4CLIM expert assistance: Angela Barrios Padura

Resources needed: Personal Computer, Plants, Garden Tools

Cost: 968 Euros

Task co-implementation participatory approach: Joint collaboration between USE and the School.

- **Milestones**

  Milestone 1: Reception of the report of the diagnosis

Milestone 2: Reception of the report of the Design

Milestone 3: Construction and planting the Garden Box

- **Outputs:**

  Output 1: Report on the Diagnosis

  Output 2: Report on the design of the Garden Box

  Output 3: Poster and Slides to show the results

- **Cost (Equipment /consumables /others)**

  Total cost: 968 Euros

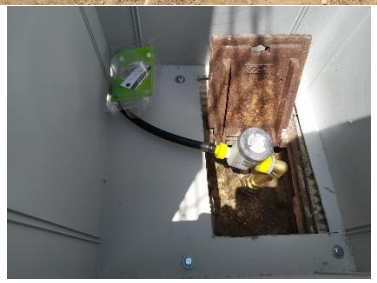
- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Review of the material produced at the beginning of the sessions

  Responsible: Angela Barrios Padura

- **Photographs of the intervention implementation**















- **Troubles during implementation, conclusion and lessons learnt.**

During the implementation phase, the selection of appropriate crops focused on summer vegetables, ensuring alignment with the seasonal conditions and the educational objectives of the activity. The intervention was supported by the gardening company Caura Jardín, under

the guidance of expert José Joaquín González Márquez, who provided the necessary plants, garden tools, and irrigation materials.

While teachers from the high school played a supervisory and organisational role, the students were the central actors throughout the process, taking primary responsibility for the practical implementation. This student-led approach not only reinforced individual competencies in ecological gardening but also fostered a sense of ownership and engagement.

The total cost of establishing the garden amounted to €968, covering all required materials and services. The experience highlighted the importance of structured coordination, external expert collaboration, and hands-on learning to ensure the success and sustainability of such interventions.

SP-DS01-IN08.- Action plan for the proper use of waste bins in the school.

General data

Description: Raising awareness of selective waste collection, especially in the school playground and classroom, encouraging the proper use of litter bins and the separation of waste.

- **Participants and profile:** 2 persons per classroom in IES ITACA: 2Yj1%, 2Yp2%, 2Yj3#, 2Yi4#, 2Yi5%, 2Yi6%, 2Yi7%, 2Yi8#, 2Yi9%, 2Yi10%, 2Yi11%, 2Yi12#, 2Yi13#, 2Yi14#, 2Yi15%, 2Yi16%, 2Yi17%, 2Yi18%, 2Yj19%, 2Ya20%, 2Ya21%, 2Yi22#, 2Yi23%, 2Yi24%, 2Yi25#, 2Yi26%,

- **SCT and SCC representatives:** Students and teachers: 2Yj1%, 2Yp2%, 2Yj3#, 2Yi11%, 2Yi12#, 2Yi13#

- **Focus (nature, objectives, pre-conditions, time scope)**

  - Nature of the intervention:

    Requiring collective action

  - Short description of the objectives:

    · Raise students' awareness of the importance of selective waste collection.
    · Promote the proper use of litter bins in the school playground.
    · Reduce the amount of non-recyclable waste sent to landfills.
    · To educate students about the correct separation of different types of waste and its impact on the environment.

  - Time scope of the intervention:

    Short/mid temp

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

    · Students' awareness of sustainability and recycling of waste generated at school and in classrooms. Sustainability coordinators are trained among students to raise awareness among their peers. The coordinator at the school will monitor the measures that have been developed.
    · Raising students' awareness of sustainability and recycling of waste generated at the school and in the classroom.

  - Main risks and uncertainties:

· Students' engagement. This intervention must involve students of all ages to be effective.
· Lack of motivation among environmental coordinators. The duration of this intervention spans the entire academic year, so classroom coordinators may become tired at certain stages of the year, neglecting their responsibilities.
· The neglect of the functions by the head of the Sustainable Development Department.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

· Organising visits like SP-DS01-IN09 intervention at the beginning of the academic year to engage students.

· Considering an appropriate award to the best class in waste management throughout the year.

Have you encountered challenges in engaging people? What are they?

· In some classrooms of the lowest educational levels (11-12 years), there seems to be a big disparity between engaged students and students who do not want to participate in this waste management intervention.

· In higher levels, students may argue they lack the time to worry about these issues.

How have you or could you overcome them?

· The best incentive found to engage students was to propose an excursion to the best class throughout the whole academic year.

· Also, to engage the classrooms' coordinators, the proposal is to make them participate in all environmental interventions, excursions or local actions. Apart from that, to

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The company in charge of collecting the garbage usually uses containers different from those proposed.

How has the cooperation worked with other stakeholders and actors outside your organisation?

The cleaning company has been notified of this discrepancy. However, for the moment, they continue to use different types of containers from those proposed.

What has enabled or could promote cooperation?

A greater predisposition on the part of the cleaning company

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

An impact on the system is expected. The implementation of this flag system aims to promote a shift in attitude throughout the school year. On the other hand, in the development of the course, the aim is to work on individual initiative skills. However, the development of collective skills stands out, both in the implementation of regulations and in the need to make a joint effort to maintain an acceptable level of waste separation throughout the course.

How do you presume the change could happen?

It is intended that the motivation for the proposed prize will encourage the group to promote a separation of waste and the correct cleaning of the classroom. Over time, it is intended to develop a habit in students where the prize ceases to matter, and the correct separation of waste generated in class becomes relevant.

What has helped you or could help you with envisioning the expected impact and the preferred future?

- **Action: How to proceed?**

What has helped you to achieve your goals?

Use a system of scores by coloured flags that shows the progress throughout the year by the different groups, while at the same time publishing a general weekly ranking to motivate and generate competition among the students.

What kind of challenges have you faced in your organisation?

The need to buy these recycling bins, as well as the attitude of some groups, is reluctant to this type of action.

How have you found, or could you find time and space for the intervention in your organisation?

This intervention does not require occupying time in any of the subjects, nor does it need to reserve a place for a talk or training. Each group is informed at the beginning of the course of the operation of the regulations, as well as the final prize.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1. - Appoint environmental coordinators at the beginning of the academic year. The tutor will appoint two environmental coordinators in each class.

Description: In each class at the beginning of the academic year, the tutor will appoint two environmental coordinators.

Responsible: Management school team

External expert assistance: no

ECF4CLIM expert assistance: no

Resources needed: Meetings between the head of studies and tutors

Cost: Euros

Task co-implementation participatory approach: At the tutors' meeting, the head of studies informs the tutors of the election of the environmental coordinators for each class. Once appointed, the list is sent to the environmental coordinator. In the first term, a meeting of the coordinators is held with the management team, the secretary, and the head teacher of the Sustainable Development Department. This department head must have a coordinating timetable in the teaching staff's timetable.

Task 2.- Head of Sustainable Development Department

Description: A Head of Department for Sustainable Development is appointed at the school, whose functions are:

- Promote actions in the centre aimed at saving supplies and energy.
- To organise awareness-raising activities for the educational community on environmental protection and sustainability.
- To coordinate a plan of curricular activities at all educational levels that include environmental protection as a cross-cutting theme.
- Promote a sustainable waste management plan for the centre with the participation of students.
- To coordinate the ALDEA program.
- To draw up the department's minutes.
- To prepare termly and annual reports, as well as a presentation of activities carried out each term.
- To coordinate the environmental coordinators of the class groups.

Responsible: Management school team

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: The Head of the department reviews the classes once a week, checking for cleanliness and recycling in the bins. After the audit, the environmental coordinator provides him with a checklist of tasks to review. After reviewing the audits, place a yellow, orange, or red flag.

Task 3.- Teacher training

Description: At the beginning of the academic year, teachers sign up for an action plan of sustainable development activities to be carried out during the academic year.

Responsible: Head of Sustainable Development Department

External expert assistance: no

ECF4CLIM expert assistance: no

Resources needed: Training and materials for working on the sustainability curriculum.

Cost: Euros

Task co-implementation participatory approach: The involvement of the teaching staff is crucial for the success of the measures. The head of the Sustainable Development Department informs the participating teachers about the audits of the class groups and the measures taken.

Task co-implementation participatory approach: Regular meetings between head of the school and involve teachers.

- **Milestones**

  Milestone 1: Placement of recycling bins

  Milestone 2: Involvement of the Head of the Sustainable Development Department

  Milestone 3: Environmental audits of the groups/classrooms

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Creation of a figure in the environmental coordination centre. The person in question is the head of the environmental department.

  Output 3: In each classroom, two students from the environmental coordination are assigned, who carry out an audit every week, checking the state of the measures and ensuring that waste separation is carried out in each classroom.

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Supervision and direction of audits by the environmental coordinator

  Responsible: Coordinator of students

- **Photographs of the intervention implementation**





AUDITORÍA AMBIENTAL. 0-6: Mal 7-8-9: Mejorar 10-11: Bien

AULA	TOTAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1º A	130	10	9	9	7	6	9	9	9	10	9	8	9	9	9	8						
1º B	130	8	8	9	8	8	9	9	8	8	7	10	9	9	10	10						
1º C	136	8	9	8	7	7	10	8	9	9	10	10	10	10	11	10						
1º D	130	10	7	10	9	9	9	9	9	7	10	7	9	9	8	8						
2º A	149	10	10	8	10	10	10	11	11	11	11	8	9	10	9	11						
2º B	139	8	9	9	9	8	9	10	11	9	9	10	10	10	9	9						
2º C	138	6	7	10	9	9	9	11	9	11	10	9	10	8	11	9						
2º D	133	7	9	10	11	9	10	8	9	8	9	8	9	8	9	9						
3º A	149	10	10	9	10	10	10	11	10	11	10	9	11	9	11	8						
3º B	122	8	9	7	7	9	9	7	9	9	7	8	10	8	8	10						
3º C	131	8	10	10	8	10	9	9	7	9	8	9	8	10	8	8						
3º D	126	8	5	8	10	7	9	7	9	10	8	10	7	11	9	8						
4º A	123	8	9	8	8	8	10	9	7	8	9	8	9	7	7	8						
4º B	137	7	8	9	10	11	9	9	10	7	10	10	8	9	10	10						
4º C	145	10	9	11	9	10	10	8	11	7	9	9	11	11	9	11						
4º D	142	8	7	9	11	10	11	9	10	7	11	10	9	11	9	10						
4º E	152	11	10	10	9	11	11	8	9	9	11	11	11	11	11	9						
1º BA	118	7	9	7	9	6	9	8	6	9	9	7	7	9	9	7						
1º BB	132	8	7	8	11	8	11	10	8	9	8	10	8	10	8	8						
1º BC	141	6	9	8	10	9	11	10	8	10	11	9	9	11	11	9						
2º BA	125	7	10	8	5	9	10	7	7	7	8	6	9	10	11	11						
2º BB	126	7	9	8	7	7	9	7	8	7	8	7	9	11	11	11						

- **Troubles during implementation, conclusion and lessons learnt.**

Although the intervention was initially conceived with a primary focus on collective action, the implementation process revealed that the most critical components were, in fact, technical aspects—such as equipment provision and infrastructure modification—as well as the development of individual competences. This shift in emphasis underscored the need to adapt the intervention's scope better to address the practical and personal dimensions of sustainability learning.

Furthermore, the early-stage training of students was identified as a key success factor and was formally incorporated into the project's milestones. This preparatory phase provided students with the foundational knowledge and skills necessary for active participation, contributing significantly to the effectiveness of the intervention.

SP-DS01-IN09.- Training on waste recycling

General data

Description: The visit to the environmental waste management and treatment complex aims to improve the sustainability skills of the participants by raising awareness and understanding of the complexity of the waste problem.

This activity is intended to be developed in collaboration with the environmental consultancy company CICONIA and will be carried out at the environmental complex La Vega. It is considered an activity of interest to students that can lead to the development of individual competences (in the acquisition of skills, awareness, and attitudes) as well as collective competences, through a participatory learning process, and the development of a culture that advocates for correct waste management in the classroom.

- **Participants and profile:** Some of the environmental coordinators of different ages

- **SCT and SCC representatives:** 4 SCT students, 2 SCT teachers

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Involving individual action

    - Short description of the objectives:

      · Facilitate educational visits to local clean points for students to experience first-hand the waste recycling process.
      · Raise awareness among students and the school community about the importance of recycling, based on practical and tangible experiences.
      · Provide training and guidance on how to use local recycling points correctly, highlighting the importance of sorting materials properly.
      · Encourage the participation of students and staff in recycling visits and the recycling process.
      · Reduce the amount of waste sent to landfills by inspiring a renewed commitment to recycling through a direct understanding of its environmental impact.

    - Time scope of the intervention:

      Short term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

Acquisition of individual competences and awareness in students through a visit to the clean point. Visualising the impact on the environment and the characteristics of a waste treatment plant will help students become involved in better waste management.

Understanding how these facilities work will help promote recycling, thereby enhancing individual students' competencies and appreciation for the impact of their waste on the environment.

- Main risks and uncertainties:

Loss of attention of some students due to age diversity.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Raise awareness among the educational community, through the participation of environmental coordinators, about the importance of respecting the environment, visualising the environmental impact generated by poor waste management, and promoting a culture of reuse and recycling.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The environmental coordinators were motivated to leave the school for the visit. They saw this activity as a reward for their work in the classroom.

Have you encountered challenges in engaging people? What are they?

Some students were uncomfortable when they found out they were visiting a waste management plant. Initially, they thought they would not be interested in the subject, as they said they already had recycling habits at home and that the visit would not provide them with much new information.

How have you or could you overcome them?

It was noted that this visit was part of their training as classroom environmental coordinators and that it would help them understand the importance of their good work in supervising waste separation and classroom cleanliness.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The organisation of the visit, the availability of the waste management plant to carry out the activity on a suitable date, transport, and the availability of the training monitors.

How has the cooperation worked with other stakeholders and actors outside your organisation?

During the planning process, there were no issues contacting the company organising the visit. This company contact the waste management plant and arranges the transport.

What has enabled or could promote cooperation?

The predisposition and organisation of the environmental consultancy company. This type of activity is common in schools in the region, so at the planning level, the organisation of the visit is relatively simple.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

It is expected that through the implementation of the intervention, an improvement in weekly waste separation scores will be achieved in as many classrooms as possible (outcome from SP-DS01-IN08), by raising awareness among the group with the help of the experience gained by the environmental coordinators.

How do you presume the change could happen?

It is necessary to provide a space after the visit for the environmental coordinators to share with their colleagues what they have learned during the activity. On the other hand, it is intended that this learning is used in the supervision of the environmental coordinators in waste separation in the classroom.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Channeling what students have learnt into an awareness-raising campaign or giving guidance to classmates in the process of separating waste in the classroom.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The environmental coordinators must meet with their classmates at the end of the visit to share what they have learned. To help students not forget what they have learned before they meet their classmates, it would be advisable for the accompanying teacher to guide environmental coordinators in this process of transmitting knowledge and experiences.

What kind of challenges have you faced in your organisation?

Search for a company to organise the visit, with dates available in accordance with the school's schedule.

How have you found, or could you find time and space for the intervention in your organisation?

It is necessary to find a time when students do not have exams nearby so that they can focus on the session's development. This could be either at the beginning of the course or after the term of their exams.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1: Search for a training company and organisation for the visit.

Description: It is necessary to find a company that offers a visit to a waste management plant, while also providing trainers to guide and conduct the visit. It is also required to find bus transportation from the school.

Responsible: USE

External expert assistance: Environmental consulting and training company

ECF4CLIM expert assistance: Researchers

Resources needed: bus, 2 environmental monitors, waste management company

Cost: 1197,9 Euros

Task co-implementation of participatory approach: Activity organisation, scheduling dates, selecting participating students, and closing the hiring process for the company in charge of the training.

Task 2.- Carrying out the visit

Description: Carrying out environmental education activity: training in recycling and waste separation.

Responsible: All institutions involved

External expert assistance: CICONIA, environmental consultants responsible for carrying out the visit.

ECF4CLIM expert assistance: 2 researchers

Resources needed: CICONIA assistants, 1 bus, teachers, USE

Cost: Euros

Task co-implementation participatory approach: Joint collaboration between all institutions

- **Milestones**

  Milestone 1: Location of the environmental centre

  Milestone 2: Students' selection

  Milestone 3: Locating instructors for training

  Milestone 4: Hiring of a training and transport company

- **Outputs:**

  Output 1: Summary sheet

- **Cost (Equipment /consumables /others)**

  Total cost: 1197,9 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: USE's researchers and teachers will conduct a short survey and deliberative workshops with the participants after the intervention

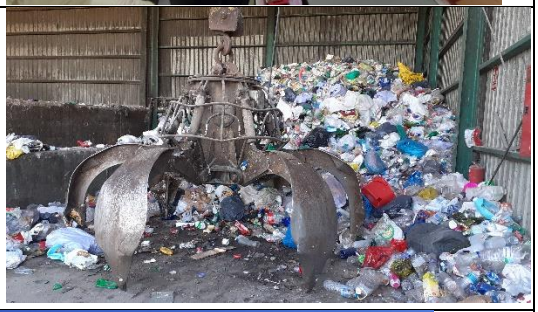
  Responsible: USE Research team

- **Photographs of the intervention implementation**










- **Troubles during implementation, conclusion and lessons learnt.**

The initial roadmap stipulated a "Change" step involving a school visit at the start of the academic year, targeting groups with previously low waste separation scores. This intervention aimed to visually demonstrate its impact on subsequent flag scores (SP-DS01-IN08).

Regarding the implementation of the comonitoring method, it was planned that USE researchers and teachers would administer a short survey and conduct a deliberative workshop with participants after the intervention. However, the deliberative workshop did not materialise due to participant fatigue during their return journey. Consequently, impressions of the visit were instead discussed informally on the bus after the visit.

This experience underscored the importance of adaptability in project implementation. While structured methods are valuable, unforeseen circumstances necessitate flexible approaches to data collection and feedback. Moving forward, it is crucial to incorporate contingency plans for engagement activities, ensuring that participant well-being is prioritised without compromising the integrity of the evaluation process.

SP-DS01-IN10.- Improving comfort temperature through an adiabatic bioclimatic system

General data

Description: The intervention aims to capitalise on the installation of a new climate control system to enable students and the school community to acquire individual and collective knowledge and skills related to sustainable climate control, thermal comfort, and indoor air quality in the school.
Several approaches to indoor and outdoor climatisation would be explored, such as evaporation systems or foggers.

- **Participants and profile:** 2 students, 1 teacher, Head of the school, 3 ECF4CLIM researchers.

- **SCT and SCC representatives:** 1 student at SCT, teacher and director at SCC

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      The nature of the intervention mainly requires individual and collective actions.

    - Short description of the objectives:

      - Improving students' knowledge of thermal comfort
      - Raising students' knowledge about indoor air quality
      - Raise students' awareness of climatisation alternatives and their carbon footprint, especially about the kind recently installed in the school.
      - To provide a guide for the use of the bioclimatic system that will maximise the sustainability impact of the system without compromising the well-being and comfort of the school's students, teachers and staff. This guide should evolve into an internal rule.
      - Raise students' awareness of sustainable solutions to climate change and adaptation to rising temperatures.

    - Time scope of the intervention:

      Mid and long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competence:
      - Internal normative on the use of the facility

- Positive attitudes of students, teachers and the school community towards sustainability
- Behavioural adaptability to manage the system in a sustainable way

Individual competence:
- Students (and teachers) acquire knowledge about the sustainable climatisation system, its complexity
- Students (and teachers) acquire knowledge about indoor air quality
- Students (and teachers) acquire knowledge about thermal comfort
- Teachers acquire skills to use ECF4CLIM tools as pedagogical materials and to envision a sustainable future.
- Teachers and other staff acquire skills for more sustainable control of the climatisation system.

- Main risks and uncertainties:

The main risks that lead to global failure:
- Student and teacher engagement
- Negative attitudes of students, teachers and the school community towards sustainability

Main risks leading to partial failure
- The working group's availability
- School management is close to changing habits and establishing new internal rules
- Regulatory and/or normative that make it impossible to change the management habits of the institution.
- Lack of documentation of the installation
- Unavailability of ECF4CLIM IoT platform
- Unavailability of the ECF4CLIM sustainability intervention tool

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

In the medium term, we aim to change students and teachers (individual competences), but in the long term, we aim to change the system (collective competences), trying to establish sustainable habits in controlling the school's climatisation system.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

A new bioclimatic system was installed in the school last year, but little documentation was provided. Students, teachers and support staff need "more information" about the equipment that appears in their classroom. Teachers and support staff require training to manage the system sustainably and effectively.

Have you encountered challenges in engaging people? What are they?

In this initial phase, we see a high level of commitment from teachers and other school staff.

In the case of the students, it is difficult to assess their commitment until the intervention starts.

How have you or could you overcome them?

For students, training tasks are designed to increase student engagement within working groups. At the same time, dissemination activities are designed to reach all students in the school.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The regional government is the financier of the facility.

The regional authority was responsible for implementing the facility.

An external company provides maintenance services on an annual basis, but these services should be financed from the school's budget.

How has the cooperation worked with other stakeholders and actors outside your organisation?

None of the external actors is expected to be involved in the implementation of the intervention.

What has enabled or could promote cooperation?

Perhaps the dissemination materials produced during the intervention could be reused by the regional agency in charge of the construction.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The recently installed equipment is, in itself, an improvement in environmental performance, but it requires tools to produce a real change in the school system, and this is what the intervention aims to do. In parallel, intervention provides an opportunity to promote STEM learning.

How do you presume the change could happen?

The motivation of teachers and staff to use the new system efficiently should be reflected in internal standards and user guides.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Tools to assess progress in school sustainability, carbon footprint and energy cost reduction should be essential in this regard.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The commitment of teachers and principals should be crucial to achieving the goals.

What kind of challenges have you faced in your organisation?

We believe that teachers' and students' lack of time should be a significant barrier to achieving the aims of the intervention.

How have you found, or could you find time and space for the intervention in your organisation?

We hope to take advantage of the new subject of sustainability research, which was introduced last academic year as part of the FAB-IDI intervention.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Bioclimatic system documentation analysis

Description: Literature and documentation search about the bioclimatic system recently installed in the school.

Responsible: ECF4CLIM researcher

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: The Principal is responsible for finding the system's official documentation.

The researcher is responsible for finding additional information about the system and analysing all the documentation.

Task 2.- Training on climatisation systems, IAQ and thermal comfort

Description: A short course on climatisation systems, indoor air quality and thermal comfort should be prepared and taught to students in the intervention working group. Tools to evaluate the carbon footprint and consumption of alternative climatisation systems should be assessed.

Responsible: ECF4CLIM researcher

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: The co-implementation strategy involves enrolling the environmental delegate from each class in this training, who will be responsible for disseminating the content to their classmates.

Task 3.- Guide on the sustainable operation of the bioclimatic system

Description: A guideline for the sustainable operation of the bioclimatic system will be developed by the members of the working group and recommended as an internal rule.

Responsible: ECF4CLIM researcher and the school's principal

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: The members of the working group will collaborate to produce the first draft of the guide, which will be revised and updated in conjunction with the teachers and the school board.

Task 4.- Dissemination

Description: Design and execute a dissemination campaign to spread the benefits of the new facility within the school community.

Responsible: Teacher

External expert assistance: no

ECF4CLIM expert assistance: no

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Material for use in the dissemination campaign will be prepared by students in the working groups with the assistance of researchers

- **Milestones**

  Milestone 1: System documentation

  Milestone 2: Training on climatisation, IAQ and thermal comfort

  Milestone 3: Guide on using the system for teachers and staff

  Milestone 4: Dissemination campaign

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Tool to evaluate the energy consumption of different climatisation systems alternatives for the school

  Output 3: Guide on using the system for teachers and staff, and dissemination material

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Bimonthly meetings to control the advances and barriers

  Responsible: ECF4CLIM research team and school principal

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

Implementation Challenges and Unexpected Outcomes

While not a primary focus of the intervention, digital signage equipment was adapted for dissemination through student working group collaboration, highlighting an emergent "third nature" of engagement. The intervention team deemed all objectives achieved; however, the school is still finalising system usage guidelines based on the researcher's recommendations.

A significant hurdle was the delay in receiving system documentation, which took over six months, impacting the intervention timeline. Additionally, not all environmental coordinators were able to participate fully in the execution. An unexpected cost of approximately 290 Euros was incurred for digital signage materials (Raspberry Pi 4, SD card, rollup), which was not initially budgeted.

Competencies Developed

Collective competence proved vital. While internal normative on facility use emerged as an output rather than a precondition, the positive attitudes of students, teachers, and the school community towards sustainability were undoubtedly the most crucial precondition for success. The head's intense involvement in behavioural adaptability to manage the system sustainably, broadly aligning with existing practices, also contributed significantly.

Individual competencies addressed in working sessions, which utilised ECF4CLIM intervention tools, included:

- Knowledge acquisition by students and teachers on sustainable climatisation systems, their complexity, indoor air quality, and thermal comfort.
- Skill development for teachers in using ECF4CLIM tools as pedagogical materials and envisioning a sustainable future.
- Skill acquisition by teachers and other staff for more sustainable control of the climatisation system.

Engagement and Dissemination Strategies

Direct student involvement was limited throughout most of the intervention. Knowledge dissemination largely relied on environmental coordinators, making it challenging to reach all students. To broaden reach, a low-cost digital signage system and a rollup were designed and installed in the school hall. This system displayed information about the climatisation system and data from classroom sensors.

Connections and Envisioning

Access to sensor data from the system was identified as a potential accelerator for the intervention, but despite efforts, this data could not be accessed. The ECF4CLIM intervention tool, alongside two specific tools developed during its execution, was effectively utilised in working sessions to help envision sustainable practices.

Actions and Barriers

The commitment of teachers and principals was indeed crucial for achieving goals. However, this commitment, particularly among students, appeared to wane as the intervention drew to a close. A significant barrier encountered was the lack of sufficient time for both teachers and students, making it challenging to progress adequately. Strategies to mitigate this included leveraging the new sustainability research subject introduced last academic year (part of the FAB-IDI intervention) and participating in the "young with researchers" program to secure more time for student engagement.

Recommendations and Resources

Recommendations for system use were provided to the school's head and a teacher during training sessions; however, comprehensive documentation was ultimately prepared solely by ECF4CLIM researchers. Materials used for dissemination included the Raspberry Pi 4, SD card, and a rollup, contributing to the digital signage campaign that displayed system information and sensor data in the school hall. A guide on system use for teachers and staff, along with dissemination materials, was also prepared.

6. Report on Implemented Interventions in CEIP MOZART.

School brief description

The CEIP Mozart public primary school is in the Alcalá de Henares district, in the Autonomous Community (AC) of Madrid. Created in 2008, it is the youngest district in the city, both in terms of housing stock and demography. The school has 670 students distributed among ten elementary school classes (1st, 2nd, and 3rd grades) and 18 primary school classes (from 1st to 6th grade). The school is highly committed to sustainability and has participated in Eco-school programs for a number of years. Recently, the school obtained the Green Flag Award for Eco-schools. The school has established a garden, which allows school classes to engage in activities from the creating the seedbeds to harvesting the produce. The garden is a source of great pride for the school. The school has elaborated an "Eco-Code" to promote environmental values and raise awareness of sustainability. As part of the Eco-Schools initiatives, CEIP Mozart has developed its own Eco-code to encompass the sustainability objectives and the underlying philosophy of its commitment to the planet (Ecocódigo del CEIP Mozart – MOZART (madrid.org)



Figure 6.1.- CEIP Mozart.

Implemented Interventions Summary

The interventions implemented in the CEIP Mozart demonstration site are listed in the following table.

Measure Id	***Title***
SP-DS02-IN01	Umbralejo Field Trip - Experiential environmental education
SP-DS02-IN02	Linking the school garden with sustainable food styles
SP-DS02-IN03	Reuse- CO2 & Water Market. Exchange T-shirts "Change things by changing things"
SP-DS02-IN04	Visit to the municipal composting plant + Promoting sustainable work in the school garden.
SP-DS02-IN06	Installation of PV solar panels + learning and awareness activity on renewable energy
SP-DS02-IN07	Planting trees in the school
SP-DS02-IN09	Expand the school garden: The garden as "Pride of the school"

SP-DS02-IN10	ECF4CLIM learning space

Table 6.1.- Interventions in CEIP Mozart.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
SP-DS02-IN01	Umbralejo Field Trip - Experiential environmental education	Educational programs	Green Spaces	Visits
SP-DS02-IN02	Linking the school garden with sustainable food styles	Green Spaces	Food	
SP-DS02-IN03	Reuse- CO2 & Water Market. Exchange T-shirts “Change things by changing things”	Water	Waste	
SP-DS02-IN04	Visit to the municipal composting plant + Promoting sustainable work in the school garden.	Waste	Green Spaces	
SP-DS02-IN06	Installation of PV solar panels + learning and awareness activity on renewable energy	Energy		
SP-DS02-IN07	Planting trees in the school	Green Spaces		
SP-DS02-IN09	Expand the school garden: The garden as "Pride of the school"	Green Spaces	Food	
SP-DS02-IN10	ECF4CLIM learning space	Educational programs		Teaching materials

Table 6.2.- Interventions main working areas in CEIP MOZART.

SP-DS02-IN01.- Umbralejo Field Trip - Experiential environmental education

General data

Description: Stay in Umbralejo (Guadalajara) to improve skills in sustainability and the fight against climate change. This environmental education intervention aims to explore the connection between nature and culture by engaging with traditional and ecological practices involved in food production and ancient crafts, as well as learning about how humans have used and affected the land. Various workshops, awareness-raising activities, and action initiatives are part of the programme.

This experience has been carried out within the framework of the "Umbralejo for Sustainability" programme, in coordination with the National Centre for Environmental Education (CENEAM) and the Provincial Delegation of Education, Culture and Sports of Guadalajara. CEIP Mozart carried out this activity in collaboration with CRA La Encina (Cogolludo, Guadalajara), as it was considered beneficial for children from both the city and a nearby village to interact and spend time together.

The intervention was repeated in two consecutive years 2023 and 2024.

- **Participants and profile:** 95 children, 6 teachers (72 children from CEIP Mozart and 23 children from CRA La Encina (Cogolludo, Guadalajara) (14 from 6th grade and 9 from 5th grade, 3 teachers from EIP Mozart and 3 teachers from CRA La Encina (Cogolludo, Guadalajara) - 1 child with special needs).

- **SCT and SCC representatives:** 3 SCT teachers and 3 SCT children
- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:
      It focuses on the individual competences of both students and teachers, with the fundamental aim of raising awareness.
    - Short description of the objectives:
      Increase knowledge of traditional livelihoods and sustainability. RAISE AWARENESS.
      Integrate sustainability into education and training through practical and experiential activities. CAPACITY BUILDING.
      To promote sustainable lifestyles in the school community. ATTITUDES.
      To know the natural and cultural values of the Umbralejo area (abandoned rural village). KNOWLEDGE.
      Living with children from other places (Cogolludo - a small rural village in another province). ATTITUDES.

    - Time scope of the intervention:
      It is a short-term intervention in the sense that the experience itself lasts a day and a half in each group; however, it is expected to have a long-term impact and help promote a culture of sustainability within the school and the broader educational community.

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:
      The conditions for success have much to do with inter-institutional cooperation, as two schools from different autonomous communities (Madrid and Castilla-La Mancha), CENEAM (Ministry for Ecological Transition and Demographic Challenge), the regional government of Junta de Castilla-La Mancha (where Umbralejo is located), and CIEMAT are involved.
    - Main risks and uncertainties:
      Lack of coordination between institutions, lack of budget and adequate logistics.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

To raise awareness among students and teachers of respect for the environment and the planet, as well as increasing their knowledge of rural activities and how people used to live in these mountain villages. To aim is also to encourage appreciation of the landscape and traditional architecture.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The previous Umbralejo experience in 2023 and the impact it had on the students constituted the most effective dissemination campaign for the second edition.

Both CEIP Mozart and Cogolludo students wanted to repeat.

The commitment of the management team and some of the teachers to incorporating this experience into the General Action Plan (PGA) is clear: they value environmental education as a driving force for protecting the natural environment.

The enthusiasm of the students and their desire to repeat the experience is another important driving force.

Have you encountered challenges in engaging people? What are they?

The main difficulties were related to the coordination between the institutions involved. There also were logistical issues related to buses, food, and monitors, among others.

How have you or could you overcome them?

These difficulties were overcome through better coordination and a more careful planning including more frequent contact, clear objectives and continuous monitoring of emerging constraints.

Flexibility to adapt to each other's constraints was also necessary.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

As the intervention involved the participation of several institutions, the internal decision-making processes of these institutions (Ministry of Ecological Transition, CENEAM and Junta de Castilla La Mancha) regarding the authorization of our intervention were beyond our control.

How has the cooperation worked with other stakeholders and actors outside your organisation?

A great deal of planning and coordination work was carried out in the second edition based on the experience of 2023, as there are many institutional logics and ways of doing things that need to be brought together.

What has enabled or could promote cooperation?

It was important to highlight the shared benefits of the experience for all the institutions,

Thanks to this intervention, Ciemat researchers conducted an additional evaluation of the activities and facilities at Umbralejo. The evaluation report of the 2023 experience was very well received by both CENEAM and the Junta de Castilla la Mancha. Some of the ECF4CLIM evaluation tools, such as short surveys and deliberative workshops, were particularly well-received and could potentially be used to evaluate future Umbralejo initiatives

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The children who experienced Umbralejo 2023 felt it was a unique experience that shaped them. They described the activity as very exciting and motivating, with a focus on hands-on learning.

The intervention aimed to develop individual skills (awareness and behavior) and, in turn, contributed to the promotion of the school's sustainability culture.

How do you presume the change could happen?

Children who have experienced Umbralejo form a strong bond with nature and pass this on to their classmates and families.

Another way to consolidate the intervention would be to incorporate the visit to Umbralejo into the school's annual PGA programme. Leadership at CEIP Mozart was keen on that possibility.

What has helped you or could help you with envisioning the expected impact and the preferred future?

To have a lasting impact in the future, it is necessary to involve all institutions with the potential to provide resources.

A proper and systematic evaluation of these experiences would also be necessary to gather evidence of their impact and to understand how this experience of environmental education in a natural environment promotes a culture of sustainability.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Institutional cooperation, adequate planning, logistics and proper budget allocation were the necessary conditions for a successful intervention. The commitment of the school leadership and teachers, as well as the enthusiasm of the students, were also crucial.

What kind of challenges have you faced in your organisation?

Main challenges were related to teacher's availability and commitment.

How have you found, or could you find time and space for the intervention in your organisation?

To ensure sufficient time and space for the intervention, the activity should be integrated into the curriculum. It is also essential to secure adequate funding through potential co-financing with other institutions. Additionally, offering incentives will help encourage teachers to participate in the experience.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Stay preparation.

Description: Discussions with the institutions involved to agree on the date and logistics.

Preparing all the materials for the evaluation of the intervention, including printing questionnaires, purchasing cards, markers, and pens.

Responsible: CIEMAT

External expert assistance: CENEAM, Junta de Castilla La Mancha, environmental monitors and teachers

ECF4CLIM expert assistance: 3 researchers

Resources needed: Involvement of Umbralejo staff, environmental monitors, teachers, researchers, food, and buses.

Cost: 0 Euros

Task co-implementation participatory approach:

Task 2.- Hiring of buses

Description: Search and select the bus company.

Responsible: CIEMAT

External expert assistance: Bus company

ECF4CLIM expert assistance: 3 CIEMAT researchers

Resources needed: 3 buses

Cost: 1790 Euros

Task co-implementation participatory approach: **Task 3.- Hiring of 2 environmental monitors**

Description: Search and hiring of a suitable company

Responsible: CIEMAT

External expert assistance: Leisure & Environmental Time Company

ECF4CLIM expert assistance: Researchers

Resources needed: 2 environmental monitors

Cost: 580,8 Euros

Task co-implementation participatory approach:

Task 4.- Food logistics

Description: Buying food in a supermarket in Cogolludo (the nearest town to Umbralejo).

Responsible: CIEMAT

External expert assistance: Manager of the supermarket.

Collaboration with the staff of the Umbralejo canteen.

ECF4CLIM expert assistance: CIEMAT researchers

Resources needed: Management of the budget and invoices

Cost: 1483.83 € Euros

Task co-implementation participatory approach:

Task 5.- Stay in Umbralejo

Description: Implementation of environmental education activities: workshops on traditional workshops on traditional crafts such as basket weaving, gardening, livestock farming, beekeeping, etc., educational itinerary, "Get to know Umbralejo", visit to the museum, etc.

Evaluation of the intervention using short surveys and deliberative workshops.

Responsible: All institutions involved

External expert assistance: Staff of Junta de Castilla La Mancha, CENEAM, teachers, leisure monitors

ECF4CLIM expert assistance: CIEMAT

Resources needed: Umbralejo staff (Junta de Castilla La Mancha), teachers, leisure monitors, CIEMAT researchers

Cost: The costs of the stay in Umbralejo have not been taken into account, as there is an agreement between CIEMAT and CENEAM - Junta de Castilla La Mancha, whereby they cover all the costs of the stay, except for food, which was paid for by CIEMAT.

Task co-implementation participatory approach:

- **Milestones**

Milestone 1: Management of all the necessary organization and logistics

Milestone 2: Stay in Umbralejo

Milestone 3: Evaluation of the intervention

- **Outputs:**

Output 1: Summary sheet

Output 2: Implementation of the Environmental Education Program "Umbralejo for Sustainability" thanks to the collaboration between the ECF4CLIM - CIEMAT project, the National Centre for Environmental Education (CENEAM - Ministry for the Ecological Transition and the Demographic Challenge) and the Regional Government of Castilla-La Mancha

Output 3: Intervention report including the results of the short survey and deliberative workshop.

- **Cost (Equipment /consumables /others)**

Total cost: 3854.83 Euros

- **Intervention implementation comonitoring strategy**

Implementation of the comonitoring approach: CIEMAT researchers and teachers conducted a short survey and deliberative workshops with the participants in the intervention

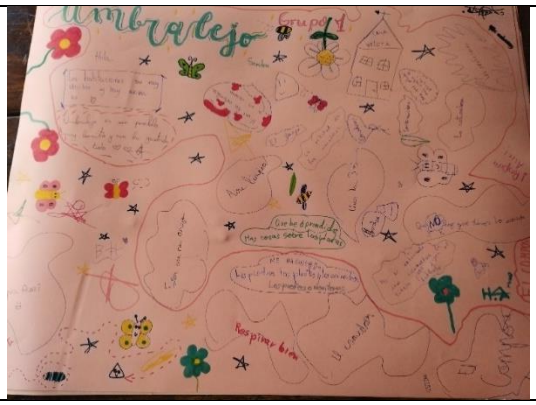
Responsible: CIEMAT research team

- **Photographs of the intervention implementation**









- **Troubles during implementation, conclusion and lessons learnt.**

Future Prospects and Institutionalisation

The enthusiasm generated by the intervention suggests a strong desire to repeat the Umbralejo experience, with children already looking forward to next year's program. To ensure continuity beyond the ECF4CLIM project, institutionalising the activity is crucial. This could involve co-financing models involving the school, parents, and the Community of Madrid (CAM). Effective communication among all participating institutions is the fundamental first step in this process.

Success Factors and Support Needs

The sustained success of such intervention hinges on several key elements: a dedicated budget and time allocation, continued cooperation from schools (especially teachers), the hiring of qualified monitors, and the consistent technical and logistical support from the Umbralejo coordinator and staff (e.g., canteen, maintenance). Furthermore, given that the nearest medical centre is 30 minutes away and the hospital an hour away, the presence of a doctor or ATS (healthcare technician) is highly recommended.

Emergent Competences

Beyond the initial planning, several important competences emerged during execution:

- Familiarity with the process of recovering abandoned villages.
- Understanding the consequences of poor natural environment management (e.g., overgrowth of non-native vegetation like pine trees, leading to fire risk and soil acidification).
- Appreciation for the recovery capacity of autochthonous vegetation (e.g., oak, holm oak).

Engagement and Impact

Umbralejo has become a significant theme in the books written by sixth-grade students, reflecting on their school experiences and underscoring its impact on their engagement. The anticipated enthusiasm of students and their desire to repeat the experience proved to be a powerful driving force, though it required additional support from Ciemat and CENEAM. This years' experience felt more successful, primarily attributed to the effective recruitment of monitors.

The intervention's pedagogical component needs to be formally planned within the school's General Annual Program (PGA) at the beginning of the academic year. Its approval by staff (including parents and teachers) and the School Council (comprising local administration and services) is essential; otherwise, secondments may become necessary for travel.

Students from the 2023 Umbralejo experience described it as a "unique" and "shaping" activity—"very exciting and motivating with learning in the field." Their enthusiasm proved contagious among peers. The intervention's goal to foster individual skills (awareness and behaviour) and contribute to a school culture of sustainability appears to have yielded better-than-expected results, evidenced by zero student absenteeism. This success is further bolstered by Umbralejo's strong pedagogical planning, which facilitates immersive learning in nature and rural environments.

However, teacher availability and commitment remain a challenge, as some are reluctant to travel with children, and others face family commitments.

Financial Considerations

The final cost of the intervention was slightly higher than anticipated due to an extra cost associated with Task 4.

SP-DS02-IN02- Linking the school garden with sustainable food styles

General data

Description: The intervention was structured in two parts: Part A focused on workshops about sustainable and healthy eating, while Part B was dedicated to the improvement of the school garden.
Part A: Attending the Workshops on Sustainable and Healthy Eating
During these workshops, two stories were shared: “Two Chickens and a Dream” and “Eat Healthy to Cool the Planet.”
The objective of the first story was to help students distinguish between two types of egg production: Intensive farming, which disregards animal welfare and consumes excessive natural resources (such as water, oil, and fertile land), and Free-range farming, which takes place in a natural environment, respects ecosystems, and is more sustainable.
The second story introduced the concept of virtual water—the water used throughout the entire food production chain—and highlighted the importance of sustainable food choices. It emphasized the benefits of healthy eating, both for personal well-being and for the health of the planet.
Part B: Expanding and Improving the School Garden
This part of the intervention focused on expanding and enhancing the school garden, connecting it to a more sustainable and healthy eating style both at school and at home. The goal was to raise awareness of our ability to change eating habits by promoting the responsible consumption of more sustainable foods—such as those grown in the school garden—which are produced organically, without the use of pesticides or synthetic fertilizers.

- **Participants and profile:** 74 participants: 3 teachers and 71 children from the 5th grade of primary school

- **SCT and SCC representatives:**. 6 SCT/SCCs members in the intervention

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:
      This intervention aims to develop students’ individual competences by increasing their knowledge, raising awareness, and promoting attitude changes toward sustainable eating and food production. At the same time, it seeks to strengthen the school’s collective competences in this area, fostering a shared commitment to more sustainable practices.
    - Short description of the objectives:
      General Objectives of the Intervention
      Individual Competences:
        - Develop the ability to identify which foods are better for both the environment and personal health.
        - Foster awareness of one’s role as a consumer and the power to make informed food choices.

- Promote understanding—among both students and teachers—of the environmental impact of different types of food.

Collective Competences:

- Strengthen the school's existing strategy of purchasing local and organic food.
- Improve the school's overall environmental performance through more sustainable food choices

- Time scope of the intervention:
  It is a short-term intervention in the sense that the experience is a one-off, but it is hoped that it will have a long-term impact beyond the school itself, involving families and helping to promote sustainable and healthy eating.

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:
    Identifying an appropriate company or cooperative to deliver the sustainability workshops.
    Ensuring the availability and commitment of school staff to participate in the workshops alongside the students.
    Securing the logistical support and time commitment from school management and teachers to plan and carry out all tasks related to the school garden, and to effectively connect these activities with issues of sustainable and healthy eating.

  - Main risks and uncertainties:
    Availability of the necessary materials to carry out the planting in the garden.
    Availability of the company/cooperative to carry out the workshops on the available dates at the school.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Promote sustainable eating habits. Link the school garden to sustainable food production and the health of the school community.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Commitment of the school staff and time available to carry out both the workshops and all the tasks necessary to set up the garden each year.

Have you encountered challenges in engaging people? What are they?

Availability of time and space for workshops and materials needed for the garden activity. The need to involve the local authority in providing the materials and labor required to start the activity.

How have you or could you overcome them?

Allow sufficient time for both the workshops and the garden activities and include them in the school's Annual General Plan (PGA) and involve the local community in preparing the garden site, fostering a sense of shared responsibility and collaboration.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Collaboration with the local council is necessary when initiating the intervention, particularly for aspects that may require support or coordination with community services.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Collaboration with the local council is often challenging, as their availability does not always align with the school's needs. Frequent delays in response and support can hinder the timely implementation of the school garden project.

What has enabled or could promote cooperation?

Establishing regular meetings or communication channels with the local council could help foster a more fluid and effective relationship. While this may not be easy given past challenges, creating structured opportunities for dialogue and planning could improve coordination and support for the school garden project.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Learning about and raising awareness of sustainable and healthy food involves understanding the responsibility we all share as consumers and making choices that minimise the impact on the environment, human health, and ecosystems. This intervention contributes to increasing knowledge, fostering more environmentally responsible behaviours within the school and among families, and positively influencing the broader food system.

How do you presume the change could happen?

By adopting a global vision and using the school garden as a cornerstone, we aim to foster a food culture that relies on fewer external inputs, is more environmentally friendly, and promotes healthier eating habits.

What has helped you or could help you with visioning the expected impact and preferable future?

The collaboration between the school, the town council, the cooperative, and the ECF4CLIM team has been key in planning and developing this intervention. This joint effort has supported a shared vision of its potential impact and the preferable future it aims to achieve.

- **Action: How to proceed?**

What has helped you to achieve your goals?

At the planning stage, securing the commitment of the school, the local community, and the company or cooperative responsible for delivering the workshops has been essential to achieving our goals.

What kind of challenges have you faced in your organisation?

The main challenges include: limited availability of school staff time, mobilising community action at key moments, and securing sufficient resources to fund the workshops.

How have you found, or could you find time and space for the intervention in your organisation?

We have been working to identify the optimal time for the workshops, so they align with the school curriculum. As for physical space, the library was used to host the activities.

Intervention co-planning and co-implementation

Implementation tasks

Part A: workshops about sustainable and healthy eating

Task 1.- Finding a suitable cooperative/company to deliver the workshops

Description: To find a company able to deliver this kind of workshop in the school

Responsible: CIEMAT

External expert assistance: Garua Cooperative

ECF4CLIM expert assistance: Cooperative selection. Contact, definition of objectives and selection of the workshop. Recruitment

Resources needed: Budget for contracting. Logistics at school, teachers' time, and selection of the space to run the workshops

Cost: - Euros

Task co-implementation participatory approach:

Task 2.- Running the workshops at the school

Description: Workshop on sustainable and healthy food conducted at the school by the Garua staff.

Responsible: CIEMAT, CEIP Mozart and Garua

External expert assistance: Garua

ECF4CLIM expert assistance: 2 researchers

Resources needed: 1 Garua expert, 3 teachers, 2 staff CEIP Mozart.

Time to run the workshop and the subsequent evaluation

Cost: 315 Euros

Task co-implementation participatory approach:

Part B: Activities in the school garden

Task 3.- Purchase of school garden material

Description: CIEMAT purchases the necessary material for the orchard. Preparation of the seedbed, planting in the orchard, fertilisation, irrigation, maintenance of the seedlings and harvesting of the fruit.

Responsible: CEIP Mozart, City Council, CIEMAT.

External expert assistance: Purchase the requested material

City Council collaboration

ECF4CLIM expert assistance: Researchers

Resources needed: Materials for implementing the garden, time for school management and teachers, and time and space for evaluation (including short surveys and deliberative workshops).

Cost: 895 Euros

Task co-implementation participatory approach: Involve school staff in the smooth running of the garden activities. Time for evaluation of the intervention.

Task 5.- Gardening activities

Description: Gardening activities to produce organic food without the use of pesticides and mineral fertilizers, with a low impact on the environment and the health of people and ecosystems.

Responsible: CEIP MOZART/CIEMAT

External expert assistance: Logistical assistance from the gardeners of the Alcala de Henares City Council

ECF4CLIM expert assistance: researchers

Resources needed: School teachers, gardeners, Ciemat researchers

Cost: - Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Workshops on sustainable and healthy food delivered

  Milestone 2: Evaluation of workshop through short survey and deliberative workshops

  Milestone 3: Gardening activities performed

  Milestone 4: Evaluation of gardening activities though short survey and deliberative workshops

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Workshop evaluation report including the results of the short survey and deliberative workshop

  Output 3: Gardening activities evaluation report including the results of the short survey and deliberative workshop.

- **Cost (Equipment /consumables /others)**

  Total cost: 1210 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the co-monitoring approach: A short survey and deliberative workshops led by the researchers and the director, secretary and teachers were conducted for both Part A and Part B.

  Responsible: ECF4CLIM CIEMAT research team

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

No significant troubles were encountered during implementation. The activity aligned well with the existing school canteen policy. The school canteen contract explicitly mandates

percentages for sustainable (unpackaged, sealed), local, and organic products. Companies are evaluated on their adherence to these specifications, with non-compliance resulting in the loss of points. Furthermore, they are obliged to recycle, separate waste, and manage oil disposal.

A central objective of this initiative is to extend sustainable habits beyond the school by engaging families—offering them menu suggestions aligned with the school's sustainability goals, and thereby encouraging healthier and more environmentally friendly food choices at home.

Planning and Stakeholder Involvement

From the outset, the integration of the activity into the school's General Annual Program (PGA) is the key to effective planning. The active involvement and commitment of both teachers and parents—particularly through the dining hall committee—is crucial. Adopting a co-design approach that invites their ideas and perspectives helps build ownership and drives meaningful progress.

Resource and Cost Considerations

While local and seasonal produce are cost-effective, organic options are not, posing an accessibility challenge for some families. The collaboration of the town council is essential for the proper functioning of the school garden, particularly in matters of irrigation and land preparation, as their support can be a decisive factor. Prioritising sustainability at the municipal level is therefore vital.

Engagement Strategies and Challenges

Engagement necessitates the contribution of materials and budget, as demonstrated by the ECF4CLIM project. To maintain children's interest in the garden, it is crucial to involve them in the entire cycle, from seedling to harvest, which demands significant teacher time and commitment for in-class preparation. Allocating sufficient time for garden work within the PGA is also important. Involving the local community in garden preparation can be also beneficial.

A major challenge is the lack of a specific budget for sustainability activities from the Community of Madrid (CAM); schools currently allocate funds from a general budget. However, schools like CEIP MOZART do have dedicated sustainability budgets.

Connections and Collaborative Hurdles

Collaboration with the local council is critical for initiating activities. The relationship with the town council is often complex, characterised by unavailability and delays that hinder timely garden operations (e.g., ploughing, preparation), preventing the establishment of a winter garden to date.

Achieving a more fluid relationship with the council, perhaps through regular meetings, seems challenging. The city council should consider creating a specific program for school gardens and composting, providing technical support from experts on planting and pest control. The municipality could also act as a liaison among schools with gardens and offer talks on gardening. Once an activity starts, maintenance is much easier. The canteen company also offers a valuable workshop on responsible consumption (labels, expiry dates, egg codes, etc.).

Vision for a Sustainable Food Culture

The overarching vision is to cultivate a global food culture, starting with the school garden as a central element, promoting practices that are low-input, environmentally friendly, and healthier. This transformation requires an interlocking infrastructure that integrates all involved institutions. Schools should not operate in isolation; students should visit other school gardens to share experiences. The CAM and the municipality should coordinate this integrated infrastructure, facilitating knowledge exchange beyond the local level, perhaps through eco-schools. Institutionalised training courses and platforms for sharing garden management challenges and solutions could further support this vision.

Collaborative planning and development of the intervention involved the school, town council, a cooperative, and the ECF4CLIM team, pooling resources and funds. A resource bank or website for sharing experiences, such as effective tools or successful seed varieties, would be invaluable for this effort.

Action and Overcoming Challenges

At the planning stage, commitment from the school, community, and workshop providers is essential. Enthusiasm and commitment from management and teaching staff, coupled with a willingness to dedicate time and a belief in the power of small actions, are crucial.

The main challenges include the availability of school staff time, the timely action of the community, and sufficient resources for workshops. Cultivating a desire for change in others is also key. Timing for talks and activities is important; it should be relevant and could be linked to extracurricular activities to attract parents. The aim is to transform the garden into a nature classroom, incorporating shaded areas and wooden benches made from repurposed pallets, thereby creating a versatile space for talks and training.

SP-DS02-IN03.- CO2 and water market. Exchange T-shirts. "Change things by changing things"

General data

Description: Organisation of a local market within the school community for the exchange of good condition T-shirts. The CO_2 and water savings associated with wearing a used T-shirt are calculated using a weighting scale and a CO_2 and water footprint calculator (taking into account the weight and the type of textile). Participants receive CO_2 and water vouchers that reflect the savings compared to purchasing a new T-shirt, and they sign a commitment agreement not to buy a new T-shirt.
At the end of the activity, the total savings, representing how much the school has saved with this intervention, are computed, after which participants engage in a deliberative workshop to reflect on their experience.
There is a possibility of repeating the activity in successive years

- **Participants and profiles:** The first session of the Second-Hand T-Shirt Market took place in the playground of CEIP Mozart School on 16 May 2023, from 4 pm to 6:30 pm. The children in attendance ranged in age from kindergarten to primary school age. Approximately 45 children and 15 parents attended.

  A total of 26 primary school students and approximately 15 parents participated in the second session of the Second-hand T-shirt market held in the playground of the CEIP Mozart school on March 15, 2024, from 16:00 to 18:30.

  On 14 February 2025, the third session of the Second-Hand T-Shirt Market was introduced as a pilot project in a 5th grade class (5ºC), as a preliminary step towards its formal incorporation into the school's sustainability plan. Twenty pupils, two teachers, one Town Hall representative and two representatives of the school's parents' association participated in the intervention, who were very interested in learning about this activity.

- **SCT and SCC representatives:** 4 SCT/SCC2 members including teachers and students

- **Focus (nature, objectives, pre-conditions, time scope)**

  - Nature of the intervention:
    Individual and collective competences as well as environmental performance
  - Short description of the objectives:
    The initial objectives of the intervention focused on raising awareness, promoting values and motivating students (i.e. developing their individual competences), as well as saving emissions and water (i.e. improving environmental performance).
  - Time scope of the intervention:

    Although this is a one-day activity, it is designed with short-term, medium-term, and long-term impact in mind. In the short term, it raises awareness and initiates reflection among students. In the medium term, the goal is to integrate it into the school's regular planning. Ultimately, the long-term intention is for

the activity to become an annual event, embedded in the school culture and repeated across all grades each year.

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

  The successful implementation of the activity relies on several key factors. First, the active involvement and engagement of the student group is essential to ensure meaningful participation. Second, the teacher must have sufficient time allocated within the school schedule to prepare and facilitate the activity effectively. Lastly, support from the ECF4CLIM project — including resources, guidance, and possible training — plays a crucial role in enabling and sustaining the initiative.

  - Main risks and uncertainties:

  The main risks associated with the intervention include a lack of human resources and limited time availability, which may hinder proper preparation or execution of the activity. Additionally, insufficient commitment from key stakeholders — such as teachers, school leadership, families or students — could compromise the continuity or effectiveness of the initiative.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Individual and collective competences as well as environmental performance

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The engagement and interest in the intervention have been driven by the strong commitment of the school management, the dedication and enthusiasm of a group of teachers and parents, and the dynamism and support provided by the researchers involved in the ECF4CLIM project.

Have you encountered challenges in engaging people? What are they?

The primary challenge for leaders and staff lies in logistics, such as time, coordinating communication with parents and managing tasks like moving furniture or relocating a digital board outdoors. Communicating with parents is particularly challenging. Although the school uses a dedicated mobile application for this purpose, its effectiveness is limited. Teachers concur that many parents are 'too busy' to stay informed about school activities and developments. Another critical issue was the timetable: should the market take place during or after class hours? No matter what time it is, there will always be someone who cannot go

How have you or could you overcome them?

These challenges can be addressed by securing additional resources and actively involving more teachers and families in the planning and implementation of the activity. Expanding the support base helps distribute the workload and fosters a stronger sense of shared responsibility and ownership.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

None. The intervention is fully managed by the researchers and the school staff, with no involvement of external actors or activities beyond the organisation's control.

How has the cooperation worked with other stakeholders and actors outside your organisation?

What has enabled or could promote cooperation?

Cooperation has been enabled — and could be further promoted — through clear and effective communication, improved dissemination of the initiative within the school community, and the active involvement of children, teachers, and parents.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Our vision of the intervention's impact is highly positive. We believe that the activity can promote individual and collective competences and have measurable environmental benefits. If the flea market is institutionalised and links are created between its content and that in the classroom, the intervention could represent a significant advance in the school's sustainability culture.

How do you presume the change could happen?

We believe that the activity can promote individual competences among children, teachers, and parents — including increased environmental awareness, the development of caring attitudes, and enhanced knowledge.

At the collective level, the intervention has the potential to contribute to broader change by being integrated into regular school activities, such as the General Action Plan, the school curriculum, and even textbooks. It also fosters greater awareness among school leaders, teachers, and staff about the importance of collective action.

In terms of environmental performance, the initiative offers measurable results — for instance, through the use of a calculator that tracks reductions in water consumption and CO_2 emissions — demonstrating its tangible contribution to sustainability goals.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Students, teachers and staff felt that the market raised awareness of the impact of our actions on shaping a better future. It also provided practical knowledge on how to reduce our environmental impact. Apart from the progress in terms of knowledge, attitudes and behavior, the school leaders see the flea market as an activity that should be repeated every year, given the amount of water saved and the amount of CO_2 not emitted. Participants were surprised to

discover how much of an impact their collective action could have on water savings and emissions reductions.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Leaders and staff played an active role in preparing for and managing the flea market, working closely with the research team. Given the success of this initiative, they are proposing that the market be included in the Centre's General Action Plan as an activity to be repeated in the future. During the SCT teachers start thinking about the logistics, generating fruitful conversations regarding how best to hold the next market. They even think about reusing the “lost but not found” clothes that are never reclaimed (even though those clothes are sometimes very expensive). Most teachers are particularly enthusiastic about the new market and the possibility to improve the previous edition. Parents and teachers collaborate to develop proposals that connect the content of the flea market with textbooks. The footprint calculator is useful for assessing the impact of your actions and choosing between different options.

What kind of challenges have you faced in your organisation?

The primary challenge for leaders, teachers and staff lies in logistics, such as time, coordinating communication with parents and managing tasks like moving furniture or relocating a digital board outdoors.

How have you found, or could you find time and space for the intervention in your organisation?

It is crucial to work well in advance to ensure that all preparations are completed on time, allowing us to participate effectively in the market and carry out the intervention within the school’s schedule.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparation

Description: Get the calculator ready, print out the vouchers and the agreement, and prepare the informative posters for the event.

Responsible: CIEMAT

External expert assistance: NO

ECF4CLIM expert assistance: YES

Resources needed: Laptop, paper, printer

Cost: 100 Euros

Task co-implementation participatory approach:

Task 2.- Preparation at the school

Description: Intendancy, logistics and public address system

Responsible: CEIP MOZART

External expert assistance: NO

ECF4CLIM expert assistance: NO

Resources needed: Tables, ballot box, weighing scale, computer, pens

Cost: 0 Euros (in case the above resources are available in the school)

Task co-implementation participatory approach:

In some of the SCTs and SCCs meetings, this intervention was monitored. During the SCT teachers start thinking about the logistics, generating fruitful conversations regarding how best to hold the next market.

Task 3.- Dissemination

Description: Send the poster to the school, disseminate the intervention on the AMPA website, inform parents through the school's information system, and disseminate it on social networks.

Responsible: CEIP Mozart/ Ciemat team

External expert assistance: NO

ECF4CLIM expert assistance: YES

Resources needed: e-mail, internet connection

Cost: 0 Euros

Task co-implementation participatory approach:

Task 4.- Implementation

Description: First explanatory talk. Placement of clothes on tables. Selection of garments to be exchanged. Weighing the clothes on the scales. Calculation of CO2 emissions and water consumption. Signing of the commitment. Distribution of vouchers. Putting the vouchers in the ballot box. Total calculation of the reduction in CO2 emissions and water consumption. Evaluation of the activity (short surveys and deliberative workshop)

Responsible: CEIP Mozart/ Ciemat team

External expert assistance: NO

ECF4CLIM expert assistance: YES

Resources needed: laptop, large screen for visualization, cardboards, printed short surveys, pens

Cost: 0 Euros

Task co-implementation participatory approach:

Task 5.- Conclusions

Description: Calculation of water savings and reduction of CO2 emissions through the exchange of T-shirts

Responsible: CEIP Mozart/ Ciemat team

External expert assistance: NO

ECF4CLIM expert assistance: YES

Resources needed: laptop, large screen for visualization

Cost: 0 Euros

Task co-implementation participatory approach:

- **Milestones**

Milestone 1: Preparation of the calculator, production of dissemination materials, design and printing of the vouchers and the commitment agreement for the use of second-hand clothes.

Milestone 2: Initiating the dissemination of the event in the school environment

Milestone 3: Preparing the logistical arrangements for the event at the school

Milestone 4: Carry out and evaluate the event

- **Outputs:**

Output 1: Summary sheet

Output 2: Water and CO2 emission savings

Output 3: Workshop evaluation report including the results of the short survey and deliberative workshop

- **Cost (Equipment /consumables /others)**

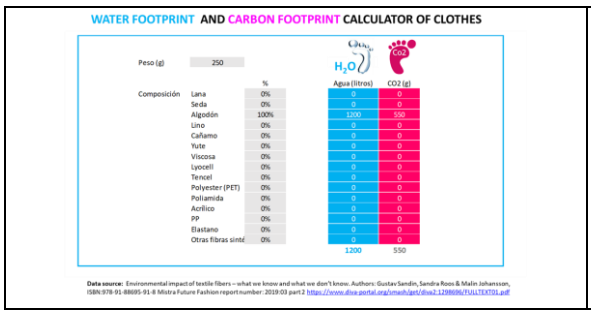
Total cost: 100 Euros

- **Intervention implementation comonitoring strategy**

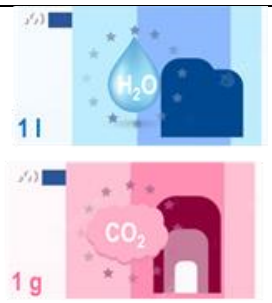
Implementation of a co-monitoring approach: A short survey and a deliberative workshop was conducted, led by the researchers, the director, the secretary, and the teachers at the very end of the intervention.

Responsible: CIEMAT research team

- **Photographs of the intervention implementation**





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- **Troubles during implementation, conclusion and lessons learnt.**

Intervention Focus and Success Factors

The primary focus of this measure was the development of individual competences in students, specifically raising awareness, promoting values and motivating students (i.e. developing their individual competences), as well as improving environmental performance through reduced emissions and water use. During the planning phase, three key success factors were identified: the active involvement of the leading team and the students, dedicated time from teachers, and the support provided by the ECF4CLIM project.

The initiative has been successfully integrated into the curriculum, particularly within the 5th-grade "Values" subject. The school's Directorate is actively working to raise awareness among all teachers who deliver this subject. Preparation for the intervention takes place both during school hours — within the "Values" subject or other classes — and voluntarily outside of school hours.

This intervention has now become an integral part of the school's identity and educational mission.

Risks and Challenges Encountered

In addition to the initially identified risks — such as limited human resources, time constraints, and a lack of stakeholder commitment — several new challenges emerged during the implementation phase:

- Poor organisation and planning: The timing of the activity proved to be critical. Scheduling the market on an unsuitable date could result in poor outcomes. To address this, the third edition of the market was held during class hours, which enabled full participation by the students but limited the involvement of parents.
- Lack of interest: A lack of engagement was observed at times among both students and the Parents' Association (AMPA). Some students questioned the market's real impact, expressing doubts about whether it could influence consumer behaviour (e.g. reduce the urge to buy new T-shirts). Others felt that a once-a-year event may not be enough to drive meaningful change. Practical issues were also raised, such as not liking the available clothes or not finding appropriate sizes.
- Logistical difficulties: Managing logistics proved to be one of the most demanding aspects for staff and organisers. This included time constraints, difficulties in coordinating communication with families, and managing physical tasks like moving furniture or relocating equipment (e.g. a digital board) outdoors.
- Inadequate communication: Reaching parents effectively remains a challenge. Although the school uses a dedicated mobile application to share information, teachers note that many parents are too busy or not fully engaged, which limits the impact of communication efforts.
- Shortage of resources: A lack of key materials — including calculators, scales, loudspeakers, and other equipment — was noted. This issue becomes especially pressing when the event attracts a large number of participants, requiring more resources to ensure smooth operation.
- Limited availability of suitable premises: Finding appropriate spaces for the event is another ongoing concern. Outdoor areas are not viable during poor weather conditions and also present challenges for evaluation activities.

Despite these difficulties, the initiative has been a great success and is now expected to become a regular feature in the school’s calendar for the coming years.

Engagement and Outreach

The second edition of the flea market significantly mobilised the educational community. The school's increased involvement in other environmental initiatives, including collaborations with eco-schools, also contributed to raising the awareness of children and families. There is a growing global awareness of the effects of climate change.

However, incompatible family schedules posed a challenge, as participation in out-of-school activities was not a priority for many parents. The immediate impact of climate change has not yet been felt in daily life for everyone, and some teachers and mothers still question the reality of climate change.

To improve engagement, more planning and dedicated time were required. The street market theme was integrated into the curriculum, and some teachers conducted preparatory work in class, with children directly involved in designing informative posters. This could be a relevant topic for discussion in parent meetings. An alternative for greater participation would be to organise the market in multiple sessions (morning and afternoon) to accommodate a larger portion of the school community.

Vision and Broader Impact

The anticipated impact of the intervention is to raise awareness and make individuals conscious of their actions' environmental footprint, promoting responsible consumption. This concept can be extrapolated to other areas of daily life, such as reuse, energy conservation, and water conservation, along with all associated environmental impacts.

Both students and staff felt that the market raised awareness of the impact of our actions on shaping a better future. It also provided practical knowledge on how to reduce our environmental impact. Apart from the progress in terms of knowledge, attitudes and behaviour, the school leaders see the flea market as an activity that should be repeated every year, given the amount of water saved and the amount of CO_2 not emitted. Participants were surprised to discover how much of an impact their collective action could have on water savings and emissions.

The street market successfully involved the entire educational community, requiring the cooperation of everyone. It served as a transversal intervention, connecting with and giving meaning to other initiatives, such as recycling and the school garden.

Securing support from the local council could significantly boost the initiative, for instance, by publicising it within the community and involving other local schools, thereby extending its reach beyond the school itself.

Actions and Policy Integration

The success of this initiative fundamentally relies on the joint commitment of parents and teachers. Leaders and staff played an active role in preparing for and managing the market, working closely with the research team. Parents association contributed communicating these activities through their networks.

Given the success of this initiative, the school is proposing that the market be included in the Centre's General Action Plan as an activity to be repeated in the future. While the curriculum should ideally host such initiatives, it often does so unilaterally or not at all. Although the LOMLOE (education law) extensively promotes sustainability, it lacks specific guidelines for implementing tangible activities. It is crucial to make sustainability tangible and visualise it in every subject.

SP-DS02-IN04.- Visit the municipal composting plant and promote sustainable work in the school garden.

General data

Description: The selected intervention comprises two stages:
Part A) Visit to 'La Campiña' recycling and composting plant: the main objective is to understand and raise awareness of the importance of proper waste separation at source and how to treat waste to minimize its impact on the environment. The plant, inaugurated in 2021, is highly innovative and is equipped with state-of-the-art technology((https://www.mancomunidadeste.com/complejo-medioambiental-la-campina/). The two main messages are 'the best waste is the waste that is not produced' and 'turning waste into raw materials'.
Part B) Sustainable work in the garden: Children will actively engage in sowing, planting, watering, harvesting, and maintenance (including fertilizing, pest control, etc.). Fertilization will be organic, using biodegradable materials such as fruit and vegetable waste, meat and fish waste, eggshells, shellfish and nut shells, other food waste, coffee and tea grounds, cork stoppers, and more.
A particularly valuable aspect of the intervention is the potential to use compost produced at the recycling and composting plant — derived from the organic fraction of waste — in the school garden, thereby closing the organic matter cycle and reinforcing circular economy principles.

- **Participants and profile:** 150 participants: 96 children, 9 teachers

- **SCT and SCC representatives:** 7 SCT/SCCs representatives including teachers and students.

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      The intervention addresses individual competences -awareness and behavior change in relation to waste management and circular economy-, collective competences promoting a recycling culture within the school, and technical and material competences by improving the school's recycling rate.

    - Short description of the objectives:
      Individual competences: The intervention aims to develop students' ability to properly sort waste, acquire basic skills related to the circular economy, and foster positive attitudes toward sustainability. A key objective is to help students understand that waste can be a valuable resource, capable of being transformed into raw materials for new processes.
      Collective competences:
      At the collective level, the initiative seeks to promote a recycling culture within the school. A strong link is established between organic waste collection and its transformation into compost, which is then used in the school garden —

reinforcing shared responsibility and creating a participatory learning experience.

Technical and material competences

The intervention is expected to improve the school's recycling rate through the introduction of new organic waste bins. Additionally, the use of compost produced at the "La Campiña" recycling plant in the school garden will help close the organic matter loop, contributing directly to environmental sustainability.

- Time scope of the intervention:

  Some of the objectives are short-term, particularly those related to raising awareness and initiating behavioural change among students. In the medium to long term, the intervention aims to foster a sustained culture of recycling and to improve environmental waste management practices within the school community.

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

    A number of factors are essential to ensure the success of the intervention:

    Student engagement: The motivation and willingness of students to learn from the visit and apply their knowledge in practice — particularly in waste sorting and sustainable gardening — are fundamental.

    Commitment from school management, teachers and staff providing leadership and institutional support for the initiative.

    Logistical and material support: Proper waste management within the school depends on the availability of adequate resources and infrastructure, including the installation of new organic waste containers by the local council.

    External collaboration: Securing compost from the recycling plant to use in the school garden is another key factor. This not only supports the circular economy approach but also avoids the use of mineral fertilizers, which are more harmful to the environment and contribute to climate change.

  - Main risks and uncertainties:

    Once the visit to the recycling plant is scheduled and transportation is arranged, this part of the intervention presents no significant risks.

    However, the garden-related component may face challenges due to potential lack of resources and insufficient support from the recycling plant or the local council. In particular, difficulties in obtaining compost or securing logistical support could hinder the implementation and long-term sustainability of the school garden initiative.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The intervention addresses the key competence of understanding the waste cycle and how waste can be transformed into raw materials for other processes or activities. It also promotes a recycling culture within the school and contributes to environmental improvement through better resource management.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The commitment of the school management has played a key role in promoting engagement, providing leadership and institutional support for the initiative. Teachers have also helped integrating the intervention into their teaching practices. Additionally, the involvement of researchers from the ECF4CLIM project has brought valuable expertise, resources, and motivation to the school community. This collaboration between educational staff and external experts has been crucial in building interest and ensuring the success of the intervention.

Have you encountered challenges in engaging people? What are they?

Some challenges have been identified in engaging both students and teachers, particularly in relation to the ongoing maintenance of the school garden. Time constraints and varying levels of commitment may hinder consistent participation. Sustaining interest over time can also be difficult.

Moreover, the involvement of external actors — specifically the recycling and composting plant and the local city council — is essential for the success of the intervention. If their support is limited or inconsistent (e.g. in providing compost or installing necessary infrastructure), it may compromise the achievement of the initiative's objectives.

How have you or could you overcome them?

To overcome these challenges, one possible solution is to allocate more time within the school schedule for teachers to tend to the garden and to organise visits to the recycling and composting plant. This would help integrate the intervention more effectively into regular school activities and reduce the burden on individual staff members.

Additionally, maintaining regular communication and collaboration with the local council and the recycling centre is essential.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

A key element of the intervention depends on the involvement of external actors, particularly the local municipality and the recycling and composting plant. These entities are responsible for providing essential support and services, such as installing organic waste containers, facilitating educational visits to the plant, and supplying compost for the school garden.

Since these actors operate outside the school's direct control, their level of commitment, availability of resources, and coordination efforts can significantly influence the success of the intervention.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with external stakeholders — particularly the city council and the recycling and composting plant — has encountered some limitations. The collaboration with the municipality has faced challenges, especially in the timely provision of organic waste containers and in carrying out certain preparatory tasks required for the school garden.

Similarly, difficulties have arisen in securing a supply of organic fertiliser from the recycling plant. These issues have impacted the smooth implementation of the intervention.

What has enabled or could promote cooperation?

Stronger coordination and a clear commitment from external partners — such as the city council and the recycling and composting plant — are essential to fully achieving the project's objectives. Cooperation could be further promoted by improving institutional relationships through regular meetings, open communication channels, and joint planning sessions. Involving, when possible, other public bodies at a higher administrative level could also help reinforce the importance of the intervention, ensure political and technical support, and facilitate the allocation of necessary resources.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The intervention is expected to generate a multidimensional impact, addressing learning, collective change, and environmental performance simultaneously. At the individual level, it promotes waste management competences, basic circular economy skills, and sustainable attitudes. By helping students recognize waste as a valuable resource, the initiative encourages behavioral change rooted in knowledge and environmental awareness.

Collectively, the project aims to establish a recycling culture within the school. Through hands-on, participatory activities foster shared responsibility and collaboration among students, teachers, and the wider school community.

From a technical and material perspective, the introduction of organic waste bins and the use of compost from the "La Campiña" plant are expected to improve the school's waste management practices and reduce its environmental footprint.

How do you presume the change could happen?

Change is expected to happen through strong collaboration and alignment among key stakeholders — including the school, the city council, and the recycling and composting plant.

By working together toward a shared goal, each actor can contribute its specific resources, expertise, and influence to support the intervention.

The school provides the educational framework and daily engagement with students, the city council can ensure the necessary infrastructure and policy support (e.g. organic waste containers), and the recycling plant offers technical know-how and composting services. This coordinated effort creates the conditions for meaningful behavioral change, the development of circular economy competences, and measurable improvements in environmental performance.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Commitment from all stakeholders to implement the new recycling culture: direct and sustained support from the city council and commitment from the plant to supply the compost needed to fertilize the garden regularly.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Several key factors have contributed to achieving the intervention's goals. First and foremost, the commitment and involvement of the school community — including teachers and students — have been essential, particularly in the educational and awareness-raising components. While maintaining long-term engagement in the school garden presents challenges, especially regarding time and sustained participation, the motivation shown has been a positive driver.

Equally important has been the collaboration with external stakeholders. The support of the recycling and composting plant and the city council has proven to be crucial, particularly in providing technical resources such as compost and organic waste containers. Their continued engagement remains vital for the full implementation and long-term sustainability of the intervention.

What kind of challenges have you faced in your organisation?

The primary challenge faced within the organisation has been the limited availability of school staff time and their capacity to commit to activities beyond their regular teaching responsibilities. Integrating new initiatives — such as maintaining the school garden or coordinating with external partners — often requires additional planning, flexibility, and effort, which can be difficult to manage within the constraints of the existing workload and school schedule.

How have you found, or could you find time and space for the intervention in your organisation?

During the planning stage, dedicated time and space need to be allocated to ensure the smooth implementation of the intervention. This includes coordinating schedules between the school and the recycling plant to select suitable dates, arranging transportation (e.g. bus hire), and preparing the necessary logistical and organizational steps.

Additionally, specific time slots need to be reserved within the school timetable — both for carrying out the activity and for evaluating its outcomes. This structured approach helps

ensure that the intervention is effectively integrated into the school's operations without significantly disrupting existing routines.

Intervention co-planning and co-implementation

- **Implementation tasks**

Part A: Recycling and composting plant

Task 1.- Arrange a visit to the recycling plant for all 5th-grade students, setting available dates with all the relevant parties

Description: Call the plant to check the availability of dates. Search for available coaches for these dates. Hiring the bus. Search and hire coaches.

Responsible: CIEMAT

External expert assistance: Part A: Staff from the recycling plant

ECF4CLIM expert assistance: Part A: Visit management and logistics

Resources needed: Participation of 9 teachers and two CIEMAT researchers

Cost: 0 Euros

Task co-implementation participatory approach:

This intervention was monitored by students, teachers, staff and members of the wider educational community in SCT4 and SCC4 meetings. The teachers have been directly involved in the pre-planning of the visit, in defining the objectives and in the work of planting and maintaining the garden.

Task 2.- Visit to the plant

Description: Visit and tour of the plant, an explanation of the technology of this state-of-the-art plant, which is set to open in 2021, detailing how it works and the importance of recycling properly at home.

Responsible: CIEMAT, CEIP Mozart, Recycling plant "La Campiña"

External expert assistance: Recycling plant staff

ECF4CLIM expert assistance: 2 researchers

Resources needed: 3 buses, 9 teachers, 2 researchers, and time.

Cost: 759 Euros

Task co-implementation participatory approach:

In SCT4 and SCC4 meetings, this intervention was monitored. For the children, the visit to the recycling plant focused on the discovery of technology, awareness of the need for more recycling facilities, and the link between waste and the environmental problems it causes (global, health and natural). At the same time, they become aware of the need to participate in the correct separation of waste at home and to convince and involve their families in this task (they have acquired the knowledge and skills to provide adequate information at home). They

have also become aware of the benefits of recycling organic material to make compost. The adults emphasized the links with the garden. The cooperation of the city council is crucial for the successful operation of the garden (by facilitating/impeding the work necessary for the garden's success). But it is not only the council that needs to be involved, but the teachers also have an important role to play. They ask for time to teach in and about the garden.

Part B: School garden

Task 3.- Purchase the necessary materials

Description: Purchase the necessary materials to start planting this year. Carrying out the sowing, maintenance and harvesting. Work with the local council to prepare the land for the orchard.

Responsible: CEIP Mozart, CIEMAT, City Council

External expert assistance: City council

ECF4CLIM expert assistance: Researchers

Resources needed: Gardening material

Cost: 895 Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Visit to the plant

  Milestone 2: Gardening material purchased

  Milestone 3: Evaluation of the intervention

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Evaluation report

- **Cost (Equipment /consumables /others)**

  Total cost: 1654 Euros

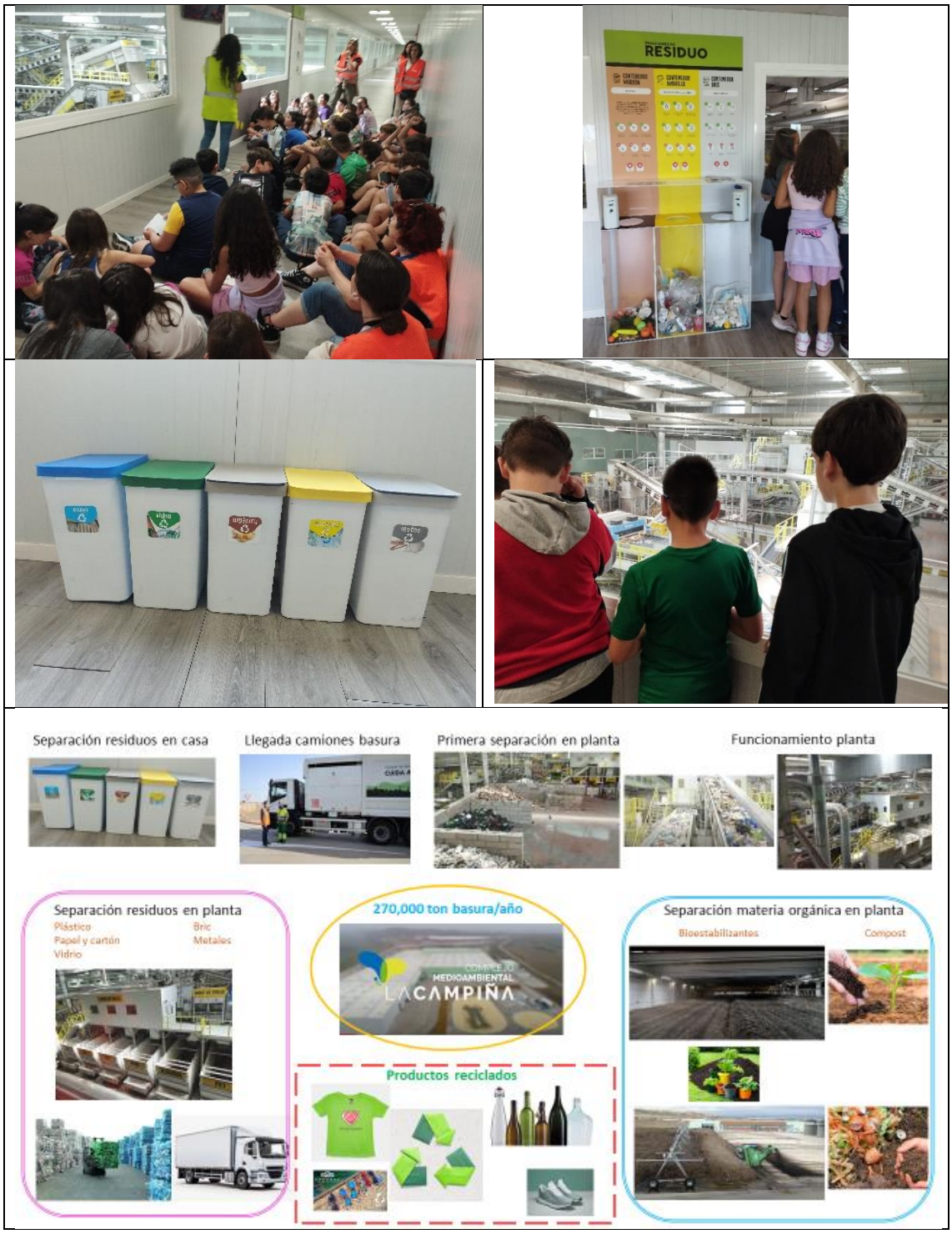
- **Intervention implementation comonitoring strategy**

  Implementation of the co-monitoring approach:

  A short survey and deliberative workshops led by the researchers and the director, secretary and teachers were conducted.

  Responsible: CIEMAT research team

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

External Support and Engagement Challenges

A significant challenge encountered was the unwillingness of external entities to provide support. Specifically, both the city council and the local recycling plant have refused to supply compost, citing industrial sales as their reason. The City Council has also been unresponsive to the school's requests, indicating a clear lack of commitment at the highest levels. It appears they do not recognise the benefits of this initiative, which severely hinders its progress.

To foster greater engagement, it is crucial to modify curriculum regulations to allocate dedicated hours for these projects.

Teachers also have an important role to play. They ask for time to teach in and about the garden. There is also an understanding that extra-curricular classes could be offered in the garden, which would allow families to get to know it and participate in its upkeep, especially during the summer season when school is closed. They recognize that in large and urban schools it is more difficult to obtain the cooperation of families than in schools located in small towns. The success of the garden also depends on the weather, which is becoming increasingly extreme.

Systemic Connections and Resource Deficiencies

If the intervention is not formally programmed into the school's General Annual Program (PGA), special service commissions must be requested for off-site activities, adding bureaucratic hurdles. As mentioned, the Ministry of the Environment's and the recycling plant's refusal to provide compost, along with the City Council's unresponsiveness, highlight a pervasive lack of support. This top-level lack of commitment from the council, seemingly due to a failure to grasp the benefits of the initiative, creates a significant barrier.

The ongoing development of the LOMLOE (education law) should ideally allocate a specific budget for schools engaged in such projects, enabling them to develop these activities fully. Furthermore, local and regional administrations (CAM and city councils) must actively coordinate and collaborate, providing essential resources and personnel.

Vision for Integrated Collaboration

The ultimate vision is for the school, city council, and recycling company to work cohesively towards the same objectives, with active support from the regional administration (Territorial Area Directorate DAT), which oversees schools.

Achieving this vision, however, faces practical obstacles: the lack of cooperation in compost supply, insufficient budget for dedicated staff and working hours, and inadequate funding for necessary materials. There is a clear need for incentives for school staff, such as bonus pay, to encourage participation in these activities. A specific budget for purchasing compost or compost bins is also vital, enabling the school to produce its own compost from canteen organic waste. While awareness of the benefits exists, resources are severely lacking.

SP-DS02-IN07.- Planting trees in the school

General data

Description:

This intervention consisted of a planting session in the schoolyard, where the children learnt about the benefits of plants and how to plant and care for a tree. Working in groups of five or six with an adult supervisor, the children carried out tasks such as digging the planting hole, removing the plant from its pot, placing the plant in the hole and filling it with soil, and watering.

This intervention took place over two sessions.

- Part A) Planting trees in the school (November 2024). The first session involved tree planting and included a workshop on planting procedures and the environmental benefits of native vegetation delivered by CIEMAT researchers.
- Part B) Visit to Arba Greenhouse located in Tres Cantos (March 2025). The second session involved a visit to the ARBA[1] greenhouse, including workshops on greenhouse and plant nursery work, identifying plant species (including medicinal plants and their healing properties), and composting organic matter from vegetation for use as fertilizer.

Participants and profile: This intervention involved 75 pupils of 4th grade and three teachers from CEIP Mozart Primary School.

SCT and SCC representatives:

3 students of 4th grade + Several teachers of school

- **Focus (nature, objectives, pre-conditions, time scope)**

  - Nature of the intervention:

    The intervention addresses individual competences by building knowledge and skills related to planting vegetation, fostering positive attitudes, and raising awareness of its environmental importance. It also strengthens collective competences through effective logistics, long-term collaboration with ARBA, and strong organisational support and clear guidance from school management, including the inspirational involvement of the headmaster, all of which boost student motivation and participation. Finally, it develops technical and material competences by enabling the measurement of concrete environmental impacts—such as an estimated 95 kg CO_2 sequestered per year—while improving the school's microclimate, biodiversity, and soil quality, with positive effects extending to the surrounding urban environment.

  - Short description of the objectives:

    Objectives:

[1] ARBA. ASSOCIATION FOR THE RECOVERY OF NATIVE FORESTS. The main objective of the ARBA is to plant native species of trees, protect native forests, and restore or improve degraded areas. They organise monthly meetings at the association's classroom and nursery. https://www.arba-trescantos.org/nosotros/

        - Individual competences: Learning to plant and care for various trees and bushes, fostering positive attitudes toward plant maintenance, and understanding vegetation's environmental significance.
        - Collective competences: Promoting cultural awareness of plants' roles in carbon sequestration, climate change mitigation, oxygen production, biodiversity enhancement, soil conservation, and erosion prevention through participatory learning.
        - Environmental performance: Plantations aimed at improving microclimate regulation and sustainability within schools and urban areas.
    - Time scope of the intervention:

      Some of the objectives are short-term, especially those related to raising awareness. In the medium to long term, there are issues related to regulating the microclimate and improving school sustainability.
- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Students demonstrated strong motivation and a willingness to apply the knowledge acquired during the planting activity, reflecting an increased awareness of the value and benefits of vegetation and care for nature. Collective efforts were key, including the coordinated logistics to manage the planting process, such as the free provision of seedlings by the Arba Association, their transportation from ARBA Tres Cantos to the school, and the preparation of the planting area by the school leading team. These combined resources and actions enabled an effective and well-supported intervention.
    - Main risks and uncertainties:

      A critical aspect is the lack of support from the city council in preparing the land and digging the holes. A critical issue is the lack of support from the city council regarding the preparation of the land and digging of the holes. Another critical aspect was the careful coordination between the collection of the plants from ARBA and the planting at school, which had to be synchronised to prevent seedling loss. In contrast, the visit to the ARBA greenhouse posed no such risk, as it could be planned in advance once the dates were agreed and transport secured.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The intervention fosters individual competences—knowledge, skills, and positive attitudes toward vegetation—while strengthening collective capacities through collaboration with ARBA, effective logistics, and strong school leadership that enhances student engagement. It also builds technical and material competences by measuring environmental impacts (e.g., 95 kg CO_2/year sequestered) and improving the school's microclimate, biodiversity, and soil quality.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The strong engagement and interest within the educational community have been driven by the active commitment of key actors. The school management played a crucial role by supporting and promoting the tree planting activity from the outset, ensuring alignment with educational goals and student involvement. Teachers and researchers from the ECF4CLIM project also contributed significantly, both through their active participation in the planting and by providing scientific and pedagogical context that enriched the experience. Additionally, the collaboration with ARBA—including a visit to its facilities and the involvement of dedicated volunteers—fostered a sense of shared purpose and environmental responsibility. This multi-actor collaboration created a motivating environment that encouraged active participation and reinforced the educational value of the intervention.

Have you encountered challenges in engaging people? What are they?

On the school side, the activity was integrated into the curriculum—specifically aligned with one of the units of the 4th-grade primary class curriculum (*Unit 4 Plants*)—and carried out during regular school hours, which facilitated the involvement of both teachers and students. Collaboration with ARBA was also very positive, with the president and volunteers offering flexible participation options and accommodating the school's schedule. This shared interest and adaptability helped prevent engagement barriers. However, a key challenge was the limited support from the City Council, which posed some risks to the implementation, particularly in relation to preparing the planting site and ensuring the necessary infrastructure.

How have you or could you overcome them?

To overcome the lack of support from the City Council, we would need to rely on early planning and proactive communication to anticipate needs and reduce dependency on last-minute responses. Strengthening alliances with other committed stakeholders, such as ARBA and CIEMAT, helped maintain momentum and ensure continuity.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Several key aspects of the intervention depend on external actors and circumstances beyond our direct control. The availability of seedlings and the timing of their collection rely on ARBA and its volunteer staff, who manage their own schedules and resources. Similarly, the support of the City Council is essential for preparing the land before planting, and their capacity to act depends on municipal priorities and planning. Weather conditions also play a critical role, as they can affect the survival of seedlings and the scheduling of outdoor activities. Additionally, transport logistics—such as the use of a vehicle to move seedlings from ARBA to the school—depend on the availability and coordination with third parties.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation has been smooth and productive. ARBA provided seedlings and hosted the school visit, and CIEMAT researchers supported logistics and transport. Most actors showed strong commitment and effective coordination, which greatly contributed to the success of the

intervention. However, the limited support from the City Council created some challenges, particularly regarding the preparation of the planting site, highlighting the need for stronger institutional involvement in future actions.

What has enabled or could promote cooperation?

Cooperation has been enabled by the shared environmental values and educational goals among the partners. Maintaining the connection established between the school and ARBA is key to promoting ongoing collaboration through activities such as tree planting, nursery visits, workshops, and landscape restoration. These joint efforts help foster a culture of native plant conservation and strengthen long-term partnerships. To further enhance cooperation, stronger involvement and commitment from the City Council would be beneficial, especially in supporting the logistical and technical aspects of future interventions.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The intervention aims to promote meaningful learning by connecting classroom content with hands-on environmental action, fostering environmental awareness and responsibility among students. In the long term, it also seeks to contribute to systemic change by strengthening collaboration between schools, local organizations, and environmental actors. Additionally, the activity has a direct positive impact on environmental performance by increasing vegetation cover, enhancing biodiversity, and sequestering carbon.

How do you presume the change could happen?

Change is expected to happen through experiential learning and sustained collaboration. By engaging students in hands-on activities like planting and caring for vegetation, they develop knowledge, skills, and values that promote long-term environmental stewardship. At the same time, continued cooperation between schools, local organisations, and public institutions can help integrate these practices into the educational culture, gradually influencing broader attitudes and behaviours within the community.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The strong commitment of all stakeholders to promote the renaturalisation of the school environment has been essential in shaping a shared vision of the intervention's long-term impact. Involving parents and grandparents in the planting process could further reinforce this vision by strengthening intergenerational learning and community bonds. Expanding family participation beyond the school—such as in local reforestation initiatives—could further support the recovery of native forests and help build a more sustainable and environmentally engaged future.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Achieving our goals has been possible thanks to the strong collaboration between the school, ARBA, and CIEMAT researchers. Clear coordination shared environmental values, and the integration of the activity into the school curriculum have ensured effective implementation.

The active involvement of all stakeholders and the enthusiasm of students have been key drivers of success.

What kind of challenges have you faced in your organisation?

The main challenge has been coordinating schedules between the school and ARBA volunteers, who manage the greenhouse and have limited availability. Planning visits and planting activities requires careful attention to timing and flexibility from all parties involved. Additionally, the involvement of the City Council is essential for preparing the planting area, making their timely support a critical factor for the success of future interventions.

How have you found, or could you find time and space for the intervention in your organisation?

Time and space for the intervention have been secured through careful planning and coordination among the school, ARBA, and CIEMAT. Agreeing on suitable dates in advance has been essential to organizing the activities effectively. For visits to the ARBA Greenhouse, timely administrative procedures—such as arranging bus rentals—are required. Additionally, time is allocated within the school schedule to reflect on and evaluate the activities, ensuring their educational value.

Intervention co-planning and co-implementation

- **Implementation tasks**

Part A: Planting trees in the school

Task 1.- Selection and collection of plants provided by Arba

Description: Contact ARBA and select the native plants available in their facilities and suitable for planting at the school. Collection and transfer of the plants from ARBA's facilities to the school.

Responsible: CIEMAT

External expert assistance: President and volunteers from the Arba Association

ECF4CLIM expert assistance: Contacts, management and logistics

Resources needed: CIEMAT researchers and ARBA volunteers

Cost: The seedlings were provided at no cost by ARBA

Task co-implementation participatory approach:

Task 2.- Planting at the school

Description: Planting at the school, by the students of the 3 classes of 4th grade of primary school and their teachers, together with the indispensable support of the Director and the Secretary of the school. At the end of this activity, the intervention was evaluated using short surveys and deliberative workshops

Responsible: CIEMAT, CEIP Mozart

External expert assistance:

ECF4CLIM expert assistance: 2 researchers

Resources needed: Director and secretary of the school, 2 teachers, 2 Ciemat researchers, seedlings, time

Cost: 0 Euros

Task co-implementation participatory approach:

The school was directly involved in the pre-planning of the planting, in defining the objectives, and continued to be involved jointly with the teachers and students in the work of planting the different species in the school.

The intervention was monitored through SCT/SCC3 meetings with active participation from students, teachers, the leading team, parents, and other members of the educational community. NGOs were also involved, including a representative from ARBA, ensuring diverse perspectives and shared responsibility in evaluating the progress and outcomes of the initiative.

Task 3.- Part A: Planting maintenance

Description: Maintenance of the planting of trees and shrubs throughout the entire life cycle of the vegetation

Responsible: CEIP Mozart, City Council

External expert assistance: School and Town Hall.

ECF4CLIM expert assistance: Researchers

Resources needed: General plant care (watering, replacement of dead or sick plants, fertilizing, pruning, etc.).

Cost: 0 Euros

Task co-implementation participatory approach:

Part B: Visit to ARBA Greenhouse

Task 4.- Planning of the visit to the Arba facilities

Description: Contact ARBA volunteers and the school to schedule the dates for the visit to the Arba greenhouse, nursery and recovery native forest

Responsible: CIEMAT

External expert assistance: Arba volunteers

ECF4CLIM expert assistance: Contacts, management and logistics

Resources needed: ARBA volunteers, Ciemat researchers, and staff from the school

Cost: 0 Euros

Task co-implementation participatory approach:

The planning of this activity was discussed at one of the SCC meetings where an ARBA volunteer participated.

Task 5.- Planning transport to the site

Description: Hiring of buses to transport children, teachers and researchers to the ARBA greenhouse

Responsible: CIEMAT

External expert assistance: Bus company

ECF4CLIM expert assistance: 1 Ciemat researcher

Resources needed: Three buses to move 3 classes of 4 grades of Primary Education

Cost: 990 Euros

Task co-implementation participatory approach:

Task 6.- Visit to the ARBA greenhouse

Description: Visit to the ARBA greenhouse, where there were workshops on greenhouse and plant nursery work, identifying plant species (including medicinal plants and their healing properties), and composting organic matter from vegetation for use as fertilizer. At the end of these activities, the intervention was evaluated using short surveys and deliberative workshops

Responsible: CIEMAT

External expert assistance: Bus company

ECF4CLIM expert assistance: 1 Ciemat researcher

Resources needed: printed short surveys, cardboards and pens

Cost: 0 Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Production of educational materials on how to carry out planting at school by children

  Milestone 2: Production of educational material explaining the environmental benefits of vegetation.

  Milestone 3: Planting native Mediterranean vegetation species at school

  Milestone 4: Visit and Workshop in the ARBA greenhouse and plant nursery

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Evaluation report

- **Cost (Equipment /consumables /others)**

  Total cost: 800 Euros

- **Intervention implementation co-monitoring strategy**

Implementation of the co-monitoring approach: A short survey and deliberative workshops led by the researchers were conducted for both Part A and Part B.

The intervention was monitored through SCT/SCC3 meetings with active participation from students, teachers, the leading team, parents, and other members of the educational community. NGOs were also involved, including a representative from ARBA, ensuring diverse perspectives and shared responsibility in evaluating the progress and outcomes of the initiative.

Responsible: CIEMAT research team

- **Photographs of the intervention implementation**

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- **Troubles during implementation, conclusion and lessons learnt.**

Logistics and Unreliable External Support

The transportation of seedlings from ARBA Tres Cantos to the school was handled by CIEMAT researchers, utilising a car. A critical pre-activity step was the preparation of the land for planting. This task, however, fell to the school's director and secretary due to the lack of assistance from the city council's gardeners. Their direct involvement in preparing the ground and digging holes was absolutely crucial; without it, the planting activity simply could not have proceeded, and the plants might have died.

This highlights a recurring challenge: the unreliability of city council support. While the director and secretary stepped in this time, future planting initiatives will critically depend on logistical support from the city council. The typical main hurdle remains coordinating schedules and securing the time availability of Arba volunteers.

Expanded Activities and Tangible Outcomes

The second part of this intervention (the collaboration with the ARBA association and the visit to its greenhouse) was integrated during the execution of the intervention. This addition allowed for the implementation of various educational activities related to native Mediterranean vegetation and their multiplication that were not initially planned. This expanded scope of this intervention led to a significant increase in the school's green areas. This included the planting of 30 lavender and 2 rosemary shrubs, along with 11 tree seedlings (2 walnut, 2 apple, 2 almond, 3 strawberry, 1 juniper, 1 maple and 1 ash tree), totalling 44 new plants. The estimated environmental benefit from this new plantation is an annual CO2 capture of 95 kg.

SP-DS02-IN09.- Expand the school garden: "The garden as Pride of the school"

General data

Description: This intervention involved planting seedlings in the school garden, which had been previously germinated by students in class with the guidance of their teachers. To carry out the activity, seeds, farming tools, an insect house, and other necessary materials were purchased in advance. Prior to the planting, a presentation was prepared to explain the objectives of the school garden and the different phases of the planting process.

In addition, a poster was created to illustrate the interconnections between several interventions implemented at CEIP Mozart (SP-DS02-IN02, SP-DS02-IN04, SP-DS02-IN07, SP-DS02-IN09, and SP-DS02-IN01), all related to the organic matter cycle. The poster highlighted how organic waste generated at the school can be composted to produce fertiliser for gardens, green areas, and forests—thus exemplifying a closed-loop system that reinforces the concept of circularity in nature.

- **Participants and profile:**

  Students of 4th, 5th and 6th grade of primary school

  SCT and SCC representatives: 3 students per grade (4th, 5th and 6th) and 2 teachers

- **Focus (nature, objectives, pre-conditions, time scope)**

  - Nature of the intervention:

    The intervention promotes individual competences by developing students' knowledge and skills related to growing vegetables—from seed to harvest—while deepening their understanding of the organic matter cycle. It fosters positive attitudes towards sustainable and healthy eating habits and raises awareness about the environmental and health benefits of consuming organic food free from pesticides and synthetic fertilisers. At the collective level, the intervention is supported by strong organisational structures and clear guidance from school leadership. The inspirational involvement of the leading team plays a key role in boosting student motivation and participation. In addition, the intervention strengthens technical and material competences through the creation and maintenance of a dedicated green space for vegetable cultivation within the school grounds.

  - Short description of the objectives:

    The main objectives are:
    - Learn to plant vegetables, greens, and fruit trees in the garden
    - Understand how the organic matter cycle is completed
    - Understand the organic matter cycle in the garden and natural ecosystems
    - Understand the relationship between the school's organic garden and sustainable and healthy eating.

- Raise awareness about the proper separation of organic waste.
- Raise awareness about the environmental and health benefits of eating organic food free of pesticides and synthetic fertilizers.

- Time scope of the intervention:
  Some of the objectives are short-term, especially those related to raising awareness and those of learning gardening techniques. In the medium-too long term, there are issues related to improving eating habits and healthy diets as well as increasing the green areas of the school.

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

  The effectiveness of the intervention depends on several critical preconditions. In terms of individual competences, students must be given opportunities to develop both knowledge and hands-on skills related to vegetable cultivation, alongside an understanding of ecological processes such as the organic matter cycle. This should be done in class and integrated into the curriculum. In terms of collective competences, the strong commitment and clear guidance from school leadership have proven to be essential. The active and inspirational involvement of a dedicated core team helps to build a sense of purpose, enhances student motivation, and ensures consistent participation. As for the technical and material infrastructure, the intervention requires access to appropriate physical space and specifically, a well-maintained green area for cultivation within the school premises equipped with the necessary materials, infrastructures and tools.

  - Main risks and uncertainties:

  The intervention faces several potential risks. First, decreasing student engagement if activities are not well integrated into the curriculum or perceived as relevant is an important potential risk that can reduce the effectiveness of the intervention. Second, the over-reliance on a few key individuals (the leading team), may affect continuity if they leave or reduce involvement. In addition, insufficient technical resources or maintenance works may lead to the deterioration of the green area. Additionally, lack of institutional support from the city council could disrupt the initiative mainly affecting the maintenance works. Finally, environmental factors (e.g. weather, pests) may affect cultivation outcomes and hence motivation.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The intervention aims to promote individual competences by developing students' knowledge and skills related to growing vegetables, and the organic matter cycle. It also fosters positive attitudes towards sustainable and healthy eating habits and raises awareness about the

environmental and health benefits of consuming organic food free from pesticides and synthetic fertilisers. The intervention also aims to reinforce the already strong organisational structures and guidance from school leadership around this activity (the school is already offering healthy meals to their students). In addition, the intervention strengthens technical and material competences through the creation and maintenance of a dedicated green space for vegetable cultivation within the school grounds.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The school garden is the pride of the school. It is an activity that was initiated several years ago, in which the educational community, led by the management team, has been involved for a considerable time. Children are highly motivated to participate in this activity. In addition, the strong commitment of the management team, some teachers, and researchers involved in the ECF4CLIM project has significantly contributed to fostering a sense of ownership and enthusiasm throughout the educational community. Regular involvement in the garden's activities, and visible results from students' work can further enhance engagement and sustained interest over time.

Have you encountered challenges in engaging people? What are they?

One key difficulty is that gardening activities, such as seedling preparation, require active participation from teachers. However, during spring, the school schedule becomes very tight, leaving both teachers and students with limited time. The principal and the school secretary have expressed concerns about the lack of cooperation from some teachers, pointing out that they often have to take on the majority of the workload themselves. They have called for greater involvement and support from the teaching staff to ensure the sustainability and success of the project.

How have you or could you overcome them?

To overcome these challenges, good coordination with the school staff is essential. Ensuring clear communication and shared responsibilities among all members of the educational community can help balance the workload. Scheduling the intervention during school hours has proven effective in facilitating participation, as it aligns the activity with the existing timetable.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Several external factors, actors, and uncertainties influence the intervention and are beyond the direct control of the school. One key issue is the necessary institutional support from the city council, particularly regarding maintenance of the green area. Without their collaboration, essential tasks such as irrigation system upkeep or structural repairs may be compromised. Environmental conditions, such as adverse weather or pest outbreaks, also pose risks to the success of the cultivation and can affect students' motivation if outcomes are poor. Additionally, the availability of technical resources or external suppliers (e.g. tools, compost, seedlings) can impact on the quality and feasibility of the intervention. These factors, while external to the school's direct control, are essential to ensure long-term success.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with external stakeholders has been generally positive, although it remains limited in scope. Collaboration with the city council has provided valuable support, particularly in the form of technical advice. However, the level of involvement from these actors is low. The potential for stronger partnerships exists, especially with the city council, and parents' associations, whose support could enhance the sustainability of the intervention.

What has enabled or could promote cooperation?

Cooperation has been enabled by the positive relationship and shared commitment among the school's management, teaching staff, and the ECF4CLIM project team. The willingness of all parties to work together towards a common goal has created a supportive and collaborative environment. Involving more teachers in the decision-making process can also strengthen engagement and shared responsibility.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The intervention aims to achieve impact on all three levels. First, it seeks to promote learning by engaging students in hands-on activities related to the ecological production of food, fostering awareness of sustainability, food systems, and healthy eating habits. Secondly, the goal is to change the school system by the curricular integration of gardening activities, and the inclusion of healthier food options into school meals. Finally, the intervention aspires to improve the school's environmental performance by enabling the management and reuse of organic waste generated on-site. Collecting organic residues in special containers installed by the city council will allow the production of compost. The use of this compost in gardening a ctivities would reduce the school's environmental footprint and close the loop between consumption and waste, increasing the circularity of the school activities.

How do you presume the change could happen?

Change is expected to occur through a combination of awareness raising, curricular integration, and community engagement. Raising children's awareness about sustainable and healthy eating—through their active participation in the school garden—can have a ripple effect, encouraging families to adopt more sustainable consumption habits, such as purchasing local and organic products. Institutional change can be promoted by integrating gardening activities and related content into the school curriculum and the Annual General Plan. In addition, engaging a broader group of teachers in the activities is crucial to distributing responsibilities. Finally, advocating for support from the city council—particularly in installing organic waste containers at the school—would reinforce the environmental dimension of the intervention and contribute to systemic change within the community.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Several factors have helped in envisioning the expected impact and shaping the preferred future. First, the active involvement of students in the school garden has made it clear that hands-on experiences can effectively promote awareness and learning about sustainability. Second, the collaboration with the ECF4CLIM project has provided valuable insights and

methodological support. Looking ahead, greater involvement of families and stronger cooperation with local authorities could further support the development of a shared vision and create the conditions for lasting impact.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Good coordination between the school and CIEMAT has been key to achieving the goals of the intervention. Open communication and mutual commitment have facilitated planning and implementation.

What kind of challenges have you faced in your organisation?

The main challenge has been coordinating schedules between CIEMAT researchers and school teachers. Aligning availability can be difficult, especially during busy periods in the academic calendar.

How have you found, or could you find time and space for the intervention in your organisation?

Time and space for the intervention are secured through joint planning between the school and CIEMAT. Suitable dates are agreed upon in advance, and specific time slots are also reserved for activity evaluation.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1. Purchase of materials for the garden by the ECF4CLIM project

Description: Purchasing the necessary materials for the garden's activity

Responsible: CIEMAT

External expert assistance:

ECF4CLIM expert assistance: Administrative personnel and researchers by Ciemat

Resources needed: Ciemat researchers

Cost: 895 Euros

Task co-implementation participatory approach:

Task 2.- Preparation of the presentation of the activity to the children

Description: PowerPoint presentation explaining in a fun way the different steps to planting a vegetable in the school garden. Presentation of the School Garden Calendar and Planning. Making a poster about the cycle of organic matter. Making a puzzle of the poster about the cycle of organic matter

Responsible: CIEMAT

External expert assistance:

ECF4CLIM expert assistance: Researchers by Ciemat

Resources needed: Researchers by Ciemat

Cost: 0 Euros

Task co-implementation participatory approach:

Task 3.- Schedule the activity

Description: Contact the school to schedule the intervention

Responsible: CIEMAT

External expert assistance:

ECF4CLIM expert assistance: Ciemat researchers

Resources needed: Staff, teachers, Ciemat researchers

Cost: 0 Euros

Task co-implementation participatory approach:

Task 4.- Educational activity - School garden

Description: Presentation of the intervention to the children in class, followed by the planting of vegetables and fruits in the school garden.

Responsible: CIEMAT

External expert assistance:

ECF4CLIM expert assistance: Researchers Ciemat

Resources needed: School teacher and staff, Ciemat researchers

Cost: 0 Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Garden material purchase

  Milestone 2: Development of Educational Materials for the Intervention.

  Milestone 3: Evaluation of the intervention

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Educational materials on planting the school garden

  Output 3: Evaluation report (short survey results and deliverative workshop)

- **Cost (Equipment /consumables /others)**

  Total cost: 895 Euros

- **Intervention implementation co-monitoring strategy**

  Implementation of the co-monitoring approach:

  A short survey and deliberative workshops led by the researchers was conducted at the very end of the intervention.

  Responsible: CIEMAT research team

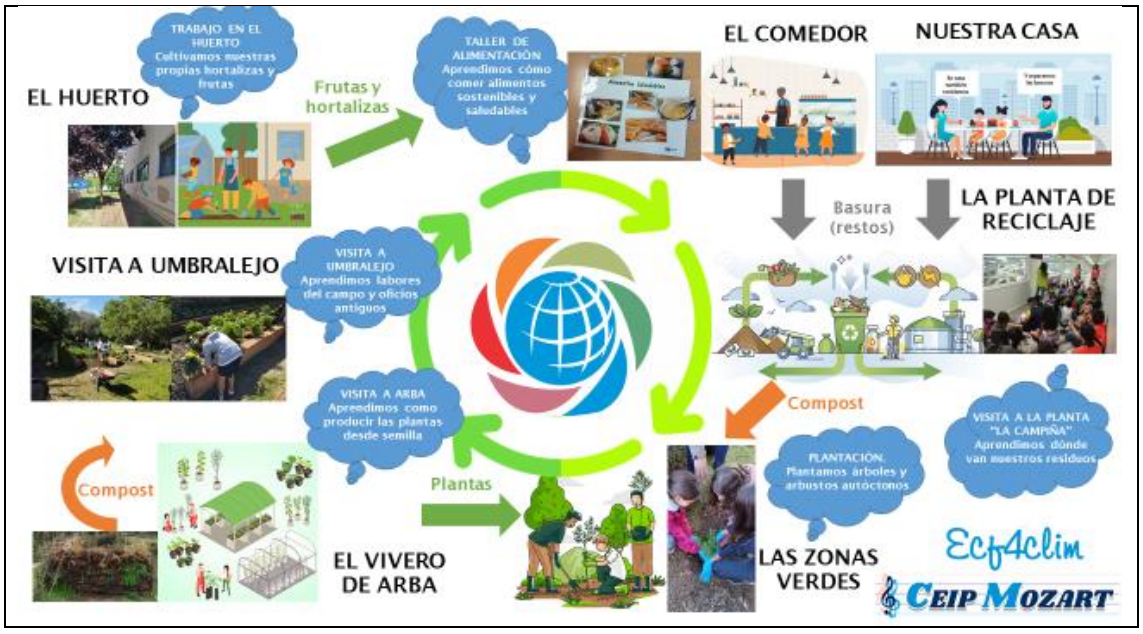
- **Photographs of the intervention implementation**











- **Troubles during implementation, conclusion and lessons learnt.**

Engagement Challenges and Adaptations

While the activity was initially designed for all three 4th-grade classes, tight schedules for students, teachers, and CIEMAT researchers ultimately limited the intervention to only the 4th B class. This highlights the ongoing challenge of coordinating the availability of multiple stakeholders within a school setting.

Converging Visions and Positive Outcomes

Despite initial engagement limitations, several factors converged to the installation of the organic matter composters at the school, aligning with the objectives of the ECF4CLIM project. The school itself had already requested specific containers. The City Council began installing these containers in Alcalá de Henares. This collective push resulted in the successful installation of composting containers, leading to a tangible improvement in the school's environmental performance.

Educational Materials and Lessons from Implementation

A range of educational materials was developed for the intervention: a PowerPoint presentation explaining vegetable planting steps, a School Garden Calendar and Planning presentation, and a poster and puzzle illustrating the organic matter cycle. However, the organic matter cycle puzzle was ultimately not used during the intervention. It proved too complex for 4th graders and required an excessive amount of time to assemble; a valuable lesson learned for future material development.

SP-DS02-IN10- ECF4 Learning Space Retrofitting Toolkit

General data

Description:
This intervention involved making use of the ECF4CLIM digital platform, particularly the Retrofitting Toolkit (https://ecf4clim.smartwatt.net/simulators-space/). The Retrofitting Toolkit is one of the user-friendly tools developed in the ECF4CLIM project to provide demonstration sites, educational communities and citizens with a set of tools to evaluate the environmental performance of educational buildings and individuals, and to simulate the effect of interventions on key environmental parameters.
In particular, the Retrofitting Toolkit provides a set of functionalities to assess building performance:
- Surface maps of climatic and energy characteristics to facilitate the efficient and sustainable design of buildings
- Building energy performance tool to evaluate the energy savings achieved by implementing various retrofitting measures.
- Visualisation tools to assist in designing energy-saving retrofitting measures in buildings.
The intervention consisted of an explanation of the basic concepts affecting comfort and energy efficiency in buildings and a presentation of the tool to students at CEIP Mozart. Several practical experiments measuring environmental parameters such as temperature and heat transmission served to illustrate the introduced concepts.

Participants and profile:

25 students in the 6th grade of primary school

- **SCT and SCC representatives:** 3 students of the 6th grade and 1 teacher

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:
      The intervention promotes individual competences by enhancing students' knowledge and skills related to energy efficiency in buildings. It deepens their understanding of the thermal performance of buildings by exploring key factors such as local climate, building type, geometry, and construction characteristics. The intervention also encourages positive attitudes and awareness regarding energy-saving measures and the reduction of energy demand through simple everyday actions—such as setting indoor temperatures to sustainable levels or wearing warmer clothes to minimize heating needs or more structural measures such as changing the windows at home by more efficient ones or improving the building envelops to reduce heat losses or gains.
      At the collective level, the intervention fosters the adoption of energy efficiency practices within the classroom environment. Students and teachers are encouraged to take shared responsibility for sustainable behaviors, including opening windows for ventilation, adjusting blinds, or switching off lights when not needed—contributing to a common vision of a more sustainable school.

Additionally, the intervention supports the development of technical and material competences through the improvement of thermal comfort in the classroom setting and reducing energy demand and the associated environmental impacts.

- Short description of the objectives:

The main objectives are:

- to introduce the concept of energy efficiency,
- to raise awareness about the environmental (reducing energy consumption, resources, and pollution) and socioeconomic implications (improving comfort and saving money) of energy efficiency measures.
- to inform about the series of bioclimatic strategies that help to reduce energy consumption and to achieve indoor comfort in houses.

- Time scope of the intervention:

The objectives of the toolkit address both short-term and long-term impacts. In the short term, the toolkit raises awareness about the role of energy efficiency in the environmental performance of school buildings (and buildings in general) and introduces passive strategies for heating and cooling that promote thermal comfort without excessive energy consumption.

In the long term, the intervention aims to foster sustained behavioral changes at both individual and collective levels. These changes can extend beyond the school context, potentially influencing students' families and communities by encouraging more energy-conscious habits and decision-making.

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

The effectiveness of the intervention relies on several key preconditions related to individual, collective, and technical/material competences. From an individual perspective, students must be given opportunities to develop both their knowledge and practical skills related to energy efficiency. The highly participatory format of the presentation proved to be very effective in engaging students and enabling them to apply the concepts learned in a hands-on way. To maximize impact, these activities should be conducted in the classroom and ideally integrated into the school curriculum. In terms of collective competences, the commitment and support from the school leadership and teachers are crucial for putting the acquired knowledge and skills into practice. Their guidance helps embed the energy-efficient behaviors learned in the activity into the school culture and daily routines.
Regarding technical and material competences, the intervention depends on the availability and transport of specific resources and equipment—such as the bioclimatic house, anemometer, and alcohol thermometer—which were

successfully provided by the ECF4CLIM research team. Ensuring access to these tools is vital for the practical component of the intervention to be effective.

- Main risks and uncertainties:

  A key risk is the limited integration of the intervention into the school curriculum, which may reduce its long-term effectiveness. Without regular reinforcement, students may not retain or apply what they learn. Another risk is the lack of sustained support from teachers and school leadership, which is essential to promote collective action and maintain energy-efficient practices. Logistical challenges, such as limited access to the necessary materials and equipment, may also hinder the practical aspects of the intervention.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**
  The intervention promotes individual competences by enhancing students' knowledge and skills related to efficiency principles in the built environment and by raising awareness regarding energy-saving measures and the reduction of energy demand. At the collective level, the intervention fosters shared responsibility for sustainable practices within the classroom and school environment. The intervention also supports the development of technical and material competences through the improvement of thermal comfort in the classroom setting and reducing energy demand and the associated environmental impacts.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The commitment and collaboration of school management, teachers, and researchers involved in the ECF4CLIM project have been key to promoting engagement. Their active participation, support, and enthusiasm helped create a positive and motivating environment that encouraged students to take part in the intervention.

Have you encountered challenges in engaging people? What are they?

No significant challenges were encountered. The activity was carried out during school hours with the participation of 6th-grade primary school students and the teacher, once the intervention had been scheduled. The intervention run smoothly and was well-coordinated.

How have you or could you overcome them?

Good coordination with school staff is essential to successfully implement the intervention. Scheduling the activity during regular school hours ensures smooth integration into the school routine and facilitates the participation of both teachers and students.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Several external factors can influence the intervention but are beyond the direct control of our project. The building maintenance policies are managed by the city council, and this can affect the potential for implementing structural energy efficiency measures proposed during this intervention. In addition, the availability of funding or external support may be necessary to scale up or replicate the intervention in other years or to implement structural measures proposed. Time constraints may limit the integration of the content of this intervention into regular school subjects. The family habits at home can influence the application of the energy-saving practices promoted during the intervention.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with external stakeholders has been generally positive, although currently limited. There is significant potential for stronger partnerships—particularly with the city council—whose involvement could support the practical implementation of the measures proposed during the intervention, especially those related to structural improvements in school buildings.

What has enabled or could promote cooperation?

Maintaining the positive attitude and commitment of the school's management and staff is essential for continued cooperation. In addition, establishing regular meetings with city council representatives responsible for the maintenance of school buildings could significantly enhance collaboration and support the implementation of structural energy efficiency measures discussed during the intervention.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The intervention envisions multiple levels of impact. First and foremost, it aims to promote learning and raise awareness within the school community about reducing energy demand and improving the energy efficiency of school buildings. By introducing bioclimatic strategies—such as installing awnings, adjusting blinds, increasing solar gain, or fine-tuning heating and cooling set points—the intervention helps students and staff acquire sustainability competences that can be applied without compromising comfort. The intervention aspires to foster systemic change in how energy is managed within the school. It promotes a collective change in behavior and shared responsibility for energy use. Additionally, it supports the improvement of technical and material competences by encouraging the implementation of concrete energy efficiency measures and structural improvements in the building, contributing to lower energy demand.

How do you presume the change could happen?

Change is expected to occur through a combination of approaches. On one hand, by encouraging children to become catalysts for energy-efficient practices, the intervention can have a ripple effect—spreading awareness and behavioural change to their families. On the other hand, involving the city council is essential to address structural aspects of school buildings. Their

support can enable improvements such as enhancing the thermal performance of the building envelope, replacing windows with more efficient ones, and implementing effective shading strategies.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Parental participation can play an important role in raising awareness and reinforcing simple energy-saving behaviours at home, which supports the overall impact of the intervention. Additionally, funding from the regional government and the city council would be crucial to implement the necessary energy efficiency improvements in the school building—such as replacing windows with more efficient ones or enhancing the thermal performance of the building envelope. These structural changes would complement behavioural efforts and contribute to achieving a more energy-efficient and sustainable school.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Effective coordination between the school and the CIEMAT team has been essential to the success of the intervention. The positive and supportive attitude of the school management and teachers created a collaborative environment that facilitated smooth implementation. Additionally, the students' enthusiastic and participative engagement played a key role in making the intervention both successful and inspiring.

What kind of challenges have you faced in your organisation?

The main challenges were related to scheduling the intervention in a way that accommodated both the availability of CIEMAT researchers—from two different units—and the school timetable. Coordinating across teams during a particularly busy period required flexibility and careful planning to ensure the intervention could take place effectively.

How have you found, or could you find time and space for the intervention in your organisation?

Adequate and advance planning, along with good coordination with the school management team and teachers, has been key to finding the necessary time and space for the intervention. Early communication and collaboration allowed for smooth integration into the school schedule.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparation of the educational materials

Description: Prepare a presentation explaining in a didactic way what the tool is about so that the children can understand the activity, and practical examples of energy efficiency (bioclimatic scaled house, environmental sensors)

Responsible: The school must be directly involved in the planning and execution of the activity

External expert assistance:

ECF4CLIM expert assistance: Researchers of the Energy Efficiency in Buildings Unit. Department of Energy

Resources needed: Ciemat researchers

Cost: 0 Euros

Task co-implementation participatory approach:

Task 2.- Schedule the activity

Description: Contacts the school to schedule the intervention

Responsible: CIEMAT

External expert assistance:

ECF4CLIM expert assistance: Ciemat researchers

Resources needed: Staff, teachers, Ciemat researchers

Cost: 0 Euros

Task co-implementation participatory approach:

Task 3.- Logistics

Description: Transportation of the bioclimatic house model and other materials needed for the intervention

Responsible: CIEMAT

External expert assistance:

ECF4CLIM expert assistance: 4 researchers

Resources needed: Transport of the bioclimatic house scale model

Cost: 0 Euros

Task co-implementation participatory approach:

Task 4.- Educational activity - Retrofitting toolkit at school

Description: Delivering the workshop in the class about the energy performance of buildings making use of the ECF4CLIM tool: surface maps of climatic and energy characteristics for sustainable design of buildings, bioclimatic charts and possible energy savings using retrofitting measures

Responsible: CIEMAT

External expert assistance:

ECF4CLIM expert assistance: Researchers of the Energy Efficiency in Buildings Unit. Department of Energy

Resources needed: School teachers, Ciemat researchers,

Cost: 0 Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Educational materials and the presentation to carry out the activity of energy efficiency prepared

  Milestone 2: Materials transported

  Milestone 4: Workshop delivered

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Presentation of educational materials on the Retrofitting Toolkit

  Output 3: Intervention evaluation report (short surveys and deliberative workshop)

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation co-monitoring strategy**

  Implementation of the comonitoring approach:

  A short survey and deliberative workshops was conducted by the researchers

  Responsible: CIEMAT research team

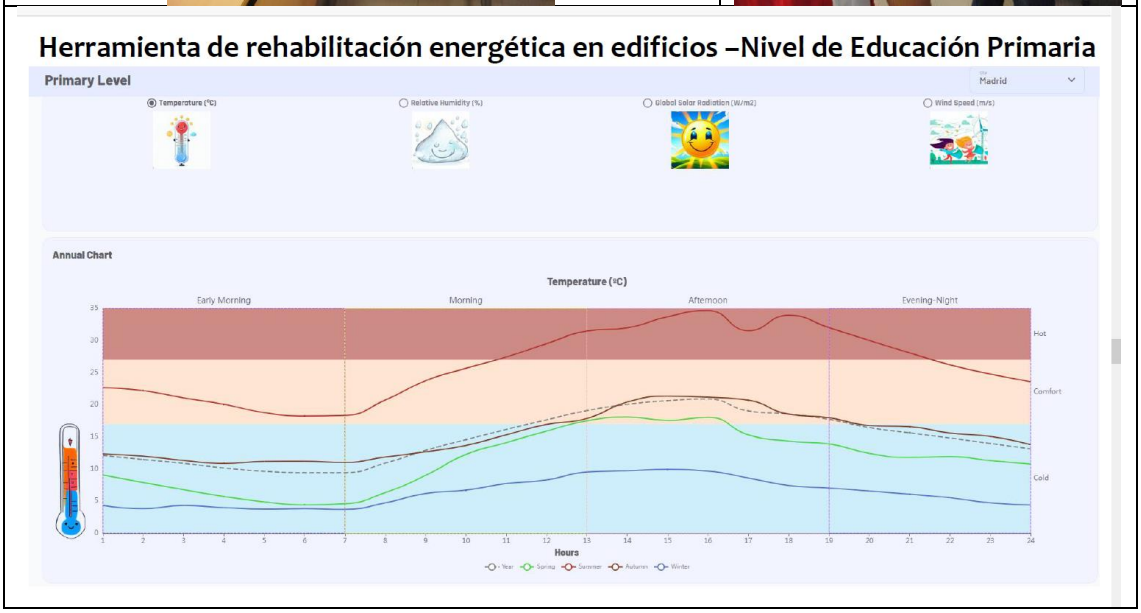
- **Photographs of the intervention implementation**











- **Troubles during implementation, conclusion and lessons learnt.**

While the intervention was successfully implemented, some minor challenges emerged during the planning phase—mainly related to scheduling and aligning the availability of CIEMAT researchers from different units with the school's calendar during a busy period. These difficulties were overcome thanks to early planning, strong coordination with the school staff, and flexibility from all parties involved.

One key lesson learned is the importance of maintaining a collaborative and open communication channel between researchers, teachers, and school management. The enthusiasm and engagement of the students also highlighted the value of hands-on, participatory approaches when addressing complex topics such as energy efficiency.

In conclusion, the intervention proved to be highly effective in raising awareness, promoting sustainability competences, and encouraging both behavioural and systemic change. It also demonstrated that meaningful educational experiences around energy efficiency are possible when technical content is translated into practical and engaging activities.

Moreover, strengthening collaboration with the city council could be key to enabling the implementation of more structural measures proposed during the intervention—such as improving the building envelope or replacing windows with more efficient alternatives—thus complementing behavioural efforts with tangible improvements in the school's energy performance.

7. REPORT ON IMPLEMENTED INTERVENTIONS IN UAB.

School brief description

UAB is a Spanish public university that offers 105 undergraduate courses covering a wide range of fields, including humanities and arts, social sciences, health sciences, experimental sciences, and technical sciences. In addition, UAB offers 67 doctoral programs and 265 postgraduate programs, including Erasmus Mundus master's degrees. UAB has more than 40,000 students and 3760 teachers and researchers. The UAB is situated in the metropolitan area of Barcelona, in the industrial-dominated county of Vallès Occidental. The metropolitan area of Barcelona has a population of about 4 million. The UAB is the second largest university in the area, after the University of Barcelona (UB). The demonstration site is the Faculty of Political Science and Sociology, which has around 1,000 students and 200 teachers.



Figure 7-1.- Universitat Autònoma de Barcelona photographs.

Implemented Interventions Summary

The interventions implemented at the UAB demonstration site are listed in the following table.

Measure Id	***Title***
SP-DS03-IN01	Improving thermal insulation
SP-DS03-IN06	Improve the waste system management at the Faculty level.
SP-DS03-IN07	Facilitate transversal learning spaces.
SP-DS03-IN09	Make data on environmental impacts visible.
SP-DS03-IN11	Designing a more sustainable food system at the university

Table 7.1- Interventions in UAB.

The following table categorises the interventions implemented, considering the area of sustainability to which each is focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
SP-DS03-IN01	Improving thermal insulation	Energy	Air quality	
SP-DS03-IN06	Improve the waste system management at the Faculty level	Waste		
SP-DS03-IN07	Facilitate transversal learning spaces	Educational programs		Teaching materials
SP-DS03-IN09	Make data on environmental impacts visible	Educational programs		Teaching materials
SP-DS03-IN11	Designing a more sustainable food system at the university	Food		

Table 7.2.- Interventions main working areas in UAB.

SP-DS03-IN01- Improving thermal insulation

General data

Description: Improving thermal insulation was one of the measures most demanded by students, faculty and staff. Classrooms are often too hot in the summer and too cold in the winter, so temperature control through thermal insulation is a priority.

- **Participants and profile:** 5 students & 1 teacher

- **SCT and SCC representatives:** 5 students (SCT) & 1 teacher (SCT/SCC)

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      This is a technical measure that involves installing a series of devices (fans) and modifying the window panes (double glazing).

    - Short description of the objectives:

      There are 3 objectives: a) to improve thermal comfort in classrooms, both in winter and summer; b) to reflect with the students on what it implies in terms of energy savings and improvement of classroom conditions (less cold in winter, less heat in summer); c) to organise thermal comfort management better.

    - Time scope of the intervention:

      During the lifetime of the project

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      The necessary technical devices must be installed to improve air conditioning (fans and double-glazed windows).
      Meetings should be held with students to assess the operation of these devices. The commitment of the maintenance and energy technicians (of the university) must be obtained to improve the management of those devices, in accordance (as far as possible) with the perceptions of the students and professors (and thus make a more efficient management).

    - Main risks and uncertainties:

      Risk of a lack of financial resources to purchase and install the devices (fans and double-glazed windows). The university needs to allocate resources, and this is only possible if the action is framed in a strategic plan.

Lack of involvement of students in the assessment of their own operation (it is necessary to dedicate time and space to do so, and these are resources that are always scarce among students and teachers).
The lack of commitment among maintenance and energy technicians to manage those appliances efficiently.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to improve and manage classroom climate control more efficiently?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The main reason for involvement seems to be the low level of thermal comfort in the classrooms.

Have you encountered challenges in engaging people? What are they?

The main obstacle to student and faculty involvement is the lack of time and space to reflect on these things. Moreover, the suspicion is that the improvement of thermal comfort should be dealt with by the university's sustainability technicians (which is expected to be difficult because they do not usually accept such proposals).

How have you or could you overcome them?

We have tried to put the meetings with students in the midday slot, which is when they do not have classes. We have had to bring food to the meetings so that when they leave, they can go directly to the next class. Additionally, we have contacted the Vice-Rector's office and the Sustainability Office to submit a formal request for this improvement. However, despite the support of the vice-chancellor's office, we have not been able to generate interaction with the maintenance technicians, who have done their job but have ignored us.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

In this case, all the actors involved are from the university itself; no external actors are needed. However, within the university, there is a significant disparity in interests and priorities, so even if they are internal actors, it is not easy to reach agreements.

How has the cooperation worked with other stakeholders and actors outside your organisation?

It has not happened.

What has enabled or could promote cooperation?

It has not happened.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Improve environmental performance.

How do you presume the change could happen?

The change will require a significant financial investment by the university (beyond what the ECF4CLIM project can offer). It will require the complicity of many actors in the university (managers, technicians, etc.).

What has helped you or could help you with envisioning the expected impact and the preferred future?

The experiences and forecasts of climate change, particularly repeated heatwaves in the Barcelona area, can serve as a catalyst for this intervention.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The fact that the proposal has emerged from discussions with students and teachers (SCTs) has made the vice-rectorate's office more receptive.

What kind of challenges have you faced in your organisation?

To carry out the intervention requires the agreement and coordination of various internal university services, including architecture, maintenance, sustainability, and the vice-rectorate, among others.

How have you found, or could you find time and space for the intervention in your organisation?

Yes

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparatory work

Description: Establishment of contacts with the university stakeholders responsible for architecture, maintenance, installers, the vice-rectorate of the Campus, etc. Design of the project to improve the thermal comfort in the classrooms (7-12).

Responsible: UAB + Sustainability Office

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Technicians specialising in thermal comfort and building insulation. Time for these technicians and meetings with university managers.

Cost: 0 Euros

Task co-implementation participatory approach: In this phase, the participation is mainly of university staff (vice-rectorate, sustainability office, architecture and works, maintenance technicians, etc.).

Task 2.- Diagnosis of thermal comfort in classrooms

Description: Collecting data on thermal comfort (temperature, humidity, etc., as well as temperature perceptions) in classrooms and holding discussions with students and teachers to define priorities for space and time.

Responsible: UAB & Maintenance technicians

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Devices to measure thermal comfort (humidity, temperature), as well as an assessment meeting to discuss students' perceptions and sensations.

Cost: 0 Euros

Task co-implementation participatory approach: This phase requires the cooperation of the university's maintenance technicians, who must install the thermal/climatic comfort sensors. Also, the students and professors who will participate in the assessment meeting.

Task 3.- Installation of ventilators (fans) and double-glazed windows

Description: Purchase and installation of ventilators and double-glazed windows in classrooms

Responsible: Sustainability office and University maintenance service

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed: A budget to purchase fans and double-glazed windows, and to install them in classrooms.

Cost: 120,000 Euros

Task co-implementation participatory approach: This is typically handled by maintenance technicians. Their participation and coordination are critical. Ultimately, the UAB covered the entire cost of the project, and no resources were required from the ECF4CLIM project.

Task 4.- Evaluation of the intervention

Description: New round of data collection on thermal comfort in classrooms. Debate with students and teaching staff to evaluate the effectiveness of the measure and establish guidelines for action (behavior, regulation of equipment, etc.) that contribute to this improvement (good practices).

Responsible: UAB & Maintenance technicians

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Devices to measure thermal comfort (humidity and temperature), as well as an assessment meeting to discuss students' perceptions and sensations, and the technicians' assessment.

Cost: 0 Euros

Task co-implementation participatory approach: This phase requires the cooperation of the university's maintenance technicians, who must install the thermal/climatic comfort sensors. Also, the students who will participate in the assessment meeting. As mentioned above, we were unable to involve the maintenance technicians in taking care of the students' assessment, so we were unable to complete part of this phase.

- **Milestones**

  Milestone 1: Purchase / install the fans and the double-glazing windows

  Milestone 2: Assessment meeting with students

  Milestone 3: Assessment meeting with technical staff

  Milestone 4: Application of the required adjustments in the management of thermal comfort in the classroom, and establishing good practices

- **Outputs:**

  Output 1: Summary sheet

Output 2: Short report/guidance to replicate the intervention (lessons learnt)

Output 3: Dissemination materials

- **Cost (Equipment /consumables /others)**
  Total cost: 120000 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Meetings with students, teachers and staff

  Responsible: UAB research team

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

Implementation Challenges and Missed Opportunities

While we successfully mitigated a key risk identified in the planning phase – securing the university's commitment to install both fans and double-glazed windows – we faced significant challenges in influencing the implementation of these installations. Upon returning from Christmas holidays, all appliances were installed. However, the technicians responsible for the work proceeded without any consideration for the involvement of students and teachers, overlooking our critical requirements.

Engagement Shortcomings

A notable shortfall was our inability to engage the maintenance technicians who installed the equipment properly. They operated entirely independently, outside of any collaborative relationship with students and teachers. This meant a missed opportunity for valuable interaction and learning.

Unfulfilled Vision and Educational Impact

In terms of environmental improvements, change has indeed occurred. The university's willingness to fully fund the intervention was exceptionally positive, as this was beyond our

project's financial capacity. However, this success was tempered by the university's unwillingness to facilitate discussions with students and teachers regarding the installation process. Consequently, the educational impact of these improvements has been low. While environmental enhancements were achieved, they did not translate into a commensurate development of educational competencies among the students.

Action Constraints

Despite finding the necessary time and space to install the devices and equipment in the classrooms, we were unable to secure time for meaningful discussions with students or with the maintenance technicians. This limitation underscores a critical disconnect between the technical implementation and the intended educational outcomes of the intervention.

SP-DS03-IN06- Improve the waste system management at the Faculty level

General data

Description: The objective of this activity has been to monitor the evolution of waste generated in the Faculty of Political Science and Sociology, in order to make its volume and typologies visible, with the aim of generating a reflection on the environmental impacts of the Faculty and on how to manage them. It was also intended to contribute to the replacement of the current waste garbage cans by selective collection points, more in line with current legislation and trends, as well as to provoke a debate on the issue of waste.

- **Participants and profile:** 6 students & 1 teacher
- **SCT and SCC representatives:** 1 SCT student + 1 SCT/SCC teacher
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Technical (as new bins will be installed in the building), and also individual (because the results will be discussed with the intention of raising awareness among students and teachers).

    - Short description of the objectives:

      To make visible the volume and types of waste generated at the centre.
      Raise awareness of waste issues.
      Improve waste management at the centre by replacing the waste garbage cans (from undifferentiated to selective).

    - Time scope of the intervention:

      During the lifetime of the project

- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Involvement of a group of students as volunteers to weigh and sort waste for a few weeks.
      Obtain the agreement of the school management (Dean's Office) to change the existing waste garbage cans.
      To generate a debate with the students and with those responsible for waste at the university.

    - Main risks and uncertainties:

Lack of student involvement.
Lack of time to be able to do everything.
The refusal of the teachers (and perhaps also of the students) to change the garbage cans.
The possible lack of support from the university's maintenance technicians for changing the litter garbage cans.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Being aware of how much waste we generate (generated in the centre) and how it is managed (individual and collective competences, and also environmental performance)

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The interest has been promoted thanks to a series of conferences that we organised at the Faculty, to which many students (including some from the SCT) have signed up, for which the university has agreed to recognise 2 ECTS credits.

Have you encountered challenges in engaging people? What are they?

With students, there has been no problem involving them. On the other hand, it has been almost impossible to involve the teaching staff.

How have you or could you overcome them?

It would probably be ideal to involve the teaching staff in advance, before the project is underway. However, this was not possible due to a lack of time.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Greater interaction with the garbage collection company would be desirable.

Additionally, the teachers' collective has remained very distant until now.

How has the cooperation worked with other stakeholders and actors outside your organisation?

We have had an excellent relationship with the cleaning company. On the other hand, the relationship with the garbage collection company has been non-existent. It is challenging to reach them.

What has enabled or could promote cooperation?

The intermediary role of the university's maintenance and sustainability technicians has made things much easier.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The aim is to improve environmental performance, but for us, the most interesting aspect is to observe how people's attitudes and behaviors change when they have information about their impacts (in this case, their garbage). We also want to get the institution to change the way it collects garbage.

How do you presume the change could happen?

The change will occur through an effective shift in the way garbage is collected (moving to a system of sorting by type) and by raising awareness among students and teachers about the implications of this volume of garbage.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The visibility of the data on the daily waste produced in the faculty can help raise awareness of what this entails.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The support we have had from the maintenance and sustainability technicians, as well as from the centre's management.

What kind of challenges have you faced in your organisation?

The most challenging aspect is aligning the rhythms of the various services and stakeholders (students, faculty, technicians, etc.). Everyone has a very different agenda, and it makes it difficult to do things together.

How have you found, or could you find time and space for the intervention in your organisation?

Yes, the Faculty has provided us with a room for weighing and sorting garbage.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparation

Description: Design the process to measure the waste generated in the Faculty during a period (a few weeks) and convince the school management and the Sustainability Office of the convenience of changing the current system to a selective garbage collection system. Find student volunteers willing to participate in the process, who will be responsible for weighing the garbage daily. Find a scale to weigh the waste and a room where to do it. Moreover, order the purchase of the new garbage cans.

Responsible: UAB

External expert assistance: NO

ECF4CLIM expert assistance: Yes

Resources needed: Time for meetings and PPT presentations. Contacts. Technical materials (scale, room, garbage cans)

Cost: 798.50 Euros

Task co-implementation participatory approach: Technicians of the Sustainability Office, Faculty Staff, Students

Task 2.- Daily weighing and sorting of garbage

Description: Daily weighing and sorting of garbage

Responsible: UAB

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Time, volunteers, a scale and a room

Cost: 0 Euros

Task co-implementation participatory approach: We had to involve the cleaning company so that they would not dispose of the garbage but instead leave it in a designated room where we could weigh it.

Task 3.- First debate and installation of new waste bins

Description: Systematise the data collected on waste in the Faculty and generate a debate about it. Schedule the installation of new selective litter bins.

Responsible: UAB

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: A place for a debate on waste, involving students and those institutionally responsible for waste management at the university. New selective waste bins.

Cost: 72.29 Euros

Task co-implementation participatory approach: Students and institutional staff will participate in the debate and the design of the new waste management system.

Task 4.- New wave of waste sorting and weighing.

Description: Once the new bins have been installed, a group of student volunteers will repeat the sorting and weighing of waste.

Responsible: UAB

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: Time, volunteers, a scale and a room

Cost: 0 Euros

Task co-implementation participatory approach: We had to involve the cleaning company so that they would not dispose of the garbage but instead leave it in a designated room where we could weigh it.

Task 5.- Final discussion, assessment of the process and retrofitting of the waste collection system

Description: Hold a discussion with all the data collected during the process, in order to assess the whole process and redesign the waste management system at the Faculty.

Responsible: UAB

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: A room for the final debate

Cost: 143.55 Euros

Task co-implementation participatory approach: Ideally, several stakeholders should be involved (students, faculty, maintenance technicians, waste management managers, etc.).

- **Milestones**

  Milestone 1: Completion of the first waste monitoring process

  Milestone 2: Installation of new bins

  Milestone 3: Completion of the second waste monitoring process

  Milestone 4: Carrying out the results discussion workshop with students, teachers and staff in charge of waste at the university.

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Report on Kg of waste produced and sorted

  Output 3: Dissemination materials

- **Cost (Equipment /consumables /others)**

  Total cost: 1,014.34 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: UAB researchers will conduct a survey and a deliberative workshop with the participants

  Responsible: UAB research team

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

The original timeline for this intervention had to be extended for two key reasons, highlighting common challenges in school-based projects. Firstly, there were delays in procuring and installing the necessary waste bins. This logistical hurdle directly impacted the project's progression. Secondly, and perhaps more significantly, the student volunteers who were instrumental in the initial phase of waste monitoring disappeared after the academic year concluded. This meant a substantial break of several months between the first and second rounds of waste monitoring, as we had to wait for the next academic year to re-engage student participation. These two factors underscore the importance of flexible timelines and robust volunteer recruitment/retention strategies in educational settings.

SP-DS03-IN07.- Facilitate transversal learning spaces

General data

Description: The intervention consists of a training course on the ecosocial crisis, designed as a transversal teaching space, open to students from all backgrounds, and also to teachers, which allows for dealing with issues related to sustainability from a social science perspective, and which also allows for various activities to collect and analyse environmental data from the campus, to be debated and interpreted in accordance with the contents of the course.

- **Participants and profile:** 12 Students + 1 teacher (2Ji%, 2Ji%, 2Ji#, 2Ji#, 2Ji#, 2Ji%, 2Ji#, 2Ji%, 2Ji%, 2Ji#, 2Ji%, 2Ji#, 2Jj#)

- **SCT and SCC representatives:** 3 SCT students + 1 SCT/SCC teacher (2Ji%, 2Ji%, 2Ji#, 2Jj#)

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Individual and collective actions. It aims to provide knowledge (to enhance individual knowledge) and to involve students in collective activities of data collection, analysis, interpretation, and debate, with the goal of generating transformative proposals for the campus.

    - Short description of the objectives:

      To provide students with up-to-date and specialised knowledge on various topics related to ecosocial transition.
      To offer a space and time to discuss sustainability issues in an interdisciplinary context, with students from different degrees and open to teachers.
      Encourage individual and group activities to collect environmental data from the campus, to be discussed collectively in specific workshops.
      Generate proposals to improve the sustainability of the university campus.

    - Time scope of the intervention:

      4 months (during the lifetime of the project)

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      To be successful, the course should have sufficient institutional support (the university should allow it to take place, provide space, help to disseminate it,

recognise the training obtained, etc.), as well as aroused the interest of enough students and teachers to be able to dedicate time and effort to this activity.

- Main risks and uncertainties:

Failure would be due to a lack of institutional support, a lack of interest of students and teachers, a lack of time or a lack of effort.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can we integrate sustainability and eco-social transition content (knowledge) into university education in a cross-cutting manner and encourage actions in favour of sustainability among students, teachers, and staff?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

This is something the students themselves called for in the SCT discussions. However, the main reason that has facilitated student recruitment is the 2 ECTS credits awarded to those who attend the entire course.

Have you encountered challenges in engaging people? What are they?

The most difficult thing has been to involve teachers, as the few who have attended have done so under pressure from the organisers (after sending them many invitations).

How have you or could you overcome them?

In the case of students, we have solved this by giving 2 credits. In the case of teachers, by insisting a lot. Perhaps they should be involved beforehand, in the design phase, but that is not always feasible because they often lack sufficient time.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The rector's office, which is responsible for allocating credits for campus activities, with whom we had to negotiate and request their support. Although it is part of the university, it is part of a different structure from our faculty. Additionally, there are entities to which several lecturers

invited to give lectures in the training cycle belong, which are not part of the university and have had to be persuaded.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Yes

What has enabled or could promote cooperation?

The cooperation has worked well because all actors have shared a common goal, which aligns with their values, concerns, and interests. In addition, there has been clear leadership from the organisers to carry out the activity.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The expected impact is to provide expertise on the ecosocial crisis from a social science point of view. It will also provide data and proposals to the university to improve the sustainability of the faculty and the campus.

How do you presume the change could happen?

The changes will increase knowledge among students (and teachers), leading them to adopt more sustainable behaviors and demand more sustainable institutions as well. In the long term, this could be the embryo of a campus subject (accessible to all university degrees) on sustainability and eco-social transition.

What has helped you or could help you with envisioning the expected impact and the preferred future?

One of the factors that has helped us is that a few months before we launched our intervention, a portion of the campus was occupied by students seeking additional training on sustainability and eco-social transition issues. This suggests that there is an interest in something that the university has not offered so far.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The support of the Faculty (dean's office) and of the office that recognises the training activities with credits (ECTS).

What kind of challenges have you faced in your organisation?

The main challenge has been to involve students and faculty. The course was mainly attended by students from other faculties on the campus, while the number of students from the school itself was small. There was no way to involve teachers.

How have you found, or could you find time and space for the intervention in your organisation?

Yes

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparation

Description: Co-design of the objectives and structure of the course. Selection of themes, speakers and dates. Establish agreements with the rectorate to recognise 2 credits for students following the course.

Responsible: UAB

External expert assistance: NO

ECF4CLIM expert assistance: Yes

Resources needed: Room available for meetings with students and teachers

Cost: 0 Euros

Task co-implementation participatory approach: Discussion in SCT and SCC. Exploring the vision, immediate-term opportunities, needs, defining objectives, and structure of the course. Validate the planning in SCT/SCC.

Task 2.- Activity implementation: conferences

Description: A lecture by a sustainability expert is scheduled every two weeks. In total, there are 5 lectures on various topics with a social science focus. It was repeated twice.

Responsible: UAB

External expert assistance: An external expert, contracted by the university with the project's resources, participates in each conference.

ECF4CLIM expert assistance: Yes

Resources needed: A classroom with a capacity of 50 people, as well as financial resources to hire the lecturer and cover dissemination tasks for each conference.

Cost: 3,198.18 Euros

Task co-implementation participatory approach: Students and teachers are invited to participate in the lectures and, above all, to take part in the ensuing debates.

Task 3.- Implementation of the activity: workshops

Description: On alternate weeks, every two weeks, workshops are held with students who have signed up for the course to discuss campus sustainability data, or to identify gaps in such data and try to find them.

Responsible: UAB

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: A classroom with a capacity of 50 people

Cost: 0 Euros

Task co-implementation participatory approach: This is an activity in which students take the lead, searching for sustainability data on the campus and discussing it in light of what the previous speakers have presented.

Task 4.- Public presentation of results

Description: At the end of the cycle of conferences and workshops to collect and discuss campus sustainability data, proposals for improvement will be drawn up and presented to the institutional heads of the university, with the aim of getting them to commit to taking on some of these proposals.

Responsible: UAB

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: A designated space to display posters prepared by the students, including diagnoses and proposals to improve the campus' sustainability.

Cost: 0 Euros

Task co-implementation participatory approach: The activity will be led by students, and representatives responsible for sustainability on campus will also participate.

Task 5.- Verification and certification of course attendance

Description: It will be necessary to verify the students who have participated in all the sessions, so that the Dean's Office of the Faculty can issue them a certificate, recognising the 2 ECTS credits.

Responsible: UAB

External expert assistance: The collaboration of the administrative staff of the Faculty is necessary.

ECF4CLIM expert assistance: Yes

Resources needed: Time to verify all data and for the Dean's Office to issue the certificates.

Cost: 0 Euros

Task co-implementation participatory approach: This activity requires close collaboration among the course organisers, administrative services, and the Dean's Office. Additionally, the elements for evaluating the pilot course will be discussed with the members of SCT and SCC.

- **Milestones**

Milestone 1: Elaboration of a program of conferences and workshops on 'Ecosocial Crisis', from a social science perspective, open to the entire university community.

Milestone 2: Conducting the different conferences and workshops

Milestone 3: Conducting a closing session addressed to the vice-rector's office and institutional staff

Milestone 4: Provide certificates of attendance to all participants who attended the series of conferences and workshops (to receive 2 ECTS credits).

- **Outputs:**

Output 1: Summary sheet

Output 2: Short report/guidance to replicate the intervention (lessons learnt)

Output 3: Program of conferences and workshops on ‘Ecosocial Crisis’ and dissemination of materials

- **Cost (Equipment /consumables /others)**

Total cost: 3,198.18 Euros

- **Intervention implementation comonitoring strategy**

Implementation of the comonitoring approach: Deliberative workshops during the course and a short survey at the end

Responsible: UAB research team

- **Photographs of the intervention implementation**

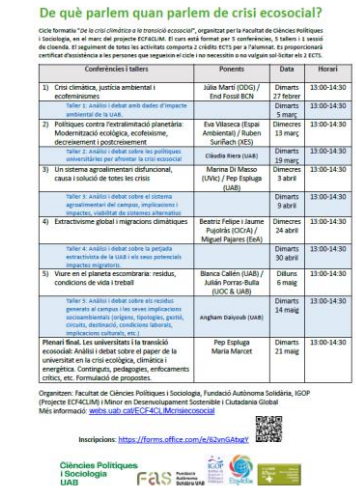






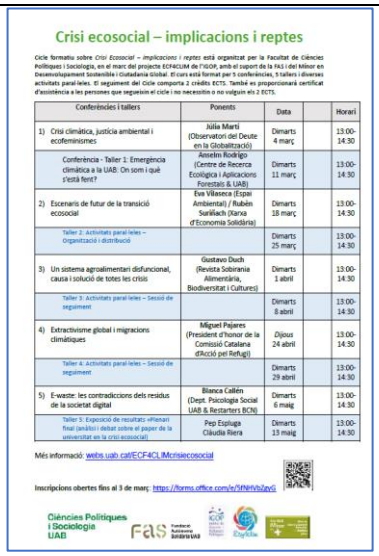






Conferències i tallers	Ponents	Data	Horari
1) Crisi climàtica, justícia ambiental i ecofeminismes	Júlia Martí (ODG) / End Fossil BCN	Dimarts 27 febrer	13:00-14:30
Taller 1: Anàlisi i debat amb dades d'impacte ambiental de la UAB.		Dimarts 5 març	13:00-14:30
2) Polítiques contra l'extralimitació planetària: Modernització ecològica, ecofeixisme, decreixement i postcreixement	Eva Vilaseca (Espai Ambiental) / Ruben Surinach (XES)	Dimecres 13 març	13:00-14:30
Taller 2: Anàlisi i debat sobre les polítiques universitàries per afrontar la crisi ecosocial	Claudia Riera (UAB)	Dimarts 19 març	13:00-14:30
3) Un sistema agroalimentari disfuncional, causa i solució de totes les crisis	Marina Di Masso (UVic) / Pep Espluga (UAB)	Dimecres 3 abril	13:00-14:30
Taller 3: Anàlisi i debat sobre el sistema agroalimentari del campus, implicacions i impactes, viabilitat de sistemes alternatius		Dimarts 9 abril	13:00-14:30
4) Extractivisme global i migracions climàtiques	Beatriz Felipe i Jaume Pujolràs (CICrA) / Miguel Pajares (EeA)	Dimecres 24 abril	13:00-14:30
Taller 4: Anàlisi i debat sobre la petjada extractivista de la UAB i els seus potencials impactes migratoris.		Dimarts 30 abril	13:00-14:30
5) Viure en el planeta escombraria: residus, condicions de vida i treball	Blanca Callén (UAB) / Julián Porras-Bulla (UOC & UAB)	Dilluns 6 maig	13:00-14:30
Taller 5: Anàlisi i debat sobre els residus generats al campus i les seves implicacions socioambientals (orígens, tipologies, gestió, circuits, destinació, condicions laborals, implicacions culturals, etc.)	Angham Daiyoub (UAB)	Dimarts 14 maig	13:00-14:30
Plenari final. Les universitats i la transició ecosocial: Anàlisi i debat sobre el paper de la universitat en la crisi ecològica, climàtica i energètica. Continguts, pedagogies, enfocaments crítics, etc. Formulació de propostes.	Pep Espluga Maria Marcet	Dimarts 21 maig	13:00-14:30

Organitzen: Facultat de Ciències Polítiques i Sociologia, Fundació Autònoma Solidària, IGOP (Projecte ECF4CLIM) i Minor en Desenvolupament Sostenible i Ciutadania Global
Més informació: webs.uab.cat/ECF4CLIMcrisiecosocial
Inscripcions: https://forms.office.com/e/62vnGAtqgY



Conferències i tallers	Ponents	Data	Horari
1) Crisi climàtica, justícia ambiental i ecofeminismes	Júlia Martí (Observatori del Deute en la Globalització)	Dimarts 4 març	13:00-14:30
Conferència - Taller 1: Emergència climàtica a la UAB: On som i què s'està fent?	Anselm Rodrigo (Centre de Recerca Ecològica i Aplicacions Forestals & UAB)	Dimarts 11 març	13:00-14:30
2) Escenaris de futur de la transició ecosocial	Eva Vilaseca (Espai Ambiental) / Rubén Suriñach (Xarxa d'Economia Solidària)	Dimarts 18 març	13:00-14:30
Taller 2: Activitats paral·leles – Organització i distribució		Dimarts 25 març	13:00-14:30
3) Un sistema agroalimentari disfuncional, causa i solució de totes les crisis	Gustavo Duch (Revista Sobirania Alimentària, Biodiversitat i Cultures)	Dimarts 1 abril	13:00-14:30
Taller 3: Activitats paral·leles – Sessió de seguiment		Dimarts 8 abril	13:00-14:30
4) Extractivisme global i migracions climàtiques	Miguel Pajares (President d'honor de la Comissió Catalana d'Acció pel Refugi)	Dijous 24 abril	13:00-14:30
Taller 4: Activitats paral·leles – Sessió de seguiment		Dimarts 29 abril	13:00-14:30
5) E-waste: les contradiccions dels residus de la societat digital	Blanca Callén (Dept. Psicologia Social UAB & Restarters BCN)	Dimarts 6 maig	13:00-14:30
Taller 5: Exposició de resultats «Plenari final (anàlisi i debat sobre el paper de la universitat en la crisi ecosocial)»	Pep Espluga Claudia Riera	Dimarts 13 maig	13:00-14:30

Més informació: webs.uab.cat/ECF4CLIMcrisiecosocial
Inscripcions obertes fins al 3 de març: https://forms.office.com/e/5fNHVb2gvG





- **Troubles during implementation, conclusion and lessons learnt.**

A significant obstacle encountered was the considerable difficulty in securing data on campus sustainability from various university departments. We faced substantial institutional resistance, as the university appeared unwilling to allow such data to become part of a deliberative process. This lack of transparency and cooperation severely hindered our efforts to assess and discuss campus sustainability performance comprehensively.

The design of this interdisciplinary course consisted of five lectures, followed by five workshops. The lectures addressed various aspects related to the ecosocial crisis (food, waste, extractivism and climate migration, environmental policies, ecofeminism). The workshops aimed to discuss the same topics but with data from the UAB. Thus, we needed data on campus sustainability to supplement the workshops that followed the experts' lectures. We organized groups of student volunteers to collect this type of data, thinking that various

university bodies could provide it, but in most cases, this was not possible. It wasn't that they refused, but rather that they deployed delaying tactics, so that the course ended and we still didn't have the data, making the planned debates unfeasible in the way we wanted to do them.

However, we managed to overcome these obstacles by generating our own data. To this end, the different student groups installed pollution sensors around campus, conducted surveys about perceptions of the university's food offering, estimated water use in restrooms, measured waste generation, and so on. Therefore, the workshops were dedicated to monitoring these student activities. The final session was reserved for a presentation of the results obtained by each student group on each specific topic. University administrative and policy leaders were invited to this session, where they were able to listen, ask questions, and clarify any concerns. In this sense, the course has managed to generate a space for debate and visibility of sustainability data, with the capacity to engage students (and some teachers, but not many) and to challenge the university's governing bodies. The university has currently created a committee to design a possible future cross-curricular course on sustainability and climate change. This course has served as a pilot project for this design.

SP-DS03-IN09.- Make visible data on environmental impacts

General data

Description: One of the results of the participatory diagnosis of sustainability in the Faculty and the campus is the lack of data to understand our environmental impact. To alleviate this deficit, it has been proposed to carry out a data collection on two topics: a) water consumption in the toilets; b) air quality on the campus.

- **Participants and profile:** 7 students + 1 teacher
- **SCT and SCC representatives:** 2 students (SCT) + 1 teacher (SCT/SCC)
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      The intervention has a technical dimension (installation of sensors) and another one of providing knowledge to individuals.
    - Short description of the objectives:

      Individual dimension: generating knowledge about environmental data (air quality, water consumption)
      Environmental dimension: installing sensors in different parts of the campus and the Faculty
    - Time scope of the intervention:

      During the lifetime of the project
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      The institution's support is needed to enable the installation of sensors at various points on campus and to establish a website where the results can be displayed. The support of a group of student volunteers is also needed to measure water consumption in the restrooms.
    - Main risks and uncertainties:

      The risks are that the institution may not provide the necessary equipment or allow it to be installed. Another risk is that students may not want to participate.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The need for data on the environmental impact of the university and the Faculty

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The ECF4CLIM research team carried out the promotion.

Have you encountered challenges in engaging people? What are they?

It was not easy to involve the students because they did not have the time. Furthermore, the university struggled to obtain permission to install the sensors, but they finally did.

How have you or could you overcome them?

We provided certificates to students who participated in data generation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

There are no external actors in this activity.

How has the cooperation worked with other stakeholders and actors outside your organisation?

The sensors were left to us by CIEMAT. Without this help the activity would not have been possible.

What has enabled or could promote cooperation?

There are no external actors in this activity.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The goal is to promote awareness of our environmental impact.

How do you presume the change could happen?

Knowing our impact will enable us to request better performance.

What has helped you or could help you with envisioning the expected impact and the preferred future?

More knowledge implies more awareness and, hopefully, more capacity to act towards sustainability.

- **Action: How to proceed?**

What has helped you to achieve your goals?

On the one hand, the support of the Sustainability Office with the installation of quality air sensors. On the other hand, the Dean's Office's willingness to issue certificates of participation to students.. In addition, CIEMAT helped us by lending us airborne particle sensors.

What kind of challenges have you faced in your organisation?

There were certain suspicions regarding the installation of sensors. And the lack of time for the students.

How have you found, or could you find time and space for the intervention in your organisation?

Yes

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Design and preparation of the activity

Description: Obtaining air quality sensors and designing their installation process. Designing the questionnaire to collect data on water consumption in restrooms and recruiting student volunteers to complete the short surveys.

Responsible: UAB research team

External expert assistance: CIEMAT experts will provide advice on the sensors.

ECF4CLIM expert assistance: Yes

Resources needed: Sensors, questionnaires, students' volunteer team, website

Cost: 0 Euros

Task co-implementation participatory approach: maintenance technicians of the Sustainability Office, teams of student volunteers, and the Deans' Office

Task 2.- Installation of air quality sensors

Description: Installation of air quality sensors at different points on campus and within the Faculty.

Responsible: UAB research team & maintenance technicians (Sustainability Office)

External expert assistance: Yes: maintenance technicians of the Sustainability Office

ECF4CLIM expert assistance: Yes

Resources needed: sensors, time

Cost: 0 Euros

Task co-implementation participatory approach: maintenance technicians of the Sustainability Office, team of student volunteers, Deans' Office

Task 3.- Collection of water consumption data in toilets

Description: The team of volunteers (students) will survey restroom users for a week (they will ask them how many times they have turned on the tap or flushed the toilet). Thanks to the maintenance technicians, we have data on the volume of water used for each of these actions.

Responsible: Students' volunteer teams & UAB research team

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Questionnaires, time, and volunteers

Cost: 0 Euros

Task co-implementation participatory approach: maintenance technicians of the Sustainability Office, team of student volunteers, Deans' Office

Task 4.- Analysis of the collected data

Description: Several groups of student volunteers will analyse the collected data and create tables and graphs to interpret them.

Responsible: Student volunteers team & UAB research team

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Statistical analysis programs, time

Cost: 0 Euros

Task co-implementation participatory approach: Students' volunteer team & UAB research team

Task 5.- Publication of the results on a university website

Description: The analysed results, tables, and graphs created will be published on a university website dedicated to disseminating sustainability data. Present these results in a public presentation. In addition, the results presentation session will feature a demonstration of how a dry toilet works and the water savings it provides

Responsible: UAB research team

External expert assistance: Yes, the dry toilet company, for the demonstration

ECF4CLIM expert assistance: Yes

Resources needed: A website and the necessary programming knowledge. The dry toilet demonstration

Cost: 460 Euros

Task co-implementation participatory approach: Students volunteer team & UAB research team

- **Milestones**

  Milestone 1: Prepare the data collection process

  Milestone 2: Collect data on air quality

  Milestone 3: Collect data on water consumption

  Milestone 4: Publish the data on the website

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Website with the summary data

  Output 3:

- **Cost (Equipment /consumables /others)**

  Total cost: 460 Euros

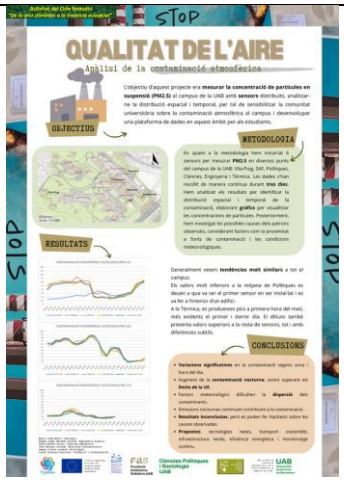
- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: A short survey and a deliberative workshop

  Responsible: UAB research team

- **Photographs of the intervention implementation**


STOP
ENTRANT ALS LAVABOS
Podem mesurar el nostre consum d'aigua? Què representa?
OBJECTIUS
METODOLOGIA
RESULTATS
130.455 L
CONCLUSIONS


STOP
QUALITAT DE L'AIRE
Anàlisi de la contaminació atmosfèrica
OBJECTIUS
METODOLOGIA
RESULTATS
CONCLUSIONS

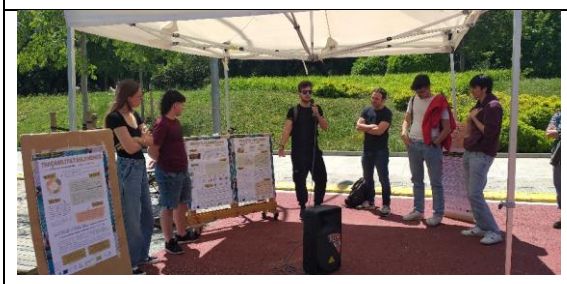




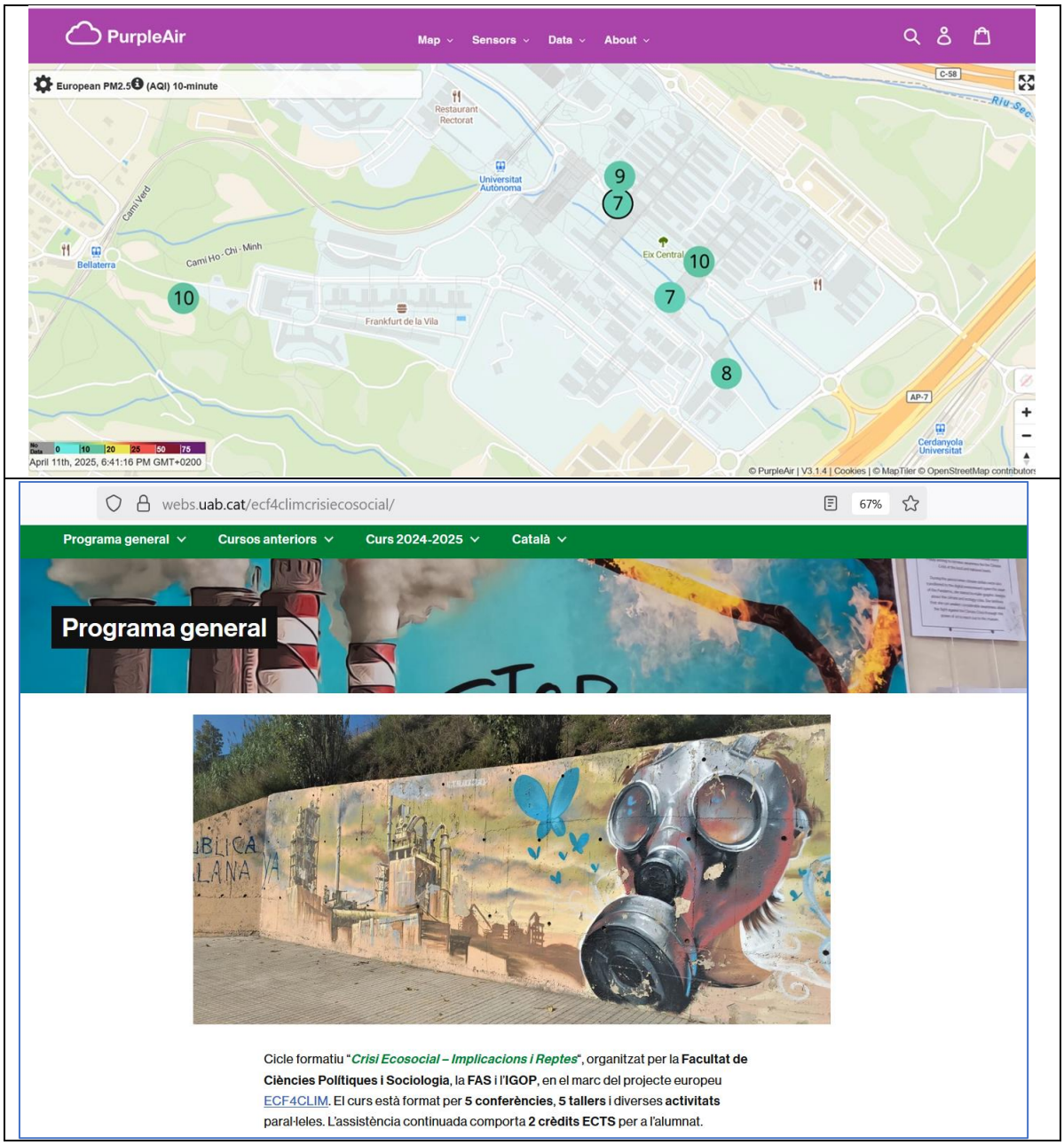



CULIFLOR









- **Troubles during implementation, conclusion and lessons learnt.**

Volunteer Recruitment and Data Collection Challenges

A key component of Task 1 involved recruiting student volunteers to administer short surveys. Unfortunately, we ended up with very few student volunteers: only four for the air quality analysis and another four for the water consumption analysis. This limited recruitment had a significant impact on subsequent data collection efforts.

In Task 2, which focused on the installation of air quality sensors, we had a positive development: CIEMAT provided the sensors, resulting in no cost to UAB.

However, Task 3, concerning the collection of water consumption data in toilets, faced substantial difficulties. The student volunteers were unable to cover all the planned hours and days due to other commitments. This widespread absence led to weak results and significant gaps in the data collection, ultimately compromising the comprehensiveness and reliability of the findings for this task.

In any case, the results presentation session featured a lively discussion about the data obtained, as well as the shortcomings experienced during the process. Furthermore, the dry toilet demonstration prompted much reflection on how we use water and the possibilities for saving it. This session was also attended by representatives from the university (from the Vice-Rector's Office), who pledged to consider using dry toilets at outdoor events

Furthermore, the data obtained was presented in separate posters, which were hosted on a project-specific website available for consultation by the entire university community: http://webs.uab.cat/ECF4CLIMcrisiecosocial

The main learning from this activity was that something as simple as collecting and displaying university environmental data is complex, requires a strong commitment from the students and faculty involved, and often encounters resistance from the university, which is reluctant to make this type of data public and a subject of debate within the university community. It was also shown that coordination among several students and faculty can overcome such resistance and use web tools to make data visible and generate debate. The ECF4CLIM project has provided a generous space to make this possible.

SP-DS03-IN11.- Designing a more sustainable food system at the university

General data

Description: Since food was one of the students' main concerns during the diagnostic phase of this project, it was decided to conduct a data collection activity on eating habits and perceptions of the campus's food offerings, with the aim of drafting proposals for sustainable transformation.

- **Participants and profile:** 10 students + 1 teacher
- **SCT and SCC representatives:** 1 SCT/SCC
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Requiring collective action (transformation of the local food system)
    - Short description of the objectives:

      The objectives are: 1) to understand students' eating habits; 2) to understand their perceptions of the campus food offering; 3) to understand their expectations regarding possible food alternatives; 4) to draft a set of coordinated proposals to improve the campus food offering to make it healthier, more sustainable, and more equitable.
    - Time scope of the intervention:

      During the lifetime of the project
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      For the intervention to be successful, it requires a group of students who actively help design a survey, distribute it to reach a representative sample, and are willing to analyse the results and formulate proposals. This includes knowledge of the individuals, an online tool for deploying the questionnaire, and a proposal for designing a dietary plan that can be implemented in accordance with university regulations.
    - Main risks and uncertainties:

      Factors that can cause the intervention to fail include being unable to conduct the survey or not having a sufficiently motivated group of students to distribute it, analyse it, and formulate proposals.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How could we improve campus food to make it healthier, more sustainable, fairer and more equitable?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Interest in this topic arose from discussions among the students themselves (and also teachers) during the SCT1 and SCT2 group discussions.

Have you encountered challenges in engaging people? What are they?

The primary obstacle is the students' limited time.

How have you or could you overcome them?

We promise to gather interesting data to formulate proposals to improve the current situation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The main obstacle to transforming the campus food system is the agreements the university has with supplier companies. These companies have considerable lobbying power, and without their support, it will not be easy to implement any proposals that may arise.

How has the cooperation worked with other stakeholders and actors outside your organisation?

So far, it has not been possible to contact the food supply companies on campus (restaurants, cafeterias, vending machines, etc.)

What has enabled or could promote cooperation?

Perhaps support from the rectorate and pressure from students could help.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The expected impact is to contribute to changing the rules regarding food supply on campus.

How do you presume the change could happen?

The change, if it occurs, will be a new regulation that allows for the introduction of some alternative food initiatives (in line with agroecology or similar). (In any case, our goal is to design a set of proposals and present them to the rector's office.)

What has helped you or could help you with envisioning the expected impact and the preferred future?

To achieve this, there should be a social mobilisation of students that would force the rectorate to introduce changes.

- **Action: How to proceed?**

What has helped you to achieve your goals?

To draft the proposals, we will use the survey results and data on similar initiatives being implemented at other universities. These measures will be selected, and proposals will be made to adapt them to the university's context.

What kind of challenges have you faced in your organisation?

The main challenge is to overcome institutional inertia and pressure from supplier companies. In any case, there are legal limitations (regulating restaurant concessions, etc.) that can be very difficult to change.

How have you found, or could you find time and space for the intervention in your organisation?

We have found time to gather the students and have them participate in the intervention by organising a (voluntary) training course. Several of those who signed up have decided to participate.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Questionnaire design

Description: Decide which variables to investigate. Write the questions and answers for the questionnaire, which will be installed in an electronic application (online response). Design the sample and the sampling procedure. All will be co-decided with the group of student volunteers.

Responsible: UAB research team

External expert assistance: Yes (Institut Metropoli)

ECF4CLIM expert assistance: Yes

Resources needed: Literature analysis

Cost: 0 Euros

Task co-implementation participatory approach: UAB research team, Institut Metròpoli, and a group of students' volunteers

Task 2.- Dissemination of the questionnaire

Description: The group of student volunteers and the UAB research team will be responsible for identifying individuals from the university community (students, faculty, and staff) who are willing to participate in the survey. A meeting will be held each week to verify the number of people who have responded and determine how many are needed to reach a statistically representative sample.

Responsible: UAB research team & group of student volunteers

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: UAB research team & group of student volunteers

Task 3.- Compilation of experiences and good practices from other universities

Description: A search will be conducted to identify initiatives from other universities that utilise agroecology and food sovereignty as a starting point for transforming the food system. Additionally, the students will calculate the ecological foodprint of the restaurants' menus. These experiences will be described and discussed at a subsequent meeting with the students.

Responsible: UAB research team

External expert assistance: Yes (There will be advice from experts from other universities, and Search Value Consulting will help with the compilation)

ECF4CLIM expert assistance: Yes

Resources needed: Contacts, time

Cost: 2,200 Euros

Task co-implementation participatory approach:

Task 4.- Survey analysis

Description: The UAB research team will prepare the database with the survey responses, while the group of student volunteers will divide up different sections of the survey for analysis. An external firm will conduct a more in-depth report on the data, as well as conduct focus groups with the results.

Responsible: UAB research team & group of student volunteers

External expert assistance: Yes (Institut Metròpoli will give advice, and Search Value Consulting will help with the analysis and focus group)

ECF4CLIM expert assistance: yes

Resources needed: Statistical analysis software.

Cost: 3,000 Euros

Task co-implementation participatory approach: UAB research team, group of students' volunteers, and Institut Metròpoli and Search Value Consulting

Task 5. Drafting the plan

Description: All the results obtained from both the survey and the search for experiences from other universities will be discussed. Based on this discussion, the proposals for the food plan will be formulated. To this end, there will also be a participatory discussion process with the main stakeholders (university bodies, catering companies, local farmers, etc.)

Responsible: UAB research team

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: A room, time

Cost: 0 Euros

Task co-implementation participatory approach: UAB research team & group of student volunteers

- **Milestones**

Milestone 1: Design activities with students to gather data on the food system on campus.

Milestone 2: Calculate the ecological footprint of restaurant menus.

Milestone 3: Conduct a survey on eating habits on campus.

Milestone 4: Conduct a participatory debate / focus group with food-related stakeholders on campus.

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Short report/guidance to replicate the intervention (lessons learnt)

  Output 3: Report on the sustainability of the food system on the campus, with recommendations for improvement

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Group discussions and a short final survey

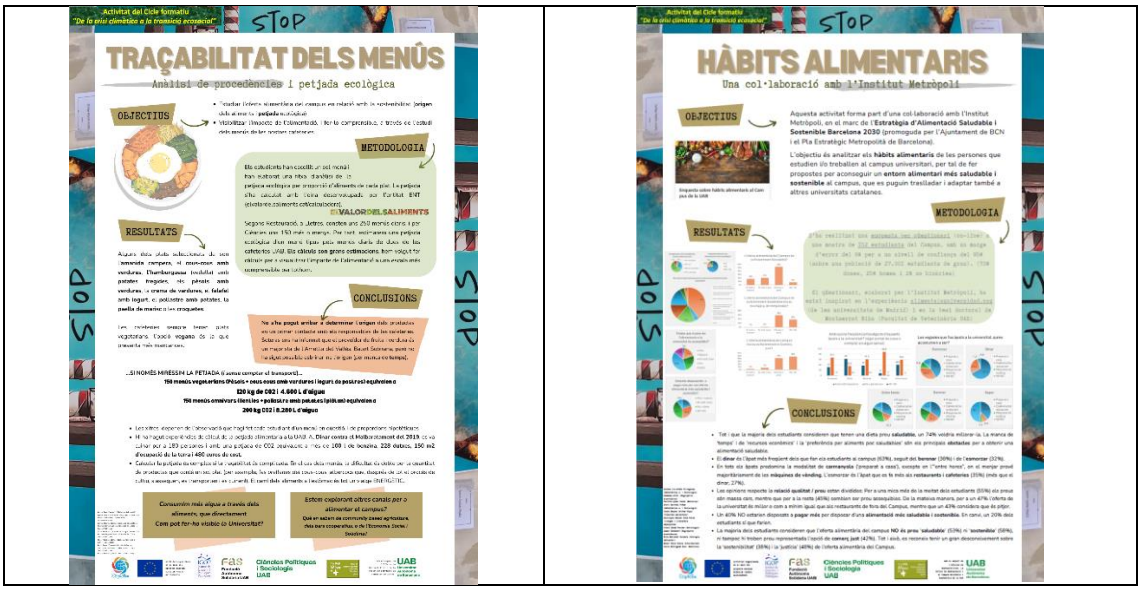
  Responsible: UAB research team

- **Photographs of the intervention implementation**









- **Troubles during implementation, conclusion and lessons learnt.**

Among the obstacles encountered in carrying out this intervention, two stand out. On the one hand, the difficulty of distributing the survey to a sufficiently representative sample of the university community. Despite the work of the student volunteers, the sample was not very large, resulting in a somewhat high level of statistical error. However, the results allow us to glimpse the major trends, at least for the students. On the other hand, it was very difficult to obtain responses from teachers and staff. This was a notable shortcoming.

On the other hand, although the technicians responsible for contracting the university's food services have been collaborative throughout, it has not been possible to obtain any commitment to change. It is evident that the contracting of these services is subject to very strict legislation, which largely determines the possibilities of what can and cannot be done.

In any case, it is observed that concerns about food are very present among students (and to some extent among faculty as well), and the data collected during this intervention are unprecedented and provide a snapshot of students' habits and preferences. Discussing this data, along with highlighting innovative initiatives being implemented at other universities, may allow for the development of a list of proposals that the university could consider in the future.

Furthermore, this intervention has generated a debate on campus that has undoubtedly allowed students to consider how the agri-food system works and what role the university plays in increasing or decreasing its environmental, social, political, cultural, and other impacts.

8. Report on Implemented Interventions in EB BOBADELA.

School brief description

EB Bobadela is a public elementary school (ISCED 1 and 2) located in the municipality of Loures, Lisbon District. The school is in the parish "União das Freguesias de Santa Iria de Azóia, São João da Talha e Bobadela". The school has a community of 910 people, comprising 792 students, 81 teachers, 7 administrative staff members, and 30 auxiliary staff. Many children attend school in the neighbourhoods of the parish of Bobadela.

Implemented Interventions Summary

The interventions implemented in the EB BOBADELA pilot centre are listed in the following table.

Measure Id	***Title***
PT-DS01-IN02	Field trips related to water
PT-DS01-IN03	Implement solar panels at the school.
PT-DS01-IN05	Implement double-glazed windows and thermal blinds.
PT-DS01-IN06	Energy route: ADENE
PT-DS01-IN07	Integrate the assessment of energy consumption into the disciplines
PT-DS01-IN08	Implement more recycling bins inside the school according to the needs.
PT-DS01-IN09	Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. Class waste production.

Table 8.1.- Intervention in EB BOBADELA.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
PT-DS01-IN02	Field trips related to water	Water	Educational programs	Visits
PT-DS01-IN03	Implement solar panels at the school	Energy		
PT-DS01-IN05	Implement double-glazed windows and thermal blinds	Energy		
PT-DS01-IN06	Energy route: ADENE	Educational programs	Energy	Short training courses

PT-DS01-IN07	Integrate the assessment of energy consumption into the disciplines	Educational programs	Energy	Teaching materials
PT-DS01-IN08	Implement more recycling bins inside the school according to the needs	Waste		
PT-DS01-IN09	Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. Class waste production.	Waste		

Table 8.2.- Interventions main working areas in EB BOBADELA

PT-DS01-IN02- Taking care of a river section

General data

Description: Taking care of a section of the Trancão River. Students must clean this section 2 to 3 times a year and carry out water analysis.

- **Participants and profile:** 1Ri# / 1Ri% / 1Rj%

- **SCT and SCC representatives:** 1Rj10%, 1Rj14%, 1Rj1%, 1Ri#4, 1Ri1%, 1Ri2%, 1Ri3%, 1Ri5%, 1Ri6%, 1Ri7%, 1Ri8%

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Involving individual action and requiring collective action.

    - Short description of the objectives:

      • Allow students to have experience and insight in the field of how they can contribute to the preservation of a resource as important as water.
      • Increase awareness in the school community about water protection and preservation.
      • Promote sustainable practices.

    - Time scope of the intervention:

      Long-term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Individual Competences:
      • Knowledge, Skills & Capabilities: Participants should possess a basic understanding of water conservation and sustainable practices.
      • Attitudes & Emotions: Participants should have a positive attitude towards learning about water conservation and be emotionally engaged in the intervention.
      Resources:
      • Sufficient personnel: There should be enough staff available and interested teachers.
      Responsibilities:

• Clear allocation of responsibilities: It should be evident which teacher is responsible for planning and coordinating the activity

- Main risks and uncertainties:

• Insufficient alignment with institutional plans: If the intervention does not align with the school's plans, it may face resistance or a lack of support.
• Cultural resistance: If sustainability is not ingrained within the community's norms and practices, participants may be less receptive to the intervention's messages.
• Inadequate individual competences: If participants lack the necessary knowledge, skills, or attitudes to engage effectively with the intervention, its impact may be limited.
• Limited resources: Without sufficient personnel, it may be challenging to organise and execute the intervention effectively.
• Ambiguity in responsibilities: If there is confusion or a lack of clarity regarding who is responsible for different aspects of the intervention.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to raise awareness, educate, and engage individuals, particularly students, about the importance of water conservation and sustainable practices?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The promotion of sustainability through immersive activities involving the topic of water

Have you encountered challenges in engaging people? What are they?

Challenges include maintaining student interest.

How have you or could you overcome them?

Overcoming challenges by incorporating interactive exhibits, personalised educational materials, and offering incentives such as certificates of participation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Relevant issues include water conservation, pollution prevention, and community involvement.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with stakeholders involves partnerships with authorities and environmental organisations.

What has enabled or could promote cooperation?

Promoting cooperation through joint educational initiatives and leveraging resources for a broader impact.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Our vision is to instil a sense of responsibility for water conservation and promote sustainable practices.

How do you presume the change could happen?

Change can occur through raising awareness, altering attitudes, and influencing behaviour.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Understanding whether knowledge was acquired during the visit and whether practices were changed.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Clear objectives, such as increasing student understanding of water preservation, guided intervention efforts.

What kind of challenges have you faced in your organisation?

Challenges include coordinating logistics and ensuring educational content aligns with curriculum standards.

How have you found, or could you find time and space for the intervention in your organisation?

Finding time and space through integrating activities into educational programs and collaborating with school administration

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Establish partnerships

Description: Establish partnerships with NGOs (such as ADAL - Loures Environmental Defence Association) and the UNESCO Escola Azul project

Responsible: Fernanda Almeida (School director)

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Teachers

Task 2.- "Bobadela, between Trancão and Tagus river, towards the Ocean"

Description: The "Bobadela, between Trancão and Tagus, towards the Ocean" project will be developed with a particular focus on preserving rivers and maintaining the quality of their water. At this stage, it is necessary to close an agreement with the competent authorities and plan visits.

Responsible: Cristina Duarte

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Teachers

Task 3.- Activities on the Trancão River

Description: Activities on the Trancão River will take place twice a year, while the school is involved in the UNESCO Blue Flag project. During these visits, the section of the river will be cleaned, and students and teachers will analyse the water quality.

Responsible: Cristina Duarte

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Teachers and students

- **Milestones**

  Milestone 1: Establish partnerships

  Milestone 2: Project: "Bobadela, between Trancão and Tagus river, towards the Ocean"

  Milestone 3: Activities on the Trancão River

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Photographs of the visit and publication of news about the event

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Preparation and Planning: Develop a detailed activity plan and educational materials for the field visits, including information about the site for which the school is responsible, the importance of water conservation, and relevant learning objectives aligned with curriculum standards.

  2. Participant Registration and Consent: Ensure the proper registration of all participants, including students, faculty, and staff, for field trips. Obtain the necessary consent forms from parents or guardians for student participation.

  3. Transportation and Logistics: Arrange transportation to and from tour locations, considering factors such as accessibility, distance, and group size.

  4. Educational Activities and Interpretation: Develop engaging educational activities and interpretive materials to enhance the learning experience during field visits.

  5. Data Collection and Observation: Encourage participants to observe and collect data during field visits actively.

7. Feedback and Evaluation: Gather feedback from participants to assess the effectiveness of field visits in meeting educational objectives and engaging them.

Responsible: Cristina Duarte

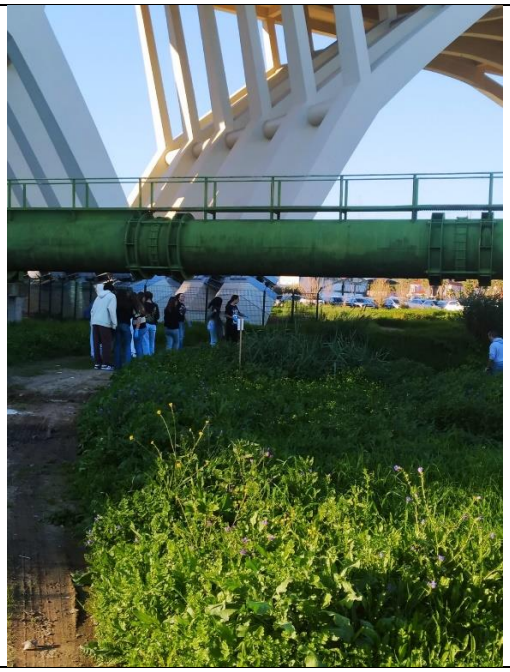
- **Photographs of the intervention implementation**











- **Troubles during implementation, conclusion and lessons learnt.**

This intervention originated within the context of the school's participation in the UNESCO Blue Flag project. One of the key lessons learned is that when an activity serves multiple purposes or is linked to different ongoing projects, it is more likely to be embraced by the school community

and implemented successfully. Such integration encourages greater participation from the school community.

However, several challenges emerged during the implementation. One of the main logistical issues was the distance of the assigned river section from the school. Since it is not feasible to walk there, transportation by bus was required. This posed difficulties due to both the cost involved and the limited availability of buses, which often jeopardised planning.

Another significant constraint was the scheduling of the visits. These activities usually took place during regular school hours, meaning that students had to miss classes, which can be problematic. A potential solution is to integrate these activities within the Science curriculum, but that depends on the willingness and engagement of the teachers involved.

Additionally, the number of students participating in each session sometimes exceeded what was necessary or manageable for the activity. As a result, some students, particularly those less engaged—ended up without tasks, which undermined the educational value of the intervention. In future visits, group sizes should be better adjusted and managed to ensure that all participants are meaningfully involved.

Despite these challenges, the intervention has been highly valued by participants. The combination of hands-on experience with theoretical learning has proven to be an effective strategy to foster environmental awareness and behavioural change. Engaging in practical actions—such as cleaning the river and analysing water quality—while also discussing key concepts and sustainability issues has helped to shape participants' attitudes and understanding. This blended approach has reinforced the idea that meaningful environmental education must combine knowledge acquisition with real-world action.

In conclusion, while logistics and curricular integration remain challenges, the overall feedback and outcomes suggest that this type of intervention is highly impactful. Future iterations should focus on improving coordination, ensuring teacher involvement, and optimising group sizes to enhance student engagement. Nevertheless, the entire intervention

PT-DS01-IN03- Implement solar panels at the school

General data

Description: Installation of solar panels. The school will involve the school community in this measure through awareness-raising actions. After a year, students will be invited to work on the savings achieved with the installation of solar panels and to publicise their work.

- **Participants and profile:** 1Ri# / 1Ri% / 1Rj% / 1Rv%

- **SCT and SCC representatives:** 1Rj9%; 1Rj6%

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Technical and collective action

    - Short description of the objectives:

      ● Promote the use of renewable energy and reduce emissions and costs.
      ● Encourage the use of renewable energies in schools.
      ● Improve existing knowledge.
      ● Stimulate learning by communicating the results.

    - Time scope of the intervention:

      • Short/Mid-Term and Long-term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competences:
      • Regulative: Supportive laws and regulations for renewable energy initiatives.
      Individual competences:
      • Knowledge: Understanding of renewable energy and its benefits.
      • Skills & capabilities: Ability to participate in awareness-raising activities.
      • Attitudes & emotions: Positive attitude towards renewable energy and environmental conservation.
      Technical infrastructure:
      • Energy infrastructure: Availability of suitable locations for solar panel installation.
      • Budget resources: Sufficient funding for purchasing and installing solar panels.

• Personnel: Trained staff for maintenance and monitoring of solar panel performance.
Responsibilities:
• Clarity on roles and responsibilities within the school community.
• Collaboration with external stakeholders such as energy providers and the municipality.

- Main risks and uncertainties:

• Absence of supportive regulations may hinder the implementation of solar panel installations.
• Lack of buy-in from the school community may result in low participation in awareness-raising activities.
• Insufficient technical expertise and resources.
• Budget constraints.
• Failure to establish clear roles and responsibilities may result in miscommunication and inefficiencies in the implementation process.
• Dependence on external stakeholders for cooperation and support may introduce delays or complications in the intervention.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to promote renewable energy adoption, reduce carbon emissions, and enhance energy efficiency through the implementation of solar energy systems?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Promote sustainability by involving students in work that reflects on the benefits of installing solar panels.

Have you encountered challenges in engaging people? What are they?

Scepticism regarding the accessibility of future data on energy expenditure

How have you or could you overcome them?

Create close collaboration between the school and the municipality on this matter.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Relevant issues include energy efficiency (dependent on the sun), the need to involve actors outside the school in the process (a solar panel company and the municipality, which is "in charge" of the school)

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with local government, energy companies, and environmental organisations.

What has enabled or could promote cooperation?

Promotion of cooperation through mutual benefit agreements and collaborative work.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The expected impact is to reduce carbon emissions by using renewable energy instead of fossil energy, inspire behavioural changes, and promote a culture of sustainability.

How do you presume the change could happen?

Change could happen through greater awareness, changing behaviours and replicating this measure in other schools (or increasing the number of solar panels in this one)

What has helped you or could help you with envisioning the expected impact and the preferred future?

Vision is aided by the establishment of measurable goals, such as increasing the school's use of renewable energy and reducing energy costs on a monthly basis. Another approach is to understand how solar panels become part of the community conversation when sustainability is addressed.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Clear communication and stakeholder engagement

What kind of challenges have you faced in your organisation?

Challenges include budget constraints, technical complexities, and bureaucratic hurdles.

How have you found, or could you find time and space for the intervention in your organisation?

Finding time and space through prioritisation of resources and leveraging partnerships.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Involve the municipal council.

Description: Involve the municipal council in the intervention, logistically and financially.

Responsible: EB Bobadela, director and IST team

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: No

Cost: 0 Euros

Task co-implementation participatory approach: School board

Task 2.- Involve a solar panels company.

Description: Invite the company and evaluate the implementation of the panels and associated costs.

Responsible: City Council - Environment Department

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach:

Task 3.- Close the contract and start implementation.

Description: Close the contract and start implementation.

Responsible: City Council - Environment Department

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: 30000 Euros

Task co-implementation participatory approach:

Task 4.- Opening day and activities with students

Description: Use Energy Day on May 29th or Environment Day on June 5th to celebrate the end of work and the beginning of the use of solar panels. Take the opportunity to engage children in activities about energy.

Responsible: City Council - Environment Department / Solar panel company / School Board

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: To be defined

Cost: 0 Euros

Task co-implementation participatory approach: students, teachers, head and other staff

Task 5.- One year of the school's energy consumption

Description: Analysis of one year of the school's energy consumption after the panels were installed.

Responsible: Science and mathematics teachers.

Coordinated by Professor Fernanda Almeida

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed: Data from energy consumption and associated costs

Cost: 0 Euros

Task co-implementation participatory approach: Students and teachers

- **Milestones**

  Milestone 1: Implementation of solar panels

  Milestone 2: "Opening day"

  Milestone 3: Works on energy consumption

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Solar Panels

  Output 3: Short report on the environmental impact.

- **Cost (Equipment /consumables /others)**

  Total cost: 30000 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Installation Progress Tracking: Track the progress of solar panel installation. Regularly monitor the installation process to ensure adherence to specifications and standards.

  2. Energy Production Monitoring: Track the energy production of the solar panels.

  3. Educational Workshops and Training: Organise educational workshops and training sessions for students, teachers, and staff to raise awareness about solar energy and the benefits of solar panels installation. Please provide information on how the solar panels work, their environmental benefits, and ways to optimise energy usage.

  4. Engagement and Communication: Maintain open communication channels with the community to keep them informed about the solar panel project

  Responsible: IST Team, School Board and City Council - Environment Department

- **Photographs of the intervention implementation**







- **Troubles during implementation, conclusion and lessons learnt.**

The planned opening day for the facility ultimately did not occur. This was primarily due to an ongoing licensing process, which introduced a significant, unforeseen delay. This substantial hold-up in both the approval and installation of the solar panels directly led to the cancellation of Task 4 (Installation) and Task 5 (Analysis of one year of the school's energy consumption after panel installation). Consequently, their associated milestones (2 and 3) were also cancelled and never realised within the project's timeline.

Despite these setbacks, the project achieved a crucial financial milestone: an agreement was reached with the Municipal Chamber of Loures to fund the majority of the solar panel system. While the total system cost was €30,000, the project only contributed €10,000, with the remaining amount covered by the Municipal Chamber. This highlights success in leveraging external funding, even amidst significant implementation delays.

PT-DS01-IN05- Implement double-glazed windows and thermal blinds

General data

Description: The school is installing double-glazed windows and thermal blinds in all classrooms and offices to control thermal fluctuations and reduce noise within the classrooms.

- **Participants and profile:** 1Rp%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Technical
    - Short description of the objectives:

      ● Improve the thermal regulation of the school rooms and offices
      ● Improve visibility
      ● Reduce noise
    - Time scope of the intervention:

      Short/Mid-term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Individual competences:
      • Knowledge: Understanding the benefits of double-glazed windows and thermal blinds.
      Technical infrastructure:
      • Availability of suitable windows and blinds for installation.
      • Budget resources for purchasing and installing double-glazed windows and thermal blinds.
      • Personnel trained in installation and maintenance procedures.
      Responsibilities:
      • Collaboration with external contractors or suppliers for equipment procurement and installation.

- Main risks and uncertainties:

  • Budget constraints may limit the school's ability to invest in energy-efficient upgrades.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

"How to improve thermal comfort, energy efficiency, and noise reduction within buildings through the installation of insulation measures?"

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Promoting sustainability by highlighting the benefits of double glazing and thermal blinds in improving comfort and reducing energy consumption.

Have you encountered challenges in engaging people? What are they?

Challenges include a lack of awareness about the environment.

How have you or could you overcome them?

Overcoming challenges through education about energy efficiency and showcasing cost savings.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Relevant issues include energy efficiency and the external company.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with contractors and suppliers for procurement and installation.

What has enabled or could promote cooperation?

Promotion of cooperation through collaboration on building initiatives, sharing best practices, and aligning goals for sustainability.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

To improve environmental performance

How do you presume the change could happen?

Change could happen through retrofitting existing buildings with energy-efficient technologies.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Visioning is aided by setting clear objectives and conducting energy audits.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Clear communication, stakeholder engagement, and project management tools facilitate goal achievement.

What kind of challenges have you faced in your organisation?

Challenges include budget constraints, technical limitations, and logistical issues.

How have you found, or could you find time and space for the intervention in your organisation?

Finding time and space through phased implementation, prioritisation of resources and seeking external funding.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Close contracts

Description: Hire a company that installs double-glazed windows and thermal blinds, and their respective suppliers

Responsible: School Board

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: School Board

Task 2.- Installation

Description: Install double-glazed windows and thermal shutters

Responsible: External company

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed: Double-glazed windows and thermal shutters

Cost: Not reported. The school Euros supported them

Task co-implementation participatory approach: School Board

- **Milestones**

  Milestone 1: Installation of double-glazed windows and thermal blinds

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Double-glazed windows and thermal shutters

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: 1. Installation Tracking: Track the installation progress of double-glazed windows and thermal blinds in each classroom and office by the school board

2. Feedback Mechanisms: Establish feedback mechanisms for occupants, including teachers and students, to report any issues or concerns related to the newly installed windows and blinds.

Responsible: School Board

- **Photographs of the intervention implementation**







- **Troubles during implementation, conclusion and lessons learnt.**

No major difficulties were encountered during the implementation of this intervention. All expenses and procedures were fully managed by the school, which included selecting and contracting the company responsible for supplying and installing the double-glazed windows

and thermal blinds. This autonomy allowed the process to run smoothly, without delays or administrative complications.

Although it was a technical measure, it did not involve excessive bureaucracy. The school's proactive role in handling all steps—from procurement to coordination—helped ensure the timely and efficient completion of the intervention. The collaboration with the external company was effective, and the installation was carried out as planned and within the expected timeframe.

This experience reinforces the idea that technical infrastructure improvements, when well-managed internally and supported by external professionals, can be implemented efficiently and with immediate benefits in terms of comfort and environmental performance.

PT-DS01-IN06- Energy route: ADENE

General data

Description: The "Energy Route" from ADENE encompasses face-to-face and/or distance information and training sessions, imparting knowledge to individuals and sparking their interest in learning more about the world of energy, enabling them to understand the role of citizens in building a more sustainable world.

- **Participants and profile:** 1Ri# / 1Ri% / 1Rj%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Individual action

    - Short description of the objectives:

      ● Involving society, investing in education, information, awareness, and training, and contributing to increasing individual and collective action, through changes in behaviour and lifestyle.
      ● Disseminate the importance of decarbonisation issues among consumers and companies.
      ● Deepen knowledge in terms of mitigating climate change, disseminating good practices, and promoting low-carbon behaviour in society.
      ● Promote training for the energy and water efficiency sectors.
      ● Combating energy poverty.

    - Time scope of the intervention:

      Mid-term / Long-term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competences:
      • Cultural-cognitive: Integration of sustainability principles into societal norms and values, fostering a culture of environmental responsibility.
      Individual competences:
      • Knowledge: Understanding of energy efficiency, decarbonisation, and climate change mitigation.

• Attitudes & emotions: Positive attitudes towards sustainability and willingness to adopt low-carbon behaviours.
Technical infrastructure:
• Availability of educational materials
Resources:
• Allocation of personnel dedicated to planning, implementing, and monitoring the intervention.
Responsibilities:
• Collaboration with educational institutions

- Main risks and uncertainties:

• Failure to integrate sustainability principles into societal norms and values may result in apathy or disinterest towards environmental issues.
• Insufficient knowledge and skills among individuals may limit their ability to implement energy-saving practices effectively.
• Inadequate access to educational materials may hamper the delivery of effective training sessions.
• Resource limitations may restrict the scope and impact of the intervention.
• Ineffective collaboration and coordination may lead to fragmented efforts and duplication of resources, undermining the overall effectiveness of the intervention.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

"How to promote and implement sustainable practices, energy efficiency, and decarbonisation initiatives within communities and organisations?"

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Promoting sustainability by highlighting the importance of energy efficiency and the role of citizens in building a sustainable world.

Have you encountered challenges in engaging people? What are they?

• Challenges include the lack of awareness about energy-related issues and competing priorities.

How have you or could you overcome them?

• Overcoming challenges through targeted communication and engaging content

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Relevant issues include energy consumption patterns, climate change mitigation, and sustainable development. Furthermore, this project is organised by an institution outside the school.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Collaborate with external stakeholders (ADENE) to access expertise and additional educational opportunities. Build partnerships through joint projects, workshops, or shared resources.

What has enabled or could promote cooperation?

Promotion of cooperation through shared objectives and collaborative initiatives

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Our vision is to empower individuals with the knowledge and skills to make informed decisions about energy use, leading to positive changes in behaviour and lifestyle.

How do you presume the change could happen?

Change can occur through increased awareness, the adoption of energy-efficient practices, and advocacy for policy changes that promote sustainability.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Change can occur through increased awareness, the adoption of energy-efficient practices, and advocacy for policy changes that promote sustainability.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Clear communication, stakeholder engagement, and resource allocation facilitate goal achievement.

What kind of challenges have you faced in your organisation?

Challenges include resource constraints, resistance to change, and competing priorities.

How have you found, or could you find time and space for the intervention in your organisation?

Finding time and space through flexible scheduling, prioritising initiatives, and seeking external partnerships for support.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Contact ADENE

Description: Contact ADENE and schedule sessions

Responsible: School Board

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: No

Cost: 0 Euros

Task co-implementation participatory approach: Science Teachers

Task 2.- Hold Energy Route sessions

Description:

Responsible: Science Teachers and ADENE

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed: Educational materials

Cost: 0 Euros

Task co-implementation participatory approach: Science Teachers and ADENE

- **Milestones**

  Milestone 1: Contact ADENE

  Milestone 2: Energy Route Session

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Short Survey

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

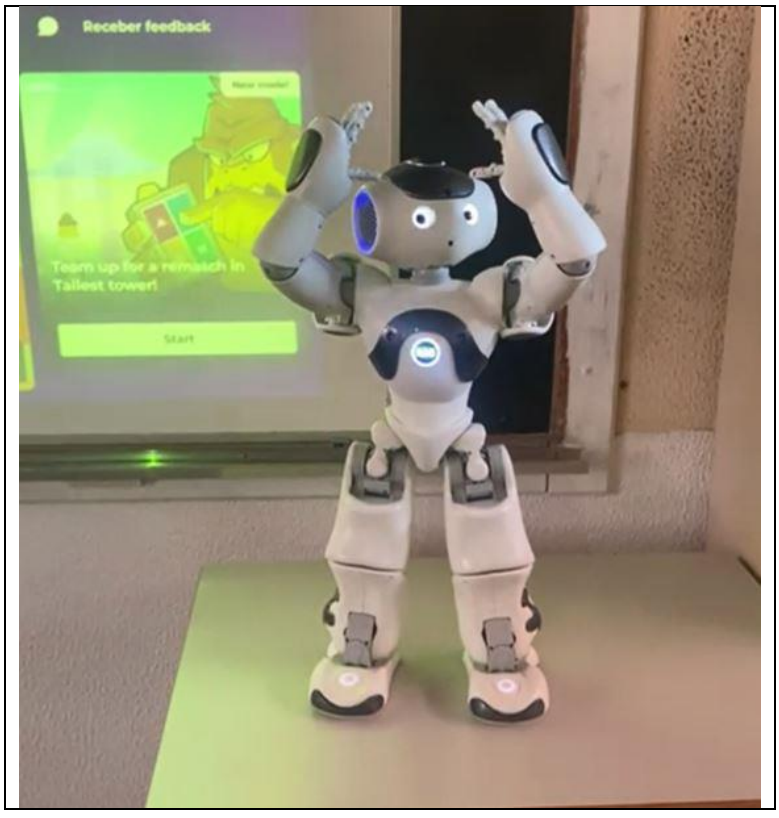
- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: 1. Data Collection: Implement a system for collecting data related to the Energy Route activities, such as attendance records and participant feedback, and energy consumption metrics.

  2. Feedback Sessions: Conduct surveys and feedback sessions with participants.

  Responsible: School Board

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

The main issue encountered during the implementation of this intervention was the repeated postponement of the Energy Route session, which had to be rescheduled twice. Although schools are allowed to contact ADENE directly to organise the sessions, in this case, the school waited for the local municipality to take the lead, as such initiatives are often coordinated by the municipal authority.

This dependency led to delays and uncertainty. In contrast, the same intervention was implemented smoothly in another pilot school where the scheduling was managed directly by the school itself. This experience highlights the importance of clear and autonomous management at the school level.

The recommended procedure is for schools to take initiative and contact ADENE directly to organise and schedule the sessions. If and when the municipality wishes to organise additional activities or complementary sessions, those can be coordinated separately. This approach ensures that the intervention is not delayed by external coordination constraints and remains within the school's control and timeline.

Despite the initial delays, the session was eventually held successfully and received positive feedback from both students and teachers, reinforcing the value of this type of awareness-raising initiative.

PT-DS01-IN07 - Integrate the assessment of energy consumption into the disciplines

General data

Description: Integrate energy consumption assessment into math and science subjects. Make students aware of their school's consumption data and use this information to develop knowledge and skills in various teaching areas.

- **Participants and profile:** 1Ri# / 1Ri% / 1Rj%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Individual and Collective Action
    - Short description of the objectives:

      ● Allow students to be aware of the consumption of their school.
      ● Encourage the introduction of themes related to sustainability in the various areas of knowledge.
      ● Raising awareness of behaviour change.
    - Time scope of the intervention:

      short/mid-term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective competences:
      • Normative: School's commitment to sustainability through inclusion in institutional plans and strategies.
      • Cultural-cognitive: Establishment of sustainability as a core value integrated into the school culture.
      Individual competences:
      • Knowledge: Understanding of energy consumption, sustainability principles, and behaviour change strategies.
      • Skills & capabilities: Ability to interpret and analyse consumption data, apply mathematical and scientific concepts.
      • Attitudes & emotions: Positive attitude towards sustainability and willingness to change behaviour.

Technical infrastructure:
• Access to energy consumption data.
Resources:
• Teachers interested in implementing these themes in their subjects
Responsibilities:
• Teachers are responsible for integrating energy consumption assessment into math and science subjects.
• School administration is accountable for providing the necessary resources and support for implementation.

- Main risks and uncertainties:

• Failure to establish sustainability as a core value may result in apathy or resistance from students and staff.
• Insufficient knowledge and skills among teachers may limit their ability to integrate energy consumption assessment into subjects effectively.
• Inadequate access to energy consumption data may impede the implementation of the intervention.
• Lack of clear responsibilities and accountability may lead to disorganised implementation and ineffective monitoring of progress.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can schools effectively integrate energy consumption assessment into math and science subjects to raise awareness, promote sustainability, and encourage behaviour change among students?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Engage students by connecting energy consumption assessment with real-world data from their school, fostering a sense of ownership and responsibility.

Have you encountered challenges in engaging people? What are they?

Initial resistance from students or teachers due to perceived complexity or lack of understanding of relevance.

How have you or could you overcome them?

Provide engaging and interactive educational materials, demonstrations, and hands-on activities to make the concept of energy consumption tangible and relatable. Offer incentives or recognition for active participation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Relevant issues include energy efficiency, environmental impact, and sustainability education. Actors, such as the municipal council, must provide the data.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Collaborate with the municipal council on the data and other educational opportunities. Build partnerships through joint projects, workshops, or shared resources.

What has enabled or could promote cooperation?

Emphasise the mutual benefits of collaboration, such as shared knowledge and resources, and align objectives to common goals.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The intervention aims to promote learning by integrating sustainability principles into math and science education, fostering behaviour change towards energy efficiency and environmental stewardship.

How do you presume the change could happen?

By empowering students with knowledge and skills related to energy consumption, the intervention can instigate a shift in attitudes and behaviours towards sustainable practices.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Regular evaluation and feedback mechanisms to track progress and measure impact.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Implement a structured curriculum that integrates energy consumption assessment into math and science subjects, supported by relevant teaching materials and educator training.

What kind of challenges have you faced in your organisation?

Potential resistance from traditional teaching methods, curriculum constraints, or a lack of resources.

How have you found, or could you find time and space for the intervention in your organisation?

Schedule dedicated class time for energy assessment activities, integrate them into existing lesson plans, and leverage available resources such as digital tools or educational partnerships to facilitate implementation.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Convincing science and mathematics teachers

Description: Raise teachers' awareness of these topics and the need to include them in study plans

Responsible: Coordinator of science and mathematics teachers

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers

Task 2.- Energy consumption data

Description: Request and obtain energy consumption data from the school management and the municipality.

Responsible: Coordinator of science and mathematics teachers

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed: Data

Cost: 0 Euros

Task co-implementation participatory approach: Teachers

- **Milestones**

  Milestone 1: Classes on energy consumption

- **Outputs:**

  Output 1: Short report/guidance to replicate the intervention (lessons learnt)

  Output 2: Graphs of energy consumption produced in class

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Regular Data Collection: Data collection process to monitor the integration of energy consumption assessment into math and science subjects. This may include tracking lesson plans

  2. Feedback Mechanisms: Establish feedback mechanisms to gather input from teachers, students, and other stakeholders involved in the intervention. This may involve conducting surveys, focus groups, or regular meetings to assess progress, identify challenges, and gather suggestions for improvement.

  Responsible: Coordinator of science and mathematics teachers

- **Photographs of the intervention implementation**

- **Troubles during implementation, conclusion and lessons learnt.**

Two main challenges were identified during the implementation of this intervention.

The first relates to access to energy consumption data. Until mid-way through the project, utility bills were managed directly by the school, which facilitated access to data for educational purposes. However, due to administrative changes, this responsibility is now centralised at the municipal level. As a result, schools must submit formal requests to the municipality to obtain consumption data, which can cause delays and complicated planning. Clearer communication

channels and predefined protocols with municipal services could help overcome this barrier in future implementations.

The second challenge concerns teacher engagement and curriculum integration. While integrating sustainability-related data into science or mathematics classes is relatively straightforward—provided teachers are motivated and open to innovation—doing so in subjects such as Portuguese or English can be more complex. It requires creativity to connect sustainability themes with language learning objectives. Furthermore, some teachers report limited time and feel pressured to prioritise standard curriculum content. This underscores the importance of supporting teachers with ready-to-use materials, examples of cross-disciplinary integration, and institutional recognition for innovative pedagogical approaches.

Despite these challenges, the intervention has demonstrated that, with adequate support and motivated educators, integrating real-world sustainability data into the classroom can enrich learning, foster critical thinking, and increase students' awareness of environmental issues. The production of student-generated graphs and reports using actual school consumption data has proven to be an effective and meaningful learning strategy.

PT-DS01-IN08 - Implement more recycling bins inside the school according to the needs

General data

Description: Increase the number of containers for recyclable waste in its spaces, either through contacts with institutions such as ValorSul or Ponto Verde, which provide these containers free of charge, or by creating art competitions among students to design containers for classrooms.

- **Participants and profile:** 1Ri# / 1Ri% / 1Rj% / 1Rt%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Individual action and Technical

    - Short description of the objectives:

      ● Increase in the number of available containers for waste separation.
      ● Awareness in the school community of the separation of garbage.
      ● Decrease the production of waste produced.
      ● Increase the separation of recyclable waste.

    - Time scope of the intervention:

      Short/mid and Long-term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competences:
      • Normative: Clear waste management policies and guidelines established by the school administration.
      • Cultural-cognitive: Cultivating a sense of environmental responsibility and waste separation as a norm within the school community.
      Individual competences:
      • Knowledge and skills: Providing education and training to students, teachers, and staff on waste separation and recycling practices.
      • Attitudes and emotions: Fostering positive attitudes towards waste reduction and recycling through awareness campaigns and incentives.
      Technical infrastructure:

• A sufficient number of recycling bins are strategically placed throughout the school premises.
• Adequate waste collection services to ensure the timely removal of recyclable materials.

- Main risks and uncertainties:

• Absence of clear waste management policies and guidelines may lead to confusion and inconsistency in waste separation practices.
• Lack of awareness and motivation among students, teachers, and staff may hinder active participation in recycling efforts.
• Insufficient resources, such as personnel, for procuring and maintaining recycling bins, conducting educational programs, and managing waste collection services.
• Limited engagement and collaboration with external stakeholders, such as ValorSul or Ponto Verde, may impede access to necessary resources and support for implementing the intervention effectively.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Waste management and recycling competency: Encouraging and empowering students, teachers, and staff to develop the knowledge, skills, and attitudes necessary for effective waste separation and recycling practices within the school environment.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Providing clear information about the benefits of recycling and sustainability.

Have you encountered challenges in engaging people? What are they?

• Creating awareness campaigns highlighting the environmental impact of waste.

How have you or could you overcome them?

• Challenges: Lack of awareness or understanding, resistance to change, logistical issues.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Relevant issues: Waste management policies, community recycling initiatives, government regulations. Companies like Valor Sul or Sociedade Ponto Verde provide waste collectors for free, but it is not guaranteed.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Collaborating with waste management companies, local authorities, and environmental organisations.

What has enabled or could promote cooperation?

• Promoting cooperation: Establishing partnerships, sharing resources and expertise, fostering open communication channels.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• Improve waste management practices and capacity and increase environmental consciousness.

How do you presume the change could happen?

• Education and awareness-building activities, integration of sustainability principles into the curriculum, and fostering a culture of environmental responsibility.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Setting clear goals and objectives, conducting regular progress assessments and involving stakeholders.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Implementing recycling infrastructure, providing education and training on recycling practices.

What kind of challenges have you faced in your organisation?

• Limited resources, resistance to change, logistical constraints.

How have you found, or could you find time and space for the intervention in your organisation?

• Allocating dedicated resources, integrating recycling activities into existing schedules, and involving students and staff in the planning process.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Contact Sociedade Ponto Verde or Valor Sul

Description: Make a formal request to these entities to provide recycling containers for classrooms

Responsible: School Board and IST Team

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: School Board

Task 2.- Session on waste separation and recycling

Description: Training and awareness session on waste separation and recycling

Responsible: Sociedade Ponto Verde

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: School community

Task 3.- Install containers.

Description: Install containers in rooms

Responsible: Teachers and Staff

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: Containers

Cost: 0 Euros

Task co-implementation participatory approach: Teachers, Students and Staff

- **Milestones**

  Milestone 1: Install containers in rooms

  Milestone 2: Training and awareness session

- **Outputs:**

  Output 1: Summary sheet

  Output 2: New recycling bins for the school.

  Output 3: Improvement of waste KPI

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Regular Inspections: Assign responsible individuals or teams to conduct regular inspections of the recycling bins and waste separation areas to ensure proper implementation and adherence to recycling guidelines.

  2. Data Collection: Collect data on the volume and types of waste generated, as well as the frequency of recycling bin usage. At the end of the project

  3. Feedback Mechanism: Implement a feedback mechanism where students, teachers, and staff can report any issues or suggestions regarding the recycling bins.

  4. Performance Metrics: Key Performance Indicators (KPIs) to measure the success of the intervention.

  Responsible: IST Team, School Board

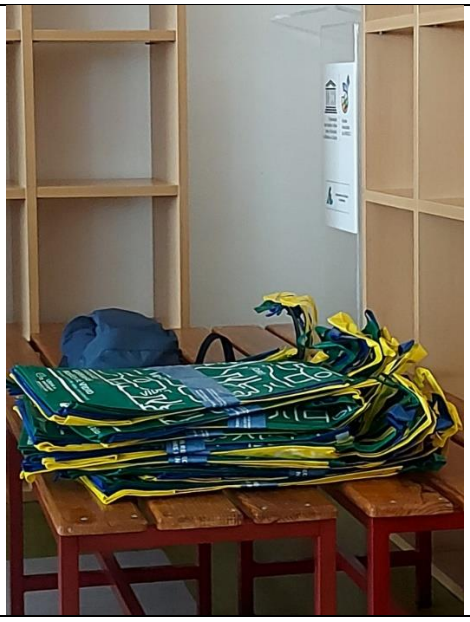
- **Photographs of the intervention implementation**




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- **Troubles during implementation, conclusion and lessons learnt.**

The implementation of this intervention was generally smooth, but some minor challenges emerged throughout the process.

One of the initial difficulties was securing recycling containers from external entities such as Sociedade Ponto Verde or ValorSul. While these organisations offer containers free of charge, their availability is not always guaranteed, and formal requests can take time to process. In this case, the school succeeded in obtaining containers, but the process highlighted the importance of early planning and proactive follow-up with external partners.

Another challenge involved scheduling the awareness and training session for school staff. Finding a suitable day and time was not easy. The school's operational staff are few in number and cannot leave their posts during teaching hours. Moreover, many are understandably reluctant to attend sessions outside their regular working hours. The solution was to hold the session during a school holiday break, which required additional coordination to align both with the school's availability and with Sociedade Ponto Verde's agenda.

In addition, ensuring the effective use of the containers requires more than just installation. While placing more bins throughout the school was a crucial first step, proper waste separation practices do not occur automatically. The training session was essential in raising awareness and fostering behavioural change among students and staff.

A further lesson learned relates to participation and motivation across the school community. Although teachers and staff were generally supportive, maintaining consistent student engagement requires continuous communication and reinforcement. Creative approaches—such as competitions or student-led initiatives—may help sustain long-term interest.

Overall, the intervention achieved its core objectives: the school now has more recycling bins in place and has improved its collective awareness of waste separation. The involvement of students, staff, and external stakeholders was key to its success. Looking ahead, sustaining the impact of this intervention will depend on regular monitoring, reinforcement of good practices, and continued integration of recycling habits into the school's daily life.

PT-DS01-IN09 - Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. Class waste production.

General data

Description: Creation of a competition or reward programme that will be played between classes or school buildings with the aim of promoting efficient waste separation. For a week, all classes of the same academic year compete against each other, with the goal of being the class that recycles the most. For this, new containers will be provided to the school to carry out the challenge.

- **Participants and profile:** 1Ri# / 1Ri% / 1Rj% / 1Rt%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Individual and collective action
    - Short description of the objectives:

      ● Promote the correct separation of waste.
      ● Get more recycling equipment at school.
      ● Teach the community about recycling and its importance.
      ● Debunking myths about recycling.
      ● Decrease the amount of waste produced at school.
    - Time scope of the intervention:

      Short/mid and Long-term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective Competences:
      • Cultural-cognitive: Fostering a culture of environmental responsibility and waste reduction among students, teachers, and staff.
      Individual Competences:
      • Knowledge: Understanding of waste separation practices and environmental impact.
      • Skills: Ability to effectively sort and dispose of waste in designated containers.

• Attitudes: Positive attitudes towards sustainability and willingness to participate in waste reduction efforts.
Environmental/Technical Elements:
• Sufficient waste separation infrastructure: Adequate number of recycling bins and proper labelling.
• Accessible collection points: Convenient locations for waste disposal to encourage participation.
Resources:
• Human resources: Adequate staffing to oversee initiatives and coordinate activities.
Responsibilities:
• Clear delineation of roles: Identification of individuals or teams responsible.

- Main risks and uncertainties:

• Lack of awareness and education: Without proper knowledge and understanding of waste separation practices, students may not participate effectively.
• Insufficient infrastructure: Inadequate availability of recycling bins and collection points may hinder waste separation efforts.
• Resistance to change: Cultural resistance or lack of buy-in from the school community may impede the adoption of sustainable waste management practices.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can the school effectively promote waste reduction and proper waste separation practices among students, teachers, and staff to minimise environmental impact and increase recycling rates?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Promote sustainability by emphasising the environmental benefits of waste separation and recycling.

• Encourage competition among classes or school buildings to foster engagement and interest.

Have you encountered challenges in engaging people? What are they?

• Challenges may include apathy or a lack of awareness about the importance of waste separation.

How have you or could you overcome them?

• Overcome challenges through education campaigns, incentives for participation, and clear communication about the goals and benefits of the competition.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Waste management policies.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation with waste management companies and the municipal council can enhance the effectiveness of the intervention.

What has enabled or could promote cooperation?

• Promote cooperation through partnerships, collaborative planning, and shared resources.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• The expected impact is to increase waste separation rates, reduce landfill waste, and cultivate a culture of environmental responsibility.

How do you presume the change could happen?

• Change could happen through increased awareness, behaviour change, and sustained participation in waste separation practices.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning the impact involves setting clear goals, measuring progress, and celebrating achievements to inspire continued engagement.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Education and communication strategies to raise awareness and motivate participation.

What kind of challenges have you faced in your organisation?

• Challenges may include logistical issues, resistance to change, and resource constraints.

How have you found, or could you find time and space for the intervention in your organisation?

• Overcome challenges through effective planning, community engagement, and flexibility in implementation strategies.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Define the regulation

Description: Define the competition regulations. Who participates, how, what are the rules, and what is the prize

Responsible: Natércia Dias

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers, School Board and Students

Task 2.- Present to students and set goals

Description: Present to students and set goals.

Responsible: Natércia Dias

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and students

Task 3.- Hold the competition.

Description: Hold a competition between classes and record all developments

Responsible: Natércia Dias

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: recycling containers

Cost: 5000 Euros

Task co-implementation participatory approach: Teachers and students

- **Milestones**

  Milestone 1: Competition rules regulation

  Milestone 2: The competition

  Milestone 3: Prize delivery

- **Outputs:**

  Output 1: Summary sheet (Report)

  Output 2: Changes in the waste KPI

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Regular Data Collection: Implement a system to track the amount of recycled waste collected from each class or school building daily or weekly.

  2. Engagement Platforms: Use digital platforms to display real-time or periodic updates on each class or building's progress in the competition.

3. Incentives and Recognition: Offer incentives or rewards for the winning class or building, such as certificates, trophies, or small prizes, to encourage participation and maintain motivation.

4. Peer Accountability: Foster a sense of peer accountability by encouraging students and teachers to remind each other about the importance of waste separation and recycling.

5. Feedback Mechanisms: Establish channels for feedback and suggestions from participants to continuously improve the competition and address any challenges or concerns.

6. Evaluation Criteria: Define clear criteria for evaluating the success of the competition, such as the percentage increase in recycling rates, reduction in landfill waste, and overall participation levels.

7. Regular Reviews: Conduct regular reviews or meetings to assess the progress of the competition, identify areas for improvement, and celebrate achievements.

Responsible: School Board and Natércia Dias

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

Although the competition was successfully implemented and generated positive engagement from the school community, several challenges emerged throughout the process.

One of the main difficulties was maintaining consistent participation and motivation among all classes throughout the competition week. While some groups showed strong enthusiasm and commitment from the start, others were slower to get involved or showed less interest, especially when they realised their chances of winning were low. It became clear that classes with motivated and supportive teachers performed better, whereas those whose teacher showed little interest ended up with weaker results. This underlines the importance of ongoing communication, teacher involvement, and visible progress updates to keep students engaged.

There were also logistical aspects to manage, such as the distribution and monitoring of the new recycling containers, as well as the daily weighing or checking of materials. These tasks required coordination and time from teachers and staff, which had to be balanced with other school responsibilities. This is an important consideration for future editions, as this method is demanding for those involved.

Another issue was the clarity of the competition rules. Some confusion arose, showing that clear, well-defined regulations are essential from the outset to ensure fairness and smooth execution.

Finally, defining and agreeing on the prize presented an unexpected challenge. Initially, there was confusion about who would fund the award. Although the project had committed to covering it, midway through we were under the impression that the school had taken on that responsibility. In the end, it became clear that they were waiting for confirmation from us. The prize was eventually funded by the project, as planned, and it was a success.

Aside from these issues, there were no major delays, and the competition unfolded as expected.

Despite these obstacles, the initiative was seen as a success. It fostered teamwork, added an element of fun to environmental education, and increased both the volume and visibility of recycling practices at the school. The lessons learned will be valuable for future editions, particularly in improving rule clarity, reinforcing proper recycling behaviour, and ensuring that all participants feel supported and engaged throughout the process.

9. Report on Implemented Interventions in EB CAMARATE.

School brief description

A public school (ISCED 1 and 2), EB Camarate, operates within the municipality of Loures in the Lisbon district. In 2021-2022, the school community consisted of 877 individuals, comprising 741 students, 102 teachers, 9 administrative staff members, and 25 auxiliary staff. The area, covering 11.57 km² and home to 34,943 inhabitants, has a high unemployment rate of around 18% and includes social housing neighbourhoods with several persistent social problems.

Implemented Interventions Summary

The interventions implemented in the EB CAMARATE pilot center are listed in the following table.

Measure Id	***Title***
PT-DS02-IN2	Learning how to drive a bicycle
PT-DS02-IN3	Reactivate the school's biological garden.
PT-DS02-IN7	Energy route: ADENE
PT-DS02-IN8	Integrate the assessment of energy consumption into the disciplines
PT-DS02-IN9	Awareness actions on the correct selective separation of waste and its impact on the environment
PT-DS02-IN10	Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. School waste production.

Table 9.1.- Interventions in EB CAMARATE.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
PT-DS02-IN2	Learning how to drive a bicycle	Transports	Educational programs	Short training courses
PT-DS02-IN3	Reactivate the school's biological garden	Green Spaces	Food	
PT-DS02-IN7	Energy route: ADENE	Educational programs	Energy	Short training courses
PT-DS02-IN8	Integrate the assessment of energy	Energy	Educational programs	Teaching materials

	consumption into the disciplines			
PT-DS02-IN9	Awareness actions on the correct selective separation of waste and its impact on the environment	Waste	Educational programs	Talks
PT-DS02-IN10	Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. School waste production.	Waste		

Table 9.2.- Interventions main working areas in EB CAMARATE

PT-DS02-IN2- Learning how to drive a bicycle

General data

Description: This is a nationally applied project supported by the Municipality of Loures. This initiative aims to provide free bicycle lessons to school students, enabling everyone to learn how to ride a bicycle.

- **Participants and profile:** 1Yi# / 1Yi% / 1Yj#

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Collective and Individual Action

    - Short description of the objectives:

      ● Increase the number of bicycle users.
      ● Promote green transportation.
      ● Promoting healthy living.
      ● Promote the practice of sport.

    - Time scope of the intervention:

      Long-Term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competences:
      • Regulative: Availability of funding and support from the municipality of Loures to implement and sustain the bicycle education program.
      • Normative: Incorporation of bicycle education into the municipality's sustainability plans and strategies, demonstrating a commitment to promoting green transportation and healthy living.
      • Cultural-cognitive: Cultivation of a community-wide mindset that values cycling as a sustainable and healthy mode of transportation.
      Individual competences:
      • Knowledge and skills: Competent instructors with the necessary expertise to teach bicycle riding effectively and safely to students of various ages and skill levels.

• Attitudes & emotions: Positive attitudes towards cycling among both instructors and students, fostering enthusiasm and motivation to participate in the program.
Technical infrastructure:
• Adequate supply of bicycles and safety equipment, ensuring that every student has access to the necessary resources for learning and practising bicycle riding.
• Availability of suitable practice areas or tracks where students can safely learn and improve their cycling skills.
• Resources:
• Sufficient financial resources allocated by the municipality to bicycles, safety equipment, and other necessary materials for the program.
• Sustained support from educational institutions and community stakeholders to provide logistical support and organisational resources for program implementation.
• Responsibilities:
• Municipality of Loures: Responsible for providing funding, regulatory support, and overarching guidance to facilitate the implementation and sustainability of the bicycle education program.
• School: Responsible for integrating bicycle education into the school curriculum, allocating time and resources for bicycle lessons, and ensuring the participation of students.
• Instructors: Responsible for delivering high-quality bicycle lessons, ensuring student safety, and fostering a positive learning environment conducive to skill development and enjoyment.

- Main risks and uncertainties:

• Lack of interest or participation: If students, teachers, and parents are not motivated to participate in the bicycle lessons, the project may struggle to achieve its goal of increasing the number of bicycle users and promoting green transportation.
• Safety concerns: Without proper safety measures and training, there is a risk of accidents or injuries during the bicycle lessons, which could deter students and parents from participating further.
• Infrastructure limitations: Inadequate biking infrastructure, such as bike lanes or safe routes to school, may hinder students' ability to practice biking outside of the lessons, reducing the effectiveness of the intervention.
• Financial constraints: Budget limitations or lack of funding may limit the project's ability to provide bicycles, helmets, or other necessary equipment for the lessons, potentially excluding students from lower-income families.
• Coordination challenges: Poor coordination between the municipality, school, and other stakeholders involved in implementing the project may lead to logistical issues or delays in scheduling the bicycle lessons, impacting their accessibility and effectiveness.
• Cultural barriers: Cultural norms or attitudes towards biking, such as concerns about safety or preferences for other modes of transportation, may pose

challenges to the adoption of biking as a means of transportation and recreation among students and their families.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can we promote sustainable transportation habits and improve the biking skills of school students to encourage the use of bicycles as an eco-friendly mode of transportation and promote healthier lifestyles?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Providing free bicycle lessons creates accessibility and removes financial barriers, encouraging participation.

Have you encountered challenges in engaging people? What are they?

• Challenges may include a lack of interest or awareness, especially in communities where biking is not common.

How have you or could you overcome them?

• Overcoming challenges can involve promoting the health and environmental benefits of biking, integrating lessons into the curriculum, and offering incentives for participation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Relevant issues include transportation infrastructure, safety regulations, and community attitudes towards biking.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation with the municipality.

What has enabled or could promote cooperation?

• Promoting cooperation can involve establishing partnerships, sharing resources, and aligning objectives with broader sustainability initiatives

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• The intervention aims to promote sustainable transportation habits and improve biking skills among students.

• Expected impacts include reduced carbon emissions, improved health outcomes, and increased community engagement.

How do you presume the change could happen?

• Change can happen through ongoing education, community involvement, and policy support for biking infrastructure.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visualising the impact and future involves setting measurable goals, tracking progress, and fostering a culture of sustainability within the community.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Collaborating with local authorities and stakeholders. • Implementing curriculum integration and awareness campaigns.

What kind of challenges have you faced in your organisation?

• Challenges may include funding constraints, logistical issues, and cultural barriers.

How have you found, or could you find time and space for the intervention in your organisation?

• Finding time and space may involve prioritising resources, leveraging existing infrastructure, and engaging with community leaders to allocate support.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Establish agreement

Description: Establish an agreement with the municipality for the school to participate in this program.

Responsible: School Board

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: School Board

Task 2.- Bicycle lessons

Description: Offer cycling lessons to students as scheduled

Responsible: Gym teacher/Instructor

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed: Bicycles, protective equipment, space for classes

Cost: 0 Euros

Task co-implementation participatory approach: Gym teacher/Instructor and students

- **Milestones**

  Milestone 1: Bicycle lessons

- **Outputs:**

  Output 1: Summary sheet

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

Implementation of the comonitoring approach:

1. Data collection: Implement a system to track participation rates, student progress, and feedback from both students and instructors.

2. Surveys and feedback mechanisms: Regularly gather feedback from participants to assess their experience, identify areas for improvement, and measure satisfaction levels.

Responsible: School Board

- **Photographs of the intervention implementation**

- **Troubles during implementation, conclusion and lessons learnt.**

No significant difficulties were encountered during the implementation of this intervention. It is part of a nationally supported programme that was adopted by municipalities choosing to participate—in this case, fully coordinated by the Municipality of Loures in close collaboration with the school.

One of the key success factors was the fact that the intervention served multiple objectives. It contributes to national and municipal goals related to sustainable mobility, promotes healthy lifestyles, and integrates seamlessly into physical education classes. This alignment made the initiative highly relevant and easy to implement at the school level.

All organisational aspects were handled efficiently by the municipality, including providing equipment, instructors, and scheduling. The school ensured student participation by embedding the activity into the existing curriculum, eliminating the need for additional time or resources.

This intervention is a strong example of how multi-purpose initiatives that align with broader programmes and curricular structures can be implemented smoothly and with high levels of participation and impact.

PT-DS02-IN3 - Reactivate the school's biological garden

General data

Description: Reactivate the school's biological garden (called "Quinta do Charco"), making it a space for promoting sustainability, learning, and contributing to the community. The garden will have space for classes and training sessions, in addition to providing biological products and offering shelter to animals.

- **Participants and profile:** 1Yi# / 1Yi% /1Yj% / 1Yt%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Technical, Individual and Collective Action
    - Short description of the objectives:

      ● Produce organic farming.
      ● Promote sustainability.
      ● Use the garden as a learning tool.
      ● Promote the participation of the school community in the maintenance of the garden.
      ● Create a space for outdoor classes and sessions.
    - Time scope of the intervention:

      Mid and Long-term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective competences:
      • Regulative: Compliance with local regulations regarding the establishment and management of biological gardens.
      • Normative: Adoption of sustainability policies and strategies by the school, including the incorporation of garden management in school regulations
      • Cultural-cognitive: Cultivating a shared understanding and acceptance of sustainability principles within the school community.
      Individual competences:

• Knowledge, skills & capabilities: Providing training and education to staff, students, and parents on farming practices, sustainability principles, and garden maintenance.
• Attitudes & emotions: Fostering a positive attitude towards environmental stewardship and active participation in garden activities.
Technical infrastructure:
• Availability of necessary resources: Access to water supply, gardening tools, composting facilities, and materials for constructing garden beds and shelters.
• Adequate green areas: Sufficient space within the school grounds to accommodate the garden and outdoor learning areas.
Resources:
• Budget resources: Sufficient funding to cover the costs associated with establishing and maintaining the garden, including procurement of equipment and materials
• Personnel: Allocation of staff or volunteers responsible for garden management, education, and community engagement.
Responsibilities:
• Planning: Designating individuals or committees to oversee the planning and implementation of the garden project.
• Implementation: Clearly defining roles and responsibilities for garden maintenance, teaching sessions, and community involvement.

- Main risks and uncertainties:

• Lack of support: not getting approval from the municipal council for the plan outlined by the school and for the necessary works.
• Insufficient engagement: If the school community lacks interest in or understanding of sustainability principles, it may lead to low participation and failure to maintain the garden.
• Limited resources: Inadequate funding or personnel dedicated to garden management can impede the project's success.
• Absence of technical infrastructure: Without access to necessary resources like water supplies and gardening tools, it would be challenging to establish and maintain the garden effectively.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to promote sustainability and environmental awareness within the school community while providing practical learning opportunities for students.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Promoting sustainability through hands-on activities such as gardening, animal care, outdoor sustainability sessions and science or arts classes in the garden

Have you encountered challenges in engaging people? What are they?

Initial lack of awareness and interest, as well as competing priorities. Lack of authorisation from the municipality

How have you or could you overcome them?

Overcome challenges by organising engaging events, educational workshops and involving students in decision-making processes. Meet with the municipality and show the impact on the school community.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Community involvement, stakeholder engagement, environmental education, and access to resources.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with stakeholders: Collaborating with local organisations and with the city council

What has enabled or could promote cooperation?

Promoting cooperation through open communication, shared goals, and mutual benefits.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Foster environmental stewardship, enhance learning experiences, and strengthen community bonds.

How do you presume the change could happen?

Change can happen through experiential learning, peer influence, and community support.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Clear objectives, stakeholder engagement, and continuous evaluation support visioning.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Achieving goals through strategic planning, resource allocation, and effective communication.

What kind of challenges have you faced in your organisation?

Challenges include resource limitations, maintenance efforts, and stakeholder alignment.

How have you found, or could you find time and space for the intervention in your organisation?

Finding time and space through curriculum integration, volunteer involvement, and adaptive management strategies.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- "Quinta do Charco" reactivation plan

Description: The teachers had to make a first draft of the school community's idea for that space.

Responsible: Teachers (Patrícia Pereira and Daniela Baptista)

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers

Task 2.- Partner involvement

Description: Involve the architecture team at Instituto Superior Técnico to design the space and develop activities with the community.

Responsible: IST Team

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: All school Community

Task 3.- Approval by the City Council

Description: The Municipal Chamber of Loures, as the owner of the space and responsible for managing the school, must approve the idea.

Responsible: School Board

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and the School Board

Task 4.- Final plan for Quinta do Charco

Description: The architecture team will present the final plan after collecting all the information from the community.

Responsible: IST Architecture team

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers

Task 5.- Works and transformation of the space

Description: Carrying out the necessary works and all activities involving the modification of the space

Responsible: School Board

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: Still under study

Cost: 10000 Euros

Task co-implementation participatory approach: All school Community

- **Milestones**

  Milestone 1: "Quinta do Charco" reactivation plan

  Milestone 2: Partner involvement

  Milestone 3: Final plan and approval by the City Council

  Milestone 4: Opening Session of "Quinta do Charco"

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Sketches, drawings and a video

  Output 3: A new space called: "Quinta do Charco"

- **Cost (Equipment /consumables /others)**

  Total cost: 210000 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Regular Assessments: Conduct regular assessments of garden activities, including gardening practices, animal care, educational workshops, and community events. This can involve observation, surveys, and feedback mechanisms to gauge progress and identify areas for improvement.

  2. Data Collection: Collect quantitative and qualitative data on key performance indicators, such as student participation rates, garden productivity, community engagement levels, and learning outcomes. Utilise tools like surveys, interviews, and attendance records.

  3. Stakeholder Involvement: Involve relevant stakeholders, including students, teachers, parents, community members, and local organisations, in the monitoring process. Encourage active participation through feedback sessions, focus groups, and collaborative decision-making to ensure their perspectives are considered.

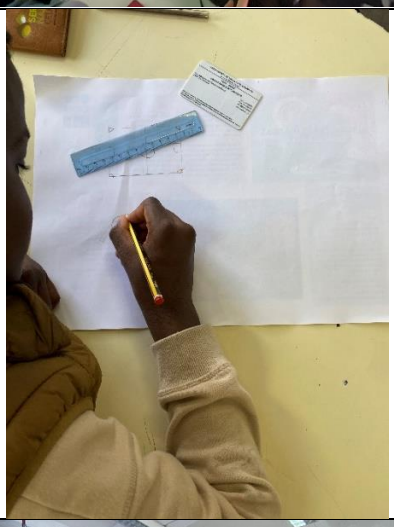
  4. Regular Reporting: Compile monitoring data into regular reports that highlight progress, achievements, challenges, and recommendations for improvement. Share these reports with stakeholders to keep them informed and engaged in the implementation of the intervention.

5. Continuous Improvement: Use monitoring findings to inform decision-making and guide continuous improvement efforts. Identify areas of success and areas needing attention, adjust strategies as needed, and implement corrective actions to address any issues or barriers encountered during implementation.

Responsible: School Board

- **Photographs of the intervention implementation**








- **Troubles during implementation, conclusion and lessons learnt.**

The implementation of the "Quinta do Charco" reactivation project progressed smoothly in terms of community mobilisation and conceptual planning. However, delays began to occur even before Task 5 – "Works and transformation of the space".

The planning phase with the IST architecture team was delayed by some months due to two main reasons—one more challenging and one notably positive.

On the more challenging side, bureaucratic procedures related to authorisation and coordination with the municipal authorities introduced early delays. Since the Municipality of Loures owns the school facilities and is responsible for approving and overseeing structural interventions, the school had to ensure that the proposed garden plan aligned with municipal priorities and was formally approved. Furthermore, the school is set to undergo major renovation works—including the construction of a new school building on-site. This raised concerns about whether the "Quinta do Charco" garden area would remain untouched and protected. Several rounds of meetings and communications were necessary to secure confirmation that the garden space would remain as is and that the planned investment would not be lost.

On the positive side, the IST architecture team chose to adopt a participatory design approach, going beyond traditional project drafting. Instead of simply delivering a pre-defined plan, they engaged in a series of sessions with students, staff, teachers, and the parents' association. These sessions explored how the community perceived the space, what emotions it evoked, what aspirations they had for it, and what their concerns and priorities were. The final plan was thus built collaboratively, reflecting the vision and values of the entire school community.

However, significant challenges emerged during Task 5 – Works and transformation of the space.

The bureaucratic complexity of approving and implementing construction work in a public school setting has proven to be a major obstacle. Additionally, the estimated cost of the intervention doubled during the planning process, rising to €20,000. Although this increase was anticipated and funds had been reserved within the project budget, it was extremely difficult to find a contractor willing to carry out the work for under this amount. This reflects a broader structural issue in Portugal, where there are limited contractors available for small-scale yet labour-intensive projects.

A further challenge relates to how IST can authorise and process payment for works carried out on property not owned by the university. Although this intervention is fully eligible within the project scope, the internal bureaucracy and regulations at IST—especially regarding procurement, financial authorisation, legal compliance, and external works management—have created substantial barriers. Several departments (legal, finance, procurement, facilities management) have become involved in navigating these institutional constraints, which has further slowed progress.

As a result of these financial and administrative challenges, the final implementation phase of the project was delayed. The school and its partners are now working toward completing the necessary works by the end of September.

Despite these obstacles, the overall process has been highly valuable. The earlier phases succeeded in mobilising the school community, strengthening institutional partnerships—particularly with the IST architecture team—and generating excitement around the garden's potential as a sustainability, learning, and community engagement hub. The lessons learned reinforce the importance of realistic budgeting, early financial validation, and proactive coordination with municipal authorities and institutional structures when delivering infrastructure-related educational interventions.

PT-DS02-IN07- Energy route: ADENE

General data

Description: The "Energy Route" from ADENE encompasses face-to-face and/or distance information and training sessions, imparting knowledge to individuals and sparking their interest in learning more about the world of energy, enabling them to understand the role of citizens in building a more sustainable world.

- **Participants and profile:** 1Yi# / 1Yi% / 1Yj%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Individual action

    - Short description of the objectives:

      ● Involving society, investing in education, information, awareness, and training, and contributing to increasing individual and collective action, through changes in behaviour and lifestyle.
      ● Disseminate the importance of decarbonisation issues among consumers and companies.
      ● Deepen knowledge in terms of mitigating climate change, disseminating good practices, and promoting low-carbon behaviour in society.
      ● Promote training for the energy and water efficiency sectors.
      ● Combating energy poverty.

    - Time scope of the intervention:

      Mid-term / Long-term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competences:
      • Cultural-cognitive: Integration of sustainability principles into societal norms and values, fostering a culture of environmental responsibility.
      Individual competences:
      • Knowledge: Understanding of energy efficiency, decarbonization, and climate change mitigation.

• Attitudes & emotions: Positive attitudes towards sustainability and willingness to adopt low-carbon behaviours.
Technical infrastructure:
• Availability of educational materials
Resources:
• Allocation of personnel dedicated to planning, implementing, and monitoring the intervention.
Responsibilities:
• Collaboration with educational institutions

- Main risks and uncertainties:

• Failure to integrate sustainability principles into societal norms and values may result in apathy or disinterest towards environmental issues.
• Insufficient knowledge and skills among individuals may limit their ability to implement energy-saving practices effectively.
• Inadequate access to educational materials may hamper the delivery of effective training sessions.
• Resource limitations may restrict the scope and impact of the intervention.
• Ineffective collaboration and coordination may lead to fragmented efforts and duplication of resources, undermining the overall effectiveness of the intervention.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

"How to promote and implement sustainable practices, energy efficiency, and decarbonization initiatives within communities and organisations?"

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Promoting sustainability by highlighting the importance of energy efficiency and the role of citizens in building a sustainable world.

Have you encountered challenges in engaging people? What are they?

• Challenges include a lack of awareness about energy-related issues and competing priorities.

How have you or could you overcome them?

• Overcoming challenges through targeted communication and engaging content

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Relevant issues include energy consumption patterns, climate change mitigation, and sustainable development. Furthermore, this project is organised by an institution outside the school.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Collaborate with external stakeholders (ADENE) to access expertise and additional educational opportunities. Build partnerships through joint projects, workshops, or shared resources.

What has enabled or could promote cooperation?

Promotion of cooperation through shared objectives and collaborative initiatives

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Our vision is to empower individuals with the knowledge and skills to make informed decisions about energy use, leading to positive changes in behaviour and lifestyle.

How do you presume the change could happen?

Change can occur through increased awareness, the adoption of energy-efficient practices, and advocacy for policy changes that promote sustainability.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Change can occur through increased awareness, the adoption of energy-efficient practices, and advocacy for policy changes that promote sustainability.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Clear communication, stakeholder engagement, and resource allocation facilitate goal achievement.

What kind of challenges have you faced in your organisation?

Challenges include resource constraints, resistance to change, and competing priorities.

How have you found, or could you find time and space for the intervention in your organisation?

Finding time and space through flexible scheduling, prioritising initiatives, and seeking external partnerships for support.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Contact ADENE

Description: Contact ADENE and schedule sessions (through the municipal council)

Responsible: School Board

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: No

Cost: 0 Euros

Task co-implementation participatory approach: Science Teachers

Task 2.- Hold Energy Route sessions

Description:

Responsible: Science Teachers and ADENE

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed: Educational materials

Cost: 0 Euros

Task co-implementation participatory approach: Science Teachers and ADENE

Task 3.-

Description:

Responsible:

External expert assistance:

ECF4CLIM expert assistance:

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Contact ADENE

  Milestone 2: Energy Route Session

- **Outputs:**

  Output 1: Summary sheet

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Data Collection: Implement a system for collecting data related to the Energy Route activities, such as attendance records and participant feedback, and energy consumption metrics.

  2. Feedback Sessions: Conduct surveys and feedback sessions with participants.

  Responsible: School Board

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

The implementation of the Energy Route session with ADENE ran smoothly and without any significant difficulties. The activity was well coordinated between the school and ADENE, and it aligned well with curricular goals. The session was positively received by both students and teachers, contributing to increased awareness of energy efficiency and sustainability. The experience confirmed the value of integrating external expertise into school-based learning initiatives.

PT-DS02-IN08 - Integrate the assessment of energy consumption into the disciplines

General data

Description: Introduction of environmental and sustainability issues in various subjects, in addition to science or citizenship classes. Take advantage of math classes to work on the school's energy consumption and talk about sustainability.

- **Participants and profile:** 1Yi# / 1Yi% / 1Yj%
- **SCT and SCC representatives:** 1Yj3%
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Individual action
    - Short description of the objectives:

      a) Increase students' knowledge about sustainability and teach them how to work with data mathematically to be able to draw conclusions.
      b) Improve the individual skills and abilities of each student.
      c) Motivate students to change behaviours.
      d) Address environmental performance and the reality that the school faces.
    - Time scope of the intervention:

      Long-term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective competences:
      • Normative: School's commitment to sustainability through inclusion in institutional plans and strategies.
      • Cultural-cognitive: Establishment of sustainability as a core value integrated into the school culture.
      Individual competences:
      • Knowledge: Understanding of energy consumption, sustainability principles, and behaviour change strategies.
      • Skills & capabilities: Ability to interpret and analyse consumption data, apply mathematical and scientific concepts.

• Attitudes & emotions: Positive attitude towards sustainability and willingness to change behaviour.
Technical infrastructure:
• Access to energy consumption data.
Resources:
• Teachers interested in implementing these themes in their subjects
Responsibilities:
• Teachers are responsible for integrating energy consumption assessment into math and science subjects.
• School administration is accountable for providing necessary resources and support for implementation.

- Main risks and uncertainties:

a) Lack of data to work with
b) Lack of interest from teachers and students
c) Lack of continuity over the years
d) Knowledge not acquired; that is, students simply looked at the exercise from the perspective of the discipline, solving a mathematical problem, and not from the perspective of sustainability.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can schools effectively integrate energy consumption assessment into math and science subjects to raise awareness, promote sustainability, and encourage behaviour change among students?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Engage students by connecting energy consumption assessment with real-world data from their school, fostering a sense of ownership and responsibility.

Have you encountered challenges in engaging people? What are they?

Initial resistance from students or teachers due to perceived complexity or lack of understanding of relevance.

How have you or could you overcome them?

Provide engaging and interactive educational materials, demonstrations, and hands-on activities to make the concept of energy consumption tangible and relatable. Offer incentives or recognition for active participation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Relevant issues include energy efficiency, environmental impact, and sustainability education. Actors, such as the municipal council, must provide the data.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Collaborate with the municipal council on the data and other educational opportunities. Build partnerships through joint projects, workshops, or shared resources.

What has enabled or could promote cooperation?

Emphasise the mutual benefits of collaboration, such as shared knowledge and resources, and align objectives to common goals.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The intervention aims to promote learning by integrating sustainability principles into math and science education, fostering behaviour change towards energy efficiency and environmental stewardship.

How do you presume the change could happen?

By empowering students with knowledge and skills related to energy consumption, the intervention can instigate a shift in attitudes and behaviours towards sustainable practices.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Regular evaluation and feedback mechanisms to track progress and measure impact.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Implement a structured curriculum that integrates energy consumption assessment into math and science subjects, supported by relevant teaching materials and educator training.

What kind of challenges have you faced in your organisation?

Potential resistance from traditional teaching methods, curriculum constraints, or the lack of resources.

How have you found, or could you find time and space for the intervention in your organisation?

Schedule dedicated class time for energy assessment activities, integrate them into existing lesson plans, and leverage available resources such as digital tools or educational partnerships to facilitate implementation.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- School energy and water consumption data

Description: Ask the school management for the school's energy and water consumption

Responsible: Maths teacher

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: The data

Cost: 0 Euros

Task co-implementation participatory approach: Teacher and School management

Task 2.- Work with the data

Description: Work in class on data on the school's energy and water consumption and look at them from a mathematical point of view, but also from a sustainability point of view.

Responsible: Maths teacher

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: A classroom, where students during mathematics class will work on the data

Cost: 0 Euros

Task co-implementation participatory approach: Teacher, Students.

- **Milestones**

  Milestone 1: Classes on energy consumption

- **Outputs:**

  Output 1: short report/guidance to replicate the intervention (lessons learnt)

  Output 2: Graphs of energy consumption produced in class

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Regular Data Collection: Data collection process to monitor the integration of energy consumption assessment into math and science subjects. This may include tracking lesson plans

  2. Feedback Mechanisms: Establish feedback mechanisms to gather input from teachers, students, and other stakeholders involved in the intervention. This may involve conducting surveys, focus groups, or regular meetings to assess progress, identify challenges, and gather suggestions for improvement.

  Responsible: Coordinator of science and mathematics teachers

- **Photographs of the intervention implementation**

- **Troubles during implementation, conclusion and lessons learnt.**

Two main challenges were identified during the implementation of this intervention.

The first was related to access to energy and water consumption data. Until recently, the school had direct access to utility bills, which made it easier to retrieve and use this data in class. However, following administrative changes, this information is now managed centrally by the municipal council. As a result, teachers must formally request the data, which may delay the integration of these activities into lessons.

The second challenge concerned teacher engagement and curriculum integration. Although mathematics and science are naturally suited for data-based exercises, not all teachers are equally motivated or comfortable incorporating sustainability topics into their teaching. Even within relevant subjects, it requires commitment and creativity to go beyond traditional content and link mathematical analysis with broader environmental reflection. Teachers also reported limited time and pressure to cover existing curriculum content, which can make it difficult to introduce new cross-disciplinary activities.

Despite these challenges, the activity was well received by the participating students and teachers. Using real school data helped make the lessons more meaningful and grounded in everyday reality. The intervention showed clear potential for replication and expansion, especially if supported by accessible data, motivated educators, and recognition of the added value that sustainability brings to traditional subject areas.

PT-DS02-IN9 - Awareness actions on the correct selective separation of waste and the impact on the environment

General data

Description: Promote awareness-raising actions within the school community about the correct selective separation of waste and the impact of waste on the environment.

- **Participants and profile:** 1Yi# / 1Yi% / 1Yj% / 1Yt%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Individual and collective action
    - Short description of the objectives:

      ● Increase the knowledge of the school community about recycling.
      ● Achieve a reduction in waste produced at school.
      ● Increase the amount of recycled waste.
      ● Guarantee the correct separation of waste by the community.
    - Time scope of the intervention:

      Short, Mid and Long-term

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

    Collective competences:
    • Normative: Establishment of clear guidelines and policies within the school regarding waste management and recycling.
    • Cultural-cognitive: Fostering a culture of environmental consciousness and responsibility among students, teachers, and staff.
    Individual competences:
    • Knowledge and skills: providing education and training sessions to enhance understanding of waste separation and recycling practices.
    • Attitudes and emotions: Encouraging positive attitudes towards waste reduction and recycling through awareness-raising campaigns.
    Technical infrastructure:
    • Adequate waste separation and recycling facilities within the school premises.
    • Access to recycling programs and services offered by local waste management authorities.
    Resources:
    • Sufficient budget allocation for organising educational activities, purchasing recycling bins, and implementing waste management initiatives.
    • Allocation of personnel responsible for coordinating and overseeing waste management efforts within the school.
    Responsibilities:
    • School administration: Develop and enforce waste management policies, allocate resources, and provide leadership in promoting recycling initiatives.
    • Students: Actively participate in waste separation and recycling efforts, follow established guidelines, and promote sustainability practices within the school community.

  - Main risks and uncertainties:

    • Lack of awareness: If the school community lacks understanding of the importance of waste management and recycling, it may not actively participate in the intervention.
    • Inadequate resources: Insufficient budget and personnel allocation may hinder the implementation of effective waste management strategies and educational programs.
    • Resistance to change: Some individuals within the school community may resist adopting new waste separation practices due to inertia or scepticism about the benefits of recycling.
    • Lack of enforcement: Failure to enforce waste management policies and guidelines could lead to non-compliance and undermine the effectiveness of the intervention.

• Limited engagement: If students, teachers, and staff are not actively involved in planning and implementing waste management initiatives, the intervention may lack buy-in and support from the community.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can the school community effectively reduce waste generation and improve recycling practices to minimise environmental impact and promote sustainability?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Promotion: Highlighting the environmental impact of waste and the benefits of selective waste separation.

Have you encountered challenges in engaging people? What are they?

• Challenges: Initial apathy, lack of understanding about waste management.

How have you or could you overcome them?

• Overcoming: Interactive sessions, visual demonstrations, incentives for participation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Related Issues: Community involvement, waste management policies, environmental conservation.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation: Collaborating with waste management authorities, NGOs, and local businesses.

What has enabled or could promote cooperation?

• Promoting Cooperation: Emphasising shared environmental goals, offering resources and support.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• Expected Impact: Cultivating a culture of responsible waste management, reducing waste generation, and improving recycling rates.

How do you presume the change could happen?

• Change: Through education, community involvement, and continuous reinforcement of sustainable behaviours.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning Support: Testimonials and visualisations of a cleaner environment

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Achievement Support: Clear communication of objectives, regular progress monitoring, and feedback mechanisms.

What kind of challenges have you faced in your organisation?

• Challenges: Limited resources, resistance to change, lack of awareness.

How have you found, or could you find time and space for the intervention in your organisation?

• Time and Space: Incorporating waste management education into the curriculum, utilising existing facilities, and scheduling sessions during opportune times.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Strategic plan for waste separation

Description: Define a strategic plan for separating waste at school, which considers each necessary resource, which elements of the school to involve, who should be assigned responsibilities and how to verify the success of the measures.

Responsible: Science teachers and students

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Science teachers, students and staff

Task 2.- Application of the strategic plan

Description: Application of the strategic plan

Responsible: Science teachers and students

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Science teachers, students and staff

Task 3.- Assessment of the strategic plan

Description: Assessment of the strategic plan and the results of its application, to define improvements

Responsible: Science teachers, staff and students

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Science teachers, students and staff

- **Milestones**

  Milestone 1: Strategic plan for waste separation

  Milestone 2: Assessment of the strategic plan

- **Outputs:**

  Output 1: Summary sheet

  Output 2: The strategic plan

  Output 3: short survey

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: • Surveys and Feedback: Regular surveys to assess community engagement, knowledge retention, and behaviour change regarding waste separation.

  • Waste Audits: Conducting periodic waste audits to measure the effectiveness of waste separation practices and identify areas for improvement.

  • Participation Tracking: Keeping records of attendance and participation in awareness sessions and waste separation initiatives.

  • Observation and Interviews: Observing waste separation practices in real-time and conducting interviews with stakeholders to gather insights into challenges and successes.

  • Key Performance Indicators (KPIs): Establishing KPIs such as waste reduction rates, recycling rates, and adherence to waste separation guidelines.

  • Continuous Improvement: Using feedback from monitoring activities to adapt and improve awareness-raising strategies and waste management initiatives over time.

  Responsible: Science teachers, students and staff

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

The intervention began with positive steps, including awareness-raising sessions for students and staff on correct waste separation, particularly during the recycling competition (Intervention no. 10). These efforts helped promote environmental responsibility and informed daily practices within the school community.

However, Task 3—focused on defining and assessing a strategic plan for recycling in the school—faced limitations. Although the school initially committed to creating a comprehensive waste management plan, including clear procedures, responsibilities, and long-term goals, this plan was never submitted or implemented. As a result, no structural changes were made to the existing waste management approach.

This also affected the evaluation phase. The intervention aimed not only to support the development of the plan but also to assess its effectiveness and define improvements based on practical application. With no plan in place, this assessment could not be carried out and has been postponed, potentially to 2026.

This situation highlights a common challenge in sustainability interventions: translating short-term awareness actions into long-term institutional change. It also reinforces the importance of clear follow-up mechanisms and sustained support when aiming for broader structural transformation in school settings.

PT-DS02-IN10.- Promoting proper waste sorting and encouraging eco-friendly behaviours through inter-class competitions. School waste production.

General data

Description: Creation of a competition or reward programme that will be played between classes or school buildings to promote efficient waste separation. For a week, all classes of the same academic year compete against each other, with the goal of being the class that recycles the most. For this, new containers will be provided to the school to carry out the challenge.

- **Participants and profile:** 1Yi# / 1Yi% / 1Yj% / 1Yt%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Individual and collective action
    - Short description of the objectives:

      ● Promote the correct separation of waste.
      ● Get more recycling equipment at school.
      ● Teach the community about recycling and its importance.
      ● Debunking myths about recycling.
      ● Decrease the amount of waste produced at school.
    - Time scope of the intervention:

      Short, Mid and Long Term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective Competences:
      • Cultural-cognitive: Fostering a culture of environmental responsibility and waste reduction among students, teachers, and staff.
      Individual Competences:
      • Knowledge: Understanding of waste separation practices and environmental impact.
      • Skills: Ability to effectively sort and dispose of waste in designated containers.

• Attitudes: Positive attitudes towards sustainability and willingness to participate in waste reduction efforts.
Environmental/Technical Elements:
• Sufficient waste separation infrastructure: Adequate number of recycling bins and proper labelling.
• Accessible collection points: Convenient locations for waste disposal to encourage participation.
Resources:
• Human resources: Adequate staffing to oversee initiatives and coordinate activities.
Responsibilities:
• Clear delineation of roles: Identification of individuals or teams responsible.

- Main risks and uncertainties:

• Lack of awareness and education: Without proper knowledge and understanding of waste separation practices, students may not participate effectively.
• Insufficient infrastructure: Inadequate availability of recycling bins and collection points may hinder waste separation efforts.
• Resistance to change: Cultural resistance or lack of buy-in from the school community may impede the adoption of sustainable waste management practices.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can the school effectively promote waste reduction and proper waste separation practices among students, teachers, and staff to minimise environmental impact and increase recycling rates?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Promote sustainability by emphasising the environmental benefits of waste separation and recycling.

• Encourage competition among classes or school buildings to foster engagement and interest.

Have you encountered challenges in engaging people? What are they?

• Challenges may include apathy or a lack of awareness about the importance of waste separation.

How have you or could you overcome them?

• Overcome challenges through education campaigns, incentives for participation, and clear communication about the goals and benefits of the competition.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Waste management policies.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation with waste management companies and the municipal council can enhance the effectiveness of the intervention.

What has enabled or could promote cooperation?

• Promote cooperation through partnerships, collaborative planning, and shared resources.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• The expected impact is to increase waste separation rates, reduce landfill waste, and cultivate a culture of environmental responsibility.

How do you presume the change could happen?

• Change could happen through increased awareness, behaviour change, and sustained participation in waste separation practices.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning the impact involves setting clear goals, measuring progress, and celebrating achievements to inspire continued engagement.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Education and communication strategies to raise awareness and motivate participation.

What kind of challenges have you faced in your organisation?

• Challenges may include logistical issues, resistance to change, and resource constraints.

How have you found, or could you find time and space for the intervention in your organisation?

• Overcome challenges through effective planning, community engagement, and flexibility in implementation strategies.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Define the regulation

Description: Define the competition regulations. Who participates, how, what are the rules, and what is the prize

Responsible: Science Teacher and students

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers, School Board and Students

Task 2.- Present to students and set goals

Description:

Responsible: Science Teachers

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and students

Task 3.- Hold the competition.

Description: Hold a competition between classes and record all developments

Responsible: Science Teachers

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: recycling containers

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and students

Task 4.- Final prize

Description: Award the final prize and carry out the chosen activity

Responsible: School Board

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Buses

Cost: 3000 Euros

Task co-implementation participatory approach: Teachers, School Board and Students

- **Milestones**

  Milestone 1: Competition rules regulation

  Milestone 2: The competition

  Milestone 3: Prize delivery

- **Outputs:**

  Output 1: Summary sheet (Report)

  Output 2: Changes in the waste KPI

- **Cost (Equipment /consumables /others)**

  Total cost: 3000 Euros

- **Intervention implementation comonitoring strategy**

Implementation of the comonitoring approach:

1. Regular Data Collection: Implement a system to track the amount of recycled waste collected from each class or school building daily or weekly.

2. Engagement Platforms: Use digital platforms to display real-time or periodic updates on each class or building's progress in the competition.

3. Incentives and Recognition: Offer incentives or rewards for the winning class or building, such as certificates, trophies, or small prizes, to encourage participation and maintain motivation.

4. Peer Accountability: Foster a sense of peer accountability by encouraging students and teachers to remind each other about the importance of waste separation and recycling.

5. Feedback Mechanisms: Establish channels for feedback and suggestions from participants to continuously improve the competition and address any challenges or concerns.

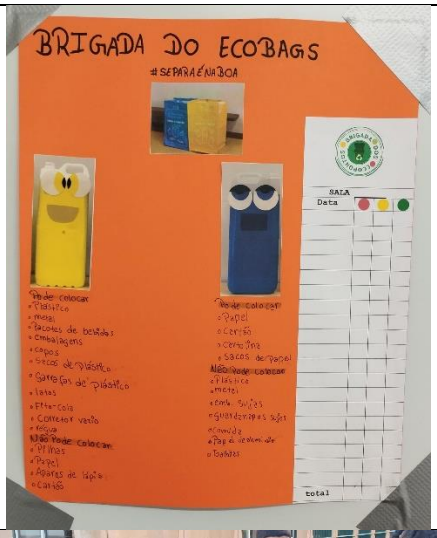
6. Evaluation Criteria: Define clear criteria for evaluating the success of the competition, such as the percentage increase in recycling rates, reduction in landfill waste, and overall participation levels.

7. Regular Reviews: Conduct regular reviews or meetings to assess the progress of the competition, identify areas for improvement, and celebrate achievements.

Responsible: Science Teacher and students

- **Photographs of the intervention implementation**











- **Troubles during implementation, conclusion and lessons learnt.**

The competition was implemented successfully and received strong participation. Clear rules, active communication, and regular updates on progress helped maintain high levels of engagement throughout the week. The playful and competitive format contributed to the community's enthusiasm and made recycling more visible and relevant in the school context.

A key challenge remains ensuring that students participate not only because of the prize, but because they understand the value of the activity itself. Even so, the incentive proved effective in mobilising participation, and the knowledge acquired throughout the process tends to remain, regardless of the initial motivation.

10. REPORT ON IMPLEMENTED INTERVENTIONS IN IST.

School brief description

IST is a faculty of the University of Lisbon, the largest Portuguese public school of engineering, architecture, science, and technology. It is considered one of the most renowned engineering institutions in Europe. The university campus in Alameda was built in 1937 and was the first autonomous campus in the Portuguese university system. Today, IST has three campuses – in Alameda, Tagus Park and Bobadela – with 11,000 students and 900 professors/researchers from various nationalities.

Implemented Interventions Summary

The interventions implemented in the IST pilot center are listed in the following table.

Measure Id	***Title***
PT-DS03-IN01	Climate Crisis and Fair Transition
PT-DS03-IN02	Master's and doctoral theses in the field of sustainability
PT-DS03-IN04	Installation of air quality sensors in classrooms
PT-DS03-IN05	Solar panels
PT-DS03-IN06	"Technical + Green" Project
PT-DS03-IN07	Communication and community involvement
PT-DS03-IN08	IST's activities and strategic plan
PT-DS03-IN09	"Bio Técnico" Project
PT-DS03-IN10	"Técnico makes the difference" Project

Table 10-1.- Intervention in IST.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
PT-DS03-IN01	Climate Crisis and Fair Transition	Educational programs		New subjects/courses
PT-DS03-IN02	Master's and doctoral theses in the field of sustainability	Educational programs		New subjects/courses
PT-DS03-IN04	Installation of air quality sensors in classrooms	Air quality		
PT-DS03-IN05	Solar panels	Energy		

PT-DS03-IN06	"Technical + Green" Project	Green Spaces	Educational programs	Projects/Works
PT-DS03-IN07	Communication and community involvement	Educational programs		Talks
PT-DS03-IN08	IST's activities and strategic plan	Educational programs		
PT-DS03-IN09	"Bio Técnico" Project	Food		
PT-DS03-IN10	"Técnico makes the difference" Project	Waste		

Table 10.2.- Interventions main working areas in IST

PT-DS03-IN01- Climate Crisis and Fair Transition

General data

Description: Creation of a curricular unit on the climate crisis and fair transition. This curricular unit was proposed by students to the university board and was accepted and implemented in the 2023-2024 academic year. It is a curricular unit designed for first-year students and open to all undergraduate students at Instituto Superior Técnico.

- **Participants and profile:** 1Ji# / 1Ji% / 1Jj%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Individual and collective action
    - Short description of the objectives:

      ● Provide a consolidated information base that supports a critical view of climate science for an engineer's decision-making processes.
      ● Provide a cross-sectional perspective on the impact of the climate crisis on society, encompassing all sectors that can play a role in change.
      ● Critically analyse the exchange and examples of a just societal transition at the national and global level.
      ● Provide decision-making resources to students in the face of individual, professional, and collective action at a social and political level.
    - Time scope of the intervention:

      Short/mid and long term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective Competences:
      • Normative: Institutional support and recognition of the importance of climate education in the curriculum.
      • Cultural-cognitive: Integration of sustainability principles into the academic culture, fostering a mindset of critical thinking and societal responsibility.
      • Regulatory: Alignment with educational standards and guidelines, ensuring the inclusion of climate science and fair transition topics.
      Individual Competences:
      • Knowledge: Access to up-to-date climate science information and understanding of climate-related issues.

• Skills: Critical thinking skills to analyse complex societal and environmental challenges and propose solutions.
• Attitudes: Motivation and willingness to engage with climate-related topics and advocate for climate action.
Technical Elements:
• Access to educational resources: Availability of relevant literature, online resources, and educational materials on climate science and fair transition.
Resources:
• Personnel: Staff to facilitate curriculum development, teaching, and student support.
Responsibilities:
• Curriculum Development: Academic staff are responsible for designing and integrating the curricular unit into the academic program.
• Teaching and Delivery: Faculty members are tasked with teaching the course and facilitating student learning.
• Student Participation: Engagement and active involvement of students in learning activities and discussions.
• Monitoring and Evaluation: The evaluation team will assess the effectiveness of the intervention and make necessary adjustments.

- Main risks and uncertainties:

• Lack of Institutional Support: Absence of support from university administration or resistance from faculty members may undermine the implementation and sustainability of the curricular unit.
• Insufficient Integration: Failure to integrate climate education across disciplines and academic programs may limit its effectiveness in providing a cross-sectional perspective on the climate crisis.
• Resistance to Change: Resistance from students or faculty members to adopt a curriculum that prioritises climate education and societal transformation may impede progress towards achieving the intervention's objectives.
• Resource Constraints: Limited budget resources, personnel, or technical infrastructure may restrict the development and delivery of the curricular unit, compromising its quality and impact.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The intervention aims to develop the competence of first-year engineering students in understanding and addressing the climate crisis and fair transition through a comprehensive curricular unit.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The relevance of addressing climate crisis issues in engineering education.

Have you encountered challenges in engaging people? What are they?

Initial scepticism about the relevance of the topic to engineering.

How have you or could you overcome them?

Highlighting real-world implications, showcasing student involvement in the proposal, and emphasising interdisciplinary connections.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Climate policy, social justice, and sustainable development.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Collaborating with environmental NGOs, policymakers, and industry partners.

What has enabled or could promote cooperation?

Emphasising shared goals, offering expertise, and fostering dialogue.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Empowering students to become informed advocates for sustainable practices.

How do you presume the change could happen?

Through critical analysis, interdisciplinary learning, and community engagement.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Success stories, interdisciplinary discussions, and expert guidance.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Clear communication of objectives, student involvement in curriculum design, and ongoing assessment.

What kind of challenges have you faced in your organisation?

Balancing workload, integrating new content into the existing curriculum, and ensuring faculty support.

How have you found, or could you find time and space for the intervention in your organisation?

Prioritising sustainability education, flexible scheduling, and leveraging existing resources.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1. Definition of the curricular unit

Description: Definition of the curricular unit (content, evaluation methods, feasibility, target audience)

Responsible: Tiago Domingues (IST Teacher)

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and students

Task 2.- Approval of the Curricular unit

Description: Present the proposal to the scientific council and wait for approval from the various members of the hierarchy

Responsible: Tiago Domingues (IST Teacher)

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and students

Task 3.- Climate Crisis and Fair Transition

Description: Start of classes

Responsible: Tiago Domingues (IST Teacher)

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and students

- **Milestones**

  Milestone 1: Definition of the curricular unit

  Milestone 2: Approval of the Curricular unit

  Milestone 3: Climate Crisis and Fair Transition classes

- **Outputs:**

  Output 1: Summary sheet

  Output 2: A brief description of the process and results

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Regular Assessments: Conduct periodic evaluations of student learning outcomes and engagement with course material.

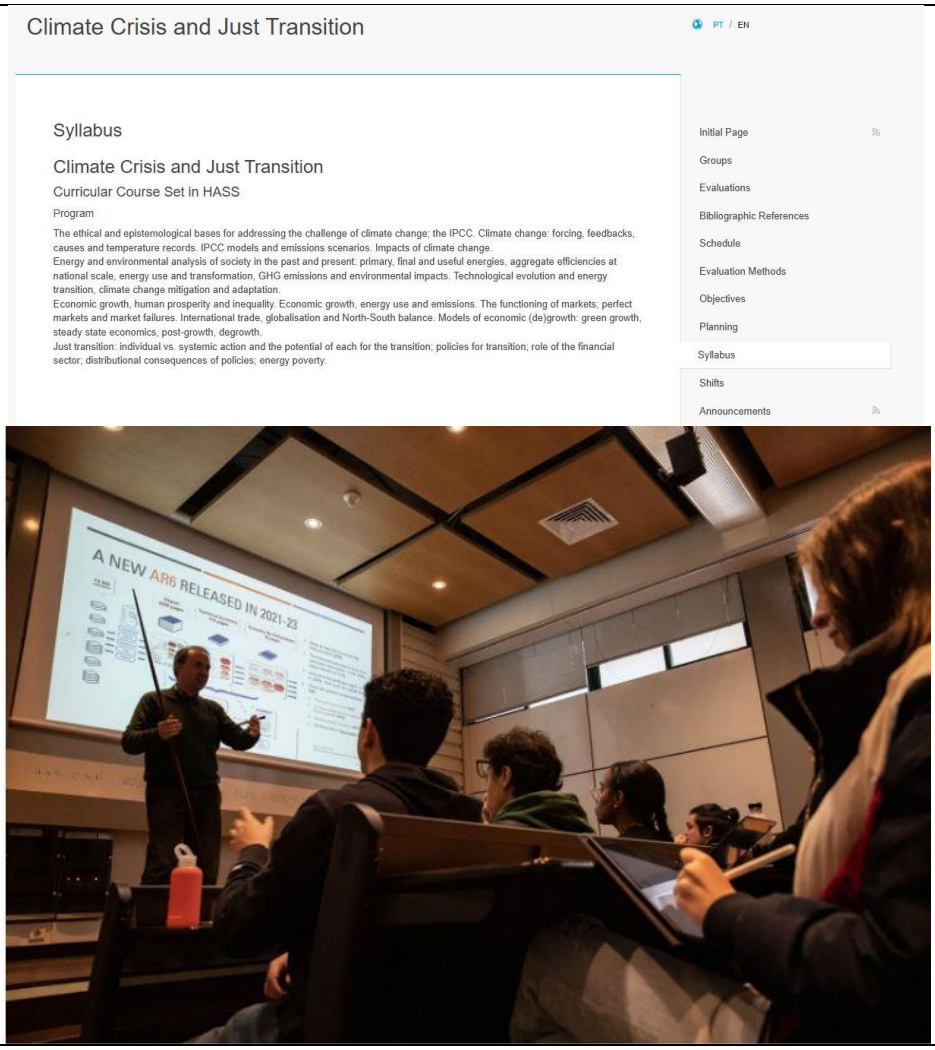
  2. Feedback Mechanisms: Establish channels for students to provide feedback on the effectiveness of the curriculum and teaching methods.

3. Faculty Engagement: Ensure faculty members are actively involved in monitoring student progress and adapting teaching strategies as needed.

4. Continuous Improvement: Use the gathered information to iteratively refine the curriculum and teaching approaches to meet the objectives of the intervention better.

Responsible: Tiago Domingues (IST Teacher)

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

No significant troubles arose during implementation. This intervention is repeated annually.

PT-DS03-IN02 - Master's and doctoral theses in the field of sustainability

General data

Description: Promotion of master's and doctoral theses in the area of sustainability. University professors and researchers are committed to addressing these issues with students and encouraging research and the development of theses within their scope, not only within the university but also in a more holistic context.

- **Participants and profile:** 1Ji# / 1Ji% / 1Jj# / 1Jj%
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Individual and collective action
    - Short description of the objectives:

      ● Promoting research about sustainability applied to the campus.
      ● Increase the number of theses and publications that address the theme of sustainability.
      ● Include sustainability issues in the university's various teaching areas.
    - Time scope of the intervention:

      mid-term/long-term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective Competences:
      • Cultural-cognitive: Cultivation of a university culture that supports climate education and societal responsibility.
      • Regulatory: Compliance with educational standards and guidelines
      Individual Competences:
      • Knowledge: Access to comprehensive information for both students and faculty.
      • Skills: Development of critical thinking and problem-solving abilities to address sustainability challenges.
      • Attitudes: Fostering motivation and enthusiasm among students and faculty to engage with climate-related topics.

Technical Elements:
• Access to Educational Resources: Provision of adequate literature, online materials, and educational tools.
Responsibilities:
• Curriculum Development: Faculty members are responsible for designing and developing the sustainability curriculum, ensuring alignment with educational standards and the university's mission.

- Main risks and uncertainties:

Limited Engagement: Lack of participation and enthusiasm from students and faculty may impede the effectiveness of the intervention.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can education contribute to fostering a deep understanding of sustainability issues, promoting critical thinking, and empowering individuals to take action towards a more sustainable future?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Promotion through university channels: Website announcements, emails, and social media posts highlighting the importance and opportunities in sustainability research.

Have you encountered challenges in engaging people? What are they?

• Challenges: Lack of awareness, perceived complexity of sustainability issues, and competing priorities among students and faculty.

How have you or could you overcome them?

• Overcoming challenges: Implementing targeted awareness campaigns, offering incentives such as research grants or recognition, and integrating sustainability topics into existing coursework.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Related issues: Climate change, environmental degradation, social justice, and economic sustainability.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation: Collaboration with government agencies, NGOs, industry partners, and international research institutions.

What has enabled or could promote cooperation?

• Promoting cooperation: Establishing interdisciplinary research networks, hosting joint conferences or workshops, and fostering mutual benefit through knowledge sharing.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• Expected impact: To advance knowledge and innovation in sustainability, influence policy and practice, and contribute to global efforts for a more sustainable future.

How do you presume the change could happen?

• Change: Through research-driven insights, policy recommendations, and practical solutions to sustainability challenges.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning support: Engagement with stakeholders, scenario planning exercises, and regular feedback mechanisms to refine and align objectives.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Achieving goals: Providing research mentorship, facilitating access to resources and funding opportunities, and fostering a supportive academic environment.

What kind of challenges have you faced in your organisation?

• Challenges: Limited funding, time constraints, and balancing research priorities with teaching and administrative responsibilities.

How have you found, or could you find time and space for the intervention in your organisation?

• Finding time and space: Prioritising sustainability research within institutional agendas, allocating dedicated research facilities, and promoting interdisciplinary collaboration to leverage resources effectively.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Submit proposals

Description: Submit proposals within the theme of sustainability

Responsible: Teachers

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers

Task 2.- Acceptance

Description: Meeting with interested students and choice of theses by students

Responsible: Teachers

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and students

Task 3.- Thesis on sustainability

Description: Development of a master's or doctoral thesis on the topic in question

Responsible: Advisor and student

External expert assistance:

ECF4CLIM expert assistance:

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Advisor and student

- **Milestones**

  Milestone 1: Acceptance of proposals

  Milestone 2: Final Thesis

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Final Thesis

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Progress Tracking: Regularly track the progress of master's and doctoral theses in the area of sustainability, monitoring key milestones and outputs.

  2. Stakeholder Engagement: Engage with university professors, researchers, and students to gather feedback on their experiences, challenges faced, and suggestions for improvement.

  3. Performance Metrics: Develop quantitative and qualitative metrics to assess the quality and impact of sustainability research, including publication outputs, citations, policy influence, and practical applications.

  4. Peer Review: Implement peer review processes to ensure the rigour and relevance of sustainability research conducted as part of master's and doctoral theses.

  5. Continuous Improvement: Use monitoring and evaluation findings to inform continuous improvement efforts, such as refining research methodologies, enhancing research support services, and addressing any barriers or gaps identified in the implementation process

  Responsible: Teachers

- **Photographs of the intervention implementation**



TÉCNICO LISBOA

Platform for Collaborative Waste Management in an Academic Campus

Tiago Maria Pereira Mamouros

Thesis to obtain the Master of Science Degree in

Computer Science and Engineering

Supervisors: Prof. Ana Gualdina Almeida Matos
Dr. Silvia Di Salvatore

Examination Committee

Chairperson: Prof. Daniel Jorge Viegas Gonçalves
Supervisor: Prof. Ana Gualdina Almeida Matos
Member of the Committee: Prof. Rui Filipe Fernandes Prada

October 2023

TÉCNICO LISBOA

Bibliotecas Universitárias:

Papel e dinâmicas arquitetónicas contemporâneas.
Estudo da Biblioteca do Instituto Superior Técnico.

Maria João Martins Ribeiro

Dissertação para obtenção do Grau de Mestre em

Arquitetura

Orientadores:

Professora Doutora Patrícia Isabel Mendes Lourenço
Doutora Silvia Di Salvatore

Júri:

Presidente: Profª Maria Alexandra De Lacerda Nave Alegre
Orientador: Profª Patrícia Isabel Mendes Lourenço
Vogal: Profª Daniela Arnaut Godinho Antunes

Maio de 2022

- **Troubles during implementation, conclusion and lessons learnt.**

This intervention has progressed smoothly overall, with professors showing interest and students engaging in thesis topics related to sustainability. Several proposals were submitted and accepted, and some master's theses are already underway or completed.

Nevertheless, some challenges were noted. One is that the promotion of these opportunities depends largely on the initiative of individual professors and their willingness to supervise work in this field. There is not yet a centralised or institutional mechanism to coordinate, track, or systematically promote sustainability-related theses across departments.

Another recurring issue is the students' workload and timeline constraints, particularly in master's programmes, which often limit the depth or ambition of the work. Sustainability topics tend to be complex and interdisciplinary, which can pose additional challenges in terms of scope definition and access to data.

Still, the initiative proved effective in raising awareness, embedding sustainability into academic research, and supporting a cultural shift within the university. Moving forward, it would be beneficial to formalise sustainability as a transversal research priority at the institutional level and create more structured incentives or support systems—such as grants, interdisciplinary supervision teams, or a shared platform for project ideas—to further consolidate this intervention.

PT-DS03-IN04 - Installation of air quality sensors in classrooms

General data

Description: Between 2021 and 2023, air quality sensors were installed in classrooms in the civil pavilion on the campus of Instituto Superior Técnico. These sensors, installed as part of a research project, will provide real-time air quality data, enabling further improvement actions and best practices.

- **Participants and profile:** 1Jt#
- **SCT and SCC representatives:**
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Technical
    - Short description of the objectives:

      ● Get the air quality status of campus classrooms.
      ● Get real-time information that allows you to make decisions.
      ● Having data that allows a deeper analysis of the air quality in classrooms and the definition of improvement measures
    - Time scope of the intervention:

      Short/mid-term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collective Competences:
      Normative: Support from university administration for installing and maintaining air quality sensors.
      Individual Competences:
      Skills: Ability to interpret air quality data and implement improvement measures accordingly.
      Technical Elements:
      Sensor technology: Reliable and accurate air quality sensors capable of monitoring key pollutants.
      Data analysis tools: Access to software or platforms for analysing and visualising air quality data in real-time.

Maintenance protocols: Established procedures for sensor calibration, maintenance, and troubleshooting to ensure data accuracy and reliability.
Resources:
Personnel: Adequate staffing to oversee sensor installation, maintenance, and data analysis.
Budget: Sufficient financial resources to procure high-quality sensors, data analysis software, and cover ongoing maintenance costs.
Responsibilities:
Installation and Maintenance: Technical staff are responsible for installing sensors and conducting regular maintenance checks.
Data Analysis: Trained personnel or researchers tasked with analysing air quality data and identifying trends or issues.
Decision-making: The university administration and relevant stakeholders are responsible for utilising the data to inform campus policies and develop improvement measures.

- Main risks and uncertainties:

• Lack of Institutional Support: Absence of support from university administration may result in delays or difficulties in installing the sensors.
• Technological Issues: Malfunctioning sensors or data inaccuracies could undermine the reliability and usefulness of the air quality data collected, leading to ineffective decision-making.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can real-time air quality monitoring contribute to enhancing indoor environmental quality and promoting health and well-being in educational settings?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The real-time air quality data produced by the sensors has generated interest and active participation within our educational community.

Have you encountered challenges in engaging people? What are they?

• Challenges in engaging people include initial scepticism about the importance of air quality monitoring.

How have you or could you overcome them?

• We plan to overcome these challenges by conducting awareness campaigns and providing transparent information about the benefits of the intervention.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Relevant issues include indoor air pollution, health impacts, and the importance of sustainable campus environments.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation with stakeholders

What has enabled or could promote cooperation?

• Promoting cooperation involves establishing clear communication channels, sharing data openly, and aligning objectives with external stakeholders.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• Our vision is to improve indoor environmental quality, promote health, and enhance the overall sustainability of our campus.

How do you presume the change could happen?

• We expect the intervention to lead to tangible improvements in air quality, fostering a healthier learning environment.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning the expected impact involves continuous monitoring, data analysis, and adaptation of strategies based on findings.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Strategies such as regular data analysis, proactive communication of findings, and implementing targeted interventions have helped us achieve our goals.

What kind of challenges have you faced in your organisation?

• Challenges faced include technical issues with sensor installation, data interpretation complexities, and ensuring sustained engagement.

How have you found, or could you find time and space for the intervention in your organisation?

• Finding time and space involves prioritising the intervention within our organisational agenda, allocating resources effectively, and fostering a culture of sustainability within the institution.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Internal coordination

Description: Consult with those responsible for the affected areas to obtain necessary authorisations and assess the feasibility of the intervention.

Responsible: IST Team - Marta Almeida

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Staff, Researchers/Teachers and master students

Task 2.- Acquisition of air quality sensors

Description: Select the sensors to be placed in the classrooms and purchase them accordingly.

Responsible: IST Team - Marta Almeida

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: The costs were paid by an international project (3SqAir)

Task co-implementation participatory approach: Teachers and master's students

Task 3.- Placement of sensors

Description: Implement sensors and perform measurements

Responsible: Master's Student

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Technical staff, teachers and master students

Task 4.- Assessment and recommendations

Description: Evaluate the data collected and recommend improvements

Responsible: Master Student

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Teachers and master's students

- **Milestones**

  Milestone 1: Installation of air quality sensors

  Milestone 2: Presentation of improvement measures

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Final report with measures and recommendations

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Regular data collection and analysis from air quality sensors installed in classrooms.

  2. Conducting reviews and assessments to track progress and identify areas for improvement.

  3. Ensuring transparency and accountability by regularly sharing findings and progress reports with the wider educational community.

  Responsible: Marta Almeida

- **Troubles during implementation, conclusion and lessons learnt.**

The intervention progressed successfully, with the sensors installed and generating real-time data as planned. Some minor challenges were encountered, particularly during the initial stages of internal coordination and logistical planning. Ensuring access to classrooms without disrupting academic activities and identifying optimal locations for sensor placement required flexibility and coordination with teaching staff. Technical issues related to sensor calibration and connectivity were also noted but resolved through routine troubleshooting.

The collected data allowed for a more informed understanding of indoor air quality and supported the proposal of improvement measures. This highlighted the potential of integrating environmental monitoring into everyday campus management. The involvement of students also proved valuable for raising awareness and fostering academic engagement with sustainability issues.

The experience suggests that institutionalising air quality monitoring at a broader scale could significantly contribute to improving indoor environmental conditions and should be considered as part of long-term campus sustainability planning.

PT-DS03-IN05 - Solar panels

General data

Description: The first renewable energy production plant at Instituto Superior Técnico was installed, a solar photovoltaic plant on the roof of the Civil Building on Campus Alameda. It is composed of 361 panels, each with a 450 Wp (Watt-peak) capacity, and consists of two Production Units for Self-Consumption (UPAC), totalling 162 kWp (kilowatt-peak) of installed capacity. It is expected to be capable of producing up to 0.3 GWh (Gigawatt-hours) of energy annually.
The work is part of the School's Action Plan for Energy Efficiency and includes several investments in the rehabilitation of the Alameda campus infrastructure.
The project, currently being implemented, extends to the entire Alameda do Técnico campus and involves the installation of photovoltaic panels on all suitable roofs of buildings. In June 2023, the campus will have a total of 2,250 panels, with a total installed power of 650 kWp, capable of producing 1,100 MWh (megawatt-hours) per year, which represents 9 per cent of the campus's annual energy consumption.

- **Participants and profile:** Staff (technicians) and the University board

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Technical action

    - Short description of the objectives:

      ● Implementation of solar panels on all roofs of campus buildings.
      ● Rehabilitation of roofs with improved thermal insulation.
      ● Production of clean energy that allows suppression of a considerable part of the university's energy needs.

    - Time scope of the intervention:

      Short/mid and long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective Competences:
      • Normative: University commitment to sustainability goals, including renewable energy implementation.

• Cultural-cognitive: Integration of sustainability principles into campus culture and practices.
• Regulative: Compliance with regulations and permits for solar panel installation.
Technical Infrastructure:
• Availability of suitable roof spaces for solar panel installation.
• Integration with existing electrical systems for energy distribution.
Resources:
• Sufficient budget allocation for purchasing and installing solar panels.
• Adequate personnel for project planning, implementation, and maintenance.
Responsibilities:
• University administration: Providing financial and logistical support for the project.
• Engineering and maintenance teams: Installing and maintaining solar panels.

- Main risks and uncertainties:

• Regulatory hurdles: Failure to comply with permits and regulations could delay or halt the installation of solar panels.
• Technical limitations: Inadequate infrastructure or expertise may hinder the proper installation and maintenance of solar panels.
• Insufficient resources: Inadequate budget allocation or personnel may prevent the project from proceeding as planned.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to transition to sustainable energy practices and reduce carbon emissions within the university campus.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• The installation of the solar photovoltaic plant has promoted engagement by demonstrating tangible action towards sustainability within the educational community.

Have you encountered challenges in engaging people? What are they?

• Challenges in engaging people may include a lack of awareness about the benefits of renewable energy.

How have you or could you overcome them?

• Overcoming challenges can involve education and awareness campaigns, showcasing the environmental and cost-saving benefits of renewable energy, and involving stakeholders in decision-making processes.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Relevant related issues include energy consumption, carbon emissions, and climate change mitigation efforts.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation with other stakeholders, such as energy suppliers or government agencies, is essential to ensure regulatory compliance and access to resources.

What has enabled or could promote cooperation?

• Promoting cooperation can involve transparent communication, collaboration agreements, and aligning objectives with broader sustainability goals.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• The expected impact of the intervention is to reduce carbon emissions, promote renewable energy adoption, and contribute to the university's sustainability targets.

How do you presume the change could happen?

• Change could happen through increased adoption of renewable energy technologies, policy support for clean energy initiatives, and shifts in societal norms towards sustainability.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning the expected impact requires data analysis, stakeholder engagement, and continuous monitoring to assess progress towards sustainability goals.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Strategies for achieving goals may include setting clear objectives, conducting feasibility studies, and implementing energy-efficient measures.

What kind of challenges have you faced in your organisation?

• Challenges may include financial constraints, technical issues, and regulatory hurdles

How have you found, or could you find time and space for the intervention in your organisation?

• Finding time and space for the intervention may involve prioritising sustainability initiatives, allocating resources effectively, and leveraging partnerships for support.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Solar panel installation plan

Description: Bring together experts and companies to define a plan to implement solar panels and see all the technical aspects necessary for the process to move forward and obtain the various necessary authorisations.

Responsible: IST Management Council

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: Funding

Cost: The costs are borne by the university; the data have not been published.

Task co-implementation participatory approach: Staff

Task 2.- Submit the plan and get approvals

Description:

Responsible: IST Management Council

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Staff

Task 3.- Solar panel installation

Description:

Responsible: Technical responsible for the energy side of the university

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Staff

- **Milestones**

  Milestone 1: Submitting the plan for approval

  Milestone 2: Installation of solar panels

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Solar Panels

  Output 3: Short report on the environmental impact.

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Project Management Team: Responsible for overseeing the implementation process, setting targets, and coordinating data collection efforts.

  2. Facilities Management Department: Provides access to energy consumption data, maintains the solar photovoltaic plant, and ensures its optimal performance.

  3. University Leadership: Provides support and resources for monitoring activities and communicates the importance of sustainability to the broader university community.

Responsible: IST Management Council

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

The intervention was managed entirely by the relevant departments of Instituto Superior Técnico, without direct involvement from the ECF4CLIM project team. All planning and execution were handled internally by the institution, and no major issues were reported. The implementation followed the expected timeline and was carried out smoothly, reflecting the strong institutional commitment to energy transition and infrastructure modernisation.

PT-DS03-IN06 - "Technical + Green" Project

General data

Description: The “Técnico + Verde” project (in English: "Technical + Green" Project) is an integrated plan of initiatives for the outdoor space of Campus Alameda to make the campus a sustainable and biodiverse space.
This project focuses on several initiatives, including:
a) Promote a Biodiversity and Permaculture Garden (Hortus IST).
b) Promote green meadow zones.
c) Construction of a green wall.
d) Installation of green roofs.
e) Promote the APIST Pedagogical Garden.
f) Build comfortable and communicative gardens on campus.
g) Increase furniture in green spaces to promote contact with nature

- **Participants and profile:** 1Ji# / 1Ji% / 1Jj# / 1Jj% / 1Jt# / 1Jt%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Technical, individual and collective action

    - Short description of the objectives:

      ● Increase campus biodiversity.
      ● Make the campus a sustainable space.
      ● Build green spaces for use by the academic community.
      ● Make the community aware of sustainability and the importance of green spaces.
      ● Promoting contact with nature.

    - Time scope of the intervention:

      Short/mid and long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competences:
      • Normative: Clear sustainability policies and guidelines established by the university to support and guide the implementation of sustainable initiatives.

• Cultural-cognitive: A shared understanding and commitment to sustainability among the university community, fostering a culture of environmental responsibility and stewardship.
• Regulative: Compliance with local regulations and standards related to environmental conservation and sustainable development.
Individual competences:
• Knowledge and skills: Training and education programs for staff and students to enhance their understanding of sustainability principles and practices.
• Attitudes and emotions: Positive attitudes towards sustainability, fostering motivation and engagement in sustainable initiatives.
Technical infrastructure:
• Availability of appropriate infrastructure and equipment for implementing green initiatives, such as irrigation systems for green spaces, construction materials for green walls, and resources for garden maintenance.
Resources:
• Sufficient budget allocation for the planning, implementation, and maintenance of sustainable initiatives.
• Adequate personnel with the necessary expertise to oversee and manage the various components of the project.
Responsibilities:
• University administration: Providing leadership and support for the development and implementation of the "Técnico + Verde" project.
• Faculty and staff: Actively participating in and contributing to the planning and execution of green initiatives.
• Students: Engaging in hands-on learning experiences and contributing to the maintenance and upkeep of green spaces on campus.
• External stakeholders: Collaborating with local authorities, environmental organisations, and community groups to leverage resources and expertise for the project's success.

- Main risks and uncertainties:

• Lack of institutional support and commitment to sustainability may hinder the implementation of the project and undermine its long-term success.
• Resistance or apathy from the university community towards sustainability initiatives could impede engagement and participation.
• Insufficient funding and resources may limit the scope and effectiveness of the interventions, leading to incomplete or unsustainable outcomes.
• Regulatory barriers or legal constraints could pose challenges to the execution of certain aspects of the project, delaying progress and increasing costs.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can Instituto Superior Técnico transform its campus into a sustainable and biodiverse space through the implementation of various green initiatives?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• Promotion: Highlighting the benefits of green spaces for health, well-being, and academic performance.

Have you encountered challenges in engaging people? What are they?

• Challenges: Initial scepticism and lack of awareness about the importance of sustainability.

How have you or could you overcome them?

• Overcoming Challenges: Providing educational workshops, organising awareness campaigns, and involving students in the planning process.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Related Issues: Urban planning regulations, community engagement, and funding opportunities.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation: Collaborating with local authorities and organisations.

What has enabled or could promote cooperation?

• Promoting Cooperation: Emphasising shared goals, fostering open communication, and leveraging mutual resources.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• Expected Impact: Transforming the campus into a vibrant, biodiverse hub that fosters ecological awareness and sustainable practices.

How do you presume the change could happen?

• Change Process: Gradual integration of green infrastructure, fostering a culture of environmental stewardship, and monitoring progress through data collection.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning Support: Conducting stakeholder workshops, engaging with sustainability experts, and benchmarking against successful green campus initiatives.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Goal Achievement: Incremental implementation of green initiatives, phased development, and ongoing evaluation.

What kind of challenges have you faced in your organisation?

• Challenges Faced: Budget constraints, logistical complexities, and stakeholder alignment.

How have you found, or could you find time and space for the intervention in your organisation?

• Time and Space: Prioritising sustainability in campus planning, allocating dedicated resources, and incorporating green design principles into infrastructure projects.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Strategic plan

Description: Define the interventions to be applied, and all the necessary logistics and resources.

Responsible: Técnico Sustentável Group

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Técnico Sustentável Group (Staff, teachers, students)

Task 2. Carry out interventions

Description: Implementing the decided-upon interventions is a continuous process that will be refined over time with various new ideas and interventions.

Responsible: Técnico Sustentável Group

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Técnico Sustentável Group (Staff, teachers, students)

- **Milestones**

  Milestone 1: Plan of initiatives for the outdoor space of the Alameda

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Biodiversity and Permaculture Garden

  Output 3: Areas of green meadows.

- **Cost (Equipment /consumables /others)**

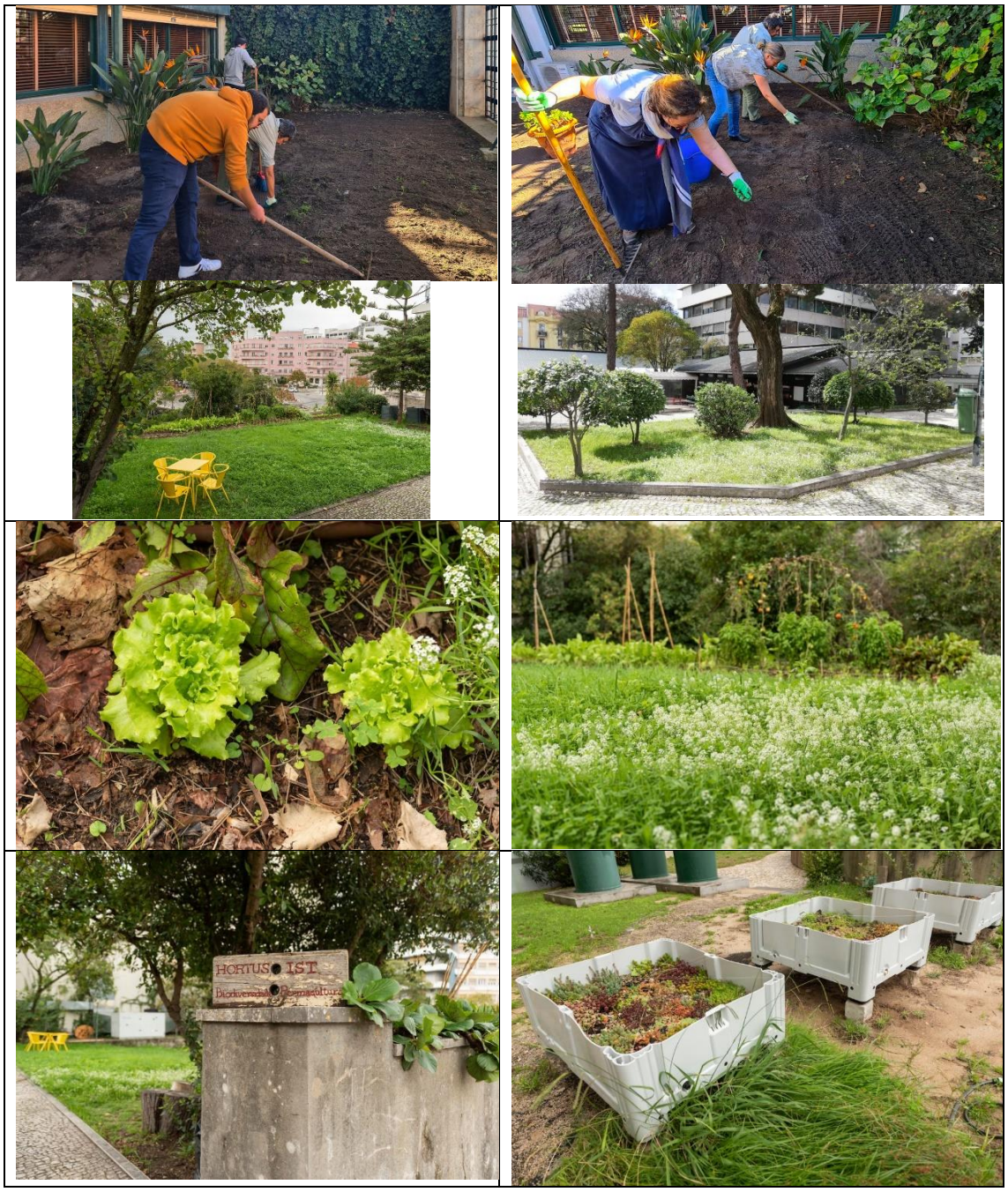
  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  Responsible:

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

The intervention is being implemented progressively and has benefited from an active involvement of the Técnico Sustentável group. Although some logistical and technical complexities were encountered—typical of projects involving infrastructure, landscaping, and coordination between departments—these have been addressed through phased planning and collaboration with external experts.

One recurring challenge is that all interventions must receive prior approval from the university's management board, a process that, while necessary, can introduce delays. Furthermore, ensuring the long-term continuity and maintenance of green spaces remains an important issue. The success of such interventions depends not only on their initial implementation but also on consistent care, engagement, and resource allocation over time.

The project demonstrates that sustained institutional commitment, interdisciplinary collaboration, and active community engagement are key to transforming campus spaces into greener, more sustainable environments. One of the main lessons learnt is the value of gradual implementation, allowing time for ideas to mature, for engagement to grow organically, and for improvements to be made along the way.

PT-DS03-IN07 - Create a space for reflection and information sharing about sustainability

General data

Description: This measure aims to enhance the communication of sustainability activities at IST. This is divided into three parts:

I. Use existing tools to communicate sustainability: the university's website, newsletter, or social media.

II. Create a space for reflection and information sharing. This part involves:

a) Create an event with architecture students to design the space.
b) Promote a contest of ideas.
c) Hold an exhibition to present the ideas to the community.
d) Consolidate the best ideas, involving professors and students of architecture, materials and construction.
e) Build the space.

III. Participate in dissemination actions.
a) European Researchers' Night.
b) Technician's Day.
c) Técnico Green Week.
d) Integration week for new students.

It is point II that will receive most of the investment in the ECF4CLIM project.

- **Participants and profile:** 1Ji# / 1Ji% / 1Jj# / 1Jj% / 1Jt# / 1Jt%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Technical, Individual and Collective Actions

    - Short description of the objectives:

      ● Improve communication of IST's sustainability actions
      ● Bring the community closer to the "Sustainable Technician" group and its initiatives
      ● Create a space for reflection and information sharing.
      ● Participate in dissemination actions.

    - Time scope of the intervention:

Short/Mid, and long term

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

    Collective Competences:
    • Normative: Clear sustainability policies and guidelines endorsed by IST's administration.
    • Cultural-cognitive: Cultivating a sustainability-focused mindset among faculty, staff, and students through educational initiatives.
    • Regulatory: Compliance with relevant regulations and standards regarding sustainability communication and initiatives.
    Individual Competences:
    • Knowledge: Understanding of sustainability concepts and effective communication techniques.
    • Skills: Ability to organise events, design spaces, and engage with diverse stakeholders.
    • Attitudes: Positive attitudes towards sustainability and willingness to participate in communication efforts.
    Technical Elements:
    • Access to Communication Tools: Availability of platforms such as the university website, social media channels, and physical spaces for exhibitions.
    • Design Expertise: Involvement of architecture students for creating the space for reflection and information sharing.
    • Financial Resources: Sufficient budget allocation for organising events, contests, exhibitions, and constructing the communication space.
    Resources:
    • Personnel: Adequate number of staff and volunteers to coordinate and execute communication activities effectively.
    • Budget: Sufficient financial resources to cover expenses related to event organisation, construction, and ongoing communication efforts.
    Responsibilities:
    • "Técnico Sustentável Group" should monitor the effectiveness of communication activities, gather feedback from participants, and evaluate the impact of the intervention on raising awareness and engagement

  - Main risks and uncertainties:

    • Lack of Institutional Support: Absence of support from university administration or insufficient resources allocated for sustainability communication initiatives.
    • Low Engagement: Challenges in engaging the IST community due to competing priorities or a lack of interest in sustainability topics.

• Inadequate Collaboration: Failure to collaborate effectively with architecture students, faculty, and relevant stakeholders in designing and implementing communication initiatives.
• Limited Awareness: Insufficient awareness or understanding of sustainability issues among faculty and students, hindering active participation in dissemination actions.
• Resource Constraints: Budget limitations or logistical challenges that impede the successful organisation of events and construction of the communication space.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to effectively communicate sustainability initiatives and engage the Instituto Superior Técnico community in promoting and participating in sustainable practices and activities.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• We promote sustainability by utilising existing communication channels such as the university's website, newsletter, and social media, and a new space to inform and engage the IST community.

Have you encountered challenges in engaging people? What are they?

• Challenges in engaging people include low awareness and understanding of sustainability issues and initiatives, as well as competing priorities.

How have you or could you overcome them?

• To overcome these challenges, we implement targeted awareness campaigns, host interactive events, and provide educational materials to increase understanding and involvement.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

• Relevant issues include the need for sustainable practices in campus operations, community involvement in sustainability initiatives, and collaboration with external organisations.

How has the cooperation worked with other stakeholders and actors outside your organisation?

• Cooperation with stakeholders outside our organisation involves partnering with local communities, businesses, and government agencies to align goals and share resources.

What has enabled or could promote cooperation?

• Promoting cooperation entails fostering relationships through open communication, mutual benefit, and shared values.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

• The expected impact is to inspire learning, catalyse systemic change, and enhance environmental performance.

How do you presume the change could happen?

• Change could happen through ongoing education, community engagement, and the implementation of sustainable practices and policies.

What has helped you or could help you with envisioning the expected impact and the preferred future?

• Visioning is aided by setting clear goals, involving stakeholders in decision-making, and regularly assessing progress towards sustainability objectives.

- **Action: How to proceed?**

What has helped you to achieve your goals?

• Implementing our goals is facilitated by strong leadership, dedicated resources, and effective communication strategies.

What kind of challenges have you faced in your organisation?

• Challenges include resistance to change, limited resources, and competing priorities.

How have you found, or could you find time and space for the intervention in your organisation?

• Time and space for the intervention are found by prioritising sustainability efforts, allocating resources efficiently, and integrating sustainability into existing programs and activities.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- TS Group communication plan

Description: Define the interventions to be applied, and all the necessary logistics and resources.

Responsible: Técnico Sustentável Group

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Técnico Sustentável Group (Staff, teachers, students)

Task 2.- Contest of ideas

Description: Create an event with architecture students to design the space and promote a contest of ideas.

Responsible: Department of Architecture

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: Between 15000 and 25000 Euros

Task co-implementation participatory approach: Architecture students and teachers + members of the sustainable group (researchers and teachers)

Task 3.- Hold an exhibition to present the ideas to the community.

Description:

Responsible: Department of Architecture

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Architecture students and teachers + members of the sustainable group (researchers and teachers)

Task 4.- Present the final project

Description: Consolidate the best ideas, involving teachers and students of architecture, materials and construction.

Develop the final project and present the IST direction

Responsible: Técnico Sustentável Group + Architecture students

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Architecture students and teachers + members of the sustainable group (researchers and teachers)

Task 5.- Build the space.

Description: Construction of the space and opening

Responsible: IST Management Council

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Architecture students and teachers + members of the sustainable group (researchers and teachers)

- **Milestones**

  Milestone 1: Contest of ideas

  Milestone 2: Final project

  Milestone 3: New Green space

Milestone 4: Dissemination actions

- **Outputs:**

  Output 1: Summary sheet

  Output 2: News, short surveys and reports

  Output 3: A new green space

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Establishing Key Performance Indicators (KPIs) to measure progress towards sustainability goals.

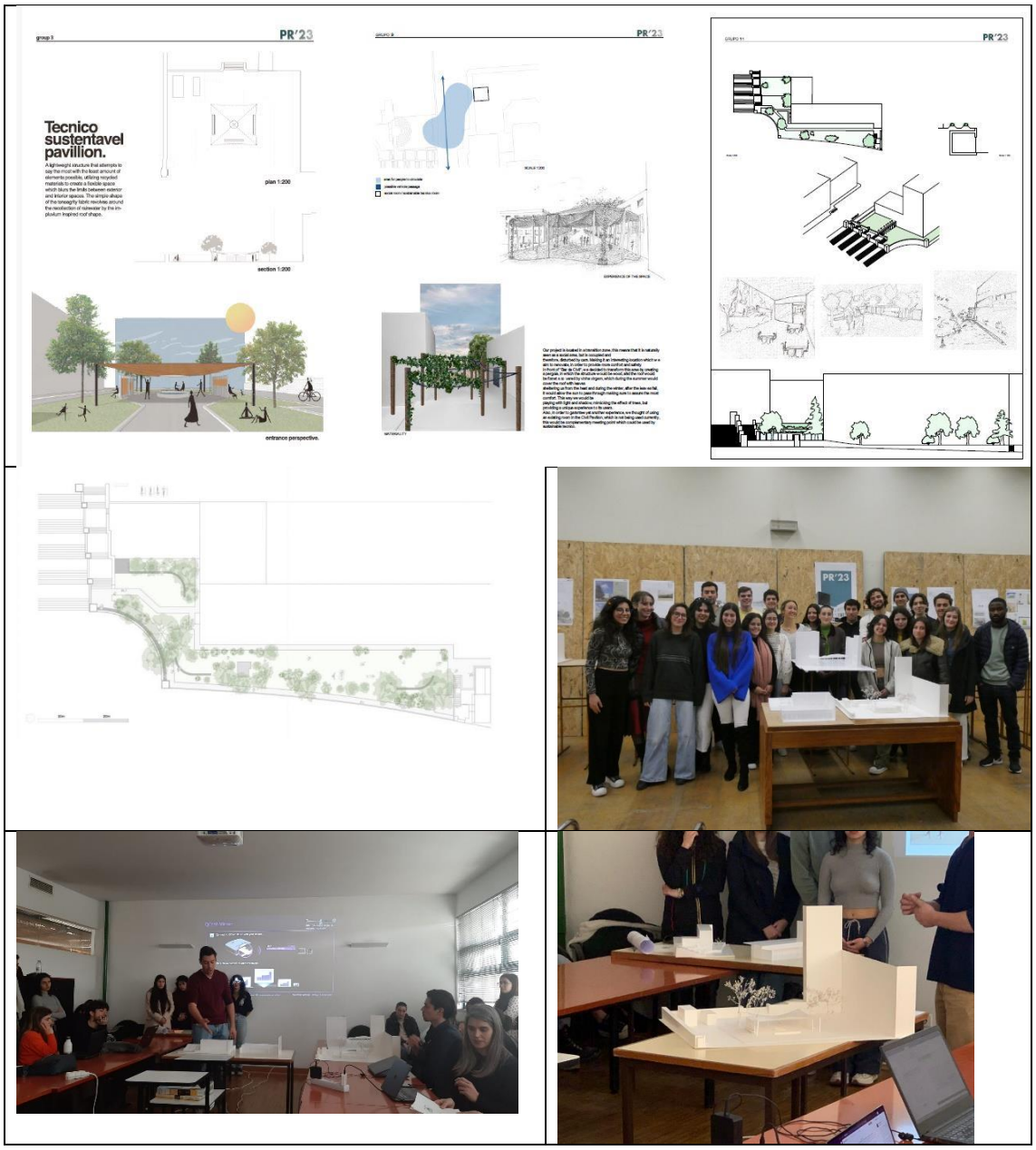
  2. Regular data collection and analysis using surveys, feedback forms, and monitoring tools.

  3. Utilising a multidisciplinary team with representatives from different departments and stakeholders to oversee implementation and address challenges.

  4. Encouraging active participation and collaboration among actors involved to promote ownership and commitment to the intervention's success.

  Responsible: Técnico Sustentável Group

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

This intervention, originally titled "Communication and Community Involvement," underwent a significant redefinition of its content and focus, eventually evolving into what is now known as "Create a Space for Reflection and Information Sharing about Sustainability." The initial concept was highly ambitious, combining a broad set of objectives related to communication, visibility, events, and stakeholder engagement. However, the diversity and number of subtasks made coordination difficult and ultimately led to a rethinking of the strategy.

To simplify the implementation and improve engagement and feasibility, the project was narrowed down to focus on a physical and symbolic space—an open, dedicated area on campus where sustainability-related information could be shared, discussions and events could take place, and the academic community could reflect and engage. This idea was seen as more tangible, impactful, and easier to manage.

Despite this reorientation, implementation has been considerably delayed due to external and institutional constraints. The intervention requires formal authorisation from the university's space management authorities. These approvals, however, have been slow to materialise, and the requirements and expectations of those managing the campus infrastructure have shifted multiple times throughout the process. Even elements that had already been defined, approved, or partially constructed have faced repeated revisions based on evolving criteria and preferences from campus administration.

This has made the intervention difficult to coordinate and has led to uncertainty and frustration among those involved. A key lesson learned is the importance of involving the decision-makers and space management authorities right from the outset—not only in the later stages when a well-developed proposal is already in place. Presenting a fully formed idea without early buy-in from those with formal decision power can create resistance, misalignment, or even the need to start over.

In future interventions, earlier engagement with key institutional actors and shared ownership of the planning phase will be crucial. This experience underscores that, in technical or infrastructural sustainability projects within universities, success hinges not only on good ideas and community participation but also on early institutional alignment and clarity regarding authorisation and governance processes.

PT-DS03-IN08 - IST's activities and strategic plan

General data

Description: This measure aims to include sustainability issues in IST's activities and strategic plan. This measure was established through an agreement between students and the university management board, aiming to integrate sustainability into the university's activities and strategic plan to ensure its inclusion in future decisions and consideration in all future decisions at IST.

- **Participants and profile:** 1Ji# / 1Ji% / 1Jj# / 1Jj% / 1Jt# / 1Jt%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Collective action

    - Short description of the objectives:

      ● Include sustainability in the university's strategic and activity plans.
      ● Making sustainability official as a fundamental part of the organisation's future.
      ● Contribute to a more sustainable university.

    - Time scope of the intervention:

      Mid/long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Collective competences:
      • Normative: A clear commitment from the university's management to integrate sustainability into strategic plans.
      • Cultural-cognitive: Fostering a culture where sustainability is seen as a fundamental value and integrated into everyday practices.
      • Regulative: Compliance with existing regulations and the presence of supportive policies for sustainability initiatives.
      Responsibilities:
      • Clear delineation of roles and responsibilities for integrating sustainability into strategic plans.

- Main risks and uncertainties:

  - Lack of leadership commitment: Without strong support from university leadership, sustainability initiatives may lack direction and fail to receive adequate resources.
  - Resistance to change: Resistance from individuals or departments within the institution to adopt sustainability practices could hinder progress.
  - Regulatory barriers: Unfavourable regulatory environments or changes in regulations could pose obstacles to sustainability initiatives.
  - External factors: External factors, such as economic downturns and political instability, may disrupt sustainability efforts and divert attention and resources elsewhere.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can sustainability be effectively integrated into the activities and strategic plans of Instituto Superior Técnico to ensure its long-term consideration and impact on decision-making processes?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

- Engagement has been promoted through collaboration between students and the university management board, fostering ownership and commitment.

Have you encountered challenges in engaging people? What are they?

- Challenges in engaging people include resistance to change and competing priorities.

How have you or could you overcome them?

- Overcoming challenges involves clear communication, highlighting benefits, and involving stakeholders in decision-making processes.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

- Relevant issues include sustainability policies, community expectations, and global environmental trends.

How has the cooperation worked with other stakeholders and actors outside your organisation?

- Cooperation with stakeholders outside the organisation involves partnership-building, mutual understanding, and shared goals.

What has enabled or could promote cooperation?

- Promoting cooperation requires active engagement, open communication channels, and recognition of shared interests.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

- The vision is to embed sustainability into IST's culture, operations, and decision-making processes. • This intervention aims to promote learning, foster systemic change, and improve environmental performance.

How do you presume the change could happen?

- Change is expected through ongoing education, policy integration, and stakeholder engagement.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Research, stakeholder engagement, and collaboration with sustainability experts facilitate the envisioning of the expected impact and the preferred future.

- **Action: How to proceed?**

What has helped you to achieve your goals?

- Clear goals, timelines, and responsibilities have helped achieve objectives.

What kind of challenges have you faced in your organisation?

- Challenges include resistance to change, resource constraints, and competing priorities.

How have you found, or could you find time and space for the intervention in your organisation?

- Time and space are found through prioritisation, resource allocation, and stakeholder buy-in

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1: Define the Strategic Plan.

Description: Discuss and put together the strategic plan for the coming years, including sustainability in its content.

Responsible: IST Management Council

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: IST Management Council, Researchers, Teachers, Students

Task 2.- Approve and apply.

Description: Approve and apply the strategic plan

Responsible: IST Management Council

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: IST Management Council

- **Milestones**

  Milestone 1: IST strategic plan

- **Outputs:**

  Output 1: Summary sheet

  Output 2: IST strategic plan

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Performing periodic reviews and evaluations to assess effectiveness and identify areas for improvement.

  2. Utilising a multidisciplinary team with representatives from various departments and stakeholders to oversee implementation and address challenges.

  3. Promoting active participation and collaboration among involved actors to foster ownership and commitment to the intervention's success.

  Responsible: IST Management Council

- **Troubles during implementation, conclusion and lessons learnt.**

This intervention was important for ensuring that sustainability is officially included in IST's strategic and activity plans. There was some uncertainty about whether this would be achieved during the ECF4CLIM project timeline, as it depended on internal agreements and management decisions. However, the plan was approved, and the process went ahead as hoped.

A key lesson is that strong collaboration between students and the university board can lead to meaningful results. Ensuring sustainability is part of future decision-making now depends on maintaining this commitment over time.

PT-DS03-IN09 - "Bio Técnico" Project

General data

Description: Bio Técnico is a project developed in collaboration to propose organic and sustainable food within the scope of the ongoing supply expansion at IST.

- **Participants and profile:** 1Ji# / 1Ji% / 1Jj# / 1Jj% / 1Jt# / 1Jt%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Collective

    - Short description of the objectives:

      Promoting organic and sustainable food and enhancing their offerings.

    - Time scope of the intervention:

      Short/mid-term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      1. Collective competences:
      - Normative: A clear sustainability policy and commitment from IST's management to promote organic and sustainable food.
      - Cultural-cognitive: Internalisation of sustainability values among students, staff, and faculty, fostering a culture that values organic and sustainable food options.

      2. Individual competences:
      - Attitudes and emotions: Encouraging a positive attitude towards organic and sustainable food among stakeholders.

      3. Responsibilities:
      - IST's management should lead the initiative by setting clear objectives, providing necessary resources, and monitoring progress towards sustainability goals.

    - Main risks and uncertainties:

- Lack of institutional support: Without strong support from IST's management, the project may struggle to secure the necessary resources and commitment to sustainability goals.
- Resistance to change: Resistance from stakeholders, including students and staff, towards adopting organic and sustainable food options could hinder the project's success.
- Limited availability of organic and sustainable ingredients: Difficulty in sourcing a consistent supply of organic and sustainable ingredients may pose a challenge to maintaining menu offerings and meeting demand.
- Cost implications: Higher costs associated with organic and sustainable ingredients and operational changes may strain budgets and limit the project's scalability.
- Market acceptance: Uncertainty regarding the acceptance and demand for organic and sustainable food options among the IST community could affect the project's long-term viability.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How can IST promote organic and sustainable food options to improve food offerings and contribute to sustainability goals?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

- People are engaged due to the project's focus on promoting organic and sustainable food, aligning with growing environmental concerns.

Have you encountered challenges in engaging people? What are they?

- Challenges include a lack of awareness about sustainable food practices and resistance to change in dietary habits.

How have you or could you overcome them?

- Overcoming challenges involves education on the benefits of sustainable food, promoting awareness through campaigns, and offering incentives for participation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

- Relevant issues include consumer preferences, supply chain logistics, and regulatory frameworks.

How has the cooperation worked with other stakeholders and actors outside your organisation?

- Cooperation with stakeholders like suppliers

What has enabled or could promote cooperation?

- Promoting cooperation involves fostering partnerships, sharing resources, and aligning interests towards sustainable food goals.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

- The intervention aims to improve environmental performance by promoting organic and sustainable food options.

How do you presume the change could happen?

- Change can occur through increased awareness, shifts in consumer behaviour, and policy support for sustainable practices.

What has helped you or could help you with envisioning the expected impact and the preferred future?

- Visioning involves setting clear goals, monitoring progress, and fostering a culture of sustainability within the organisation.

- **Action: How to proceed?**

What has helped you to achieve your goals?

- Strategies such as offering organic food options and implementing sustainable food policies have helped achieve goals.

What kind of challenges have you faced in your organisation?

- Challenges include sourcing sustainable ingredients, cost considerations, and changing consumer preferences.

How have you found, or could you find time and space for the intervention in your organisation?

- Finding time and space involves integrating sustainability into existing activities, allocating resources effectively, and involving stakeholders in decision-making processes.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Partnerships and possibilities

Description: Think about partnerships and possibilities with companies that provide this service

Responsible: APIST: Instituto Superior Técnico Staff Association

External expert assistance: yes

ECF4CLIM expert assistance: no

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Staff, teachers, students

Task 2.- Inclusion in the Menu

Description: Provide organic and sustainable food options to the IST community

Responsible: Miosótis company

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Staff

- **Milestones**

  Milestone 1: Organic and sustainable food on the IST menu offers

- **Outputs:**

  Output 1: Summary sheet

Output 2: Report and short survey

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

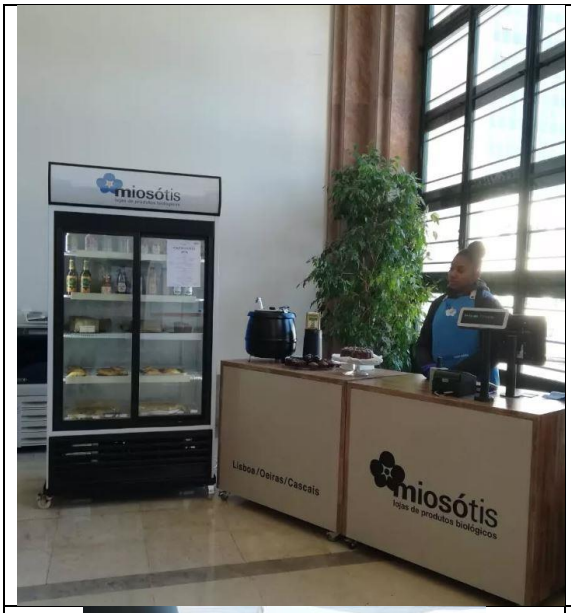
  Implementation of the comonitoring approach:

  1. Establishing clear sustainability metrics and targets to measure progress.

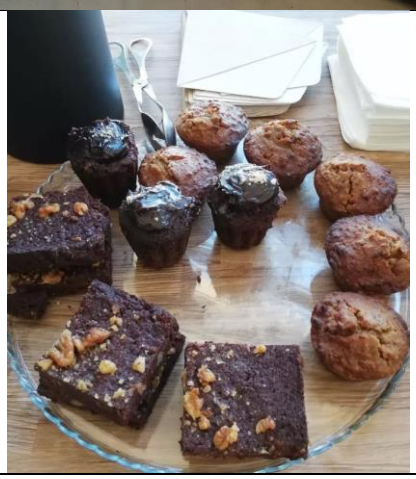
  2. Conducting periodic reviews and evaluations to assess the effectiveness of sustainability initiatives.

  Responsible: APIST

- **Photographs of the intervention implementation**













- **Troubles during implementation, conclusion and lessons learnt.**

This intervention was implemented smoothly and in close collaboration with several groups within IST, including APIST and the food supplier. The inclusion of organic and sustainable food options was well received by the community, and the process unfolded without major issues.

One key takeaway is that early coordination with the entities responsible for food provision and clear communication about the goals of the intervention helped ensure its success. The positive reception shows that there is space to expand sustainable food initiatives in the future.

PT-DS03-IN10 - "Técnico makes the difference" Project

General data

Description: The project “Técnico makes a difference” (TDF) aims to implement a new procedure for managing solid urban waste by introducing phased separation and selective collection of solid urban waste on IST campuses through an innovative model. This project had several phases:
a) Accounting for waste produced.
b) Purchase and install containers.
c) Provide training to the academic community.
d) Optimise waste collection with the waste management company.

- **Participants and profile:** 1Ji# / 1Ji% / 1Jj# / 1Jj% / 1Jt# / 1Jt%

- **SCT and SCC representatives:**

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Technical and collective action

    - Short description of the objectives:

      ● Moving from the current situation at IST, where there is no systematic procedure for waste separation, to a waste separation and selective collection model to drastically reduce the impact of this environmental issue on the institution
      ● Decrease the economic impact of IST's solid urban waste management procedure to generate investment capacity in separation and collection equipment.
      ● Implement the separation of biowaste, as foreseen by Directive (EU) 2018/851 of May 2018, with obligation from January 1, 2024, as an important contribution to the future National Strategy of Circular Bioeconomy and also for compliance with the Roadmap for Carbon Neutrality 2050 and the National Energy and Climate Plan.

    - Time scope of the intervention:

      Mid/long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

Collective competences:

- Regulative: Compliance with waste management regulations and directives.
- Normative: Institutional commitment to sustainability plans and strategies.
- Cultural-cognitive: Incorporation of waste separation as a norm within the IST community.

Individual competences:

- Knowledge, skills, and capabilities: Training the academic community on waste separation practices.
- Attitudes and emotions: Fostering a culture of environmental responsibility and waste reduction.

Technical infrastructure:

- Installation of waste separation containers.
- Optimisation of waste collection procedures.

Resources:

- Sufficient budget allocation for purchasing equipment and conducting training.
- Adequate personnel for waste management tasks.

Responsibilities:

- Clear delineation of roles and responsibilities among stakeholders.
- Collaboration between internal and external parties for effective waste management implementation.

- Main risks and uncertainties:

- Regulatory obstacles hindering compliance with waste management directives.
- Lack of institutional commitment and support for sustainability initiatives.
- Resistance or apathy from the academic community towards waste separation practices.
- Insufficient training and awareness programs lead to low adoption rates.
- Inadequate technical infrastructure for waste separation and collection.
- Budget constraints limit investment in necessary equipment and resources.
- Ambiguity or conflicts in roles and responsibilities among stakeholders are hindering effective coordination.
- External factors such as changes in waste management regulations or policies affecting project implementation.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

The primary competence addressed by the intervention is waste management and sustainability practices within the context of IST.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

- The promotion of sustainability was driven by raising awareness about the environmental impact of solid urban waste.

Have you encountered challenges in engaging people? What are they?

- Challenges included resistance to change and a lack of awareness about the importance of waste management.

How have you or could you overcome them?

- Overcoming challenges involved education campaigns and incentivising participation.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

- Relevant issues include waste disposal regulations, community behaviour towards waste, and waste management infrastructure.

How has the cooperation worked with other stakeholders and actors outside your organisation?

- Cooperation with waste management companies, local authorities, and environmental organisations was essential.

What has enabled or could promote cooperation?

- Cooperation was promoted through open communication channels, joint planning, and shared responsibility.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

- The expected impact is to improve environmental performance by implementing a sustainable waste management system.

How do you presume the change could happen?

- Change is presumed to happen through the gradual adoption of waste separation practices and cultural shifts towards sustainability.

What has helped you or could help you with envisioning the expected impact and the preferred future?

- Visioning is facilitated by setting clear goals, involving stakeholders in decision-making, and continuous monitoring.

- **Action: How to proceed?**

What has helped you to achieve your goals?

- Achieving goals was facilitated by meticulous planning, stakeholder engagement, and continuous monitoring of progress.

What kind of challenges have you faced in your organisation?

- Challenges included initial resistance, logistical constraints, and resource limitations.

How have you found, or could you find time and space for the intervention in your organisation?

- Time and space for the intervention were found through prioritisation, resource allocation, and collaboration across departments

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1. Accounting for waste produced

Description:

Responsible: Tecnico Sustentável Group

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Técnico Sustentável Group (Staff, teachers, students)

Task 2.- Purchase and install containers.

Description:

Responsible: Técnico Sustentável Group

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: Funding

Cost: 0 Euros

Task co-implementation participatory approach: Técnico Sustentável Group (Staff, teachers, students)

Task 3.- Provide training to the academic community.

Description:

Responsible: Técnico Sustentável Group

External expert assistance: Yes

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Staff, teachers, students

Task 4.- Optimise waste collection with the waste management company.

Description:

Responsible: Técnico Sustentável Group

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed:

Cost: 0 Euros

Task co-implementation participatory approach: Técnico Sustentável Group (Staff, teachers, students)

- **Milestones**

  Milestone 1: Accounting for waste produced

  Milestone 2: Purchase and install containers.

  Milestone 3: Provide training to the academic community.

  Milestone 4: Optimise waste collection with the waste management company.

- **Outputs:**

  Output 1: Summary sheet

  Output 2: New recycling bins

  Output 3: Optimised waste collection plan

- **Cost (Equipment /consumables /others)**

  Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  1. Establishing clear performance indicators to measure progress and success (KPI).

  2. Regularly collecting data on waste production, separation, and collection processes.

  3. Engaging stakeholders through feedback mechanisms, workshops, and training sessions.

  4. Ensuring accountability by assigning roles and responsibilities to different actors and departments.

  5. Implementing a feedback loop to adapt strategies based on feedback and changing circumstances.

  Responsible:

- **Photographs of the intervention implementation**













- **Troubles during implementation, conclusion and lessons learnt.**

This intervention has progressed through several distinct phases, with its inception dating back to 2021. Those involved have indicated that the third phase, which entails implementing the waste collection system in three additional buildings on the campus, is nearing completion. Consequently, a request has been made to conduct an assessment that specifically incorporates

these newly integrated buildings. This highlights an evolving scope and the need for a comprehensive evaluation that captures the full extent of the intervention's reach.

The initiative began as a voluntary effort involving researchers and staff, and over time has gained visibility and relevance within the institution. With sustainability now formally included in the new strategic plan, this intervention will require a different, more structured and professionalised approach. How to reorganise the process to match this new context is currently under discussion, and further developments are expected soon.

11. REPORT ON IMPLEMENTED INTERVENTIONS IN NICOLAE BALCESCU SCHOOL.

School brief description

This public primary school is located in Dragasani town, Olt County. It has more than 500 students (ages 6-15) and over 30 teachers. Dragasani is a small town with approximately 18,000 inhabitants, located in the southern part of the country. The primary economic sectors and job providers include wine production, small companies that manufacture components for the automotive sector, and various services. The town has suffered from socioeconomic decline for the last three decades.




Figure 11.1.- Nicolae Balcescu School photographs.

Implemented Interventions Summary

The interventions implemented in demonstration site NICOLAE BALCESCU SCHOOL are list in the table below.

Measure Id	***Title***
RM-DS01-IN01	(Solar panels in urban area) Installation of solar panels for green electricity
RM-DS01-IN07	(Active) Supporting the activities of groups approaching sustainability

Table 11.1.- Interventions in NICOLAE BALCESCU SCHOOL.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational

RM-DS01-IN01	(Solar panels in urban area) Installation of solar panels for green electricity	Energy
RM-DS01-IN07	(Active) Supporting the activities of groups approaching sustainability	

Table 11.2.- Interventions main working areas in NICOLAE BALCESCU SCHOOL.

RM-DS01-IN01.- (Solar panels in urban area) Installation of solar panels for green electricity

General data

Description: Installing solar panels on the roof of the school to produce electricity. Full support of the ECF4CLIM project for the investment. Intervention is coupled with an educational program dedicated to understanding solar energy and how to utilise it.

- **Participants and profile:** 3Rt1%, 3Rj4%, 3Rj5%

- **SCT and SCC representatives:** 3Ri1#, 3Ri2%, 3Ri3%, 3Ri4%, 3Ri5#, 3Ri6%, 3Ri7#, 3Ri8#, 3Ri9#, 3Ri10%, 3Ri11#, 3Ri12%, 3Ri13#, 3Ri14%, 3Ri15%, 3Ri16#, 3Ri17%, 3Ri18#, 3Ri19%,3Ri20#, 3Ri21#, 3Rt1%, 3Rt2#, 3Rt3#, 3Rj4%, 3Rj5%, 3Rj6%, 3Rj7#, 3Rj8#, 3Rj9#

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Collective

    - Short description of the objectives:

      To share how solar energy may be easily harvested at the school and household levels.
      To promote the use of renewable energy and reduce emissions and costs.
      To stimulate learning by communication of the results.
      To promote the energy shift from fossil fuel to green alternatives and to improve the existing knowledge.
      To increase awareness by understanding the impacts of the implemented measure
      To create appropriate messages to spread the use of solar energy
      To spread the information to the local community and other schools

    - Time scope of the intervention:

      During the lifetime of the project.

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Technical Support: Installation by an authorised team. Support obtaining the documents and approvals for prosumer status. Install the interface to the grid. Establish a framework for future technical support to address any issues and ensure the efficient use of the solar panels.

Realistic Budgeting: Develop a realistic budget that includes all costs associated with the implementation, including installation, maintenance, and training.
Involvement of the School Community: Engage and involve teachers, students, parents, and administrative staff in the planning and decision-making processes to foster a sense of ownership and accountability.
Educational Programs: Implement educational programs that highlight the importance of capturing and utilising solar energy, understanding prosumer status, and sustainability performance.
Transparent Communication: Clearly communicate the goals, benefits, and expected outcomes of the solar panel implementation to staff, teachers, students, and parents, addressing any possible concerns.
Life Cycle Considerations: Incorporate sustainable practices in the selection of solar panels, considering their environmental impact throughout their life cycle, from production to disposal.
Performance Metrics: Establish clear performance metrics to monitor the intervention's impact over time, enabling adjustments and improvements as needed.
Contingency Plans: Develop contingency plans to address potential issues, such as interface malfunctions, to minimise disruptions.

- Main risks and uncertainties:

Weather Dependency: Solar power generation is highly dependent on weather conditions, resulting in fluctuations in energy production.
Technical Issues: Maintenance and repair costs may arise, which can impact on the system's efficiency and reliability.
Long-Term Maintenance Costs: Ongoing maintenance costs may be higher than initially estimated.
Regulatory Changes: Changes in government incentives or regulations could impact on the advantages of being a prosumer.
Technology Obsolescence: Rapid advancements in solar technology could make current systems outdated sooner than expected.
Insurance and Liability: Additional insurance may be required, and liability concerns may arise in the event of accidents or damages.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

"How can the integration of solar energy technology in a school setting contribute to sustainable energy practices and educational outcomes?"

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Students are aware of the possibility of reducing their electricity bills by harvesting solar energy, as well as reducing the school's carbon footprint. They view the intervention as a good opportunity to learn how to install and utilise solar panels.

Have you encountered challenges in engaging people? What are they?

The intervention is directly related to infrastructure modernisation. After some months following the installation, it is possible that the solar panels may lose the attention of the educational community. The educational activities and the communication/dissemination programme will create conditions to address the challenge, but the risks remain, as there is resistance to change, and people also have other priorities in their daily activities.

How have you or could you overcome them?

The educational activities and the communication/dissemination programme are intended to counteract this effect by promoting a critical thinking process on solar energy and renewables, to appreciate its real value, and to discuss outside of school in order to replicate the measure and contribute to carbon reduction.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The authorities in energy are involved in the approval of the statute of the prosumer (the electricity local distribution company), and other local authorities (Local Council, Municipal Urbanism Committee) approve the investment.

How has the cooperation worked with other stakeholders and actors outside your organisation?

One stakeholder is directly involved in the intervention: the installer, who also acts as the system designer and selects the materials and equipment. The approach is based on commercial contracts with very clearly stipulated rules regarding amount, quality, and deadlines. The indirect involvement (necessary to obtain the statute of prosumer for the school) involved the following stakeholders: the electricity company, the Local Council, and the Municipal Urbanism Committee.

What has enabled or could promote cooperation?

The good cooperation with the design and installation company is based on the well-written contracts, with rights and obligations, and also on the use of a risk management approach during work (a person is nominated to identify and treat any situation causing risks for the

project). For other stakeholders, respecting procedures is the primary proactive measure for success.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The first impact is on environmental performance, aiming to reduce the carbon footprint through electricity consumption. The second is to offer students and teachers a model for a simple intervention that is easy to replicate at the household level or in other schools. The third (according to the associated educational material) is to offer a set of competences related to solar energy, or more generally, to renewables.

How do you presume the change could happen?

The primary change aims to enhance understanding of the potential for harvesting solar energy with solar panels, as well as how to invest and become a prosumer. In this manner, it is expected that students and teachers will serve as influential factors in implementing solar energy by replicating the current intervention. At the societal level, more informed individuals regarding clean energy and its acquisition will create better conditions for informed decisions related to energy and energy consumption.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The intervention is planned to improve the sustainability performance of the school. By harvesting solar energy through the installation of solar panels on the school's roof, a reduction in electricity consumption from the national grid will be achieved. The green energy obtained by the school will create a practical basis for understanding the impacts, promoting the prosumer possibility among the educational community. The educational material will provide a better understanding of the energy system and the opportunities for producing energy.

- **Action: How to proceed?**

What has helped you to achieve your goals?

A detailed plan, a good selection of the contractor, and measures for risk management are outlined in the first plan. The continuous monitoring of the work's execution by the school representative is the second. Collaboration with teachers and the development of educational materials incorporating feedback received from the school (students and teachers) are key elements in supporting the achievement of the objectives.

What kind of challenges have you faced in your organisation?

The main challenge is related to the ownership bureaucracy. The ECF4CLIM is supporting the intervention through MedaResearch, and ultimately, the school will take ownership of the system.

How have you found, or could you find time and space for the intervention in your organisation?

The resources are well planned. For the educational program, a negotiation with the teachers (in terms of their time) will be conducted, considering the next 1.5 years of the ECF4CLIM project.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Planning and design

Description: Planning of the intervention. Define the objectives, specifying the desired environmental and behavioural outcomes. Determine the scope and scale of the project. Evaluate the existing infrastructure. Select appropriate solar panels. Cost estimation and detailed budget (including costs of purchasing solar panels, installation, prosumer interface, and approvals, as well as ongoing maintenance). Identify potential funding sources, including the school budget, grants, and external partnerships. Prepare the communication program for the educational community and the local community.

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Ionut Voiculescu (DS)

External expert assistance: yes

ECF4CLIM expert assistance: yes

Resources needed: 2 persons (MedaResearch), 2 persons from the School (desk research, offer from market, visiting the school to explore the current infrastructure), specialised support for installing panels and interface

Cost: 200 Euros

Task co-implementation participatory approach: Discussion with the technical staff of the school. Market exploration to find technical installation support. SCT and SCC meeting to discuss and validate the planning.

Task 2.- Initial conditions

Description: Reference measurement of the initial energy consumption. Purchasing the materials/equipment.

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Dragut Maria (DS)

External expert assistance: No

ECF4CLIM expert assistance: yes

Resources needed: Existing equipment (electricity meters) at the school's canteen. Funds (ECF4CLIM for solar panels and prosumer interface).

Cost: 2500 Euros

Task co-implementation participatory approach: Participation of teachers (contact persons for ECF4CLIM)

Task 3.- Installing and applying for prosumers.

Description: Installation of the solar panels and prosumer interface

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Ionut Voiculescu (DS)

External expert assistance: yes

ECF4CLIM expert assistance: yes, to select the main elements to be recorded

Resources needed: Qualified technicians (from an external specialised company) to install the panels and the interface.

Cost: 800 Euros

Task co-implementation participatory approach: Video registration of how to install, for the educational programme

Task 4.- Calibrate, train, and use

Description: Staff training on how to use the system, use the technical support in case of malfunctions, measure the impact, how to interpret data, and understand the environmental impact. Establish Monitoring Protocols: Implement protocols for regularly monitoring system performance to ensure optimal operation. Maintenance Plan: Develop a maintenance plan to address solar panels and interface malfunctions promptly and conduct routine checks.

Responsible: Marian Constantin (MedaResearch), Maria Dragut (DS)

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: training materials,

Cost: 200 Euros

Task co-implementation participatory approach: Discuss the materials elaborated by the ECF4CLIM team to improve them in accordance with the audience's level.

Task 5.- Behavioural changes

Description: Educational Campaigns: Implement educational campaigns to raise awareness about solar energy use and the environmental impact. Evaluation and Adjustment: Define

key performance indicators to evaluate the success of the intervention. Establish feedback mechanisms to gather input and make adjustments as needed.

Responsible: Marian Constantin (MedaResearch), Roxana Stroe (DS)

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed: Materials for the campaign (posters, flyers, posts prepared for the school social media, Facebook)

Cost: 600 Euros

Task co-implementation participatory approach: Discuss the materials elaborated by the ECF4CLIM team to improve them in accordance with the audience's level.

- **Milestones**

  Milestone 1: Intervention plan agreed by ECF4CLIM and the school

  Milestone 2: Purchase the solar panels and the prosumer interface

  Milestone 3: Solar panels and interface installed. System functionally.

  Milestone 4: Training and educational material presented

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Short report/guidance to replicate the intervention (lessons learnt)

  Output 3: Short report on the environmental impact

- **Cost (Equipment /consumables /others)**

  Total cost: 4300 Euros

- **Intervention implementation comonitoring strategy**

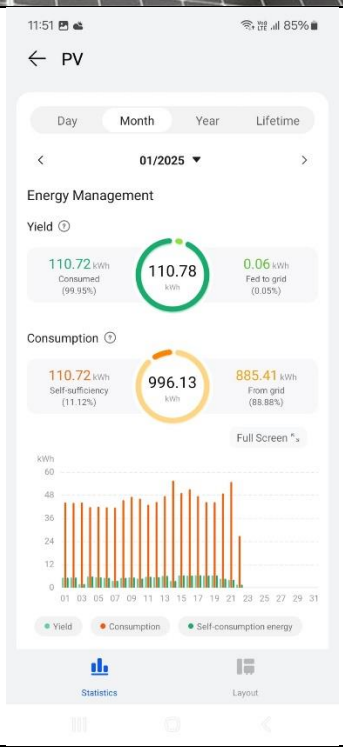
  Implementation of the comonitoring approach: Regular visits, discussions based on the regular reports of the responsibles

  Responsible: Anca Germizara Ciurduc Todoran

- **Photographs of the intervention implementation**









- **Troubles during implementation, conclusion and lessons learnt.**

Reorientation and Student Engagement

Initially, the intervention was planned for the installation of water heating solar panels. However, a strategic reorientation led to the installation of photovoltaic panels instead. This

shift necessitated a reorientation of all associated tasks, though the core objective remained largely consistent.

This change had a positive impact on student engagement. Students became more aware of the potential to reduce electricity bills through solar energy harvesting and gained a better understanding of how they could directly contribute to lowering the school's carbon footprint. Their understanding of the installation and exploitation of solar panels is now a foundational prerequisite for future involvement in environmental actions and decarbonization efforts.

The intervention directly aligns with the school's infrastructure modernisation. However, interest in the solar panels among the educational community tended to wane a few months after installation, as stakeholders seemed to desire "something new and cool." This highlights a significant risk: without continuous educational activities and a robust communication/dissemination program, the positive gains in attitudes and knowledge could be lost. Conversely, sustained educational efforts and communication significantly contributed to consolidating positive attitudes towards solar energy and renewables. Students remained focused on the intervention and its impacts, stimulating critical thinking about renewables, fostering an appreciation for their real value, and encouraging discussions outside of school about replicating the intervention to decrease carbon emissions further.

Effective Connections and Cooperation

Cooperation throughout the project was highly effective. With the installer, who also served as the system designer and material selector, collaboration was governed by a clearly stipulated commercial contract outlining amounts, quality, and deadlines. For indirect involvement, particularly in obtaining "prosumer" status for the school, cooperation with the electricity company, Local Council, and Municipal Urbanism Committee was also very good within the existing regulatory frameworks and procedural applications.

RM-DS01-IN07- Supporting the activities of groups approaching sustainability - "How we understand solar? Educational activity by drawings"

General data

Description: Investigation of the understanding of solar energy. How to harvest and use it? What is the potential of solar energy? Who may be involved in obtaining success?

- **Participants and profile:** 3Rt1%, 3Rj4%, 3Rj5%

- **SCT and SCC representatives:** 3Ri1#, 3Ri2%, 3Ri3%, 3Ri4%, 3Ri5#, 3Ri6%, 3Ri7#, 3Ri8#, 3Ri9#, 3Ri10%, 3Ri11#, 3Ri12%, 3Ri13#, 3Ri14%, 3Ri15%, 3Ri16#, 3Ri17%, 3Ri18#, 3Ri19%,3Ri20#, 3Ri21#, 3Rt1%, 3Rt2#, 3Rt3#, 3Rj4%, 3Rj5%, 3Rj6%, 3Rj7#, 3Rj8#, 3Rj9#

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Competition for students (VIII B classroom) for the best Figure of solar power impact in the school and reflecting the complexity of the connections between different stakeholders.

    - Short description of the objectives:

      Enhance Awareness of Solar Energy - develop students' understanding of solar energy as a renewable resource and its importance for sustainable development.
      Encourage Creative Problem-Solving - Foster creativity by allowing students to visualise solutions for harvesting and utilising solar energy through drawings and collaborative brainstorming.
      Promote Collaborative Learning - strengthen teamwork and communication skills as students work together to explore ideas and present their shared understanding.
      Highlight Stakeholder Roles in Solar Energy Adoption - Help students identify key players (e.g., scientists, engineers, policymakers, and communities) and their roles in achieving the successful implementation of solar energy solutions.

    - Time scope of the intervention:

      During the lifetime of the project.

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

Individual Competences

Knowledge and Understanding: Basic knowledge of renewable energy, particularly solar energy (what it is, how it works, and its benefits). Awareness of environmental and sustainability issues, such as climate change and resource conservation.

Critical Thinking and Creativity: Ability to analyse the challenges and opportunities related to solar energy. The capacity to think creatively and visualise ideas through drawings.

Collective Competences

Group Problem-Solving: Ability to collectively explore and identify practical and innovative solutions for harnessing and using solar energy.

Consensus Building: Developing shared ideas and consolidating individual inputs into a cohesive group output (the drawing and presentation).

Interdisciplinary Approach: Combining diverse perspectives within the group to address technical, environmental, and societal aspects of solar energy adoption.

Environmental/Technical Elements

Supportive Educational Environment: A classroom culture that encourages inquiry, exploration, and creativity.

Access to Materials and Tools: Drawing supplies (paper, markers, crayons) and optional visual aids, such as photos, diagrams, or videos of solar panels, solar-powered devices, and energy systems.

Facilitation by Teachers/Moderators: Educators knowledgeable about solar energy will guide discussions, provide background information, and encourage students to think critically and engage in meaningful learning experiences.

- Main risks and uncertainties:

Lack of Relevance or Engagement: Students may find the topic abstract or irrelevant, especially if solar energy seems disconnected from their daily lives or local context. Engagement levels may vary, which can impact on the quality of group work and discussions.

Time Management Issues: Groups may struggle to complete their drawings or presentations within the allotted time. Variability in group progress could lead to some groups feeling rushed while others finish early.

Difficulty in Measuring Learning Outcomes: The activity's creative and collaborative nature may make it hard to assess whether the intended learning objectives have been met. The outcomes may be subjective and vary in depth across groups.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

At the school level, there is a determination to enact a green school statute. The teachers and students are aware of the possibility of improving the school's energy performance through wise consumption and the generation of electricity from solar resources.

Have you encountered challenges in engaging people? What are they?

The intervention is planned to enhance awareness of sustainability and demonstrate how green energy can improve it at the school, community, national, and global levels. Engagement is quite high, with some individual differences in actual engagement and discourse.

How have you or could you overcome them?

The educational activities and the communication/dissemination programme are intended to compensate for this effect. A reflexive process is initiated and sustained through educational activities to consolidate knowledge of solar energy and renewables, appreciate their true value, and discuss them outside of school within the local community.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The influence of other people discussing with students, including the effects of social media.

How has the cooperation worked with other stakeholders and actors outside your organisation?

The cooperation was limited to the school and the ECF4CLIM partner, a relationship that was consolidated as the project evolved.

What has enabled or could promote cooperation?

The good cooperation is guaranteed by the project context, established rules, previous work, established trust, and careful consideration of the school's needs.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The first impact is on the understanding of the role of green energy, creating competencies related to its use.

How do you presume the change could happen?

The main change is intended to enhance understanding of the possibility of harvesting solar energy with solar panels, as well as how to invest and become a prosumer. In this manner, it is expected that students and teachers will act as key influencers in implementing solar energy by replicating the current intervention. At the societal level, more informed people regarding clean energy and how to obtain it will create better conditions for informed decisions related to energy and energy consumption.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The impact is connected to the previous intervention (RM-DS02-IN01). It is devoted to consolidating understanding and reflecting on the installation of solar panels at school, how they work, and what their main impacts are.

- **Action: How to proceed?**

What has helped you to achieve your goals?

A detailed planning and discussion with teachers and kids.

What kind of challenges have you faced in your organisation?

To create the best organising context to meet the enthusiasm of kids.

How have you found, or could you find time and space for the intervention in your organisation?

The resources are well planned. For the educational program, a negotiation with the teachers (in terms of their time) will be conducted, considering the next 18 months of the ECF4CLIM project.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparatory phase

Description: Planning of the intervention. Define the objectives, specifying the desired environmental and behavioural outcomes. Define the timing, materials and organising aspects. Prepare the plan for discussions and group-level exchange of ideas.

Responsible: Marian Constantin (MedaResearch), Maria Dragut (Dragasani School)

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed: 2 persons (MedaResearch), 2 persons from the School (educational activity planning)

Cost: 100 Euros

Task co-implementation participatory approach: Discussion in SCT4 and SCC4 to validate the planning.

Task 2.- Organising the details

Description: Discussion on the educational materials "Solar energy", provided by the ECF4CLIm team and website

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Dragut Maria (DS)

External expert assistance: No

ECF4CLIM expert assistance: yes

Resources needed: Hard copies are available upon request, and access to the internet is required.

Cost: 150 Euros

Task co-implementation participatory approach: Participation of teachers (contact persons for ECF4CLIM)

Task 3.- Thinking, drawing and discussing

Description: Educational activity: expressing solar energy - knowledge and connections - by drawings

Responsible: Anca Germizara Ciurduc Todoran (MedaResearch), Maria Dragut (DS)

External expert assistance: yes

ECF4CLIM expert assistance: yes, to moderate the discussion

Resources needed: Drawing paper (A4, A3 sizes, at request), pencils, erasers, sharpeners, colored pencils, markers, crayons, paints, rulers and stencils (optional). Seating and tables: comfortable arrangements for participants. Refreshments: snacks and water will be provided for participants and attendees.

Cost: 150 Euros

Task co-implementation participatory approach: Consult the audience to find the best solution for comfort during work.

Task 4.- Discussion and conclusions

Description: Discussing the drawings. Ideas are expressed by individual presentation. Group discussion on the main elements. Identify values to take away and spread. Identify elements to be implemented.

Responsible: Marian Constantin (MedaResearch), Maria Dragut (DS)

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: Blackboard, Post-its, and a new arrangement of seating and tables.

Cost: 100 Euros

Task co-implementation participatory approach: Discuss the drawings and expressed ideas, engaging all participants to ensure a comprehensive understanding.

- **Milestones**

  Milestone 1: Intervention plan agreed by ECF4CLIM and the school

  Milestone 2: Discuss the rules and organising aspect with the students

  Milestone 3: All educational materials and resources are ready for use

  Milestone 4: Data collected

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Short report/guidance to replicate the intervention (lessons learnt)

  Output 3: Short report on the environmental impact

- **Cost (Equipment /consumables /others)**

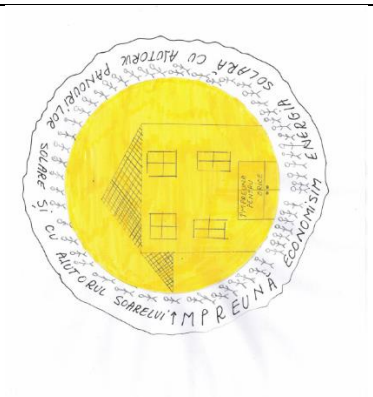
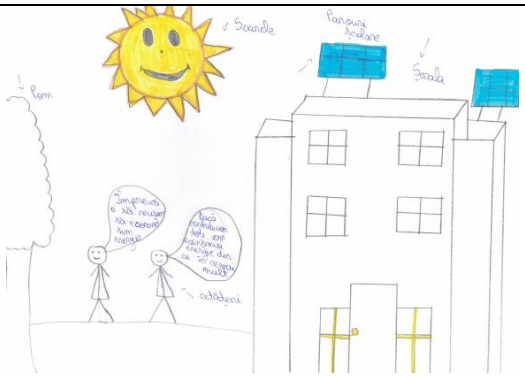
  Total cost: 500 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Regular visits and discussions on the reports of the responsible parties.

Responsible: Anca Germizara Ciurduc Todoran

- **Photographs of the intervention implementation**

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- **Troubles during implementation, conclusion and lessons learnt.**

12. Report on Implemented Interventions in SERCAIA SCHOOL.

School brief description

This public primary school located in the rural area of Brasov County, Transilvania region of Romania has 270 students (age 4 to 14 years), 10 classrooms, one computer science lab, one history lab, a sports hall, a separate building that hosts the kindergarten, a large green space where students spend their breaks, and a parking space outside the schoolyard.



Figure 12.1.- Sercaia School photographs.

Implemented Interventions Summary

The interventions implemented in the SERCAIA SCHOOL pilot centre are listed in the following table.

Measure Id	***Title***
RM-DS02-IN01	(Solar panels in rural area) Installation of solar panels for green electricity production
RM-DS02-IN05	(Active) Supporting the activities of groups approaching sustainability

Table 12.1.- Interventions in SERCAIA SCHOOL.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
RM-DS02-IN01	(Solar panels in rural area) Installation of solar panels	Energy		

	for green electricity production			
RM-DS02-IN05	(Active) Supporting the activities of groups approaching sustainability	Educational programs		Short training courses

Table 12.2.- Interventions main working areas in SERCAIA SCHOOL.

RM-DS02-IN01.- (Solar panels in rural area) Installation of solar panels for green electricity production

General data

Description: Installing solar panels to produce green electricity. Full support of the ECF4CLIM project for the investment. Intervention is coupled with an educational program dedicated to understanding solar energy and how to utilise it.

- **Participants and profile:** 3Rt1%, 3Rj2#, 3Rt3%

- **SCT and SCC representatives:** 3Ri1#, 3Ri2#, 3Ri3%, 3Ri4%, 3Ri5%, 3Ri6%, 3Ri7%, 3Ri8#, 3Ri9%, 3Ri10%, 3Ri11#, 3Ri12#, 3Ri13#, 3Ri14#, 3Ri15%, 3Rt1%, 3Rj2#, 3Rt3%, 3Rj4#, 3Rj5#

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Technical (installing solar panels); an educational activity to stimulate individual and collective action on water use is added.

    - Short description of the objectives:

      To share how solar energy may be easily harvested at the school and household levels.
      To promote the use of renewable energy and reduce emissions and costs.
      To promote the energy shift from fossil fuel to green alternatives and to improve the existing knowledge.
      To stimulate learning by communication of the results.
      To create appropriate messages to spread the use of solar heat to other schools, organisations, and households.

    - Time scope of the intervention:

      During the lifetime of the project.

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Realistic Budgeting: Develop a realistic budget that includes all costs associated with the implementation, including installation, maintenance, and training.
      Technical Support: Installation by an authorised team. Support obtaining the documents and approvals for prosumer status. Install the interface to the grid.

Establish a framework for future technical support to address any issues and ensure the efficient use of the solar panels.
Involvement of the School Community: Engage and involve teachers, students, parents, and administrative staff in the planning and decision-making processes to foster a sense of ownership and accountability.
Educational Programs: Implement educational programs that highlight the importance of capturing and utilising solar energy, understanding prosumer status, and sustainability performance.
Transparent Communication: Clearly communicate the goals, benefits, and expected outcomes of the solar panel implementation to staff, teachers, students, and parents, addressing any possible concerns.
Life Cycle Considerations: Incorporate sustainable practices in the selection of solar panels, considering their environmental impact throughout their life cycle, from production to disposal.
Performance Metrics: Establish clear performance metrics to monitor the intervention's impact over time, allowing for adjustments and improvements as needed.
Contingency Plans: Develop contingency plans to address potential issues, such as interface malfunctions, to minimise disruptions.

- Main risks and uncertainties:

Budget Overruns: Unforeseen expenses during installation or maintenance may lead to budget overruns.
Weather Dependency: Solar power generation is highly dependent on weather conditions, resulting in fluctuations in energy production.
Technical Issues: Maintenance and repair costs may arise, which can impact on the system's efficiency and reliability.
Long-Term Maintenance Costs: Ongoing maintenance costs may be higher than initially estimated.
Regulatory Changes: Changes in government incentives or regulations could impact on the advantages of being a prosumer.
Technology Obsolescence: Rapid advancements in solar technology could make current systems outdated sooner than expected.
Insurance and Liability: Additional insurance may be required, and liability concerns may arise in the event of accidents or damages.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

"How can the integration of solar energy technology in a school setting contribute to sustainable energy practices and educational outcomes?"

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

At the school level, there is a determination to enact a green school statute. The teachers and students are aware of the possibility of improving the school's energy performance through wise consumption and the generation of electricity from solar resources.

Have you encountered challenges in engaging people? What are they?

The intervention is planned to improve the school's infrastructure. After some months from the installation, it is possible that the solar panels will lose most of their effectiveness. The educational activities and the communication/dissemination programme will create conditions to face the challenge, but the risks remain, as there is resistance to change, and people also have other priorities in their daily activities.

How have you or could you overcome them?

The educational activities and the communication/dissemination programme are intended to compensate for this effect. A reflexive process is initiated and sustained through educational activities to consolidate knowledge of solar energy and renewables, appreciate their real value, and discuss them outside of school in order to replicate the intervention.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The authorities in energy are involved in the approval of the statute of the prosumer (local electricity distributor company), and other local authorities (Local Council, Local Urbanism Committee) approve the investment.

How has the cooperation worked with other stakeholders and actors outside your organisation?

One stakeholder is directly involved in the intervention: the installer, who also acts as the system designer and selects the materials and equipment. The approach is based on commercial contracts with very clearly stipulated rules regarding amount, quality, and deadlines. The indirect involvement (necessary to obtain the statute of prosumer for the school) involved the following stakeholders: the electricity company, the Local Council, and the Local Urbanism Committee.

What has enabled or could promote cooperation?

The good cooperation with the design and installation company is based on the well-written contracts, with rights and obligations, and also on the use of a risk management approach during work (a person is nominated to identify and treat any situation causing risks for the

project). For other stakeholders, respecting procedures is the primary proactive measure for success.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The first impact is on environmental performance, aiming to reduce the carbon footprint through electricity consumption. The second is to offer students and teachers a model for a simple intervention that is easy to replicate at the household level or in other schools. The third (according to the associated educational material) is to offer a set of competences concerning solar energy, or more generally, concerning renewables.

How do you presume the change could happen?

The main change is intended to enhance understanding of the possibility of harvesting solar energy with solar panels, as well as how to invest and become a prosumer. In this manner, it is expected that students and teachers will act as key influencers in implementing solar energy by replicating the current intervention. At the societal level, more informed people regarding clean energy and how to obtain it will create better conditions for informed decisions related to energy and energy consumption.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The intervention is planned to improve the sustainability performance of the school. By harvesting solar energy through the installation of solar panels on the school's roof, a reduction in electricity consumption from the national grid is expected. The green energy generated by the school will provide a practical basis for understanding the impacts, promoting a prosumer status. The educational material will provide a better understanding of the energy system and the opportunities for producing energy.

- **Action: How to proceed?**

What has helped you to achieve your goals?

A detailed plan, a good selection of the contractor, and measures for risk management are outlined in the first plan. The continuous monitoring of the work's execution by the school representative is the second. Collaboration with teachers and the development of educational materials incorporating feedback received from the school (students and teachers) are key elements in supporting the achievement of the objectives.

What kind of challenges have you faced in your organisation?

The main challenge is related to the ownership bureaucracy. The ECF4CLIM is supporting the intervention through MedaResearch, and ultimately, the school will take ownership of the system.

How have you found, or could you find time and space for the intervention in your organisation?

The resources are well-planned. For the educational program, a negotiation with the teachers (in terms of their time) will be conducted, considering the next 11/2 years of the ECF4CLIM project.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Planning and design

Description: Planning of the intervention. Define the objectives, specifying the desired environmental and behavioural outcomes. Determine the scope and scale of the project. Evaluate the existing infrastructure. Select appropriate solar panels. Cost estimation and detailed budget (including costs of purchasing solar panels, installation, prosumer interface, and approvals, as well as ongoing maintenance). Identify potential funding sources, including the school budget, grants, and external partnerships. Prepare the communication program for the educational community and the local community.

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Delia Ganea (DS)

External expert assistance: yes

ECF4CLIM expert assistance: yes

Resources needed: 2 persons (MedaResearch), 2 persons from the School (desk research, offer from the market, visiting the school to explore the current infrastructure), specialised support for installing panels and interface

Cost: 200 Euros

Task co-implementation participatory approach: Discussion with the technical staff of the school. Market exploration to find technical installation support. SCT and SCC meeting to discuss and validate the planning.

Task 2.- Initial conditions

Description: Reference measurement of the initial energy consumption. Purchasing the materials/equipment.

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Delia Ganea (DS)

External expert assistance: No

ECF4CLIM expert assistance: yes

Resources needed: Existing equipment (electricity meters at the school's canteen). Funds (ECF4CLIM for solar panels and prosumer interface).

Cost: 2500 Euros

Task co-implementation participatory approach: Participation of teachers (contact persons for ECF4CLIM)

Task 3.- Installing

Description: Installation of the solar panels and prosumer interface

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Ionut Voiculescu (DS)

External expert assistance: yes

ECF4CLIM expert assistance: yes, to select the main elements to be recorded

Resources needed: Qualified technicians (from an external specialised company) to install the panels and the interface.

Cost: 800 Euros

Task co-implementation participatory approach: Video registration of how to install, for the educational programme

Task 4.- Calibrate, train, and use

Description: Staff training on how to use the system, use the technical support in case of malfunctions, measure the impact, how to interpret data, and understand the environmental impact. Establish Monitoring Protocols: Implement protocols for regularly monitoring system performance to ensure optimal operation. Maintenance Plan: Develop a maintenance plan to address solar panels and interface malfunctions promptly and conduct routine checks.

Responsible: Marian Constantin (MedaResearch), Delia Ganea (DS)

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: training materials,

Cost: 200 Euros

Task co-implementation participatory approach: Discuss the materials elaborated by the ECF4CLIM team to improve them in accordance with the audience's level.

Task 5.- Behavioural changes

Description: Educational Campaigns: Implement educational campaigns to raise awareness about solar energy use and the environmental impact. Evaluation and Adjustment: Define

key performance indicators to evaluate the success of the intervention. Establish feedback mechanisms to gather input and make adjustments as needed.

Responsible: Marian Constantin (MedaResearch), Iuliana Grapa (DS)

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed: Materials for the campaign (posters, flyers, posts prepared for social media of the school, Facebook)

Cost: 600 Euros

Task co-implementation participatory approach: Discuss the materials elaborated by the ECF4CLIM team to improve them in accordance with the audience's level.

- **Milestones**

  Milestone 1: Intervention plan agreed by ECF4CLIM and the school

  Milestone 2: Purchase the solar panels and the prosumer interface

  Milestone 3: Solar panels and interface installed. System functionally.

  Milestone 4: Training and educational material presented

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Short report/guidance to replicate the intervention (lessons learnt)

  Output 3: Short report on the environmental impact

- **Cost (Equipment /consumables /others)**

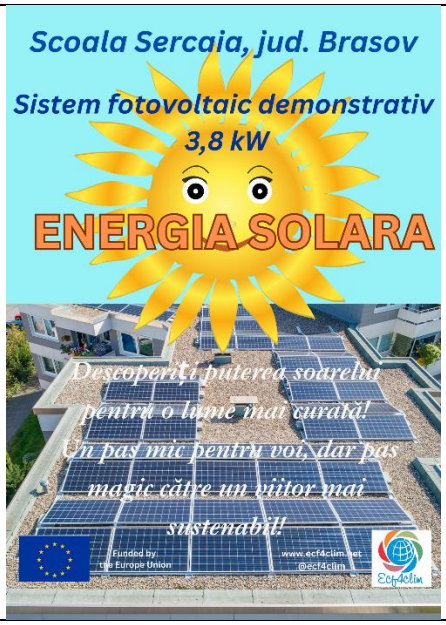
  Total cost: 4300 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Regular visits and discussions based on the regular reports of the parties responsible.

  Responsible: Anca Germizara Ciurduc Todoran

- **Photographs of the intervention implementation**

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- **Troubles during implementation, conclusion and lessons learnt.**

Initially, this intervention aimed to install a water heating solar system, but it was ultimately reoriented to install photovoltaic panels instead.

Engagement Outcomes

This shift provided students with a better understanding of how to directly contribute to reducing the school's carbon footprint. Their newly acquired knowledge of installing and utilising solar panels is a crucial foundation for their future engagement in environmental initiatives and efforts to decarbonise the economy. However, we observed that interest in the solar panels diminished after a few months post-installation, suggesting a desire for new and innovative projects within the educational community.

Vision and Impact Achieved

The core vision of harvesting solar energy through rooftop panel installation was successfully realised. In its first three months of operation, the solar panel system generated enough electricity to reduce the school's electricity bill by approximately 40%, demonstrating a tangible and significant impact on energy consumption from the national grid.

RM-DS02-IN05- Supporting the activities of groups approaching sustainability - "How we understand solar energy in the sustainability context"

General data

Description: Investigation of the understanding of solar energy. How to harvest and use it? What is the potential of solar energy? Who can be involved to achieve success?

- **Participants and profile:** 3Rt1%, 3Rj4%, 3Rj5%

- **SCT and SCC representatives:** 3Ri1#, 3Ri2%, 3Ri3%, 3Ri4%, 3Ri5#, 3Ri6%, 3Ri7#, 3Ri8#, 3Ri9#, 3Ri10%, 3Ri11#, 3Ri12%, 3Ri13#, 3Ri14%, 3Ri15%, 3Ri16#, 3Ri17%, 3Ri18#, 3Ri19%,3Ri20#, 3Ri21#, 3Rt1%, 3Rt2#, 3Rt3#, 3Rj4%, 3Rj5%, 3Rj6%, 3Rj7#, 3Rj8#, 3Rj9#

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Competition for students (VIII B classroom) for the best Figure of solar power impact in the school and reflecting the complexity of the connections between different stakeholders.

    - Short description of the objectives:

      Enhance Awareness of Solar Energy - develop students' understanding of solar energy as a renewable resource and its importance for sustainable development.
      Encourage Creative Problem-Solving - Foster creativity by allowing students to visualise solutions for harvesting and utilising solar energy through drawings and collaborative brainstorming.
      Promote Collaborative Learning - strengthen teamwork and communication skills as students work together to explore ideas and present their shared understanding.
      Highlight Stakeholder Roles in Solar Energy Adoption - Help students identify key players (e.g., scientists, engineers, policymakers, and communities) and their roles in achieving the successful implementation of solar energy solutions.

    - Time scope of the intervention:

      During the lifetime of the project.

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

Individual Competences

Knowledge and Understanding: Basic knowledge of renewable energy, particularly solar energy (what it is, how it works, and its benefits). Awareness of environmental and sustainability issues, such as climate change and resource conservation.

Critical Thinking and Creativity: Ability to analyse the challenges and opportunities related to solar energy. The capacity to think creatively and visualise ideas through drawings.

Collective Competences

Group Problem-Solving: Ability to collectively explore and identify practical and innovative solutions for harnessing and using solar energy.

Consensus Building: Developing shared ideas and consolidating individual inputs into a cohesive group output (the drawing and presentation).

Interdisciplinary Approach: Combining diverse perspectives within the group to address technical, environmental, and societal aspects of solar energy adoption.

Environmental/Technical Elements

Supportive Educational Environment: A classroom culture that encourages inquiry, exploration, and creativity.

Access to Materials and Tools: Drawing supplies (paper, markers, crayons) and optional visual aids, such as photos, diagrams, or videos of solar panels, solar-powered devices, and energy systems.

Facilitation by Teachers/Moderators: Educators knowledgeable about solar energy will guide discussions, provide background information, and encourage students to think critically and engage in meaningful learning experiences.

- Main risks and uncertainties:

Lack of Relevance or Engagement: Students may find the topic abstract or irrelevant, especially if solar energy seems disconnected from their daily lives or local context. Engagement levels may vary, which can impact on the quality of group work and discussions.

Time Management Issues: Groups may struggle to complete their drawings or presentations within the allotted time. Variability in group progress could lead to some groups feeling rushed while others finish early.

Difficulty in Measuring Learning Outcomes: The activity's creative and collaborative nature may make it hard to assess whether the intended learning objectives have been met. The outcomes may be subjective and vary in depth across groups.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

At the school level, there is a determination to enact a green school statute. The teachers and students are aware of the possibility of improving the school's energy performance through wise consumption and the generation of electricity from solar resources.

Have you encountered challenges in engaging people? What are they?

The intervention is planned to enhance awareness of sustainability and demonstrate how green energy can improve it at the school, community, national, and global levels. Engagement is quite high, with some individual differences in actual engagement and discourse.

How have you or could you overcome them?

The educational activities and the communication/dissemination programme are intended to compensate for this effect. A reflexive process is initiated and sustained through educational activities to consolidate knowledge of solar energy and renewables, appreciate their true value, and discuss them outside of school within the local community.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The influence of other people discussing with students, including the effects of social media.

How has the cooperation worked with other stakeholders and actors outside your organisation?

The cooperation is limited to the school and the ECF4CLIM partner.

What has enabled or could promote cooperation?

The good cooperation is guaranteed by the project context, established rules, previous work, established trust, and careful consideration of the school's needs.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The first impact is on the understanding of the role of green energy, creating competencies related to its use.

How do you presume the change could happen?

The main change is intended to enhance understanding of the possibility of harvesting solar energy with solar panels, as well as how to invest and become a prosumer. In this manner, it is expected that students and teachers will act as key influencers in implementing solar energy by replicating the current intervention. At the societal level, more informed people regarding clean energy and how to obtain it will create better conditions for informed decisions related to energy and energy consumption.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The impact is connected to the previous intervention (RM-DS02-IN01). It is devoted to consolidating understanding and reflecting on the installation of solar panels at school, how they work, and what their main impacts are.

- **Action: How to proceed?**

What has helped you to achieve your goals?

A detailed planning and discussion with teachers and kids.

What kind of challenges have you faced in your organisation?

To create the best organising context to meet the enthusiasm of kids.

How have you found, or could you find time and space for the intervention in your organisation?

The resources are well-planned. For the educational program, a negotiation with the teachers (in terms of their time) will be conducted, considering the next 11/2 years of the ECF4CLIM project.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparatory phase

Description: Planning of the intervention. Define the objectives, specifying the desired environmental and behavioural outcomes. Define the timing, materials and organising aspects. Prepare the plan for discussions and group-level exchange of ideas.

Responsible: Marian Constantin (MedaResearch), Delia Macrea (Sercaia School)

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed: 2 persons (MedaResearch), 2 persons from the School (educational activity planning)

Cost: 100 Euros

Task co-implementation participatory approach: Discussion in SCT4 and SCC4 to validate the planning.

Task 2.- Organising the details

Description: Discussion on the educational materials "Solar energy", provided by the ECF4CLIm team and website

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Delia Macrea (DS)

External expert assistance: No

ECF4CLIM expert assistance: yes

Resources needed: Hard copies are available upon request. Internet access.

Cost: 200 Euros

Task co-implementation participatory approach: Participation of teachers (contact persons for ECF4CLIM)

Task 3.- Thinking, drawing and discussing

Description: Educational activity: expressing solar energy - knowledge and connections - by drawings

Responsible: Anca Germizara Ciurduc Todoran (MedaResearch), Delia Macrea (DS)

External expert assistance: yes

ECF4CLIM expert assistance: yes, to moderate the discussion

Resources needed: Drawing paper (A4, A3 sizes, at request), pencils, erasers, sharpeners, colored pencils, markers, crayons, paints, rulers and stencils (optional). Seating and tables: comfortable arrangements for participants. Refreshments: snacks and water will be provided for participants and attendees.

Cost: 200 Euros

Task co-implementation participatory approach: Consult the audience to find the best solution for comfort during work.

Task 4.- Discussion and conclusions

Description: Discussing the drawings. Ideas are expressed through individual presentations and group discussions on the main elements. Identify values to take away and spread. Identify elements to be implemented.

Responsible: Marian Constantin (MedaResearch), Delia Macrea (DS)

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: blackboard, Post-its, and a new arrangement of seating and tables.

Cost: 100 Euros

Task co-implementation participatory approach: Discuss the drawings and expressed ideas, engaging all participants to ensure a comprehensive understanding.

- **Milestones**

  Milestone 1: Intervention plan agreed by ECF4CLIM and the school

  Milestone 2: Discuss the rules and organising aspect with the students

  Milestone 3: All educational materials and resources are ready for use

  Milestone 4: Data collected

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Short report/guidance to replicate the intervention (lessons learnt)

  Output 3: Short report on the environmental impact

- **Cost (Equipment /consumables /others)**

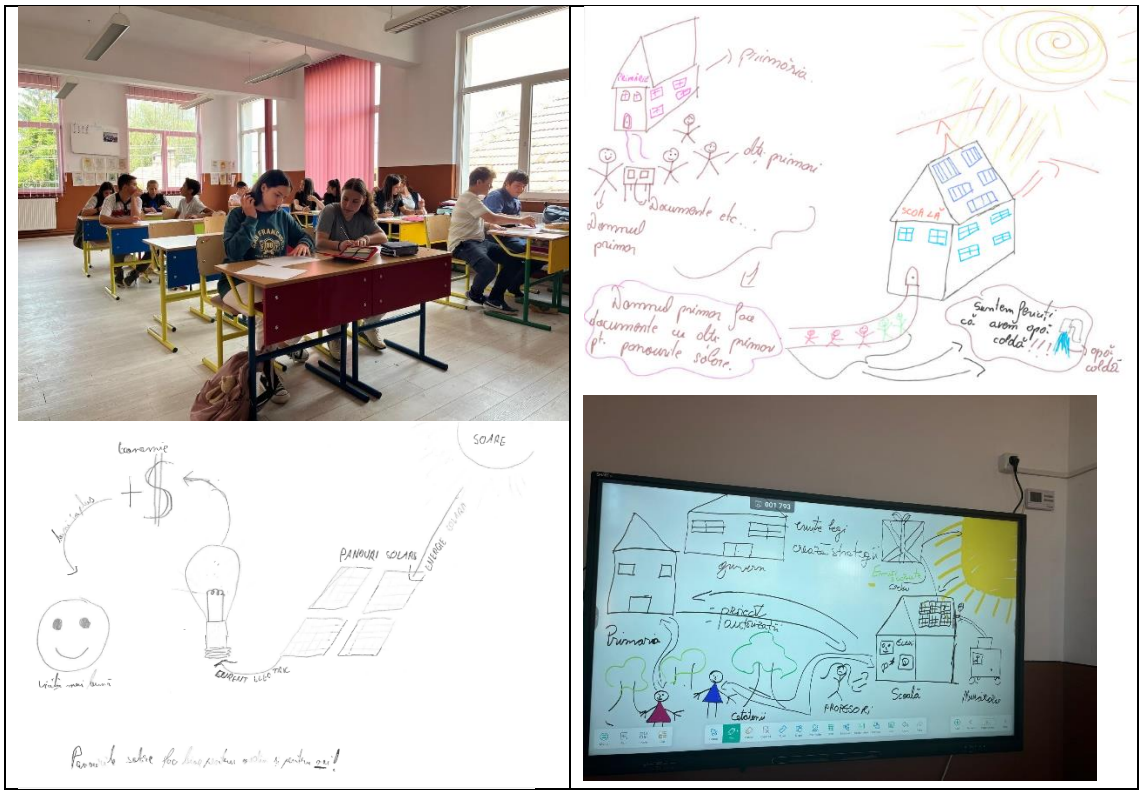
  Total cost: 600 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Regular visits and discussions on the reports of the responsible parties.

  Responsible: Anca Germizara Ciurduc Todoran

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

No significant troubles arose during the intervention implementation.

13. REPORT ON IMPLEMENTED INTERVENTIONS IN IULIA ZAMFIRESCU HIGH SCHOOL.

School brief description

This public high school, located in Mioveni town, Argeș County, has more than 1,300 students (ages 6-19) and over 60 teachers. The students mainly come from the town of Mioveni and its surrounding neighbourhoods. Although small (approximately 35,000 inhabitants), Mioveni is a dynamic city experiencing rapid development. The local economy is dominated by industry (automotive and nuclear fuel). This demonstration site was selected as a representative of a modern high school in Romania, having a recently built infrastructure (2006) and students predominantly originating from the local area.





Figure 13.1.- Lulia Zamfirrescu school photographs.

Implemented Interventions Summary

The interventions implemented in the pilot centre, IULIA ZAMFIRESCU HIGH SCHOOL, are listed in the following table.

Measure Id	***Title***
RM-DS03-IN01	(Water Sensors) Infrastructure improvement - water sensors at the sanitary facilities

Table 13.1.- Intervention in IULIA ZAMFIRESCU HIGH SCHOOL.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
RM-DS03-IN01	(Water Sensors) Infrastructure improvement - water sensors at the sanitary facilities	Water		

Table 13.2.- Interventions main working areas in IULIA ZAMFIRESCU HIGH SCHOOL.

RM-DS03-IN01.- (Water Sensors) Infrastructure improvement - water sensors at the sanitary facilities

General data

Description: In all sanitary rooms, replacing traditional water sinks with sensor-equipped ones is targeted, offering advantages that combine efficiency, hygiene, and convenience. These sensor-equipped sinks utilise technology to detect the presence of hands or objects, automatically controlling the flow of water. A reference consumption for water will be measured before the intervention, in order to quantify the impact. An educational component will be directly dedicated to communication and educational activities. Large posters will be placed in the toilets to illustrate the typical water consumption in daily life and emphasise the importance of conserving water. A dedicated material on water and water conservation in the context of climate change will be developed and recommended for use in various lessons. The students will be involved in communicating the intervention measure and its impacts to other schools in the town and the region.

- **Participants and profile:** 3Yt1#, 3Yt2#, 3Yj4%, 3Yj%

- **SCT and SCC representatives:** 3Yt1#, 3Yt2#, 3Yj4%, 3Yj%, 3Yi1%, 3Yi2#, 3Yi3%, 3Yi4#, 3Yi5#, 3Yi6%, 3Yi7%, 3Yi8#, 3Yi9#, 3Yi10#, 3Yi11#, 3Yi12#

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Technical (installing equipment for water infrastructure) and an educational activity are added to stimulate individual and collective action on water use.

    - Short description of the objectives:

      To demonstrate the effectiveness of water conservation by a simple measure, such as avoiding excessive water wastage
      To contribute to the global effort of conserving water resources and mitigating the environmental impact of human activities
      To reduce energy consumption by automatic shut-off after a certain period of inactivity, eliminating the need for continuous heating of the water.
      To increase awareness by understanding the impacts of the implemented measure
      To spread the information to the local community and other schools
      To implement better hygiene and cleanliness by reducing the risk of cross-contamination due to the required contact in the case of the classical device
      To save time in the handwashing process by eliminating the need to turn the faucet on and off manually
      To increase the accessibility for people with limited mobility by simplifying the faucet handles, making it easier for everyone to use the sink comfortably

- Time scope of the intervention:

  During the lifetime of the project.

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

    Involvement of the School Community: Engage and involve teachers, students, parents, and administrative staff in the planning and decision-making processes to foster a sense of ownership and accountability.
    Thorough Assessment: Conduct a comprehensive assessment of the school's water usage patterns, existing infrastructure, and potential areas for improvement to tailor the intervention accordingly.
    Realistic Budgeting: Develop a realistic budget that includes all costs associated with the implementation, including installation, maintenance, and training.
    Transparent Communication: Clearly communicate the goals, benefits, and expected outcomes of the water sensor implementation to all stakeholders, addressing any concerns and ensuring buy-in.
    Training Programs: Develop and implement training programs for staff and students to ensure they understand how to use the water sensors and interpret the data.
    Educational Programs: Implement educational programs that highlight the importance of water conservation, linking sensor data to real-world impact to encourage behavioural change.
    Technical Support: Offer ongoing technical support to resolve any issues and ensure the efficient use of the sensor system.
    Life Cycle Considerations: Incorporate sustainable practices in the selection of water sensors, considering their environmental impact throughout their life cycle, from production to disposal.
    Performance Metrics: Establish clear performance metrics to monitor the intervention's impact over time, allowing for adjustments and improvements as needed.
    Contingency Plans: Develop contingency plans to address potential issues, such as sensor malfunctions or water supply interruptions, to minimise disruptions and ensure continuity of operations.

  - Main risks and uncertainties:

    Budget Overruns: Unforeseen expenses during installation or maintenance may lead to budget overruns.
    Long-Term Maintenance Costs: Ongoing maintenance costs may be higher than initially estimated.
    Staff and Student Resistance: Resistance from staff and students to adapt to the new system could undermine its effectiveness.

Dependency on Electricity: If the sensors are heavily dependent on electricity, power outages could disrupt their functionality.
Negative Perception: Community members might have concerns or misunderstandings about the purpose and implications of water sensors.
Manufacturing and Disposal: The production and disposal of the sensors may have environmental implications. Ensuring proper disposal practices is essential.
Sensor Malfunction: The water sensors may malfunction, leading to inaccurate readings or false alarms.
Compatibility Issues: Incompatibility between the sensors and existing plumbing or infrastructure could pose challenges during installation.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

"How can the implementation of water sensors in a school setting reduce water wastage and enhance students' understanding of water conservation and its critical role in sustainable development?"

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Students are aware of the possibility of avoiding water wastage in the school and at home. They are seeing the intervention as an experiment to demonstrate this possibility.

Have you encountered challenges in engaging people? What are they?

The focus is on infrastructure modernisation. After the implementation, the kids, teachers and administrative staff will use it. The communication programme has a role in engaging as many members of the entire educational community as possible to reflect on the intervention, appreciate its real value, and discuss it outside of school to replicate the measure and contribute to wise water consumption. This last part presents a challenge, as there is resistance to change, and people also have other priorities.

How have you or could you overcome them?

An educational programme is planned to complement the intervention. Additionally, the communication and dissemination activities, which involve the educational community (including proposing and executing communication within the school and among schools), are devoted to overcoming this challenge.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

There are no relevant issues during the project time. In the long term, the decision on system maintenance is at the school level, also influenced by the availability of funds (the Local Council approves the budget).

How has the cooperation worked with other stakeholders and actors outside your organisation?

Two stakeholders are directly involved in the intervention: the seller of the smart sensors and the installer. For both, the approach is through commercial contracts with clearly stipulated rules regarding amount, quality, and deadlines.

What has enabled or could promote cooperation?

The good cooperation is based on the well-written contracts, with rights and obligations, and also on the use of a risk management approach during work (a person is nominated to identify and treat any situation causing risks for the project).

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The first impact is on environmental performance, specifically reducing water wastage. The second is to offer students and teachers a model for a simple intervention that is easy to replicate at the household level or in other schools. The third (according to the associated educational material) is to offer a set of competences in relation to water use.

How do you presume the change could happen?

The primary change aims to promote wise consumption by reducing water wastage. Additionally, it seeks to enrich knowledge on water systems, water consumption levels, and the costs associated with water at both the school and household levels.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The intervention was clearly oriented towards improving the sustainability performance of the school. It is planned to eliminate water wastage. In terms of educational materials, the elements planned are designed to enhance understanding of the water system, constraints on drinkable water, the impact of climate change, typical household water consumption, and associated costs.

- **Action: How to proceed?**

What has helped you to achieve your goals?

A detailed plan, a good selection of contractors, and measures for risk management are outlined in the first plan. The second plan involves continuous monitoring of the work's execution by the school representative.

What kind of challenges have you faced in your organisation?

The main challenge is related to the ownership bureaucracy. The ECF4CLIM is supporting the intervention through MedaResearch, and ultimately, the school will take ownership of the system.

How have you found, or could you find time and space for the intervention in your organisation?

The resources are well planned. For the educational program, a negotiation with the teachers (in terms of their time) will be conducted, considering the next 1.5 years of the ECF4CLIM project.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Planning and design

Description: Planning of the intervention. Define the objectives, specifying the desired environmental and behavioural outcomes. Determine the scope and scale of the project. Evaluate the existing infrastructure. Select appropriate water sensor technology. Cost estimation and detailed budget (costs of purchasing sensors, installation, training programs, and ongoing maintenance). Identify potential funding sources, including the school budget, grants, and external partnerships. Prepare for stakeholder involvement.

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Ionut Voiculescu (DS)

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed: 2 persons (MedaResearch), 2 persons from the School (desk research, offer from market, visiting the school to explore the current infrastructure)

Cost: 200 Euros

Task co-implementation participatory approach: Discussion with technicians responsible for the water system at the school. SCT and SCC meeting to discuss and validate the planning.

Task 2.- Initial state and purchasing

Description: Reference measurement of the initial water consumption. Purchasing the materials/equipment.

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Ionut Voiculescu (DS)

External expert assistance: No

ECF4CLIM expert assistance: No

Resources needed: Existing equipment (water consumption meters). Funds (ECF4CLIM for faucets and sensors).

Cost: 3000 Euros

Task co-implementation participatory approach: Participation of teachers (contact persons for ECF4CLIM)

Task 3.- Installing

Description: Installation of the sink faucets with sensors

Responsible: Dan Lucian Ciurduc Todoran (MedaResearch), Ionut Voiculescu (DS)

External expert assistance: No

ECF4CLIM expert assistance: yes, for video materials

Resources needed: Qualified technician (existing in school) to install the sink faucets with water sensors in the identified sanitary facilities

Cost: 600 Euros

Task co-implementation participatory approach: Video registration of how to install, for the educational programme

Task 4.- Calibrate, train, and use

Description: Calibrate the sensors to ensure accurate measurement and functionality. Staff and Student Training on how to use the water sensors, interpret data, and understand the environmental impact. Establish Monitoring Protocols: Implement protocols for regularly monitoring sensor data and system performance to ensure optimal operation. Maintenance Plan: Develop a maintenance plan to address sensor malfunctions promptly and conduct routine checks.

Responsible: Marian Constantin (MedaResearch), Roxana Stroe (DS)

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: training materials,

Cost: 500 Euros

Task co-implementation participatory approach: Discuss the materials elaborated by the ECF4CLIM team to improve them in accordance with the audience's level.

Task 5.- Behavioural changes

Description: Educational Campaigns: Implement educational campaigns to raise awareness about water conservation and connect sensor data to environmental impact. Evaluation and Adjustment: Define key performance indicators to evaluate the success of the intervention. Establish feedback mechanisms to gather input and make adjustments as needed.

Responsible: Marian Constantin (MedaResearch), Roxana Stroe (DS)

External expert assistance: no

ECF4CLIM expert assistance: yes

Resources needed: Materials for campaign (posters, flyers, posts prepared for the social media of the school, Facebook)

Cost: 200 Euros

Task co-implementation participatory approach: Discuss the materials elaborated by the ECF4CLIM team to improve them in accordance with the audience's level.

- **Milestones**

  Milestone 1: Intervention plan agreed by ECF4CLIM and the school

  Milestone 2: Purchase the faucets with sensors

  Milestone 3: Faucets with sensors installed and calibrated

  Milestone 4: Training and educational material presented

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Short report/guidance to replicate the intervention (lessons learnt)

  Output 3: Short report on the environmental impact

- **Cost (Equipment /consumables /others)**

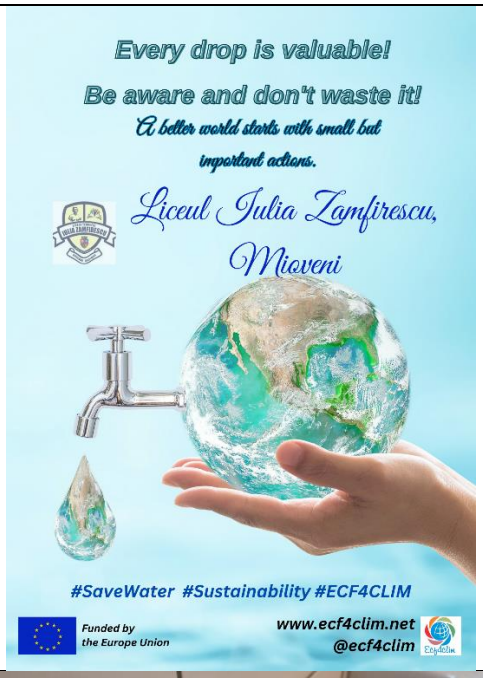
  Total cost: 4500 Euros

- **Intervention implementation comonitoring strategy**

Implementation of the comonitoring approach: Regular visits and discussions are conducted based on reports from the party responsible.

Responsible: Anca Germizara Ciurduc Todoran

- **Photographs of the intervention implementation**









- **Troubles during implementation, conclusion and lessons learnt.**

Persistent Challenges and Environmental Considerations

We anticipate that long-term maintenance costs for the new system may exceed initial estimates. Furthermore, potential resistance from staff and students to fully adapt to the system could undermine its overall effectiveness. There is also a risk of a negative perception among community members due to misunderstandings about the purpose and implications of the water sensors.

From an environmental standpoint, the manufacturing and disposal of the sensors themselves carry implications. We must prioritise and ensure proper disposal practices to mitigate any negative environmental impact.

Engagement and Sustained Interest

The installation and functionality of the smart sensors were initially perceived as "cool" by students, fostering rapid communication and excitement throughout the educational community. This initial enthusiasm, driven by the system's modernisation and potential for savings, was powerful but short-lived. After the initial week or two, results became normalised. To sustain this initial appreciation, a focused communication program and proactive reintroduction of water conservation into discussions by teachers were crucial.

The accompanying educational program played a vital role. Discussions around its content stimulated students and teachers to reflect more deeply on water issues, fostering stronger, real-world connections to water conservation.

Effective Collaboration and Connections

Cooperation with the school was excellent; they showed clear interest in the implementation's success. Relationships with the smart sensor vendor and installer were commercial, with contracts fully respected in terms of deadlines and quality. Our good relationship with MedaResearch also suggests potential for continued collaboration.

The school's designated point person for ECF4CLIM cooperation was essential, providing daily monitoring of work progress during installation.

Vision Realised and Future Replication

The intervention's environmental impact was clear: a 20-25% reduction in current water consumption was observed based on aggregated data from the first three months post-installation. A second significant impact was offering students and teachers a simple, replicable model for interventions that could be applied at home or in other schools. Students discussed water reduction possibilities at home, validating the replicability of this approach. A third impact, facilitated by the educational materials, was the development of specific competencies related to water use. Feedback from students and teachers confirms the utility and appropriateness of these materials for the students' learning level.

Actionable Insights

ECF4CLIM supported the intervention through MedaResearch, ultimately transferring ownership of the system to the school. Procedural documents were meticulously produced in accordance with Romania's legal framework.

Key success factors included detailed planning, careful selection of contractors, and proactive risk management. The school's continuous monitoring of the work's execution was also a substantial contributor to the positive outcome.

14. REPORT ON IMPLEMENTED INTERVENTIONS IN THE UNIVERSITY OF PITESTI.

School brief description

This Romanian university is relatively young (founded in 1962) and has expanded rapidly since 1990. There are more than 9000 students across the three university cycles, bachelor's, master's, and doctorate, in the following faculties: sciences, informatics, physical education and sports; mechanics and technology; theology, literature, history and arts; electronics, communications and computers, economics and law; education sciences, social sciences and psychology. Most of the students are between the ages of 19 and 24, originating from the local region (dominantly Arges, Olt, Teleorman, and Valcea counties). The number of international students is typically low, with fewer than 50 in attendance. Pitesti is a medium-sized and reasonably prosperous town in Romania (around 180,000 inhabitants), with automotive industry, petrochemistry, services and commerce as the main economic sectors. The University of Pitesti has been recognised as a good provider of human resources for the regional labour market. The demonstration site is the Faculty of Science.



Figure 14.1.- Pitesti University photographs.

Implemented Interventions Summary

The interventions implemented in the UNIVERSITY OF PITESTI pilot centre are listed in the following table.

Measure Id	***Title***
RM-DS04-IN02	Development of educational materials for sustainability

Table 14.1.- Intervention in the UNIVERSITY OF PITESTI.

The following table categorises the interventions implemented, considering the area of sustainability to which each is focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
RM-DS04-IN02	Development of educational materials for sustainability	Educational programs		Teaching materials

Table 14.2.- Intervention main working areas in UNIVERSITY OF PITESTI.

RM-DS04-IN02- Development of educational materials for sustainability

General data

Description: The intervention involves the development of a course titled “Sustainable Development in a Technological Society” for students enrolled in technical faculties.
It is structured in 8 modules: (M1) Introduction to Sustainable Development, (M2) Technical Aspects of Sustainable Development, (M3) Sustainable resource management, (M4) Responsible technological development, (M5) Green and Renewable Technologies, (M6) Climate Change and Technical Adaptation, (M7) Global Collaboration and the Future of Technical Sustainability, (M8) Practical Sustainable Development Projects. The intervention is based on co-design, with the participation of SCT/SCC, and will be finalised through testing in a pilot course.

- **Participants and profile:** 3Jj1#, 3Jj2#, 3Jt1#, 3Jt2#

- **SCT and SCC representatives:** 3Jj1#, 3Jj2#, 3Jt1#, 3Jt2#, 3Ji1%, 3Ji2#,3Ji3#, 3Ji4%,3Ji5%, 3Ji6#,3Ji7%,

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      The intervention is aimed at creating the competences necessary for the future graduates of the technical faculties to faster integrate in their future jobs in relation to the requirements of sustainability (developing and implementing devoted policies at the level of a company/organisation, adapting to the new requests resulting from national and EU documents).

    - Short description of the objectives:

      To offer a thorough understanding of the economic, environmental, and social dimensions of sustainable development and how they intersect with technological advancements.
      To evaluate various green and renewable technologies and apply principles of sustainable engineering and resource management to real-world scenarios.
      To foster the ability to design and implement technological solutions that are ethically sound, socially
      To equip students with the knowledge and skills to create and adapt technologies that address the challenges of climate change and enhance community resilience.
      To promote interdisciplinary collaboration, preparing students to effectively engage in global sustainability projects and initiatives.
      To develop skills for effective stakeholder engagement, ensuring that technological solutions are inclusive, culturally sensitive, and meet the needs of diverse communities.

To provide practical experience through the design and implementation of sustainable development projects, allowing students to apply theoretical knowledge in real-world contexts

- Time scope of the intervention:

  During the lifetime of the project.

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

    The preconditions encompass collective and individual competencies as well as environmental and technical elements. It is assumed that students possess the necessary knowledge in the areas of industrial technologies and processes, energy systems, waste management, and environmental indicators. They have an incipient understanding of multidisciplinarity (encompassing engineering, environmental science, and social sciences), as effective interdisciplinary collaboration is crucial for addressing complex sustainability challenges. The students possess the basic elements for sustainable technologies and have practice in critical thinking and problem-solving approaches. There is a basic understanding of the real world, including the influence of different stakeholders on the implementation of sustainability policies, strategies, and programmes.

  - Main risks and uncertainties:

    Implementing the course involves several risks that could impact its success:
    Insufficient interdisciplinary collaboration across different disciplines is necessary for addressing complex sustainability challenges
    Limited resources (financial, technological, or human)
    Insufficient institutional support leads to inadequate funding, resources, and policy alignment.
    Low student engagement or interest in the course, with poor participation and learning outcomes
    Resistance from students, faculty, or external partners to adopting new sustainability practices and technologies may slow progress.
    A shortage of faculty members with expertise in both sustainability and technological fields may limit the quality of instruction.
    Poor data collection, analysis, and management practices could undermine research and project outcomes.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

"How can technological advancements be leveraged to achieve sustainable development while addressing the environmental, social, and economic challenges of the 21st century?"

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Students are aware of the dynamics of the economy, integrating many constraints related to environmental and climate policies. They understand that basic courses are insufficient for the jobs of the future. The members of SCTs and SCCs clearly express the need for an interdisciplinary course.

Have you encountered challenges in engaging people? What are they?

Bridging the gap between technical and non-technical content. The broad and complex nature of sustainability issues can be overwhelming. Developing effective methods for evaluation due to the difference between technical disciplines and the proposed course.

How have you or could you overcome them?

Introduce relevant content for both technical and non-technical perspectives. Break the course into manageable modules, each focusing on a distinct aspect of sustainability. Include reflective assignments that encourage students to consider the broader implications of their technical work.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The beneficiaries are a broad spectrum of companies that will hire future graduates from the technical faculties. A wide range of approaches to environmental and climate policies related to our own procedures and processes.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Cooperation with the university is quite good. Additionally, the SCC will integrate stakeholders representing local industry and other economic sectors.

What has enabled or could promote cooperation?

The common interest relates to the requirements to implement environmental and climate policies.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The intervention will equip students with the knowledge and skills to create and adapt technologies that address the challenges of climate change and enhance community resilience.

How do you presume the change could happen?

Students will learn through practical examples and with a greater emphasis on real-life applications in industry and other economic sectors.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The vision is based on current national and EU policies, targeting the improvement of environmental performance and finding solutions to prevent and mitigate the effects of climate change.

- **Action: How to proceed?**

What has helped you to achieve your goals?

A good collaboration with the Faculty of Sciences. Participation of the students, teachers, and administrative staff in SCT/SCC meetings. Their engagement in discussing and providing feedback on the course.

What kind of challenges have you faced in your organisation?

The need for time resources to consult a vast documentation on the issues in order to select the most appropriate ones.

How have you found, or could you find time and space for the intervention in your organisation?

The planning is detailed and also considers the risks and possible deviations.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Preparation

Description: Co-design of the objectives and structure

Responsible: Marian Constantin (MedaResearch), Gabriel Ghita (University of Pitesti)

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: 2 persons (MedaResearch), room available for meetings, students (12), teachers (3), and administrative staff (3) from the university, smart board

Cost: 500 Euros

Task co-implementation participatory approach: Discussion in SCT and SCC. Exploring the vision, immediate-term opportunities, needs, defining objectives, and structure of the course. Validate the planning in SCT/SCC.

Task 2. Drafting of the modules of the course

Description: The eight modules of the course will be drafted based on the expected needs formulated by SCT/SCC and/or collected from the beneficiaries (especially local industry and other organisations hiring the fellows of the technical faculties).

Responsible: Marian Constantin and Anca Germizara Ciurduc Todoran (Meda Research)

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Needs formulated by beneficiaries, relevant literature on sustainability, computers, tools, 2 persons from MedaResearch, 1 person from the University

Cost: 10000 Euros

Task co-implementation participatory approach: Contact with teachers to discuss and eventually address open issues

Task 3.- Discussing the draft and creating feedback, incorporating the feedback and releasing the final version

Description: SCT and SCC meetings (with students, teachers, and administrative staff) will create feedback on the contents of all 8 modules. The captured feedback will be analysed, and all valuable elements will be incorporated into the course to create the new version. This version will be considered the final version.

Responsible: Marian Constantin (MedaResearch), Gabriel Ghita (University of Pitesti)

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Meetings (SCT and SCC), room for meeting, smart board, computer and videoprojection, computer and tools, 2 persons from MedaResearch, 1 person from the University

Cost: 1000 Euros

Task co-implementation participatory approach: Engagement of SCT and SCC members. Consulting other teachers and stakeholders relevant to the success of the intervention.

Task 4.- Preparing the pilot course

Description: Obtain the approvals and resources to run the course at the university. Develop the presentations and other associated materials (exercises, case studies, etc.)

Responsible: Marian Constantin (MedaResearch), Gabriel Ghita (University of Pitesti)

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Computer and tools, 2 persons from MedaResearch, 1 person from the University

Cost: 4000 Euros

Task co-implementation participatory approach: A part of the members of SCT and SCC will be consulted to receive feedback on the suitability of the materials for the proposed course (adapted to the students' needs and students' level)

Task 5.- Implementing the pilot course and reporting on its results

Description:

Responsible: Marian Constantin and Anca Germizara Ciurduc Todoran (Meda Research)

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Computer, videoprojector, tools, smart board, 2 persons from MedaResearch

Cost: 6000 Euros

Task co-implementation participatory approach: The elements for evaluating the pilot course will be discussed with members of SCT and SCC.

- **Milestones**

  Milestone 1: Structure of the course agreed by SCT and SCC

  Milestone 2: Draft of the course

Milestone 3: Final form of the course (all 8 modules finalised)

Milestone 4: Educational materials prepared for the pilot course

- **Outputs:**

  Output 1: Summary sheet

  Output 2: Guidelines to implement the pilot course

  Output 3: Report on the pilot course

- **Cost (Equipment /consumables /others)**

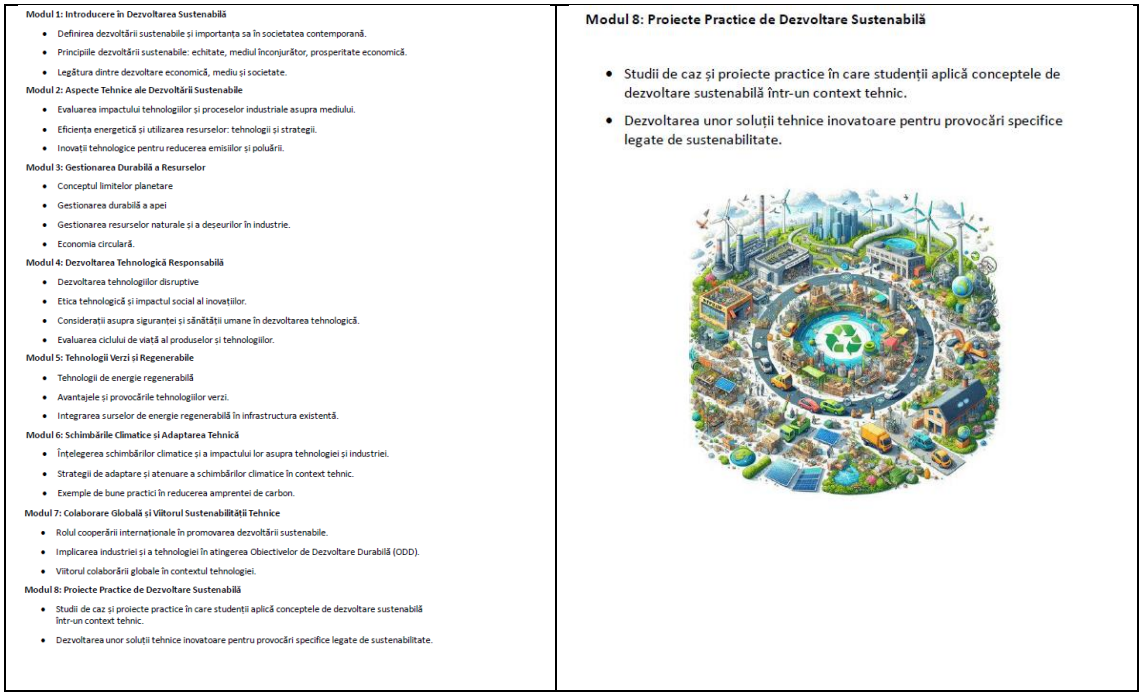
  Total cost: 21500 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Regular visits and discussions are conducted based on reports from the party responsible.

  Responsible: Anca Germizara Ciurduc Todoran

- **Photographs of the intervention implementation**



Modul 1: Introducere în Dezvoltarea Sustenabilă
- Definirea dezvoltării sustenabile și importanța sa în societatea contemporană.
- Principiile dezvoltării sustenabile: echitate, mediul înconjurător, prosperitate economică.
- Legătura dintre dezvoltare economică, mediu și societate.

Modul 2: Aspecte Tehnice ale Dezvoltării Sustenabile
- Evaluarea impactului tehnologiilor și proceselor industriale asupra mediului.
- Eficiența energetică și utilizarea resurselor: tehnologii și strategii.
- Inovații tehnologice pentru reducerea emisiilor și poluării.

Modul 3: Gestionarea Durabilă a Resurselor
- Conceptul limitelor planetare
- Gestionarea durabilă a apei
- Gestionarea resurselor naturale și a deșeurilor în industrie.
- Economia circulară.

Modul 4: Dezvoltarea Tehnologică Responsabilă
- Dezvoltarea tehnologiilor disruptive
- Etica tehnologică și impactul social al inovațiilor.
- Considerații asupra siguranței și sănătății umane în dezvoltarea tehnologică.
- Evaluarea ciclului de viață al produselor și tehnologiilor.

Modul 5: Tehnologii Verzi și Regenerabile
- Tehnologii de energie regenerabilă
- Avantajele și provocările tehnologiilor verzi.
- Integrarea surselor de energie regenerabilă în infrastructura existentă.

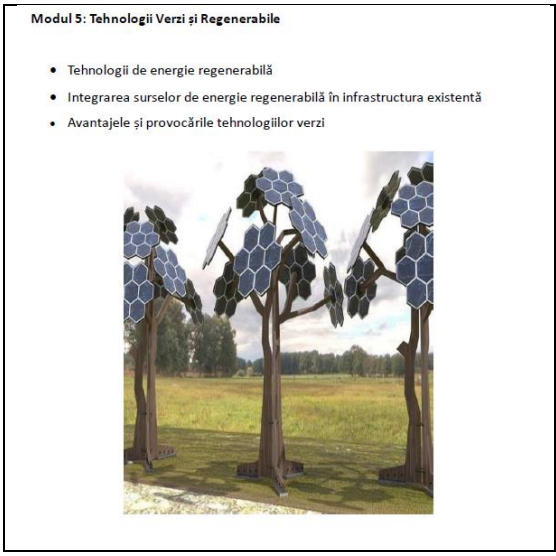
Modul 6: Schimbările Climatice și Adaptarea Tehnică
- Înțelegerea schimbărilor climatice și a impactului lor asupra tehnologiei și industriei.
- Strategii de adaptare și atenuare a schimbărilor climatice în context tehnic.
- Exemple de bune practici în reducerea amprentei de carbon.

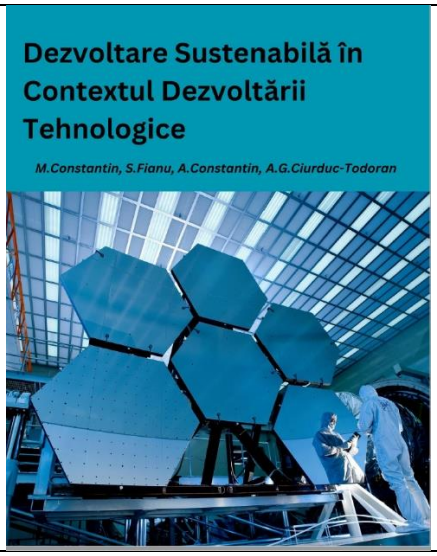
Modul 7: Colaborare Globală și Viitorul Sustenabilității Tehnice
- Rolul cooperării internaționale în promovarea dezvoltării sustenabile.
- Implicarea industriei și a tehnologiei în atingerea Obiectivelor de Dezvoltare Durabilă (ODD).
- Viitorul colaborării globale în contextul tehnologiei.

Modul 8: Proiecte Practice de Dezvoltare Sustenabilă
- Studii de caz și proiecte practice în care studenții aplică conceptele de dezvoltare sustenabilă într-un context tehnic.
- Dezvoltarea unor soluții tehnice inovatoare pentru provocări specifice legate de sustenabilitate.

Modul 8: Proiecte Practice de Dezvoltare Sustenabilă

- Studii de caz și proiecte practice în care studenții aplică conceptele de dezvoltare sustenabilă într-un context tehnic.
- Dezvoltarea unor soluții tehnice inovatoare pentru provocări specifice legate de sustenabilitate.





- **Troubles during implementation, conclusion and lessons learnt.**

Engagement and Future Support Concerns

A primary concern is the uncertainty of continued support and resources from faculty beyond the conclusion of the ECF4CLIM project. This potential lack of sustained engagement could impact the long-term viability and integration of the intervention's outcomes.

Stakeholder Connections and Unexpected Outcomes

Cooperation with the university was very good. Within the SCC (Sustainable Campus Committee), we successfully integrated some stakeholders, although not as many as desired, due to a low response rate to our invitations. Nevertheless, the participating representatives from industry and civil society provided pertinent opinions that directly addressed the identified needs.

As an unexpected positive outcome, there are now concrete plans to integrate the course into the university's official curriculum. This suggests a more widespread institutional adoption than initially anticipated.

15. REPORT ON IMPLEMENTED INTERVENTIONS IN JUHANNUSKYLÄ SCHOOL.

School brief description

Juhannuskylä school is a public primary and lower secondary school, serving students from grade 0 (for those aged 5-6 years) to grade 9 (14-15 years). In 2021-2022, the school had 831 students (vipunen.fi), of whom 2/3 were in lower secondary school (grades 7-9), and approximately 90 teachers, including about 1/6 who teach multiple subjects to grades 1-6. Juhannuskylän koulu is located in Tampere, Finland's third-largest city by population, and operates under the municipal administration, as do most public schools in the country. In socioeconomic terms, the school admission area is at the average Finnish level.

Implemented Interventions Summary

The interventions implemented in the JUHANNUSKYLÄ SCHOOL pilot centre are listed in the table below.

Measure Id	***Title***
FN-DS01-IN02	Attitude within the whole school towards sustainability
FN-DS01-IN03	Attitude: Information for students
FN-DS01-IN04	Food: Vegetarian cooking recipes contest Ruoka (served at school)
FN-DS01-IN05	Effective use of resources: Art supplies storage room rearranged and in order
FN-DS01-IN06	Strategy for whole school sustainability education

Table 15.1.- Intervention in JUHANNUSKYLÄ SCHOOL.

The following table categorises the interventions implemented, considering the area of sustainability to which each is focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
FN-DS01-IN02	Attitude within the whole school towards sustainability	Educational programs	Food	Projects/Works
FN-DS01-IN03	Attitude: Information and action campaigns for students	Educational programs		Talks
FN-DS01-IN04	Food: Vegetarian cooking recipes contest Ruoka (served at school)	Food	Educational programs	Talks
FN-DS01-IN06	Strategy for whole school sustainability education	Educational programs		Regulations

Table 15.2.- Interventions main working areas in JUHANNUSKYLÄ SCHOOL.

FN-DS01-IN02.- Fostering positive attitudes within the teachers and whole school personnel towards sustainability education

General data

Description: Fostering positive attitudes and engagement among the teachers towards sustainability education

- **Participants and profile:** Deputy head, teachers' sustainability team as the main responsible, the whole school participated

- **SCT and SCC representatives:** (ID1)4Yj% (ID2)4Rj% (ID3)4Yj% (ID5)4Yj% (ID6)4Yj% (ID8)4Yj# (ID9)4Rj% (ID10)4Yp% (ID11)4R(Y)p%

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Requiring both individual initiatives and collective action

    - Short description of the objectives:

      Talking about and taking actions for sustainability would increase. Sustainability would become a common principle, visible and integrated throughout the whole school culture and teaching. Establishing continuous students' teams at both primary and secondary schools. Sustainability becomes a lens for critical reflection, asking whether our practices are sustainable and meaningful or not.

    - Time scope of the intervention:

      long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Management engaged in leading the development of sustainability education by showing interest, encouraging and responding positively to initiatives and allocating resources for this development. Positive attitudes and motivation among teachers - without them, nothing will succeed. Making visible the efforts already made for sustainability. Ongoing discussions are needed. Technical issues are also essential - when there are no parking places or safe places for bikes, it is necessary to use either public transportation or bikes. The management team should include someone with an interest in sustainability.

- Main risks and uncertainties:

  There are numerous issues in the daily lives of schools that affect both teachers and principals. If the engaged teachers quit their jobs and there are changes in personnel, the continuity of sustainability education becomes endangered. Generally, teachers do not have time for extra issues, and if sustainability is considered an extra, not a relevant aspect of education. If sustainability is considered boring and uninspiring. What will happen after the ECF4CLIM project, when external support decreases and people come asking and raising sustainability as a relevant issue?

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How sustainability could become an integrated and established as an essential part of the practical culture of the school.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The relevant actors' positive attitude and enthusiasm, as well as the support from the school leaders and the management. Students are showing interest. Continuous discussions facilitated and discussions among personnel. Concrete acts are also important!

Have you encountered challenges in engaging people? What are they?

We do not know exactly how people act in practice. Among the personnel, some individuals are not interested or do not consider it important. In the beginning of the intervention there were also negative and dismissive attitudes.

How have you or could you overcome them?

Positive approach, collaboration, continuous work and talking, as well as time and resilience, are among the qualities that those who promote this value possess. Management showing the importance of sustainability work at school

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Strategies of the municipality for sustainability education and carbon neutrality, general attitudes

How has the cooperation worked with other stakeholders and actors outside your organisation?

The municipality offers qualified and sufficient guidance and support for sustainability education, for example EKOTUKI, FUSILLI, and Eco-social education for tutor teachers.

What has enabled or could promote cooperation?

Other actors are very active, and knowledge is accessible.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

System-level attitude change

How do you presume the change could happen?

Continuous and resilient talk about the importance and relevance of sustainability. Discuss sustainable actions during the lessons. Also, individuals matter.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Collective meetings and facilitation of the ECF4CLIM-project for visioning.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Active teachers, enthusiasm and engagement.

What kind of challenges have you faced in your organisation?

Changing personnel and the hectic daily life of teachers and principals.

How have you found, or could you find time and space for the intervention in your organisation?

It is scheduled in the personnel's calendar when the whole academic year has been planned.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Info sessions and introductions for teachers

Description:

Responsible:

External expert assistance:

ECF4CLIM expert assistance:

Resources needed: Teachers', headmaster's and researchers' time

Cost: Euros

Task co-implementation participatory approach:

Task 2.- Discussions in subject groups about links to sustainability

Description: Discussions in subject groups about their teaching and links to sustainability

Responsible: Team leaders, principals and ECF4CLIM researchers

External expert assistance:

ECF4CLIM expert assistance: Researchers facilitating discussions

Resources needed: Teachers' and researchers' time

Cost: Euros

Task co-implementation participatory approach: Comments about the questions for discussion were asked from the teachers' team members and headmasters

Task 3.- Organising an escape room session for teachers

Description: Organising an escape room session for teachers during their further education day

Responsible: ECF4CLIM researchers Anna Lehtonen and Niina Mykrä

External expert assistance:

ECF4CLIM expert assistance: ECF4CLIM researchers Anna Lehtonen and Niina Mykrä

Resources needed: Researchers' time, prices

Cost:15 Euros

Task co-implementation participatory approach: Teachers commenting on the game and its tasks

Task 4. Adjusting the escape room game for both primary and secondary school students

Description: Adjusting the escape room game created based on the Roadmap for both primary school students and secondary school students

Responsible: (ID1)4Rj%, (ID2)4Rj%, two teachers: one from primary and one in secondary school, Niina Mykrä and Anna Lehtonen, ECF4CLIM researchers

External expert assistance:

ECF4CLIM expert assistance: Niina Mykrä and Anna Lehtonen, ECF4CLIM researchers

Resources needed: Teachers' and researchers' time for planning

Cost: 300 Euros

Task co-implementation participatory approach:

Task 5.- Planning and realisation of a phenomenon-based learning week on sustainability

Description: Planning during spring 2024 and realisation of a phenomenon-based learning week on sustainability at the end of May, Collecting feedback by a survey of the teachers and students

Responsible: All teachers of the school, the teachers' sustainability team, and more are responsible

External expert assistance: Study visits may include external personnel

ECF4CLIM expert assistance: Niina Mykrä and Anna Lehtonen

Resources needed: Teachers' and researchers' time

Cost: Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Info sessions and introductions for teachers

  Milestone 2: Discussions in subject groups about links to sustainability

  Milestone 3: Organising an escape room session for teachers and adjusting it to students at both the primary and secondary levels

  Milestone 4: Designing and realising a phenomena-based learning week about sustainability

- **Outputs:**

  Output 1: Info sessions and introductions for teachers

  Output 2: Discussions in subject groups about links to sustainability

  Output 3: An escape room session organized for teachers and adjusting it to students at both the primary and secondary levels

  Output 4: A phenomena-based learning week about sustainability

- **Cost (Equipment /consumables /others)**
  Total cost: 315 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Deliberative discussion, feedback questionnaire from teachers

  Responsible: Deputy head (ID11)4R(Y)p% and researchers

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

Evolving Societal and Educational Context

The success of sustainability initiatives is deeply intertwined with the broader societal atmosphere and public opinion, particularly when supported by national goals and infrastructure that facilitate sustainable behaviour. Integrating sustainability into the curriculum is also paramount.

The demonstration site participants observed a notable improvement in general attitudes towards sustainable practices and education. Negative attitudes have significantly diminished, and sustainability has consistently become a relevant issue in staff meetings and discussions. The headmaster has even incorporated the topic into teachers' annual performance evaluations.

Consequently, there is now more frequent discussion about sustainability among pedagogical staff, solidifying its position as a relevant common issue within the school. The deputy head has played a particularly important role in promoting and reinforcing the significance of sustainability within the school community as “A school is like its leaders.”

Resistance is a part of the process. It is important to not let the critique take you down!’

FN-DS01-IN03.- Attitude: Engaging students and the whole school through awareness raising and positive behaviour campaigns

General data

Description: Engaging and promoting positive attitudes among the whole school community for promoting sustainability has been brought up as one of the key issues in SCTs and SCCs. The first phase, the "Sustainability Christmas calendar", included informational slides motivating people to take sustainability actions. This intervention was further developed into a 5-week campaign competition to boost small, yet meaningful acts for sustainability. The campaign was co-created with students and researchers. The students created communication slides during a full-day meeting and were responsible for sharing the information, setting up an Instagram account for the competition, and evaluating the competition's results.

- **Participants and profile:** 1 teacher and 11 secondary school students. 2 teachers and 6-8 primary school students participated only for milestones 2-3.

- **SCT and SCC representatives:** All teachers and students have been actively involved in SCTs. One teacher and a varying number of students, ranging from 2 to 5, from both secondary and primary schools, have also participated in SCCs.

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Individual and collective attitudes and actions

    - Short description of the objectives:

      It aims to raise awareness, engage, and motivate students in acts of sustainability, while also making these sustainability acts and issues more visible in the school. At the primary school, the competition was held both between classes and among individuals. Another objective was to foster the creative skills of communication and influencing others' attitudes among the organising students, as well as to promote their agency.

    - Time scope of the intervention:

      long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

Organising students' motivation to prepare for and realise the campaign. Other students' positive attitudes. Teachers are allowing and encouraging students to organise this. Technical competencies for communication.

- Main risks and uncertainties:

The attitudes will not change; the organising students will have bad experiences and become frustrated. Communication is not effective enough, and people are not aware of the campaigns. Technical constraints of communication. Campaigns are not good enough, but they are also embarrassing from students' perspectives.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to foster positive attitudes in school towards sustainability action among students

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Students created the information sheets, considered different motivation profiles, and were also encouraged to use humour in their advertising. These activities were interesting and helped students skip boring lessons.

Have you encountered challenges in engaging people? What are they?

Many students are not interested in sustainability; those who might be interested do not have the courage to join.

How have you or could you overcome them?

Reflection with the students: how to reach students and how to make the advertisements visible.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The teacher is responsible for the information on the screens. Headmaster. Teachers.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Well, with the teacher responsible for the screen, but in fact, he did not give any advice on how to succeed. Other teachers have not been interested.

What has enabled or could promote cooperation?

Personal contact, headmaster's support

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Sustainability becomes visible within the school, and many students become interested in it.

How do you presume the change could happen?

By positively approaching sustainability and considering different motivation factors.

What has helped you or could help you with envisioning the expected impact and the preferred future?

By positively approaching sustainability and considering different motivation factors.

- **Action: How to proceed?**

What has helped you to achieve your goals?

At the primary school, some teachers introduced the campaign to their students during class. Trying out, not giving up, organising various campaigns several times during 1,5 years

What kind of challenges have you faced in your organisation?

Time problems, no time for extra activities, overwhelming school life: there are so many other issues, campaigns and happenings. The students' communication skills have not been sufficiently appealing to their peers. Communication and advertising have not worked well enough in the organization. Technical problems in communication.

How have you found, or could you find time and space for the intervention in your organisation?

The students skipped some of their classes to participate in the planning of the intervention/tasks.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Advent calendar about sustainability

Description: Planning, realisation and evaluation of the "advent calendar" campaign in December 2023

Responsible: Juhannuskylä teachers and students

External expert assistance: A teacher responsible for the school screen

ECF4CLIM expert assistance: Only for evaluation discussion

Resources needed: Teachers' time, and resources

Cost: 100 Euros

Task co-implementation participatory approach: The idea was derived from teachers' evaluation day and was designed and realised within teacher and student collaboration

Task 2.- Competition campaign

Description: Competition campaign for small acts for sustainability: co-design, realisation and evaluation

Responsible: Juhannuskylä student team and ECF4CLIM researchers

External expert assistance: 7

ECF4CLIM expert assistance: 2 researchers

Resources needed: prizes, time dedicated by teachers and researchers

Cost: 220 Euros

Task co-implementation participatory approach: an intense co-developing process together with students and researchers. The students created communication slides during a whole-day meeting. They were responsible for sharing the information, creating an Instagram account for the competition, and evaluating the results of the competition.

Task 3.- Third try out of the campaign: campaign days for the secondary school students

Description:

Responsible: New biology-geography teacher

External expert assistance:

ECF4CLIM expert assistance: Researchers' help during some campaign days.

Resources needed:

Cost: 121 Euros

Task co-implementation participatory approach:

Task 4.- Recycling toys and stuff day for primary school and secondary school

Description: Fostering students' motivation and critical attitudes for consumerism through recycling toys and stuff campaign days.

Responsible:

External expert assistance:

ECF4CLIM expert assistance:

Resources needed: Teachers' time for preparation and materials for advertising

Cost: 170 Euros

Task co-implementation participatory approach:

- **Milestones**

Milestone 1: Preparing the info on the screen, dissemination/display on the screens like an advent calendar, before Christmas

Milestone 2: Designing with students' teams a competition campaign and its dissemination: a five-week campaign for pro-environmental behaviour for the whole school

Milestone 3: Critical consumerism day and workshop for non-material gifts in secondary school

Milestone 4: Third try out of the campaign: several various campaign days for the secondary school students

Milestone 5: Non-material gifts days for secondary school, Nov 2024, Primary Feb 2025

- **Outputs:**

Output 1: Advent calendar on sustainability theme prepared by students shown on a screen.

Output 2: a five-week campaign for pro-environmental behaviour for the whole school

Output 3: Change recycled toys and stuff days for primary students, October 2024

Output 4: Critical consumerism day and workshop for non-material gifts in secondary school

Output 5: Further developed campaign days during the spring term 2025

- **Cost (Equipment /consumables /others)**
  Total cost: 611 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  Responsible:

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

The initial attempts to achieve both the first and second milestones, specifically the advent calendar and the competition campaign, were largely unsuccessful due to technical problems with the information screen and Instagram at the secondary school. However, the competition campaign succeeded in the primary school, offering a valuable lesson in adapting strategies to different educational levels.

Despite these initial setbacks, new campaigns were both planned and successfully executed during the 2024-2025 school term. Notably, the Earth Hour 2025 campaign was highly effective and even expanded to two other schools that were challenged to participate, demonstrating significant ripple effects and successful outreach. Campaigns have made sustainability visible in the whole school, and the themes covered have also been discussed during the lessons.

Collaboration between students and teachers helped to find creative and appealing activities and campaigns that cover both ecological and social issues.

FN-DS01-IN04- Food: Vegetarian cooking recipes and quality of food served at school

General data

Description: Measures to promote sustainable food transition, especially positive attitudes towards vegetarian food within the whole school, with students, teachers, families and relevant stakeholders.

- **Participants and profile:** (ID1)4Yj% (ID2)4Rj% (ID3)4Yj% (ID5)4Yj% (ID6)4Yj% (ID8)4Yj# (ID9)4Rj% (ID10)4Yp% (ID11)4R(Y)p%, students not possible to identify or anonymise, as changed almost in every meeting

- **SCT and SCC representatives:** All the SCT and SCC participants

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Both individual and collective action for and awareness of the sustainability of food among all the stakeholders at school

    - Short description of the objectives:

      (1) promote sustainable food transition, decrease emissions of food produced and leftovers. (Collective) (2) Foster positive attitudes towards vegetarian food, (3) awareness of sustainability of food within the whole school, with students, teachers, families and relevant stakeholders (4) The remodified aim and focus of Juhannuskylä has been to foster respect towards food and school meals. Making the school meals more appealing and improving the atmosphere of the school lunches and the restaurant.

    - Time scope of the intervention:

      Long term: Pro-sustainability and vegetarian attitudes and behaviour related to food during and after the project

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Proactive attitudes, skills to collaborate, communicate and reflect critically, and make initiatives. Understanding the issue of food sustainability and the school system related to the food served in schools. Understanding the reasons to choose vegetarian options. Adaptability to changes. Time and space for discussions and meetings. Management supports the work by allocating

resources and prioritising sustainability. Ability to collaborate, make initiatives and political agency of the students, teachers and all the other stakeholders of the intervention.

- Main risks and uncertainties:

  Resistance to change and other challenging attitudes, such as adults not taking students' feedback seriously, work overload among relevant stakeholders, and a lack of time and energy to proceed with interventions in a hectic school life. Managing and coping with the complexity.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Systems thinking - understanding why food matters.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Debate, communication and collective action. Meetings and opportunities to discuss with decision-makers from the food serving company, as well as students, teachers, and principals. Responsive attitudes among decision-makers and engagement among all participants.

Have you encountered challenges in engaging people? What are they?

Identity and status issues that it is not cool to eat vegetarian food. Unrespectful attitudes towards food. Not understanding the complexity of the food issue and all the aspects that need to be considered when developing the quality of the food.

How have you or could you overcome them?

Try to make the initiatives and campaigns as appealing as possible. Raising awareness of all the issues and aspects of developing the quality of food.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Centralised food production for school restaurants

How has the cooperation worked with other stakeholders and actors outside your organisation?

The meeting with the Food serving company's development leaders and sustainability education and food experts from Tampere municipality was fruitful. However, students complained afterwards that they felt their comments and opinions were not respected or well-received.

What has enabled or could promote cooperation?

Meetings among different stakeholders, including decision-makers and principals, to collaborate and further develop schools' food services. (Time restricts)

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

People meet each other, and something concrete (perhaps small) will change at school, as awareness of the school's perspectives and people's positive attitudes towards food will increase.

How do you presume the change could happen?

Through several meetings, questions, listening and debate, active teachers and students

What has helped you or could help you with envisioning the expected impact and the preferred future?

I do not know

- **Action: How to proceed?**

What has helped you to achieve your goals?

Active teachers and good collaboration

What kind of challenges have you faced in your organisation?

Lack of time and interest in vegetarian diets.

How have you found, or could you find time and space for the intervention in your organisation?

Yes, ECF4CLIM has organised the meetings, and teachers receive substitute teachers for the meetings, allowing them to participate.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Tasting vegan food

Description: Organising a happening where vegan food was served to the students

Responsible: Students and teachers

External expert assistance:

ECF4CLIM expert assistance: Researchers organised an evaluation discussion

Resources needed: Time of the teachers and researchers

Cost: 91 Euros

Task co-implementation participatory approach: 5 teachers for organising the event. The money for the food came from the Tampere town campaign.

Task 2.-

Description: Vegetarian recipe contest

Responsible: Competition, evaluation, dissemination - monthly letters from school include vegetarian recipes attached (Autumn term 2023)

External expert assistance:.

ECF4CLIM expert assistance: No

Resources needed: Working hours for organising the contest

Cost: 360 Euros

Task co-implementation participatory approach: This was envisioned and planned partly during the SCT meetings

Task 3.- Discussions on the quality of the (especially vegetarian) food served at school.

Description: Discussions on the quality of the (especially vegetarian) food served at school

Responsible: ECF4CLIM researchers organised committees with a special focus on food and relevant stakeholders of the Tampere municipality, and a food-serving company was invited.

External expert assistance: Personnel from the food serving company of Voimia, Tampere town food developers.

ECF4CLIM expert assistance: Researchers Anna Lehtonen and Niina Mykrä organised the meetings

Resources needed: Time of the organisers and participants, food served

Cost: 80 Euros

Task co-implementation participatory approach: This task was proposed by demonstration site teachers. Teachers from both schools, Juhannuskylä and Samke, participated in the event.

Task 4.- Campaigns for decreasing wasted food

Description: Organising campaigns for decreasing wasted food

Responsible: teachers at school

External expert assistance: no

ECF4CLIM expert assistance: no

Resources needed:

Cost: Euros

Task co-implementation participatory approach:

Task 5.- Teachers' veggie cooking event

Description: Teachers' veg cooking evening event

Responsible: Teacher

External expert assistance:

ECF4CLIM expert assistance:

Resources needed: Food for cooking

Cost: 381,67 Euros

Task co-implementation participatory approach:

- **Milestones**

Milestone 1: Organising a vegan food tasting day

Milestone 2: Competition, evaluation, dissemination of the competition- monthly letters from school include vegetarian recipes attached

Milestone 3: Discussions on the quality of the (especially vegetarian) food served at school, organised spring 2024-autumn 2024

Milestone 4: Organising campaign days for decreasing the amount of wasted food / Cooking vegetarian food event for teachers

- **Outputs:**

  Output 1: Vegan food was served for the whole school

  Output 2: Competition, evaluation, dissemination of the competition- monthly letters from school include vegetarian recipes attached

  Output 3: Campaign days for decreasing wasted food

- **Cost (Equipment /consumables /others)**

  Total cost: 912,67 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: We organised evaluation meetings separately for students and teachers, asking about their experiences with the tasting day and recipe contest. We will report on the results.

  Responsible: Anna Lehtonen, Niina Mykrä, Noora Sallinen

- **Photographs of the intervention implementation**







- **Troubles during implementation, conclusion and lessons learnt.**

Connections and Unmet Expectations

We conducted two successful meetings with stakeholders, fostering discussions about forming a small group to provide feedback and initiate improvements regarding school meals. Active teachers will primarily lead the group's organisation from Samke. The broader aim at Juhannuskylä has been refocused on fostering respect for food and school meals, with the expectation that increased awareness of the school's food perspectives will lead to improvements.

However, a significant issue arose after the meeting: students expressed feeling that their comments and opinions were not respected or well-received. This highlights a critical gap between the intention of gathering feedback and the actual perception of its reception by the students, potentially undermining future engagement.

Action and Prioritisation Challenges

A key challenge encountered is that individuals generally do not prioritise this issue sufficiently to invest their time in it. This lack of perceived importance directly impacts the willingness of stakeholders to commit their time and effort, thereby hindering the initiative's progress and its potential for broader impact.

It is difficult to influence a large organization that provides food services. However, every actor plays a significant role within the network of stakeholders. Top-down guidance only works if the people implementing it in practice are motivated. Schools can influence families and the general atmosphere.

FN-DS01-IN06.- Strategy for whole school sustainability education

General data

Description: Developing a sustainability education strategy for the entire school. Engaging all of the team members and hopefully all the school personnel

- **Participants and profile:** (ID1)4Yj% (ID2)4Rj% (ID3)4Yj% (ID5)4Yj% (ID6)4Yj% (ID8)4Yj# (ID9)4Rj% (ID10)4Yp% (ID11)4R(Y)p%

- **SCT and SCC representatives:** (ID1)4Yj% (ID2)4Rj% (ID3)4Yj% (ID5)4Yj% (ID6)4Yj% (ID8)4Yj# (ID9)4Rj% (ID10)4Yp% (ID11)4R(Y)p%

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Requiring collective action, but also individual competencies

    - Short description of the objectives:

      More everyday actions become visible, and sustainability should continue after the ECF4CLIM work.

    - Time scope of the intervention:

      Long-term and ongoing goals

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Time for planning and realisation, skills and knowledge, as well as interests, are no problem. Support from management has been essential.

    - Main risks and uncertainties:

      ECF4CLIM has provided time resources as monetary compensation. When the project ends, it is an important question: how will active teachers manage to continue? Personnel changes, one active teacher has left. Sustainability is not only a value; how long the motivation for sustainability remains is uncertain, as there are numerous issues that need to be developed and improved. There has been a structure of teams for different educational issues, which might not change suddenly.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Clear structure for promoting sustainability education: How to begin implementing sustainability education at our school

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Management demands this kind of strategy, which prioritises individuals' interests regarding sustainability as a valuable goal, without excessive pressure, and the strategy should be a practical tool for planning and documentation.

Have you encountered challenges in engaging people? What are they?

Teachers' sustainability team members have been well engaged

How have you or could you overcome them

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

City authorities in basic education, basic education plans

How has the cooperation worked with other stakeholders and actors outside your organisation?

Other responsible teachers of sustainability teams in other schools have collectively reflected on some of the ideas.

What has enabled or could promote cooperation?

The town's project and a coordinator who has organised meetings within the network.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Changing the system is number one, but also connecting people, the other two are also important (learning and behaviour)

How do you presume the change could happen?

Through the concrete plans in the strategy, every individual actor (teachers) matters

What has helped you or could help you with envisioning the expected impact and the preferred future?

Shared conversations within the teachers' team and the management team

- **Action: How to proceed?**

What has helped you to achieve your goals?

See above

What kind of challenges have you faced in your organisation?

See above

How have you found, or could you find time and space for the intervention in your organisation?

The teacher responsible had a study leave for sustainability education, which was part of the studies and included assigned meeting times.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Planning day for active teachers and students

Description: Planning day for active teachers and students in a forest in April 2023 for further planning of interventions and to prepare for the General Assembly

Responsible:

External expert assistance:

ECF4CLIM expert assistance: Niina Mykrä and Anna Lehtonen

Resources needed: Food served for the participants, hiring a cottage for planning, teachers' time, paid substitute teachers, researchers' time

Cost: 838 Euros

Task co-implementation participatory approach:

Task 2.- Evaluation day for active teachers

Description: evaluation day for active teachers in November 2023

Responsible: Researchers Anna Lehtonen, Niina Mykrä and Hannu Heikkinen

External expert assistance:

ECF4CLIM expert assistance: Niina Mykrä, Anna Lehtonen and Hannu Heikkinen - ECF4CLIM researchers

Resources needed: Food served for the participants, hiring a cottage for planning, teachers' time, paid substitute teachers, researchers' time

Cost: 1850 Euros

Task co-implementation participatory approach:

Task 3.- SCTs and SCCs Reflective discussions to generate a common understanding for developing sustainability education

Description: Reflective discussions in team and committee meetings and GA trips generate common and collective will formation for developing sustainability education

Responsible: Sustainability responsible teacher and Team members

External expert assistance: Advisory board members in SCCs and some sustainability experts of the municipality

ECF4CLIM expert assistance: Anna Lehtonen and Niina Mykrä

Resources needed: Food served for teachers

Cost: 1960 Euros

Task co-implementation participatory approach:

Task 4.- Sustainability strategy and further education

Description: Creating the sustainability strategy and further education of the leading teacher of sustainability education

Responsible: Sustainability education responsible teacher

External expert assistance: The teacher participated in further education by external experts and gained insights from experienced environmental educators

ECF4CLIM expert assistance: no

Resources needed: no

Cost: Euros

Task co-implementation participatory approach:

Task 5.- Benchmarking visits

Description: Benchmarking visits: Juhannuskylä teachers and deputy head visit a climate change education pioneer school, and a teacher from that school visits Juhannuskylä

Responsible: Teacher and deputy head

External expert assistance: The benchmarking (pioneer) school: teacher and headmaster

ECF4CLIM expert assistance: The benchmarking visit was an initiation of the ECF4CLIM researcher

Resources needed: train tickets, substitute teachers, compensation paid for the visiting benchmarking teacher

Cost: 7450 Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Planning and evaluation days for active teachers (April and December 2024)

  Milestone 2: Participation of demonstration sites to SCTs, SCCs and GAs (Throughout the whole project)

  Milestone 3: Further education about sustainability education and creating a strategy for the whole school sustainability education (term 2023-2024)

  Milestone 4: Collective further development of the strategy

  Milestone 5: Benchmarking visits

- **Outputs:**

  Output 1: planning day for student representatives and teachers, evaluation day for teachers

  Output 2: SCTs 6-12 teacher participants, SCCs 2-6 teacher representatives, General Assemblies (4 times) 2-3 teacher representatives in each GA

  Output 3: Sustainability strategy and further education of the leading teacher of sustainability education.

  Output 4: Collective further development of the strategy

  Output 5: Benchmarking visits: Juhannuskylä personnel visiting a pioneer school and a pioneer teacher coming for a visit.

- **Cost (Equipment /consumables /others)**

  Total cost: 12098 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Evaluative reflections and continuous complementation of the strategy - deliberative discussions

  Responsible: (ID2)4Rj% Responsible teacher of both schools' sustainability education and the teachers' sustainability team

- **Photographs of the intervention implementation**







- **Troubles during implementation, conclusion and lessons learnt.**

In the school there are always several important topics simultaneously. It is up to the headmaster to choose what you want to concentrate on. Focus on the issues you can change.

Time and resources are essential. How can sustainability education be integrated into teachers' work and teaching? Otherwise, it is easily perceived as an extra task and often left unimplemented.

Long term planning is essential as "Well begun is half done." Regular interventions and reminders by the principal are crucial so that the topics stay active in the everyday life of the school.

Networking empowers. Get and stay in touch with like-minded colleagues, i.e. other principals. Visiting another school was very meaningful learning experience for the headmaster and teachers.

16. REPORT ON IMPLEMENTED INTERVENTIONS IN SAMKE UPPER SECONDARY SCHOOL.

School brief description

Sammon keskuslukio (Sampo Upper Secondary School) is a public upper secondary school operated by the Tampere municipality. In 2021-2022, the school had a total of 912 students and approximately 50 teachers. Most of the students are between 15 and 20 years of age. Students come mostly from Tampere, but also from the surrounding areas. The Finnish government provides subsidies for both public and private upper general schools.

Implemented Interventions Summary

The interventions implemented in the SAMKE UPPER SECONDARY SCHOOL pilot centre are listed in the following table.

Measure Id	***Title***
FN-DS02-IN01	Recycling
FN-DS02-IN02	Food
FN-DS02-IN03	Sustainability strategy
FN-DS02-IN04	Pedagogy
FN-DS02-IN05	Transport
FN-DS02-IN06	Engagement of students

Table 16.1.- Intervention in SAMKE UPPER SECONDARY SCHOOL.

The following table categorises the interventions implemented, considering the area of sustainability to which each is focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
FN-DS02-IN01	Recycling	Waste		
FN-DS02-IN02	Food	Food	Waste	
FN-DS02-IN03	Sustainability strategy	Educational programs		New subjects/courses
FN-DS02-IN04	Pedagogy	Educational programs		Projects/Works
FN-DS02-IN05	Transport	Transports		
FN-DS02-IN06	Engagement of students	Educational programs		Projects/Works

Table 16.2.- Interventions main working areas in SAMKE UPPER SECONDARY SCHOOL.

FN-DS02-IN01- RECYCLING

General data

Description: Developing an effective recycling system for students in the corridors and classrooms

- **Participants and profile:** (ID51)4Yj#, (ID52)4Yj%, (ID53)4Yp%
- **SCT and SCC representatives:** (ID51)4Yj#, (ID52)4Yj%, (ID53)4Yp% + students' team
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Mainly requiring collective action, but also others.
    - Short description of the objectives:

      Developing an effective recycling system for students in the corridors and classrooms, enabling students to learn about recycling, and integrating sustainability into the school's daily life. Reducing the amount of unrecycled waste
    - Time scope of the intervention:

      Long term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Students' and teachers' initiatives, the headmaster's support, and networking to organise the system, as well as buying and ordering functional recycling bins. Recycling bins as a technical element. Communication for recycling (collective competence)
    - Main risks and uncertainties:

      The recycling bins will not be used because students are too lazy, busy, and not interested, and do not regard recycling as important. New options to recycle are not advertised enough to students. Recycling does not gain attention in school.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Engaging students in waste recycling.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Recycling bottles to get money for excursions. Easy-to-reach recycling bins.

Have you encountered challenges in engaging people? What are they?

Engaging students is challenging, as Students cannot control many issues or enter classrooms; therefore, their participation is restricted. Other schools' teachers had similar problems, and the importance of the recycling issue was raised collectively. Tampere municipality became interested, and subsequently, all the high schools in Tampere town received new bins and improved recycling systems, initiated by the ECF4CLIM demonstration site and its headmaster.

How have you or could you overcome them?

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Cleaning personnel and the company responsible for maintenance, Tampere municipality

How has the cooperation worked with other stakeholders and actors outside your organisation?

The headmaster is effective in networking and well-known; she is efficient in making initiatives and takes care to ensure that talking results in and becomes realised in practice.

What has enabled or could promote cooperation?

Good relations and networks of the headmaster, active and resilient teachers

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

It is all of these - decrease the use of natural resources and waste materials, engage students in recycling, and create an efficient recycling system.

How do you presume the change could happen?

Networking, collaboration, communication, and engaging activities

What has helped you or could help you with envisioning the expected impact and the preferred future?

Reflections between headmaster, active students and teachers are also facilitated by ECF4CLIM SCTs and SCCs

- **Action: How to proceed?**

What has helped you to achieve your goals?

Networking, collaboration, communication, and engaging activities

What kind of challenges have you faced in your organisation?

Indifference, lazy students, and people who do not regard this issue as important.

How have you found, or could you find time and space for the intervention in your organisation?

SCTs, SCCs, students and teachers' teams

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Mapping the problem

Description: Mapping where there are not enough bins and reflective discussions on the problem

Responsible: Headmaster, teachers, and students' teams, with leading teachers responsible for their respective teams.

External expert assistance:

ECF4CLIM expert assistance: 1-2 SCTs and SCCs

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Students have been included in discussions of the current state of practice

Task 2.- Effective recycling system and new bins

Description: Searching for an effective system, making the initiative to buy new bins for the whole Tampere high school system

Responsible: Headmaster and teachers (ID51)4Yj#, (ID52)4Yj%, (ID53)4Yp%

External expert assistance:

ECF4CLIM expert assistance:

Resources needed:

Cost: Euros

Task co-implementation participatory approach:

Task 3.- Collecting bottles

Description: Collecting bottles -> transporting (prev. FN-DS02-IN02), a piggy bank -> savings for a trip (prev. FN-DS02-IN03) and a Depository room (prev. FN-DS02-IN05)

Responsible: (ID51)4Yj#,

External expert assistance:

ECF4CLIM expert assistance:

Resources needed: Teachers' and students' time

Cost: Euros

Task co-implementation participatory approach: Students engaged partly

Task 4.- Dissemination video related to recycling

Description: Communication students made a video that was shown to all the students and will be used every year for new students

Responsible: Headmaster, communication teacher and students

External expert assistance:

ECF4CLIM expert assistance:

Resources needed: Teacher's and students' time

Cost: 191 Euros

Task co-implementation participatory approach: Students prepared the video

Task 5.-

Description:

Responsible:

External expert assistance:

ECF4CLIM expert assistance:

Resources needed:

Cost: Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Collecting bottles -> transporting, a piggy bank -> savings for a trip and a Depository room

  Milestone 2: Sorting/recycling bins and an effective system

  Milestone 3: Dissemination video related to recycling

- **Outputs:**

  Output 1: Collecting bottles -> transporting, a piggy bank -> savings for a trip and a Depository room

  Output 2: Sorting/recycling bins and an effective system

  Output 3: Video prepared and shown to the whole school

- **Cost (Equipment /consumables /others)**

  Total cost: 191 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Deliberative discussion in spring 2025 - finding time to meet the teachers or headmaster for evaluation has not yet been possible.

  Responsible: Anna Lehtonen

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

Careful planning an intervention is essential. Headmaster has a key role in planning, allocating resources and ensuring that collaboration works with different stakeholders and to engage different actors. By building good relationships within the network, sharing one's own practices and making actions visible, it becomes possible for interventions to succeed and spread to other schools as well.
Recycling is a concrete and visible action, thus meaningful issue for the students and rather easy to engage eventhough the environmental impact is not very remarkable. However, the positive impact of recycling needs to be informed and communicated continuously and effectively.

FN-DS02-IN02- Improving the quality of (vegetarian) FOOD

General data

Description: Efforts to improve the sustainability and quality of FOOD served at the school restaurant

- **Participants and profile:** (ID51)4Yj#, (ID52)4Yj%, (ID53)4Yp% students not identified
- **SCT and SCC representatives:** (ID51)4Yj#, (ID52)4Yj%, students not identified
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      Requiring collective action
    - Short description of the objectives:

      Improving the quality and sustainability of food served at the school restaurant, decreasing the amount of wasted food, reducing the environmental impact of food, and fostering positive attitudes towards vegetarian food among students, especially. Influencing the quality of food
    - Time scope of the intervention:

      long term
- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Collaboration and argumentation skills of all the people involved, understanding what really matters, and being able to comprehend all the connected and interfering issues. Technical issues, such as bio-waste scales, are used to measure the amount of wasted food. Skills and resources for sustainable nutrition, food and cooking by restaurant and food service company members. Collective competences of time and space and meetings for a food service company, the headmaster, teachers and students.
    - Main risks and uncertainties:

      Time and willingness to collaborate and promote sustainable food transition / improve the sustainability and quality of food

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to foster sustainable food transition in schools? How to improve the sustainability and quality of the food served at the school restaurant? How to foster positive attitudes towards sustainable food among students? How to decrease the environmental impact of school food?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

The quality of food served at school is crucial for students' well-being. The CO2 emissions from food served at schools are a relevant and significant issue in municipal CO2 calculations. A food service company is obliged to consider students' feedback.

Have you encountered challenges in engaging people? What are they?

Limited time for meetings and collaboration.

How have you or could you overcome them?

ECF4CLIM SCCs have been used to promote this collaboration.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

The school or its restaurant personnel do not control most of the issues related to school food, as production and decisions are centralised.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Rather well

What has enabled or could promote cooperation?

Meetings and organising time for discussions and questions.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The quality of school food will slightly improve, and the feedback system will also improve. People will learn how they can influence and collaborate on this issue.

How do you presume the change could happen?

Through meetings and school, measuring wasted food allows for exact feedback to be given to the restaurant.

What has helped you or could help you with envisioning the expected impact and the preferred future?

ECF4CLIM SCTs and SCCs

- **Action: How to proceed?**

What has helped you to achieve your goals?

Meetings and buying the bio waste scale, and positive, resilient attitudes

What kind of challenges have you faced in your organisation?

Communication and finding time for meetings and collaboration

How have you found, or could you find time and space for the intervention in your organisation?

Scheduled meetings for the collaboration and student-teacher food team. If people regard this as important, they prioritise this collaboration, and time is easier to find.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Meetings

Description: Meetings for discussing planning and collaboration

Responsible:

External expert assistance: Tampere town sustainable food transitions and sustainability education experts, food service company decision-makers

ECF4CLIM expert assistance: Niina Mykrä and Anna Lehtonen

Resources needed: Food served at the meetings, teachers' time for organising and participating in the meetings

Cost: 515,45 Euros

Task co-implementation participatory approach: Food service company management, headmaster, teachers and students, ECF4CLIM advisory board members

Task 2.- Bio waste scale

Description: Buying a bio waste scale for the year 2024-2025

Responsible: (ID52)4Yj%,

External expert assistance:

ECF4CLIM expert assistance:

Resources needed: Money 2434€ and time for planning and buying 191€

Cost: 2704 Euros

Task co-implementation participatory approach:

Task 3.-

Description: Inquiry about students' opinions on the quality of plant-based food in schools

Responsible: (ID51)4Yj#

External expert assistance:

ECF4CLIM expert assistance:

Resources needed: Teachers' time

Cost: Euros

Task co-implementation participatory approach: Students commented on the questions of the inquiry

Task 4.- Trying out not to use trays and selling leftover food at the school restaurant

Description: Trying out not to use trays at the school restaurant, as this would save natural resources and time for the personnel

Responsible: the school's restaurant personnel

External expert assistance:

ECF4CLIM expert assistance:

Resources needed:

Cost: Euros

Task co-implementation participatory approach:

Task 5.- Tasting vegetarian food event for student representatives organised by the food service company

Description: Establishing a teacher-student team that aims to give feedback and make initiatives to the food service company

Responsible:

External expert assistance: The food service company organised this meeting

ECF4CLIM expert assistance:

Resources needed: Teacher's and students' time.

Cost: Euros

Task co-implementation participatory approach: teacher-student collaboration

- **Milestones**

  Milestone 1: Measuring the amount of biowaste and Reminders about reducing waste in the canteen, especially in bio waste free campaign days

  Milestone 2: Selling leftover food and stopping the use of trays

  Milestone 3: Making an inquiry and giving continuous feedback about the quality of plant-based food in schools, together with the students

  Milestone 4: Establish a school food team for teachers and students

- **Outputs:**

  Output 1: Measuring the amount of biowaste and bio waste-free campaign days

  Output 2: Leftover food is sold, and the use of trays is stopped

  Output 3: A school food team for teachers and students start to have a meeting before Christmas 2024

- **Cost (Equipment /consumables /others)**

  Total cost: 3219,45 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

Results were discussed in meetings, and the next steps were planned according to the results achieved. This is an ongoing project, making things better.

Responsible:

Techers at Samke, researchers Anna Lehtonen and Niina Mykrä

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

The food service provider and the food system

The food service provider prepares meals for all schools in the municipality of Tampere and delivers them from a central kitchen. This process affects the quality of the food: the structure of the meals—especially vegan options—can change during transportation and reheating. Additionally, the resources available for food preparation are limited, which places constraints on the types of meals that can be served.

Through collaboration with the food service provider, students and teachers have the opportunity to share their opinions about the food, while the provider can explain the limitations they face and their efforts toward sustainability. This cooperation helps ensure that feedback from students and teachers is more effectively addressed, and the provider can better take their wishes into account.

The preferences of the students

This demonstration site is a secondary school with a focus on sports. Many students believe that participating in sports requires meat-based protein. Additionally, the energy content of the vegan meals has not been sufficient.

Information campaigns about the food, along with examples of vegan athletes, can help shift these attitudes. The food service provider has also committed to carefully calculating the energy

and protein content of the meals to ensure that the portions provide adequate nutrition for student athletes.

Reducing food waste

Reducing biowaste from school cafeterias has been a persistent issue and a topic of ongoing discussion in Finland. At Samke, information campaigns have been conducted, but their impact has been limited outside the actual campaign days.

Students found the biowaste scale to be a useful tool for seeing the personal amount of food waste they left on their plates, giving them daily info and an opportunity to influence the amount of biowaste they produce.

DS02-IN03 STRATEGY.- SUSTAINABILITY STRATEGY

General data

Description: Developing a whole school approach for sustainability education. Engaging teachers in sustainability education, decreasing emissions from the school and developing the school's everyday activities to be more sustainable. Enable students to adopt sustainable learning practices and make informed choices at school.

- **Participants and profile:** (ID51)4Yj#, (ID52)4Yj%, (ID60)4Yp%

- **SCT and SCC representatives:** (ID51)4Yj#, (ID52)4Yj%, (ID60)4Yp%

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Requiring collective action, but also demanding individual initiatives and aiming at individual acts for sustainability

    - Short description of the objectives:

      Developing a Whole-School Approach for Sustainability Education. Engaging teachers in sustainability education. Decreasing emissions from the school involves developing its everyday activities to be more sustainable. Enable students to adopt sustainable learning practices and make informed choices at school.

    - Time scope of the intervention:

      Long term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Leadership skills of the headmaster and leader teachers to promote positive attitudes among personnel and students, including skills of listening and considering multiple perspectives. Motivation and interest among teachers. Collective regulations within the school. Curriculum obligations to sustainability education. Municipality infrastructure to enable sustainable practices. Teachers and principals allocate time for sustainability education in teachers' meetings and teaching.

    - Main risks and uncertainties:

No time and no interest.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Bringing teachers to a nice outdoor place - a national park to discuss sustainability

Have you encountered challenges in engaging people? What are they?

Sustainability is not prioritised enough in the curriculum and is often considered an extra, when time resources are very limited, teachers easily prioritise other issues over sustainability. Lack of time is another main problem, as well as overly tight schedules and curricula.

How have you or could you overcome them?

Very hard. We have tried to promote the integration of sustainability in teaching, which is a teacher's core task.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Teachers' interests and attitudes, curriculum

How has the cooperation worked with other stakeholders and actors outside your organisation?

Active teachers take part in Tampere town climate networks and teachers' networks.

What has enabled or could promote cooperation?

Teachers' motivation

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Collective discussions and prioritising time in sustainability by the headmaster. Prioritising sustainability in curricula, understanding the value of sustainability for students' future and wellbeing, and recognising the connection between sustainability and wellbeing.

How do you presume the change could happen?

Slowly rough discussions

What has helped you or could help you with envisioning the expected impact and the preferred future?

Facilitated discussions about the vision.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Bringing teachers to a beautiful outdoor location, such as a national park, to discuss sustainability. The headmaster who allocates time to sustainability issues

What kind of challenges have you faced in your organisation?

Time and prioritisation of other issues

How have you found, or could you find time and space for the intervention in your organisation?

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Designing a strategy for sustainability education

Description: Designing a strategy for sustainability education for the whole school

Responsible: Headmaster and active responsible teachers

External expert assistance:

ECF4CLIM expert assistance: ECF4CLIM team

Resources needed: Meeting times, money for the planning trip for students and teachers

Cost: 800 Euros

Task co-implementation participatory approach:

Task 2.- An active teachers' team for sustainability

Description: An active teachers' team for sustainability

Responsible: Leading teacher

External expert assistance:

ECF4CLIM expert assistance: Workshops and facilitating planning and evaluation discussions

Resources needed:

Cost: Euros

Task co-implementation participatory approach: Headmaster and the three most active teachers

Task 3.- Designing a strategy for sustainability education for the whole school

Description: Designing a training day for teachers at a national park together with the headmaster

Responsible: Headmaster

External expert assistance:

ECF4CLIM expert assistance: Niina and Anna are having a presentation, facilitating a discussion and a creative task while walking

Resources needed: Bus and researchers' time

Cost: 544 Euros

Task co-implementation participatory approach: Planning together the day between the researchers and the headmaster

Task 4.- Designing a yearly calender for sustainability education together for students and teachers

Description: **Designing a yearly calender for sustainability education together for students and teachers**

Responsible: Teachers

External expert assistance:

ECF4CLIM expert assistance: Niina ,facilitating an evaluation discussion

Resources needed: Bus and researchers' time

Cost:1795,55 Euros

Task co-implementation participatory approach: Planning together the day between the researchers and the headmaster

- **Milestones**

  Milestone 1: Designing a strategy for sustainability education for the whole school

  Milestone 2: An active teachers' team for sustainability

  Milestone 3: Designing a training day for teachers at a national park together with the headmaster

  Milestone 4: Designing a yearly calender students and teachers' teams together

- **Outputs:**

  Output 1: a strategy for sustainability education for the whole school

  Output 2: An active teachers' team for sustainability

  Output 3: a training day for teachers at a national park, together with the headmaster

  Output 4: A yearly calender designed by students and teachers' teams together

- **Cost (Equipment /consumables /others)**

  Total cost: 3139,55 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Deliberative discussion

  Responsible: Anna Lehtonen

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

Lessons learnt

Developing sustainability education in upper secondary schools is challenging, as it is difficult to change established practices due to the core educational tasks and legislation. Sustainability education is not defined in legislation or the curriculum as a central educational goal. Therefore, finding time and resources for it becomes a critical issue.

Prioritizing teachers' core tasks does not mean that sustainability issues are considered unimportant. The tightly scheduled daily routines and the demanding, strictly defined curriculum goals in upper secondary education prevent teachers from implementing sustainability education. Changing the structures that limit sustainability education is a slow process, and dismantling these barriers requires time—long-term and continuous development. This calls for extended projects that follow an action research approach, where participants reflect together: what was done, what worked, and what can be learned for the future.

When there was enough time and research supported the process and provided resources, significant progress was made. Students were engaged in the activities and began co-developing sustainability education with teachers. Various options for meeting times were tested over a couple of years, and eventually a workable solution was found: teachers and students began having joint meetings.

It is essential to recognize the scope of one's own agency—to be aware of what one can influence and, conversely, to accept the things that are beyond one's control. Through strong relationships within the network, sharing one's practices and making actions visible enables interventions to spread to other schools as well

FN-DS02-IN04- PEDAGOGY

General data

Description: Sustainability pedagogy: developing methods for learning sustainability

- **Participants and profile:** • 3 physics teachers (2 female, 1 male)
- • Students (one class autumn 2023, all first-year students autumn 2024, about 300 students altogether, about half of them males)

- **SCT and SCC representatives:** (ID51)4Yj#, (ID52)4Yj%, some students also

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      2) Individual action: participation of teachers and students is needed
      3) Collective action: permanent time and place for the Roadmap game/ escape room, collaborative planning

    - Short description of the objectives:

      The general objective is to develop new pedagogies that motivate students to think about sustainability issues.
      • Individual competences: students learn about sustainability and the dimensions of sustainability competence according to the ECF4CLIM roadmap
      • Collective competences: A regular time and place for sustainability can be found. Students learn to cooperate.
      • Environmental performance: No new equipment, but learning improves students' environmental performance.

    - Time scope of the intervention:

      In the short term, new pedagogies can be developed during our project, and students can learn through the activities.
      Long-term: When students learn, their environmental impact also decreases over time.

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      1. Collective competences: A regular place and time for the ECF4CLIM roadmap can be found in the schedule of the school. Time can be allocated for planning the sustainability theme week and implementing the plans.

2. Individual competences: Teachers welcome new pedagogies for sustainability. Students are motivated to change their attitudes to be positive because of the interesting contents.
3. Technical infrastructure: An online system for the ECF4CLIM Roadmap Escape Game can be planned so that it works and is adaptable
4. Resources: Teachers, students, and ECF4CLIM researchers have enough time for planning and implementing the plans
5. Responsibilities: Physics teachers and ECF4CLIM researchers collaborate closely in planning the ECF4CLIM roadmap game. Students collaborate to plan and implement sustainability exercises for other students on team-building day. The principal is positive towards these approaches and provides an open environment for them.

- Main risks and uncertainties:

The main risk is that there is not enough time and energy to take these steps. Additionally, a negative attitude among students can also hinder success. Teachers have to prioritize other issues in their teaching. Students prioritise other studies than climate change education, they are achievement-oriented or choose studies on the basis of social relations.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

What kinds of innovative pedagogies for sustainability can be developed that motivate students?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Teachers: possibility to promote sustainability during normal lessons, or closely related to their subjects

Students: new pedagogies, games as a method, and alternative methods to everyday school life.

Have you encountered challenges in engaging people? What are they?

When the Roadmap Escape game was just before the exam, it was not easy for students to concentrate on playing the game.

Teachers have always found it challenging to find time for collaboration with one another, given the school's size.

Not any student in the school chose voluntary climate education course for the theme week, they prioritized other issues either related to final exams or social entertainment/relaxing outdoor activity.

How have you or could you overcome them?

Efficient meetings with physics teachers. ECF4CLIM researchers are supporting the planning and preparation of materials, being patient as they take things forward.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Many other things, besides sustainability, can be in focus. Making these activities a priority and finding a place and time for them requires negotiation between the school's objectives.

How has the cooperation worked with other stakeholders and actors outside your organisation?

In this intervention, the main cooperation has been between teachers, between teachers and students, and between teachers and ECF4CLIM researchers. Between these groups, there are also different objectives and worldviews, and negotiations are necessary.

What has enabled or could promote cooperation?

Discussing, considering possibilities, listening to each other, and taking others' worries and viewpoints seriously.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

To promote the learning of both students and teachers, and to introduce new practices into the structure of school life. The desirable outcome is that the environmental impact of individual and school activities decreases.

How do you presume the change could happen?

If the methods prove to be motivating and interesting, they will be incorporated as part of the school program.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Discussing with the students and teachers.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Being active. Cooperation with teachers.

What kind of challenges have you faced in your organisation?

Scarce time, students prioritizing other issues.

How have you found, or could you find time and space for the intervention in your organisation?

Negotiating with the stakeholders of the other objectives.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Designing a theme week and study materials about climate change and sustainability

Description:

Responsible: Teachers' team

The student team

External expert assistance: No

ECF4CLIM expert assistance: Only mental support

Resources needed: Time for planning

Cost: Euros

Task co-implementation participatory approach: Students plan the activities for other students

Teachers' cooperation

Task 2.- ECF4CLIM Roadmap Escape room game, first try

Description: Designing an escape room game for first-year students. Some classrooms were transformed into escape rooms. Students open locks with their mobile devices and move from room to room in groups.

Responsible: ECF4CLIM researchers

External expert assistance: no

ECF4CLIM expert assistance: ECF4CLIM researchers designed the game according to the ECF4CLIM roadmap and set the scene

Resources needed: Time for ECF4CLIM researchers, cooperation time from a teacher, time and place for implementation

Cost: 90 Euros

Task co-implementation participatory approach: Teacher and students commented on the design

Task 3.- ECF4CLIM Escape room game for physics course

Description: Adjusting the escape room game to introduce the ECF4CLIM roadmap as a permanent part of the obligatory physics course. Modifying the game together with teachers, launching and trying out for the first time, assessing with students and teachers, and making remodifications

Responsible: ECF4CLIM researchers, physics teachers (3)

External expert assistance: No (facts from the internet)

ECF4CLIM expert assistance: Yes - part of the planning team

Resources needed: Time for ECF4CLIM researchers and teachers

Cost: 300 Euros

Task co-implementation participatory approach: Cooperation of researchers and teachers. Students comment and assess the game.

- **Milestones**

  Milestone 1: Theme day autumn 2024

  Milestone 2: First try of the Escape room for one class, autumn 2023

  Milestone 3: All first-year physics groups play the ECF4CLIM Roadmap escape room in autumn 2024

- **Outputs:**

  Output 1: No output of the theme week.

  Output 2: Escape room game tried and integrated in the physics course, developed together with teachers and commented by one student

  Output 3: All first-year physics groups play the ECF4CLIM Roadmap escape room in autumn 2024

- **Cost (Equipment /consumables /others)**
  Total cost: 390 Euros

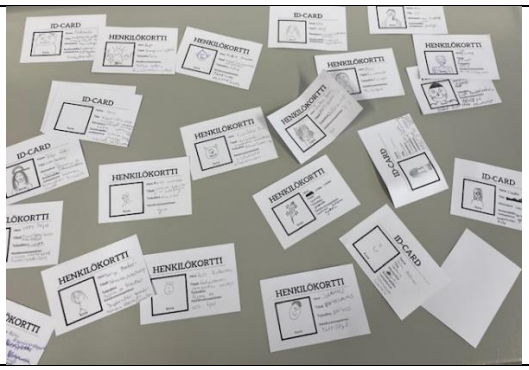
- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach:

  Responsible:

- **Photographs of the intervention implementation**





- **Troubles during implementation, conclusion and lessons learnt.**

Persistent Challenges in Task 1 Execution

Task 1 was originally envisioned as "Designing a theme week and study materials about climate change and sustainability." Unfortunately, this initial plan was not realised at all due to a complete lack of student interest or participation.

As an alternative approach, SAMKE decided to leverage the Finnish curriculum's provision for multidisciplinary theme days or weeks. Consequently, an alternative Task 1 involved planning a sustainability theme week for spring 2025. Regrettably, this revised attempt also did not come to fruition. Ultimately, the student team pivoted and organised sustainability exercises for other students during a team-building day, demonstrating an adaptive response to recurring engagement challenges.

Developing a motivating game-based sustainability competence activity is complex. In a game-based activity students are generally achievement oriented resulting in thinking not on deep level. Thought-provoking activities need to be designed carefully based on students' feedback.

FN-DS02-IN05- TRANSPORT/BIKING: Promoting biking, buying bicycle racks

General data

Description: Sustainable transport to school/home by promoting biking.

- **Participants and profile:** Head (ID60)4Yp%
- Teachers (ID51)4Yj#, (ID52)4Yj%

- **SCT and SCC representatives:** all

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      1) technical: buying new bike racks, both for teachers and students
      2) involving individual action: students and teachers choosing biking instead of coming to school/ work by motor power (motorbike, car, scooter)
      3) requiring collective action: setting a time and place, and instructions for regular promotion of biking to the school's annual working structure

    - Short description of the objectives:

      Already at the beginning of the ECF4CLIM project, one of the goals was to promote cycling at Samke Upper Secondary School (also known as Samke High School). One obstacle was that in previous years several expensive bikes were stolen from the schoolyard because the bike racks were not secure and did not allow bikes to be locked properly. Without a good place for bikes, teachers did not feel comfortable promoting biking. The goal was also to obtain some informational materials and determine the regular time and place for promoting biking annually.
      Individual competences: attitudes towards biking, knowledge about the environmental impact of transportation
      Collective competences: Time and place for promoting green transport
      Environmental performance: New bicycle racks -> more cycling -> less CO2 emissions

    - Time scope of the intervention:

      Short term: competences of current students and teachers increase
      Long-term: Long-lasting bike racks, providing a permanent time and place for promoting biking, also for new generations of students.

- **Success factors: the critical preconditions for a successful intervention**

- Individual, collective and technical/material competences:

• Monetary resources for the new biking racks
• Motivation of teachers and students to bike to school/work
• Cooperation with the municipality to agree on the purchase and assembly of the bike racks
• Cooperation with the city transport agency to draw a map of the biking possibilities and the times needed around the school
• agreement between teachers to take time from the schedules of the common meetings with students, annually at the beginning of the academic year

- Main risks and uncertainties:

• The lives of the teachers or students are so busy that they do not want to consider biking
• It is impossible to find time and place for discussions about transportation because there are so many other things to do that teachers prioritise

Risk factors:

1. Collective competences
   Regulations/permits for building the yard

   Normative: not agreeing to promote biking regularly (within the teacher community)

   Cultural-cognitive: Biking is not a trendy thing among students

2. Individual competences
   Knowledge about the environmental impact is hard to find

   Personal attitudes are negative towards biking

3. Technical infrastructure (infrastructure & equipment)
   The construction of the school yard is not suitable for building the bike racks

   There is not enough space for a new bike rack

4. Resources
   The principal or the teachers do not have time to negotiate with the city administration

   There would be some unpredictable monetary costs, and there is not enough money for them

5. Responsibilities: who should do what?
   The installers of the bike racks do not have time to install the racks on time

   The principal does not have time to organise the work

The city traffic office is not interested in cooperation when there is time to make the map

Teachers are not interested in facilitating the discussions and teaching

The assessment of the intervention does not interest anybody.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Individual competences: Students' and teachers' understanding of the environmental impacts of school commutes, and the desire to make decisions to reduce them

Collective competences: the provision of good structures to improve understanding and behaviour (bike racks, regular time and place).

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

• The previous incidents of stealing the bikes promoted the motivation to buy new bike racks

• The knowledge about the negative impact of motor-driven transportation, and the experience of seeing many students come to school by scooters or mopeds.

Have you encountered challenges in engaging people? What are they?

Those most central teachers and the principal were active and motivated. Evaluating student engagement can be challenging.

How have you or could you overcome them?

Planning the lesson/ discussion so that it interests students personally - students can see the time it takes from their home to school.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

A significant amount of collaboration and planning with the city administration and bike rack installers is needed.

How has the cooperation worked with other stakeholders and actors outside your organisation?

The progress has been very slow.

What has enabled or could promote cooperation?

Perseverance

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

It promotes learning and changes the system by providing materials and new possibilities. The ultimate goal is to collectively and individually improve the school's environmental performance by reducing CO2 emissions.

How do you presume the change could happen?

Biking will become a part of everyday life by being added to the program at the beginning of the academic year, and students and teachers will understand through discussions and visual changes in the schoolyard that biking is a normal way to move.

What has helped you or could help you with envisioning the expected impact and the preferred future?

The motivation to make the bike racks safer and see that a sustainable future means more biking.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Resources from the ECF4CLIM project and Tampere City. Perseverance/ personal initiatives. Encouragement of ECF4CLIM researchers.

What kind of challenges have you faced in your organisation?

Very slow action within the municipality

How have you found, or could you find time and space for the intervention in your organisation?

Thinking of a suitable time to introduce biking to students. Persistent contact with the municipality.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Bike racks

Description: Bike racks for students will be purchased by the municipality, and for teachers from the resources of the ECF4CLIM project

Responsible: Principal (ID60)4Yp%

External expert assistance: Those responsible for the school property and schoolyard in Tampere City, the city traffic office, and installers of the bike racks

ECF4CLIM expert assistance: Only mental support

Resources needed: money for racks and installation, personnel resources

Cost: 4133,14 Euros

Task co-implementation participatory approach: The approach primarily involved principal and active teachers. Students are taking part in discussions.

Task 2.- Info about biking for students

Description: Every year from this on, the first-year students make plans for their way to school by walking/cycling/or public transport. Material: A map for the time zones of biking was created by the city office of transport

Responsible: Teachers of SAMKE, the main planners: (ID51)4Yj#, (ID52)4Yj%

External expert assistance: City Office of Transport

ECF4CLIM expert assistance: Only mental support

Resources needed: Personnel resources for planning

Cost: Euros

Task co-implementation participatory approach: Students taking part in discussions.

Task 3.- Campaign for promoting biking

Description: Info sections at the beginning of the year

Responsible: Teachers and students

External expert assistance: No

ECF4CLIM expert assistance: Only mental support

Resources needed: Time resources of teachers and students

Cost: Euros

Task co-implementation participatory approach:

Task 4.- Evaluation

Description: What is the impact of this intervention?

Responsible: Teachers, ECF4CLIM researchers

External expert assistance: no

ECF4CLIM expert assistance: Query from ECF4CLIM researchers

Resources needed: Personnel resources (time)

Cost: Euros

Task co-implementation participatory approach: The student environmental group could be a co-planner of the query

- **Milestones**

  Milestone 1: Bike racks established in the schoolyard

  Milestone 2: Materials for the starting discussion are ready

  Milestone 3: Materials for info campaign are ready, e.c. Videos created by students

  Milestone 4: Assessment

- **Outputs:**

  Output 1: Bike racks are in the schoolyard

  Output 2: Materials for the students are ready

  Output 3: Materials for info campaign are ready, e.c. Videos done by students

- **Cost (Equipment /consumables /others)**

  Total cost: 4133,14 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Evaluation discussion with the teacher and student team

  Responsible: ECF4CLIM researchers

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

Challenges with the purchase of the bike racks

The municipality owns the school buildings and areas, and there are many regulations—for example, regarding who has the authority to make decisions about and plan school yards, as well as where purchases must be made. With patience and persistent effort, these challenges can be overcome.

Attitudes and possibilities of the students

This demonstration site is a secondary school with a focus on sports, and the students aspire to become top athletes in Finland and internationally. They follow regular training schedules, with

training locations spread across the city. Often, they must carry heavy sports equipment—such as in ice hockey—which makes choosing cycling over private car use challenging.

However, information campaigns and the introduction of a new cycling map can help dispel misconceptions about cycling. In the future, integrating cycling into their daily training routines could be a possibility. Still, when the primary focus is on elite sports performance, making cycling a top priority may prove difficult.

FN-DS02-IN06- ENGAGEMENT OF STUDENTS: ESTABLISHING A STUDENT SUSTAINABILITY ACTION GROUP

General data

Description: Establishing an active student sustainability team for Samke High School and recruiting new students. First, raising students' awareness about the team and the possibilities for participation. Second, mapping potential interested students. Organising different activities with students by applying a participatory approach for the academic year, like improving schools' practices towards more sustainable, awareness-raising campaigns, visits and excursions. Short meetings are organised almost every week. During the 2022-2023 academic year, the focus was on mapping the issues that students regarded as important. Improving the quality of school food and recycling were considered the main issues. During the year 2023-2024, a new recycling system was established, along with campaign days aimed at reducing bio-waste at the school restaurant. Also, critical consumerism days were organised. In both years, 2022-2023 and 2023-2024, students visited primary schools to discuss the problems associated with fast fashion.

- **Participants and profile:** 2 teachers (1 physics teacher (ID51)4Yj# has been responsible of conducting the students' team since 2022 autumn, 1 biology/geography teacher (ID53)4Yj% have been on study leave for several periods during 2024), 7-12 students, students and their amount have changed from the first academic year 2022-2023 to 2023-2024

- **SCT and SCC representatives:** 2 teachers, no permanent student participants in SCTs and SCCs

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Collective competences: It aims to foster visibility of sustainability and climate action at school, establishing a culture and structures for students' participation. This initiative also aims to foster collective awareness and positive attitudes about sustainability and climate action, thereby promoting individual competences.

    - Short description of the objectives:

      It aims to increase visibility of sustainability and climate action at school and establish a culture and structures that promote students' participation. It aims to foster collective awareness and positive attitudes towards sustainability and climate action, thereby also aiming to develop individual competencies.

Establish a student sustainability team for Samke High School through a participatory approach. Raise students' awareness about the possibilities for participation and acting in a sustainable way. Organising different activities with students, such as improving schools' practices towards sustainability, awareness-raising campaigns, and visits and excursions. Creating a structure of time, place and resources for the team. Improving whole-school practices to become more sustainable.

- Time scope of the intervention:

  Throughout the entire project, spanning three academic years. And afterwards, continuous and long-term

- **Success factors: the critical preconditions for a successful intervention**

  - Individual, collective and technical/material competences:

    How to find time in a very tight school schedule. How to organise the team so that it does not constrain students' studies - demand them to skip their lessons. How to motivate students whose main interests are not sustainability. How to introduce and recruit new students into the group.

  - Main risks and uncertainties:

    No suitable time was found or organised for the meetings, so students would not get engaged and interested, but instead become bored. Students cannot invest their scarce time in team meetings. Students often regard acts for sustainability and climate issues as not personally relevant, but rather as weird and detrimental to their social status.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

How to engage and motivate high school students who seem not to be interested in this topic or find sustainability as a relevant issue in their lives?

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Inviting the friends of those who have expressed interest in environmental issues to the meetings, listening to and considering students' wishes and perspectives. The students also earn easy study credits by participating in the team and organising interesting excursions

related to their interests and wishes. Telling about the option to influence positively also through the possibility to participate in the ECF4CLIM research project

Have you encountered challenges in engaging people? What are they?

Students often do not find time to participate and are reluctant to skip their lessons to attend team meetings.

How have you or could you overcome them?

Different times have been tried out. The meetings must be organised in a time slot that does not disrupt their studies.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Collaboration between Tampere municipality and the local high school participants has resulted in collective/centralised timings of the schedules (to facilitate cross-studying between schools) and has addressed general attitudes, especially among boys.

How has the cooperation worked with other stakeholders and actors outside your organisation?

We have not cooperated with other stakeholders for this intervention.

What has enabled or could promote cooperation?

If we could attend those meetings and discuss with representatives of other schools, we could identify if they have similar time problems and collectively advocate for a change in the schedules for student-centred activities within the school day.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

It aims to promote teachers' skills in engaging and motivating students, as well as organising student-centred activities. Moreover, it involves a collective change in the structure of the students' schedules, finding a good time for student team activities.

How do you presume the change could happen?

By reflecting on these issues together with the teacher and principal, we can determine how these issues have been addressed in other high schools and share our experiences. We can also try to lobby for the curriculum to incorporate this student-centred and participatory activity.

What has helped you or could help you with envisioning the expected impact and the preferred future?

It aims to promote teachers' skills in engaging and motivating students, as well as organising student-centred activities. Moreover, it involves a collective change in the structure of the students' schedules, finding a good time for student team activities.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The teacher's evaluative discussions with each participating student have best fostered his understanding. Continuous reflective discussions with ECF4CLIM researchers, as well as with the headmaster and teachers, e.g., during evaluation days, have also been beneficial.

What kind of challenges have you faced in your organisation?

Time problems and students lacking interest or a poor social reputation of climate activism / eco-friendly behaviour

How have you found, or could you find time and space for the intervention in your organisation?

The teachers and headmaster have tried out different time options, including breaks. School day, etc. Proposing an option for an extended break and having a shorter lesson once a week to allow for all student-centred/lead activities. Feedback related to these time issues was requested from the students.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Mapping the possible interested students (through a survey)

Description: Mapping the possible interested students (through a survey) and contacting them face-to-face, negotiating time for the meetings, and organising the meetings almost every week. The main responsible teacher interviewed all the participating students.

Responsible: Responsible teachers

External expert assistance: no

ECF4CLIM expert assistance: no

Resources needed: No resources from ECF4CLIM were utilised. Instead, resources from a nationally funded project for sustainability education were used to cover the salaries of the responsible teachers and fund excursions.

Cost: Euros

Task co-implementation participatory approach: One teacher is responsible for planning the survey and asking for feedback on it from students

Task 2.- Evaluative discussions with the participating students

Description: Evaluative discussions on the activities conducted and planned with the participating students

Responsible: Responsible teachers

External expert assistance:

ECF4CLIM expert assistance: ECF4CLIM researchers facilitated valuable discussions for students with a breakfast

Resources needed: Food served for students

Cost: 73 Euros

Task co-implementation participatory approach: The results have been discussed with and referred to the researchers

Task 3.- Evaluative discussions with teachers

Description: Evaluative discussions with teachers in an evaluative seminar and SCTs

Responsible: Facilitated by ECF4CLIM researchers

External expert assistance:

ECF4CLIM expert assistance: Anna Lehtonen and Niina Mykrä

Resources needed: Substitute teachers for teachers, and food served for teachers

Cost: 227 Euros

Task co-implementation participatory approach: The plan for how to discuss and where was planned together with teachers

Task 4.- Weekly meetings with the student team

Description: Weekly meetings with the student team are organised by the responsible teachers

Responsible: Teachers

External expert assistance:

ECF4CLIM expert assistance:

Resources needed:

Cost: Euros

Task co-implementation participatory approach:

- **Milestones**

  Milestone 1: Establishing an active student group for the academic year 2022-2023

  Milestone 2: Engaging more new students for 2023-2024 and 2024-2025

  Milestone 3: Creating a strategy: how to recruit and engage students in the group, when, where, what and resources

- **Outputs:**

  Output 1: Student group established (but not very active and the number of students is low av. 7), and time for meetings scheduled, not working well

  Output 2: Trying to organise activities differently (one possibility: using tutor-student structure), making a better structure for weekly activities. 8-12 participants

  Output 3: A strategy created: how to recruit and engage students in the group, when, where, resources, what, etc. (results of the Deliberative workshop), and this is a part of IN03

- **Cost (Equipment /consumables /others)**

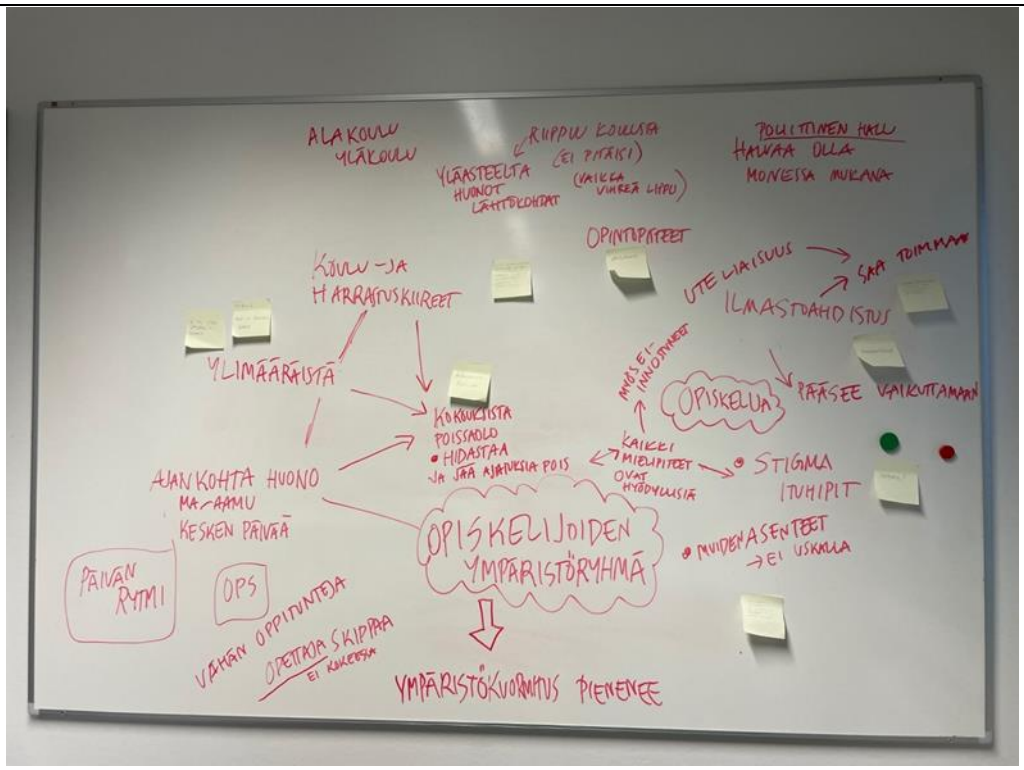
  Total cost: 300 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: The main responsible teacher has interviewed the student members individually. Evaluative discussions have also been organised by the researchers as part of the evaluation seminars, involving both teachers and students, and in SCT4 with students.

  Responsible: Samke High School, responsible teachers (2 persons, one of whom has been on study leave periodically)

- **Photographs of the intervention implementation**







- **Troubles during implementation, conclusion and lessons learnt.**

Engagement Challenges and Potential Solutions

A persistent challenge has been student engagement, primarily due to time constraints and a reluctance to miss lessons for team meetings. We have observed that boys, in particular, appear to avoid discussions related to climate change, possibly due to concerns about their social reputation.

To overcome these engagement hurdles, teachers have considered inviting and the student team organized a panel discussion on green careers for company representatives to highlight the importance of sustainability competencies in professional life. Another idea is to bring in professional athletes (e.g., from winter sports) to discuss how climate change impacts their fields and inspire action

Vision and Reflective Practice

Fostering reflective discussions on the aims of our actions is considered crucial for effectively envisioning the expected impact of sustainability initiatives.

Specific Difficulties Encountered

While a student group was successfully established, its activity level remained low. The group size was consistently small (averaging 7 students), and the scheduled meeting times proved ineffective, further hindering consistent participation. Sustainability is not of interest, valued nor prioritized among majority of students in Samke. Their daily life is busy and no time for extra activities.

Conclusions

It is important to take students' interests and values into account when planning activities. Ideally, the planning can be done together with the students. Students have diverse forms of agency and various motivations for participating in sustainability activities. Some are motivated by the benefits they gain from participation, such as study credits or a certificate that may be useful when applying for jobs. Social relationships and status are also important. Others want to contribute to making the world a better place, for example, as a way to cope with eco-anxiety. Some are driven by a desire to influence and take part in decision-making on shared matters.

17. REPORT ON IMPLEMENTED INTERVENTIONS IN THE UNIVERSITY OF JYVÄSKYLÄ.

School brief description

This public research university, which conducts teaching and research in all major disciplines, is located in Jyväskylä, Finland's 7th-largest city in central Finland. The university aspires to be a global leader in the study of learning, well-being, and basic natural phenomena, with sustainability as one of its core values. The university is ranked among the top 3% in the world. Of the 14,000 students, 3.9% come from abroad, and the rest are from all regions of Finland. Approximately 15% of the applicants are admitted to JYU. Approximately half of the 2,600 employees hold permanent positions. Two-thirds of the employees are researchers and teachers, with 13 % of foreign nationality. The demonstration site is the Faculty of Education.

Implemented Interventions Summary

The interventions implemented in the UNIVERSITY OF JYVÄSKYLÄ pilot centre are listed in the table below.

Measure Id	***Title***
FN-DS03-IN01	DISCUSSIONS AND COACHING ON SUSTAINABILITY AND CURRICULA DEVELOPMENT WITH TEACHERS AND STUDENTS
FN-DS03-IN02	FROM SUSTAINABILITY COMPETENCES IN CURRICULA TO PRACTICE AND PEDAGOGY: Designing a transdisciplinary course on sustainability competences
FN-DS03-IN03	FROM SUSTAINABILITY COMPETENCES TO PRACTICE AND PEDAGOGY: Preparing concrete teaching and study materials for each step of the Roadmap

Table 17.1.- Interventions in the UNIVERSITY OF JYVÄSKYLÄ.

The following table classifies the interventions implemented, taking into account the area of sustainability to which they are focused.

DS code	Intervention title	Main Sustainability Area	Secondary Sustainability Area	Subtype of Educational
FN-DS03-IN01	DISCUSSIONS AND COACHING ON SUSTAINABILITY AND CURRICULA DEVELOPMENT WITH TEACHERS AND STUDENTS	Educational programs		Talks and discussion workshops
FN-DS03-IN02	FROM SUSTAINABILITY COMPETENCES IN	Educational programs		New subjects/courses

	CURRICULA TO PRACTICE AND PEDAGOGY: Designing a transdisciplinary course on sustainability competences		
FN-DS03-IN03	FROM SUSTAINABILITY COMPETENCES TO PRACTICE AND PEDAGOGY: Preparing concrete teaching and study materials for each step of the Roadmap	Educational programs	Projects/Works

Table 17.2.- Interventions main working areas in the UNIVERSITY OF JYVÄSKYLÄ.

FN-DS03-IN01- DISCUSSIONS AND COACHING ON SUSTAINABILITY AND CURRICULA DEVELOPMENT WITH TEACHERS AND STUDENTS

General data

Description: Happenings, meetings, and discussions in connection with the "Responsible expertise and sustainable development" theme in the curriculum reform process at the University of Jyväskylä

- **Participants and profile:** 4Jp, 4Jj, 4Ji

- **SCT and SCC representatives:** (ID61)4Jp#, (ID62)4Jp%, (ID63)4Ji%, (ID64)4Jj#, (ID65)4Jj%, (ID66)4Jp%

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      3) requiring collective action

    - Short description of the objectives:

      Collective competences: The aim was for sustainability to become visible, connected, and prioritised in the university's curriculum reform process from 2021 to 2024. The new curriculum was finished in autumn 2024.

    - Time scope of the intervention:

      The objectives were expected to be achieved in the mid-term (during the lifetime of the project). Achieved objectives reflect on the final JYU curricula text, autumn 2024

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      1. Collective competences
      - Regulative: In the agreement between the University of Jyväskylä and the Ministry of Culture and Education, there is a statement that the university will integrate sustainability in all of its curricula.
      - Normative: 1) The decision of the vice rector that the curricula for 2024–2027 are to be drafted so that all future JYU graduates will have the necessary understanding for the promotion and development of sustainability. 2)Environmental Programme of the University of Jyväskylä. 3) Theses on sustainable development and responsibility of UNIFI (The Council of Rectors of Finnish Universities)

- Cultural-cognitive: Willingness to take sustainable development and environmental issues as a subject in every faculty (independent faculties)

2. Individual competences

- Knowledge, skills, and capabilities (on sustainability and environment) of the persons who plan the curriculum

3. No need for changes in the technical infrastructure and equipment
4. Resources

- 1) Resources of the researchers in this project to facilitate the process and create materials to promote the process; 2) Resources of the Faculties to plan the sustainability issues (this part cannot come from this project but must be part of the resources allocated to curriculum development)

5. Responsibilities

- The Division of Policy & Planning/ sustainability expert is in charge of promoting the development work in the field of sustainability issues in the curriculum. Due to the division's scarce resources, the ECF4CLIM team was asked, needed, and has the opportunity to help in this field.

- Main risks and uncertainties:

1) It would not be easy to promote sustainability education with the possibilities of the ECF4CLIM-project, if faculties do not want the ECF4CLIM team to join in the planning of the curriculum
2) Values: Many things other than sustainability are important in the curriculum development process, too. How to get sustainability to the list of priorities?

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Collective competence: How to include sustainability in university education more than before through the new curricula.

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Contacting and meeting people

Have you encountered challenges in engaging people? What are they?

Finding out who the crucial contacts are

How have you or could you overcome them?

Straight contact with some people, asking for tips, organising happenings, and cooperation with others. Persistently contacting people.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

- The structure of the curriculum development process of the whole university

- Some disciplines have special demands for the contents of education connected to legislation, e.g. teacher education and psychology education

How has the cooperation worked with other stakeholders and actors outside your organisation?

We are considered outsiders. The staff seem not to have an interest, perhaps due to a lack of time or resources for collaboration with us.

What has enabled or could promote cooperation?

Discussions and meetings. Creating contacts actively by the ECF4CLIM project.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The immediate impact we aim to achieve is that sustainability will be comprehensively embedded in the curriculum across various courses. The ultimate goal is that students will gain comprehensive, multidisciplinary sustainability competencies during their studies.

How do you presume the change could happen?

The curriculum planners take sustainability into account during their planning process. The ECF4CLIM project could highlight these possibilities.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Knowing the present state of the curriculum and the curriculum-developing process

- **Action: How to proceed?**

What has helped you to achieve your goals?

Persistent work on organising connections between people.

What kind of challenges have you faced in your organisation?

People often lack the time for cooperation.

How have you found, or could you find time and space for the intervention in your organisation?

This is a hard question. Organising happenings and discussions.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Seminar and a panel discussion

Description: Seminar and a panel discussion on sustainability and curricula, 24.11.2023, dialogue between personnel and students. Organised in collaboration with the Student Union, Students' Sustainability forum and sustainability officers, first meeting on 22nd Sept 2022. Open seminar and panel for students and representatives from all the faculties. Evaluation by query, with open and closed questions. The task includes all planning and evaluation efforts (meetings, email discussions), as well as the preparatory phase.

Responsible: Students from the students' union, Researchers Anna Lehtonen & Niina Mykrä

External expert assistance: yes

ECF4CLIM expert assistance: yes

Resources needed: Human resources: Planning time for the seminar for ECF4CLIM researchers, informing the entire university community, including students and development personnel at JYU. Taking part in the seminar, participants in the panel discussion included staff, researchers, and students, all of whom invested their time in this issue. Analysing the results and writing a news article after the seminar (https://www.jyu.fi/en/news/curriculum-development-is-coming-but-what-about-sustainability-students-criticise-sustainability-is). The seminar was arranged in a hybrid form, so the janitor helped to set up the video connection. The auditorium had all the equipment permanently installed.

Monetary resources: the rent of the auditorium, coffee for participants.

Cost: 661 Euros

Task co-implementation participatory approach: Students played a crucial role in organising the seminar. They contacted faculty members and asked representatives from curriculum planning to join the panel discussion and seminar. All faculties joined. They also advertised the seminar to students. Students also hosted the entire seminar and delivered a speech to the participants. Representatives from the university administration participated in the planning of

the seminar. ECF4CLIM researchers facilitated the entire process and participated in informing, analysing, and reporting on the seminar to the university.

Task 2.- Sustainability breakfast

Description: Sustainability breakfast for the Faculty of Education and Psychology, 4.5.2023: ecological sustainability and curriculum work. Participants (n=28) were mainly teachers responsible for sustainability pedagogy, but all faculty members from Education and Psychology were invited, as well as students. We were invited to participate in the sustainability breakfast practice at the faculty of education and psychology. The event consisted of a plenary and a workshop session. The task includes all planning efforts (email discussions), as well as the preparatory phase.

Responsible: Researchers Anna Lehtonen & Niina Mykrä, organising person of the series of sustainability breakfasts in the faculty

External expert assistance: No

ECF4CLIM expert assistance: Yes

Resources needed: Human resources: time for planning, advertising and participating

Monetary resources: Breakfast for participants, room for workshops and plenary, Post-Its

Cost: 104,5 Euros

Task co-implementation participatory approach: Open invitation for both students and staff

Task 3.- Coaching students and teachers

Description: Milestone 3: Coaching students and teachers in the promotion of sustainability competences and discussions. Creating a variety of different-length workshops (available to all the faculties) about integrating sustainability in the curriculum, based on the ECF4CLIM Roadmap. Instructions on how to take part in the curriculum development within the university. Both staff, teachers, and students. The task includes all the planning and advertising efforts, as well as the preparatory phase.

Responsible: Researchers Anna Lehtonen & Niina Mykrä

External expert assistance: yes

ECF4CLIM expert assistance: yes

Resources needed: Human resources: Time for planning, creating and sharing the plans.

Monetary resources: coffee and snacks

Cost: 55,51 Euros

Task co-implementation participatory approach: All staff and students of the University of Jyväskylä were invited. The participants were asked about their preferences for the kind of approach they would like to have.

Task 4.- Creating materials for curriculum development

Description: Creating materials for curriculum development about sustainability competences to be shared on the curriculum planning platform for all university personnel.

Responsible: Researchers Anna Lehtonen & Niina Mykrä

External expert assistance: yes

ECF4CLIM expert assistance: yes

Resources needed: Human resources, including time for planning, creating, and sharing materials.

Cost: Personnel resources of the researchers, Euros

Task co-implementation participatory approach: We inquired about the types of materials required.

Task 5.- Assessment

Description: When the curricula are ready, assessing the curricula of the faculties ECF4CLIM visited

Responsible: Niina Mykrä, Anna Lehtonen

External expert assistance: Yes

ECF4CLIM expert assistance: Yes

Resources needed: Human resources for assessment

Cost: Personnel resources of the researchers, Euros

Task co-implementation participatory approach: Asking the representatives of the faculties

- **Milestones**

Milestone 1: Seminar and a panel discussion on sustainability and curricula, 24.11.2022

Milestone 2: Sustainability breakfast for the Faculty of Education and Psychology 4.5.2023

Milestone 3: 3 workshops about integrating sustainability in the curriculum based on the ECF4CLIM Roadmap and how to take part in the curriculum development within the university

Milestone 4: Materials for curriculum development and shared on the curriculum planning platform for all university personnel: videos and documents on the ECF4CLIM roadmap, a checklist for sustainability and responsibility in curricula

Milestone 5: Once the curriculum is ready, assess the curricula of the faculties ECF4CLIM visited.

- **Outputs:**

Output 1: The seminar and panel discussion on sustainability and curricula on 24 November 2022 was an open seminar on possible sustainability goals in the development of new university curricula. Organised with students' union representatives. Every faculty member of JYU participated in the panel discussion during the seminar. Sixty university personnel members and students participated in the seminar. Analysis of the results and a news article on the university's website published after the seminar (https://www.jyu.fi/en/news/curriculum-development-is-coming-but-what-about-sustainability-students-criticise-sustainability-is).

Output 2: The Sustainability Breakfast for the Faculty of Education and Psychology on 4.5.2023 was a half-day event open to all members of the university. Facilitating discussions with education and psychology faculty members (N = 28) on sustainability competencies in curriculum reform. The event was part of the faculties' series of "Sustainability breakfasts". Our role was to bring ecological sustainability to the forefront, as previous events had primarily focused on social sustainability. The planners of the curriculum drew inspiration from sustainability and the ECF4CLIM Roadmap to inform their work, and this was a valuable effort to organise time and place for discussions on ecological sustainability and its role in the forthcoming curricula.

Output 3: 3 workshops about integrating sustainability in the curriculum based on the ECF4CLIM Roadmap: 7.11.2022 Jyväskylä University School of Business and Economics, 7.11.2022 Students' Union's environmental committee, and 12.4.2023 Students' Union's members in charge of education politics. The participants got information on how to take part in the curriculum development within the university and had a chance to discuss together influencing the curriculum towards sustainability (giving them time and place for that).

Output 4: Created three different workshop plans of different volumes and materials for curriculum development: videos, a checklist, and the ECF4CLIM roadmap document. Materials were shared on the curriculum planning platform for all university personnel.

Output 5: Knowledge about obstacles in the curriculum process and sustainability. A plan for a research article based on the results. The results can be utilised in future curriculum processes at universities.

- **Cost (Equipment /consumables /others)**

Total cost: 821,01 Euros

- **Intervention implementation comonitoring strategy**

Implementation of the comonitoring approach: Achieved objectives will be reflected in the final JYU curricula text by autumn 2024 but cannot be specified. Additionally, other actors, such as ECF4CLIM, have made efforts to gain a more sustainable curriculum in

JYU. Some analysis of the curriculum was conducted during the autumn semester of 2024. At the 4SCT/SCC meeting, we created a mind map of the curriculum planning process and discussed the obstacles and outcomes of this project with the team.

Responsible: Niina Mykrä, Anna Lehtonen

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

Limited Engagement and Outreach Difficulties

A significant challenge was the lack of proactive engagement from faculties, who did not actively seek facilitation or assistance from ECF4CLIM project experts. While workshops facilitated discussions on a wide range of values, not all of them were pro-sustainability, indicating varied perspectives within the university community.

Reaching students and staff proved particularly challenging due to the university's policy prohibiting the use of general posting lists, a common method for disseminating information to a broad audience. Given the university's large size, this policy created a significant barrier. The primary hurdle in engagement was initial contact; people simply were not reading university announcements on the website, and direct contact via posting lists was not an option. Furthermore, both students, teachers, and administration had very limited time for discussions and reflection with "outsiders" like our project team.

Connections: Offers of Help Unsuccessful

Our offers of assistance in curriculum planning were not successful; no one from the faculties or student organisations invited us to join the process. While we could have provided some input, we were not deeply involved.

Vision: Assessing Impact and Influencing Curriculum

To demonstrate the intervention's impact, comparing pre- and post-intervention curriculum content would be beneficial, potentially in courses within the Faculty of Education and Psychology or the School of Business and Economics. However, members of SCC4 noted that the ECF4CLIM project's impact cannot be isolated, as many other factors also influenced the final curriculum. Despite this, our intervention, along with the initial ECF4CLIM Roadmap, provided new insights to some course planners, influencing their thinking about sustainability.

Action: Overcoming Obstacles to Collaboration

A key challenge was that some participants expressed concern that our involvement primarily served our research at their expense (in terms of their time and intellectual investment). The limited time available to participants proved to be the main obstacle and constraint for this intervention.

Our research group, as "outsiders," were not consistently perceived as competent actors in discussions about course content. Offers of help on these matters were often not appreciated or deemed necessary. It is plausible that, given numerous other priorities besides sustainability, our participation was seen as an added burden for various disciplines. Participants in STC4 clarified that it was not a question of our competence, but rather that curriculum work primarily involves negotiating labour division between courses and structuring the curriculum. Teachers typically plan subject matter in short timeframes, often individually and remotely, leaving little room for major planning seminars that researchers could have joined. Ultimately, finding the time and a suitable forum to elaborate on curricula with teachers and planners was the hardest task, largely due to a lack of motivation for cooperation on their part.

FN-DS03-IN02- INTERVENTION WITH "SUSTAINABILITY TRANSITIONS" MODULE

General data

Description: ECF4CLIM Researchers are taking part in the planning process of a new transdisciplinary study module (15 ECTs) on sustainability transitions

- **Participants and profile:** 4Jp, 4Jj
- **SCT and SCC representatives:** (ID61)4Jp#, (ID64)4Jj#, (ID65)4Jj%
- **Focus (nature, objectives, pre-conditions, time scope)**
    - Nature of the intervention:

      2) involving individual action, and
      3) Requiring collective action

    - Short description of the objectives:

      Individual competences: knowledge, skills and attitudes about sustainability transitions will spread across disciplines among participants in the planning process
      Collective competences: A new approach challenges the rules, norms, and culture of the university. New resources will be negotiated, and the course will be part of the JYU curriculum. The entire planning process is a learning experience for designers—and for students in the future.
      Environmental performance: Students will develop competence in addressing environmental issues, which will enhance the environmental performance of their future workplaces.

    - Time scope of the intervention:

      Collective change (new module to the curriculum) will be gained during this intervention (mid-term), learning objectives of the staff will be achieved during the project (short term), but the results for students will be achieved after the lifetime of the project, during their whole working life (long term).

- **Success factors: the critical preconditions for a successful intervention**
    - Individual, collective and technical/material competences:

      Individual competences: The designers/architects of the study module should know about the sustainability crisis and the need for sustainability transition,

should be ready to communicate the viewpoints of their disciplines about green transition, open to different views, and prepared to negotiate the interdisciplinary goals of this study module with others, maybe by widening their assumptions and accepting their own learning process. The designers/architects should have personal flexibility, allowing them to prioritise planning/designing work over other tasks in the busy lives of universities. The researchers of the ECF4CLIM project should have the competence to present the ideas from the project so that they can be useful for the planning process.
Collective competences: The university is not accustomed to this type of study modules that combine multiple faculties, so there are no established structures for allocating resources or defining the administrative owners of the module. The rectorate and deans of faculties should be ready to negotiate these. Faculties should organise the work of designers/architects so that teachers and researchers can allocate time for this work. The atmosphere in the planning group should be open to "outsiders" from the ECF4CLIM project and accept their competence in certain issues, even though they will not be part of the implementation (teaching/organising) of the course.

- Main risks and uncertainties:

If we are only talking about the ECF4CLIM intervention part of this course, the risk is that other members of the group do not value the impact of the ECF4CLIM project.

If the entire design process is taken into account, the risk is that, in the end, there will not be enough resources for the design and implementation of the course, and the high-level goals will not be reached. Another risk is that only a very few students will choose this voluntary course, despite the vast amount of time invested in planning.

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Gaining interdisciplinary competence about sustainability, learning about fruitful cooperation between disciplines

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Personal interest of planners/designers in developing sustainability studies at universities, knowledge about sustainability crises, and the need for interdisciplinary approaches to solve problems.

Have you encountered challenges in engaging people? What are they?

Staff at the university are very busy, and it is a challenge to find enough time as needed.

How have you or could you overcome them?

It was a very fruitful intervention to organise a two-day seminar with the help of ECF4CLIM resources - when taken away from the university and their computers, designers can focus on deep conversations and negotiation about the goals of this course.

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

In some faculties, there are nationwide demands for the content of studies (psychology, teacher education), so for those students, this kind of course is hard to fit into their studies.

A significant portion of resources comes to universities from the government, and these resources are not vast; new openings are always challenging.

Additionally, connections between faculties and the university administration have been crucial. Each faculty has power only over its own issues.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Sustainability is stated as a goal of the university in the contract between the university and the Ministry of Education, and it has helped in designing this course.

The organiser of this planning process has been in contact with the administration and faculties. Some negotiations have been challenging not all deans buy into the idea of this course. There are diverse understandings of what constitutes research and knowledge, and what constitutes only opinions. The whole range of life philosophies also exists at universities.

What has enabled or could promote cooperation?

Persistent discussions to understand and accept the different views of others. Accepting not to gain a single vision, but parallel understandings, and still going forward.

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

The long-term vision is that students studying this course will broaden their understanding of sustainability and the driving forces of the green transition, moving from single-discipline to

multidisciplinary thinking, and acquire the competence to negotiate with professionals from different disciplines to achieve the best results for sustainability in their future work.

The vision of this ECF4CLIM intervention is that incorporating ideas from the ECF4CLIM project can enhance this course. Our vision is to promote the learning of designers. Also, resources from ECF4CLIM are crucial (planning seminar in Konnevesi).

How do you presume the change could happen?

Designing the course carefully. Giving needed resources to the planning process.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Discussions among designers, as well as with the administration and organisers.

- **Action: How to proceed?**

What has helped you to achieve your goals?

Engagement of designers/architects of the study module, and patience throughout the process.

What kind of challenges have you faced in your organisation?

Scarcity of resources, different ideas of the needs for education

How have you found, or could you find time and space for the intervention in your organisation?

Organising a seminar, getting money from the administration for the planning process, and reserving time for discussions

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Participation in the transdisciplinary design of the transdisciplinary module on sustainability transitions

Description: Meetings and discussions of the overall goals of the module, the organiser´s negotiations with the administration

Responsible: Organiser of the designing work (=participant (ID61)4Jp#)

External expert assistance: 0

ECF4CLIM expert assistance: 3

Resources needed: Money allocation for working time in EVCF4CLIM project, time resources from all participants

Cost: Euros

Task co-implementation participatory approach: Utilisation of time resources from the main organiser, the ECF4CLIM team, and members from all faculties (teachers and administrative staff).

Task 2.- Participation in the organisation and evaluation of the course design seminar, interviews with participants

Description: A 2-day seminar was organised at the Konnevesi research centre. The overall design of the study model was planned through discussion and group work.

Responsible: Organiser of the designing work (=participant (ID61)4Jp#)

External expert assistance: no

ECF4CLIM expert assistance: 1

Resources needed: accommodation and meals, time resources of designers and ECF4CLIM researcher

Cost: 1185,08 Euros

Task co-implementation participatory approach: Utilisation of time resources from the organiser, the ECF4CLIM team, and members from all faculties (teachers and administrative staff).

Task 3.- Finetuning of the study module design

Description: Finetuning of the study module design, contents of the courses, e.g. design of the course about cultural and behavioural aspects of sustainability transition

Responsible: Organiser of the designing work (=participant (ID61)4Jp#), The leader of the Cultural transitions group Cultural transitions (=participant (ID67)4Jj#)

External expert assistance: no

ECF4CLIM expert assistance: 2

Resources needed: Money allocated for working time in EVCF4CLIM project, time resources from all participants

Cost: Euros

Task co-implementation participatory approach: Utilisation of time resources from the main organiser, the ECF4CLIM team, and members from all faculties (teachers and administrative staff).

- **Milestones**

  Milestone 1: Overall structure of the module

  Milestone 2: Description of sections of the module

  Milestone 3: Descriptions of the courses of the module

- **Outputs:**

  Output 1: ECF4CLIM researchers taking part in the design process, GreenComp and Roadmap were introduced in the design process

  Output 2: 15 representatives of different faculties designing a transdisciplinary course module in the Konnevesi seminar for 2 days, 4 group interviews for participants

  Output 3: ECF4CLIM researchers taking part in the planning process. Final course plans for courses.

- **Cost (Equipment /consumables /others)**

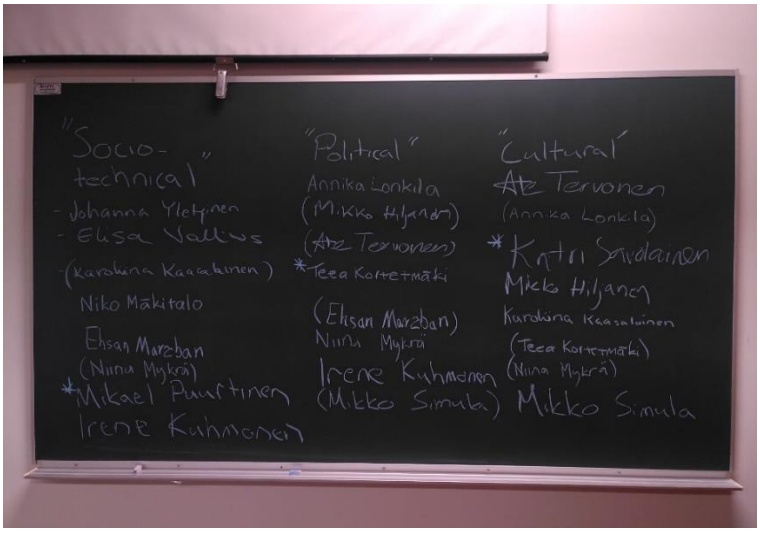
  Total cost: 1185,08 Euros

- **Intervention implementation comonitoring strategy**

  Implementation of the comonitoring approach: Discussions on the planning process on November 1, 2024, and the report.

  Responsible: ECF4CLIM researchers

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

No significant troubles arose during implementation.

FN-DS03-IN03- FROM SUSTAINABILITY COMPETENCES IN CURRICULA TO PRACTICE AND PEDAGOGY: Preparing concrete teaching and study materials for each step of the Roadmap

General data

Description: Designing workshops for teachers about GreenComp sustainability competence areas and creative drama practices of each step of the Roadmap. Designing an escape room game based on the ECF4CLIM roadmap.

- **Participants and profile:** Researchers Anna Lehtonen and Niina Mykrä, student representative of Student Union Sustainability Forum (ID63)4Ji%

- **SCT and SCC representatives:** (ID63)4Ji%

- **Focus (nature, objectives, pre-conditions, time scope)**

    - Nature of the intervention:

      Planning is an action of individuals within the planning team.

    - Short description of the objectives:

      Implementing the Roadmap in pedagogical practice. Presenting and increasing awareness and use of the roadmap. Promoting creative and inspiring pedagogies.

    - Time scope of the intervention:

      Rather short-term

- **Success factors: the critical preconditions for a successful intervention**

    - Individual, collective and technical/material competences:

      Individual knowledge of Roadmap and GreenComp, skills of facilitating workshops, and skills of drama

    - Main risks and uncertainties:

      Facilitation, contacting and dissemination skills

ECF4CLIM Roadmap link

- **What is the main question or competence that the intervention helps to answer or address?**

Inspiring and creative pedagogical skills for sustainability education

- **Engagement: Why and how to promote sustainability?**

What has promoted people's engagement and interest in the intervention among your educational community or organisation?

Having workshops integrated in conferences organised by others, the participants interested in these are already there.

Have you encountered challenges in engaging people? What are they?

Lack of networks and connections in a big organization. Some difficulties to integrate this intervention effectively in university teaching due to the scarce resources of personnel.

How have you or could you overcome them?

Good introduction to the workshops, why these methods and the roadmap are relevant for them

- **Connections: How to frame the problem?**

What are the relevant related issues, actors and activities that are not controlled by your organisation and relate to your intervention?

Participants' orientation and interests, and whether they will apply the workshop approaches later as part of their pedagogical practice.

How has the cooperation worked with other stakeholders and actors outside your organisation?

Well, with established networks.

What has enabled or could promote cooperation?

Active communication

- **Vision: What are the possible futures in our context?**

What is your vision of the expected impact of the intervention? Is it to promote learning, change the system or improve environmental performance?

Some teachers will incorporate more creative and engaging approaches into their practice.

How do you presume the change could happen?

Reflecting on how to apply the methods presented in practice and what to consider helps teachers utilise them effectively.

What has helped you or could help you with envisioning the expected impact and the preferred future?

Earlier pedagogical experience of using these methods.

- **Action: How to proceed?**

What has helped you to achieve your goals?

The organising committees of seminars and conferences have asked us to conduct workshops - they have been aware of our ability and skills and are familiar with the ECF4CLIM project. There have been interested participants.

What kind of challenges have you faced in your organisation?

Restricted teaching resources, lack of time for pedagogical development and collaboration within university personnel.

How have you found, or could you find time and space for the intervention in your organisation?

Integrated interventions into existing events.

Intervention co-planning and co-implementation

- **Implementation tasks**

Task 1.- Designing and facilitating workshops for teachers about GreenComp sustainability competence areas

Description: The ECF4CLIM Finland team designed workshops

Responsible: ECF4CLIM team, Anna Lehtonen and Niina Mykrä

External expert assistance:

ECF4CLIM expert assistance: The whole ECF4CLIM Finnish team

Resources needed: time for planning

Cost: Euros

Task co-implementation participatory approach:

Task 2.- Designing and testing creative drama practices

Description: Designing and testing creative drama practices for each step of the Roadmap

Responsible: Anna Lehtonen

External expert assistance:

ECF4CLIM expert assistance: Anna Lehtonen

Resources needed: Time

Cost: Euros

Task co-implementation participatory approach:

Task 3.- Writing about a drama practice

Description: Writing a book chapter about a drama practice related to the first step of the roadmap

Responsible: Anna Lehtonen

External expert assistance: Book editors

ECF4CLIM expert assistance: Anna Lehtonen

Resources needed: Time

Cost: Euros

Task co-implementation participatory approach:

Task 4.- Designing an escape room game

Description: Designing an escape room game for university students about the Roadmap

Responsible: Niina Mykrä and Anna Lehtonen

External expert assistance:

ECF4CLIM expert assistance: Niina Mykrä and Anna Lehtonen

Resources needed: Time

Cost: Euros

Task co-implementation participatory approach:

- **Milestones**

Milestone 1: Designing workshops for teachers about GreenComp sustainability competence areas

Milestone 2: Designing and testing creative drama practices of each step of the Roadmap

Milestone 3: Writing about a drama practice related to the first step of the roadmap

Milestone 4: Designing an escape room game

- **Outputs:**

Output 1: Workshops facilitated for 60 teachers in different countries as part of the Erasmus TCA+ seminar in October 2023 and for 20 participants in September 2024.

Output 2: Output 2: A workshop of creative drama practices about each Roadmap step, dissemination on SDG4 seminar (Nov 2023) and an open-access book chapter about Debate in role on sustainability

Output 3: An Escape room organised and facilitated 3 times (1) for the festival of the university for all the students and staff with the students' union, (2) for sustainability day of the faculty of education and psychology, (3) gaming week of the faculty of education and psychology

- **Cost (Equipment /consumables /others)**

Total cost: 0 Euros

- **Intervention implementation comonitoring strategy**

Implementation of the comonitoring approach: Personal reflections reported in the Deliberative workshop sheet

Responsible: Anna Lehtonen

- **Photographs of the intervention implementation**



- **Troubles during implementation, conclusion and lessons learnt.**

GreenComp is a relevant framework for developing sustainability education in universities however teachers have not time or resources to develop their teaching in order to integrate sustainability or trying out alternative pedagogies. However, traditional university studies do not cover all the areas of sustainability competence defined in GreenComp. It is important to practice influencing in real-life contexts. Experiential and action-based learning around concrete sustainability issues enables the development of sustainability competences. Students appreciate different experiential pedagogical approaches like game-based pedagogy and applied drama activities.

Creative, action-oriented teaching is pedagogically demanding, but rewarding. All different areas of sustainability competence can be practised through various applied drama methods**.** Applied drama activities can be successfully implemented with good guidelines, collaboration, and pedagogical mentoring. However, integrating such methods within limited teaching hours and resources is challenging. Therefore, projects that provide additional resources for pedagogical development are needed.

18 -MOTIVATION IN UNCOMPLETED AND/OR NOT DOCUMENTED INTERVENTIONS

Although project partners working with demonstration sites did their best, 21 of the interventions selected to be implemented in the participatory process, and report in D5.1, had been finally discarded before being completed, or completed but not documented. The list of intervention in this situation is included in the table below.

DS code	Intervention title	Status
SP-DS01-IN05	Sustainability research FAB-IDI program	Completed but not documented
SP-DS02-IN05	Making the invisible visible: participatory air quality monitoring with PurpleAir sensors. Citizen science at school	Not completed
SP-DS02-IN06	Installation of PV solar panels installation + learning and awareness activities on renewable energy	Not completed
SP-DS02-IN08	Installation of high quality insulating windows	Not completed
SP-DS03-IN02	Installing energy-saving mechanisms	Not completed
SP-DS03-IN03	In-door spaces reform	Not completed
SP-DS03-IN04	Outdoor spaces arrangement	Not completed
SP-DS03-IN05	Promote the 'reuse' of objects	Not completed
SP-DS03-IN08	Promote environmental volunteers on Campus	Not completed
SP-DS03-IN10	Repository of good practices	Not completed
SP-DS03-IN12	Don't waste food	Not completed
SP-DS03-IN13	Promote walking	Not completed
SP-DS03-IN14	Promote shared/common working and teaching spaces	Not completed
PT-DS02-IN04	Raising awareness of the role of green species in air quality	Not completed
PT-DS02-IN11	Field trips related to the production, treatment and recycling of waste	Not completed
RM-DS01-IN02	(Tr Trainers) Training for trainers (sustainability dedicated course)	Not completed
RM-DS02-IN02	(Tr Trainers) Training for trainers (sustainability dedicated course)	Not completed
RM-DS03-IN03	Teacher training (courses) in the field of sustainability	Not completed
RM-DS03-IN05	(Digital) Extending the school digitalization	Not completed
RM-DS04-IN01	Programme "train the trainers" for sustainability	Not completed
FN-DS01-IN05	Effective use of resources: Art supplies storage room rearranged and in order	Completed but not documented

Table 18.1.- Interventions with execution not completed or completed but not documented.

In the next paragraphs we describe the factors that had limited the execution or the lack of documentation of each of the intervention listed above.

SP-DS01-IN05.- Sustainability research FAB-IDI program

Status: Completed but not documented

Motivation: This intervention proposed, through a new educational program called “FAB-IDI, Design of a network of educational centers with a research itinerary," that schools can generate several different lines of research per school and year, conceived, designed, and presented by the students themselves. Different institutions, such as the University of Seville and the CSIC will be the teaching references for these educational centres. Within this program, a previous project “Young People with Researchers” will be integrated, where the development of research lines will be promoted. Among the projects developed through this educational program, those that work on sustainability issues are encouraged.

This intervention was completed successfully in IES ITACA, during school year 23/24 and 24/25. The execution task relies mainly in one teacher of the school. Unfortunately, she didn’t have time enough to fill in the planning, execution and evaluation documentation. ECF4CLIM offer her to help preparing the documentation but she decided to face it by herself, not been able to do it on time to include in D5.2.

SP-DS02-IN05 Making the invisible visible: participatory air quality monitoring with PurpleAir sensors. Citizen science at school

Status: Not completed

This intervention was initially co-designed and planned to be implemented at CEIP Mozart. It aimed to engage primary school students in participatory air quality monitoring using PurpleAir sensors. The proposed activity involved installing air quality sensors at the students' homes, allowing them to record local air quality data over the course of one week. The collected data would then be uploaded to a shared online platform, contributing to a broader community-based map of air quality across residential areas. The initiative was designed to raise awareness among children about environmental issues through direct participation in a citizen science project, fostering experiential learning and environmental protection.

However, during the preparatory phase, it became evident that the sensors and their setup were too complex for students and families to manage independently. Given the technical limitations and potential for malfunctioning, the team decided not to proceed with the implementation of this specific activity.

SP-DS02-IN08 Installation of high quality insulating windows

Status: Not completed

This intervention was initially co-designed and planned to be implemented at CEIP Mozart. Its primary objective was to enhance the technical and material performance of the school building

by improving thermal insulation. Specifically, it proposed replacing the windows of a classroom with high-efficiency insulating windows to reduce energy loss and improve indoor comfort.

However, during the implementation phase, it became evident that the available budget would not be sufficient to carry out all the planned interventions. Given that this particular intervention involved a relatively high cost and had a limited direct contribution to the development of students' sustainability competences, the decision was made to exclude it from implementation. Alternative, more cost-effective measures with greater educational impact were prioritized.

SP-DS02-IN06 Installation of PV solar panels installation + learning and awareness activities on renewable energy

Status: Not completed

This intervention was co-designed and planned to be implemented at CEIP Mozart. It combines an upgrade of the school technical and material competences through the installation of photovoltaic (PV) solar panels with a set of educational and awareness-raising activities on renewable energy for students.

The intervention is currently in the planning phase, with several preparatory tasks already completed. These include:

- A pre-assessment of the school's electrical installation and structural capacity for supporting the PV system, conducted by a technical company.
- The planning of pedagogical activities, such as the acquisition of solar car kits to be assembled and tested in class. These hands-on activities aim to help students understand how solar energy is captured and converted into electricity.

Unfortunately, the installation of the panels has been delayed due to pending official authorization from the city council. The installation is now scheduled for the first school term of fall 2025.

UAB: Reasons for not executing the measures that have been left aside. Global motivation:

The discussions held with students, faculty, and staff during SCT1 and SCT2 resulted in a list of 14 proposals that the various groups considered desirable for improving sustainability at the Faculty (and on campus).

All of these were subsequently discussed and negotiated with the UAB Vice-Rector's Office and the Campus Sustainability Office. This led to some of them being shelved, either due to their excessive cost or because they required structural modifications that were beyond the scope of the project or were not included in the university's strategic plans.

Finally, we focused on 5 interventions that were feasible with the available resources and within the project's timeframe.

SP-DS03-IN02: Installing energy-saving mechanisms

Status: Not completed

The goal here was to install electricity meters in several classrooms and thermostats on their heating radiators. Unfortunately, a series of bureaucratic obstacles (in purchasing them), a lack of qualified personnel from the maintenance department, and planning delays made their installation impossible. In this regard, it should be noted that there was a certain resistance from the university's technical services to the fact that data on electricity consumption, heating, CO2, etc., could be made available to non-experts and potentially misinterpreted. Ultimately, this intervention had to be scrapped given the impossibility of installing these devices within a reasonable timeframe.

SP-DS03-IN03: In-door spaces reform / SP-DS03-IN04: Outdoor spaces arrangement

Status: Not completed

These two intervention proposals go together. In the SCT1 and SCT2 discussions with students, faculty, and staff, the need to improve the Faculty's environment, both internal and external, arose several times. It is currently perceived as unfriendly and as something that encourages people to disidentify with the Faculty (and, therefore, to neglect its care). It so happened that, in parallel with the SCTs, the university was planning its 'sustainability and health strategy' (named Campus SiS) for the next five years, and one of the measures to be included was aimed specifically at improving teaching and leisure spaces inside and outside the university buildings. Those responsible for this "sustainability and health strategy" were contacted to try to establish synergies with ECF4CLIM project and share costs when promoting these types of improvements inside and outside the Faculty. However, in the end, the university decided to dedicate very few resources to this measure, and what ECF4CLIM could contribute was not sufficient to carry it out. Therefore, although it seemed feasible for a few months, it was later discarded due to the impossibility of covering the cost of these interventions.

SP-DS03-IN05: Promote the 'reuse' of objects

Status: Not completed

This measure was related to waste prevention. It was proposed by the students participating in SCT1 and SCT2 and seemed easy to implement. We even spoke with the organization that coordinates volunteering on Campus (called FAS) to try to integrate it into its annual activities program. However, when we tried to get students involved in its organization and development, we couldn't find anyone willing to lead it. Furthermore, we couldn't get it included in the FAS's annual activities program in time. Therefore, it was decided to drop it. However, students did get involved in another measure related to waste management, which we implemented at the Faculty (SP-DS03-IN06: Improve the waste system management at Faculty level).

SP-DS03-IN08: Promote environmental volunteers on Campus

Status: Not completed

This intervention proposed organizing groups of student volunteers to carry out sustainability initiatives at the university throughout the academic year. An internal entity (called FAS) already exists that promotes and coordinates volunteer groups on various topics (health, education,

environment, etc.), and it was thought that sustainability volunteers would fit in well there. However, in the end, the time required to integrate them into the FAS procedures was inadequate for the pace of the ECF4CLIM project (basically, forecasts had to be made months in advance, which was difficult to reconcile with the project's capabilities). Ultimately, the establishment of formal sustainability volunteer groups was abandoned. However, another intervention (SP-DS03-IN07: Facilitate transversal learning spaces) did succeed in generating small groups of student volunteers who were responsible for collecting sustainability data on campus. Thus, although a formal sustainability volunteer network could not be established, volunteers did participate informally. In some ways, these two interventions would have been redundant, so it was decided to eliminate the first one.

SP-DS03-IN10: Repository of good practices

Status: Not completed

This intervention aimed to gather good practices to promote sustainability at different levels but was unable to implement due to lack of time. The idea was to involve students in searching for, characterizing, summarizing, and writing up different types of good practices in an informative manner. But this required a series of efforts, time, and skills that ultimately were not available. However, another intervention has been carried out (SP-DS03-IN09: Making data on environmental impacts visible), which has somewhat compensated for this absence, as it has allowed for the construction of a website containing conference summaries and data on sustainability collected by student volunteers. This website is an ideal place to showcase good practices, although for now it only contains raw information and data.

SP-DS03-IN12: Don't waste food

Status: Not completed

This intervention was decided to be shelved for two reasons. First, because contacts with the campus restaurants weren't particularly fruitful, and it became clear that any modification to their operating methods was beyond our reach. Second, because there had been another, much broader intervention on the food issue (SP-DS03-IN11: Designing a more sustainable food system at the university), of which this intervention could be a part. Thus, it was decided to pursue the latter, dispensing with the former.

SP-DS03-IN13: Promote walking

Status: Not completed

Mobility issues are very important for sustainability, especially on a campus like the UAB, which is located outside of urban areas, necessitating extensive use of all types of transportation. When negotiations were held with the Vice-Rector's Office, we were advised to avoid this measure because it was already included in other university strategic plans. Furthermore, it was a measure that the students and faculty participating in the SCTs preferred to relegate. Therefore, it was ultimately decided to set it aside.

SP-DS03-IN14: Promote shared/common working and teaching spaces

Status: Not completed

Although this was an intervention proposed by students and some professors, it soon became clear that it would be very difficult to implement because it affected key elements of the faculty's organization, such as schedules and offices. The idea was to contribute to modifying the faculty's schedule and space organization to save energy. But both are very difficult. On the one hand, changing schedules requires considerable support from the faculty, something that quickly became clear was not going to happen for this issue. On the other hand, in response to the proposed spatial reorganization, a significant portion of the faculty expressed their opposition to changing from individual offices to shared ones. For all these reasons, this measure was shelved.

PT-DS02-IN04 — Outdoor environmental education activities

Status: Not completed

This intervention was initially planned to take place in the outdoor area of Quinta do Charco, a space dedicated to nature and environmental education (intervention: PT-DS02-IN03). However, the significant delay in the rehabilitation and preparation of the site made its use unfeasible within the timeframe of the ECF4CLIM project. Although the activities remain relevant and are still planned by the school, their implementation has been postponed to a later stage, outside the project's execution window. Therefore, the intervention was cancelled for the time being and may be resumed in the future, once the necessary conditions are met.

PT-DS02-IN11 — Awards and dissemination of results of the recycling competition

Status: Not completed

This intervention was originally planned to follow the recycling competition (PT-DS02-IN10), as a way to deepen students' understanding and reinforce the lessons learned during the contest. The goal was to provide a more practical, real-world perspective on the processes of waste production, treatment, and recycling, contributing to a more comprehensive educational experience. However, during the implementation phase, the budget required for intervention PT-DS02-IN03 (Reactivate the school's biological garden) turned out to be significantly higher than anticipated. Faced with limited resources, the school chose to prioritise PT-DS02-IN03, which was considered more urgent and aligned with their immediate sustainability efforts. Consequently, PT-DS02-IN11 was cancelled despite its educational value.

RM-DS01-IN02 (Tr Trainers) Training for trainers (sustainability dedicated course) / RM-DS02-IN02 (Tr Trainers) Training for trainers (sustainability dedicated course) / RM-DS03-IN03 Teacher training (courses) in the field of sustainability / RM-DS04-IN01 Programme "train the trainers" for sustainability

Status: Not completed

In Romania, several interventions were planned to support teacher training in the field of sustainability. One of these, RM-DS03-IN03, focused on providing basic sustainability training for teachers. In addition, three other interventions—RM-DS01-IN02, RM-DS02-IN02, and RM-DS04-IN01—were designed to train teacher-trainers, with the aim of accelerating the broader preparation of educators to address the interdisciplinary nature and specific challenges of sustainability education.

Between August and October 2024, teachers from the Dragasani, Sercaia, and Mioveni schools were invited to express their interest in participating in one of these training courses, which had been developed by the ECF4CLIM research team. A minimum of five registered participants was required to organize the course.

However, it came as a surprise that this threshold could not be met—even when considering the possibility of combining participants from all three schools. The primary reason cited by teachers was their already overloaded schedules, due to numerous other training programs at the local and regional levels, many of which are recognized by the School Inspectorate as part of the mandatory continuous professional development framework.

Given this context, the ECF4CLIM team contacted the designated project coordinators in each of the three schools, asking them to confirm potential availability for rescheduling the training in autumn 2025. As of the time of this report, no responses have been received.

RM-DS03-IN05 (Digital) Extending the school digitalization

Status: Not completed

For RM-DS03-IN05, "(Digital) Extending the School Digitalization", the discussion focused on the available resources and the current state of the school's digital infrastructure. Mioveni High School stands out with a highly advanced digital setup, which includes dedicated data servers, large interactive screens in every classroom, a robust computer network, and 3D printing equipment used in robotics and technology projects. Additionally, essential digital tools—such as the electronic gradebook system—are fully operational, supporting the school's ongoing efforts toward comprehensive digitalization.

The students expressed a forward-looking intention to take digitalization to the next level—specifically by integrating virtual reality (VR) and artificial intelligence (AI) to support sustainability monitoring. However, due to limited resources, unclear technical ideas, and significant implementation risks, it was ultimately decided not to move forward with this intervention.

FN-DS01-IN05.- Effective use of resources: Art supplies storage room rearranged and in order.

Status: Completed but not documented

Motivation: Mapping the need to re-arrange material storages. Organising the storages. Communication about the reorganization and effective use

This intervention was completed. The execution task relies totally in one teacher of the school. Unfortunately, he didn't fill in the planning, execution and evaluation documentation and ECF4CLIM team did not have enough information to do it.

19 CONCLUSIONS FROM THE ECF4CLIM INTERVENTIONS EXECUTION AND MONITORING.

The implementation and monitoring of the diverse interventions carried out within the ECF4CLIM project offer valuable insights into the practical challenges and transformative potential of fostering sustainability competences within educational communities. This section presents key conclusions that emerged from the codesign, co-monitoring and co-implementation of 61 interventions, across 13 demonstration sites in four countries.

The interventions reflected a rich diversity, both in thematic focus and methodological approach. Thirty-seven of the selected interventions targeted transformations mainly within a specific environmental sector (energy, waste, water, air quality, transport, green areas, food). The other twenty-four interventions took a more cross-cutting approach, focusing on developing sustainability competences through conferences, talks, educational materials, or the creation of new courses.
This diversity underscores the importance of context: the selection, design, and effectiveness of interventions were strongly influenced by each site's specific environmental challenges, existing infrastructures, institutional priorities, and available expertise.

The integration of the ECF4CLIM analytical framework allowed the project to explore how interventions contributed to the development of individual, collective, and technical-material competences. While the overall distribution of competences within the ECF4CLIM analytical framework was homogeneous, demonstration sites in each country designed interventions to address the sustainable competence needs identified by their respective educational communities during the SCT1 to SCC2 meetings. Interestingly, while interventions were often initially designed with a specific competence in mind, their implementation in practice revealed overlapping impacts across all three domains—highlighting the interconnected nature of sustainability learning processes.

An important conclusion drawn from the implementation phase is the effectiveness of the project's innovative, hybrid participatory approach. The establishment of Sustainability Competence Teams (SCTs) and Sustainability Competence Committees (SCCs) proved to be instrumental in ensuring that interventions were not merely imposed but rather co-designed and co-implemented by the school communities they aimed to serve. This collaborative model fostered a strong sense of ownership and relevance, significantly enhancing the likelihood of successful adoption and sustained behavioral change. For instance, the active involvement of students and teachers in identifying local needs, such as energy consumption patterns or waste management issues arose as a very useful tool. The iterative reflection, dialogue and communication with and within school teams, facilitated by the SCTs and SCCs, were critical in refining intervention strategies, adapting them to unforeseen circumstances, and ensuring continuous alignment with both school priorities and the overarching ECF4CLIM objectives.

Many of the interventions successfully generated tangible benefits in school environmental performance. From the implementation of renewable energy solutions to improvements in waste separation and water consumption, the project yielded concrete improvements in the

environmental performance, for example, the installation of solar panels not only reduced reliance on grid electricity but also served as a practical learning laboratory, enhancing understanding of sustainable energy systems.

In terms of individual competences, the interventions encouraged the active and equitable involvement of all participants, promoted dynamic, motivating and real-world-connected learning, fostered a more integrated and holistic understanding of sustainability, and increased participants' awareness, encouraging the development of long-term sustainable habits and mindsets.

The development of educational materials and workshops, such as courses on sustainable development in technological societies, further solidified the integration of sustainability principles into formal curricula, trying to ensure that the acquired competences are systematically embedded.

While the interventions achieved significant success (61 interventions completed /2 completed but not documented / 14 uncompleted), its execution had presented several challenges, which served as valuable learning opportunities. Sustaining motivation and engagement over time, especially in the absence of immediate results, was a recurrent issue. Logistical and coordination difficulties, limited availability of human and physical resources, and the complexity of integrating sustainability into existing curricula also posed significant barriers. Despite these, many interventions successfully overcame obstacles through adaptive planning, strong institutional support, and leveraging existing networks and programs. Technical troubles, such as problems with information screens for dissemination campaigns or unexpected costs, underscored the importance of anticipating practical obstacles and allocating contingency resources. These challenges necessitated adaptive planning and continuous communication among ECF4CLIM and school teams.

One of the most promising outcomes is the capacity for replication and continuity. Educational interventions, particularly those focused on creating materials or integrating content into curricula, offer scalable solutions with lasting impact. Even infrastructure-related interventions, while resource-intensive, contributed to long-term structural improvements and provided powerful learning opportunities.

Overall, the results of this deliverable demonstrate that competence-based, participatory interventions can be a powerful driver for embedding sustainability within education. The experiences, lessons learned, and tools developed through this process offer a solid foundation for further replication, adaptation, and scaling across other contexts and institutions in Europe and beyond.

ANNEXE 1: IMPLEMENTATION TEMPLATE

Intervention participatory approach (co-planning, co-implementation and co-monitoring)

Intervention general data

Intervention ID			
Title			
Brief description			
ECF4CLIM Roadmap link	ENVIRONMENTAL PERFORMANCE: CHANGE OF THE CONDITIONS NEW EQUIPMENT, INFRASTRUCTURE, ACCOUNTING and MONITORING	INDIVIDUAL COMPETENCE: CHANGE OF THE PEOPLE FIELD TRIPS, EVENTS and THEME WEEKS, INFORMATION and AWARENESS, LEARNING POSSIBILITIES, COMPETITION and REWARDS	COLLECTIVE COMPETENCE: CHANGE OF THE SYSTEM CURRICULA, PEDAGOGY. CULTURE, STEERING DOCUMENTS, COOPERATION, RESEARCH
Engagement: Why and how to promote sustainability?	How to engage students in learning from new facilities? ☐ How to find the best ways to promote nature? ☐	How to involve all the students and teachers in learning? ☐ What is the most important knowledge? ☐	How to find the place and time for engaging people? ☐ How to embed sustainability values in curriculum and school culture? ☐
Connections: How to frame the problem?	How to use measurements to learn about connections between consumption and environmental impact? ☐ What is the most crucial thing to change at school? ☐	How the every day acts are connected to big picture of sustainability? ☐ How to turn the external motivation into internal motivation? ☐	What are the most important partnerships? ☐ What kind of structures are constraints on change? ☐
Vision: What are the possible futures in our context?	What is the educational goal of the procurement? ☐ How students can use this experience in their future? ☐	How to envision and create the preferred future together? ☐ How to deal with uncertainty? ☐	How to plan research based and creative strategies? ☐ How to envision steps for long term objectives? ☐
Action: How to proceed?	How other schools can learn from this measure? ☐ How to increase the students' competence to make same kind of measures in their lives? ☐	How to activate learners? ☐ How to promote learning to have impact on policies? ☐	How the school can change the whole society? ☐ How to connect the strategies to the concret everyday life? ☐

Intervention co-planning and co-implementation

Tasks

Task ID	1
Task title	
Description	
Responsible	
Time unit	days
Start	
Finish	
External expert assistance	
ECF4CLIM expert assistance	
Resources needed	Necessary resources (staff, equipment and consumables, subcontracting, ...)
Task co-implementation participatory approach	Description of the participation of the school actors in the task execution (students, teachers, head, other staff)

(5 identical tables for including the description of the tasks)

Milestones

Milestone 1	
Milestone 2	
Milestone 3	
Milestone 4	

Outputs

Output 1	
Output 2	

Cost (Equipment /consumables / others)

Task 1	
Task 2	
Task 3	
Task 4	
Task 5	0 €
Task 6	
Intervention estimated cost (€)	0 €

Intervention implementation co-monitoring

Implementation monitoring method	Proposed method for monitoring implementation and actors involved
Responsible	