



Project Start Date: 1 January 2022 | Duration: 36 months

# D5.2 – Pilots Operational Plan and Ethics Management

*Due Date of the Deliverable: 31 December 2023 (extension of former 31 October 2023 accepted by PO)*

*Actual Submission Date: 29 December 2023*

Project	GreenSCENT – Smart Citizen Education for a Green Future
Call ID	H2020-LC-GD-2020-3-2020
Work Package	WP5 – GreenComp Piloting
Work Package Leader	University of Novi Sad Faculty of Sciences (UNSPMF)
Deliverable Leader	Climate Risk Analysis – Manfred Mudelsee (CRA)
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Deliverable Type	Report
Dissemination Level	Public
Version	Final 14 (28 December 2023)
Revision	Final



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## Acronyms

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Acronym	Description
CEO	Chief Executive Officer
COVID-19	Corona Virus Disease-19
CSV	Comma-Separated Values
Dx.y	Deliverable x.y (where x and y are integer numbers between 1 and 9)
EC	European Commission
EU	European Union
GA	Grant Agreement including amendment(s)
GDPR	EU's General Data Protection Regulation
GHG	Greenhouse Gas
GIS	Geographic Information System
HEI	Higher Education Institution
IP	Intellectual Property
KPI	Key Performance Indicator
Mxx	Project Month xx (where xx is an integer number between 1 and 36)
NA	Not Applicable
NGO	Non-Governmental Organisation
PO	Project Officer
PSHEE	Personal, Social, Health and Economic Education
PTR	Periodic Technical Report



Acronym	Description
SDG	Sustainable Development Goal
TED	Technology, Entertainment, Design
UN	United Nations
WP	Work Package
YDA	Youth Design Assembly

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## 1.4 Document History

Version #	Date	Changes
0	31 March 2023	Initial template erected; internal online site for individual reports established; internal grid table (demonstrator/pilot) built
1–2	13 October 2023	CRA-internal
3	24 October 2023	Draft 03 on basis of (A) online discussions at weekly WP5 Friday Online Discussion meetings
4–5	31 October 2023	CRA-internal
6	3 November 2023	Draft 06 (for WP5-internal feedback)
7–10	24 November 2023	CRA-internal
11–12	16 December 2023	Completion of Section 11 (WP5-internal)
13	21 December 2023	Completion of full draft, submission to internal review
14	28 December 2023	Final version

## 1.5 Document Data

Keywords	<i>Behavioural Change, Climate Change, Education, Environment, Green Deal, GreenSCENT Competence Framework, Instructional Co-Design, Learning Performance, Preparatory Training</i>
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## 2. Background

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### 2.1 European Green Deal

As the EC [[https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en), 19 June 2023] explains, climate change and environmental degradation are an existential threat to Europe and the world. To overcome these challenges, the European Green Deal will transform the EU into a modern, resource-efficient and competitive economy, ensuring:

- no net emissions of greenhouse gases by 2050;
- economic growth decoupled from resource use;
- no person and no place left behind.

The European Green Deal is also our lifeline out of the Corona Virus Disease-19 (COVID-19) pandemic. One third of the €1.8 trillion investments from the NextGenerationEU Recovery Plan, and the EU's seven-year budget will finance the European Green Deal.

### 2.2 GreenSCENT

GreenSCENT – Smart Citizen Education for a Green Future – is a research and innovation project funded by the European Union's Horizon 2020 programme, under Grant Agreement N° 101036480.

GreenSCENT aims at developing a competence framework embracing all the Green Deal focus areas through an iterative, participated, experience and learning-by-doing based design approach.

GreenSCENT activities embrace both experts' and researchers' inputs and advice, citizen participation and stakeholder engagement initiatives; different European regions, different educational levels (from primary schools to higher education), at different engagement levels (from observation to data collection and processing, to contribute to scientific and policy agenda).

GreenSCENT legacy will consist of the Competence Framework (GreenComp), its Methodology, Use Cases, User Guides; Training kits co-designed for implementing the framework; SCENTbox, the set of digital, physical and hybrid demonstrators developed by the project; and ECCEL, a European “driving license” for Climate and Environmental competencies and skills, that will be tested during the project.

GreenSCENT's Work Package WP5 – GreenComp Piloting – has the objective to develop a common piloting framework, and the application of tools and approaches for eight European Green Deal Focus Areas, that can be extended and implemented elsewhere, with the objective of creating genuine European reference piloting environments. The common piloting framework and tools will, through training, enable the involved citizens to become aware of European Green Deal principles. This WP provides input and iteratively co-develops content and activities aimed at enhancing educational, social, technical and cross-cultural impacts.



GreenSCENT's WP5 includes Task 5.2, where the main objective is to provide a plan for the operation of the demonstrator activities at the piloting institutions. The plan is constructed as a result of previous work in Task 5.1 (Subtasks 5.1.1 and 5.1.2). Task 5.2 is planned to run until Project Month 30 (M30). This means that this present report will likely be further adapted during future iterations, refinements and discussions within the GreenSCENT project. The WP5 leader coordinates the development efforts in other WPs for the management of the operational plans for the SCENTbox (i.e., the set of digital and physical demonstrators developed), the GreenSCENT Competence Framework, the SCENT Platform and the GreenSCENT mobile application; the WP5 leader will also oversee the co-creation process. In WP5, the task leaders will, together with the WP5 leader, coordinate high-level implementation of strategies and plans and set or agree on goals and milestones.

## 2.3 This Document

This document reports as part of Task 5.2 the operational plan. This includes a definition of what will happen on each pilot. Based on the initial use cases, the concepts will be detailed, together with a first proposal of activities. This process will be done jointly with samples of end-users as a co-creation process. This includes the time schedule, how pilots have to be deployed, iterations, technologies available per pilot, what are the KPIs, is some necessary data to align all pilots.

In order to achieve the aims described in the previous paragraph, this document explains the three major "players", that means, the Demonstrators (Section 3), the Pilots (Section 4), and the Stakeholders (Section 5) targeted by the activities. The plan then explains the typical generalized structure and aims of the Pilot workshops in GreenSCENT (Section 6) and gives advice on the roles of the various partners engaged in these educational activities (Section 7). An important aspect of the implementation of the Demonstrator/Pilot activities is Ethics (Section 8). We assess challenges and risks (Section 9). Then there are two longer, descriptive, detailed sections, which contain details about the Demonstrators (Section 10) and local implementations at pilot sites (Section 11).

Remark. Due date of D5.2 is M22 (October 2023), while due dates of some deliverables (to be used in the demonstrator activities implemented at the pilot sites) are later. This means that this document has to be considered as "premature", and it will be updated and made available once the full information is available.





### 3. What are the Demonstrators?

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According to Merriam-Webster's Unabridged Dictionary, a Demonstrator is

*one that demonstrates or makes a demonstration: as (a) a teacher or teacher's assistant in a professional school or a science department who demonstrates the principles and theories studied (as by means of experiments, dissections, physical and chemical preparations); (b) one that demonstrates an article or product to a prospective buyer, also an article or product (as an automobile or vacuum cleaner) used in a demonstration (c) : one engaged in a public demonstration.*

GreenSCENT employs the word in a similar meaning as Merriam-Webster's variant (a), but still with a different twist – see, for example, the Grant Agreement (GA) at various places – namely, a Demonstrator is

*an activity, a measure, a tool that is designed for the purpose of educating participants in aspects related to the EU's Green Deal.*

There are a total of 9 Demonstrators (Section 10) within GreenSCENT. For each Demonstrator, there is one single project partner responsible for the production of it. The participants range from a wide array of educational or age levels, from children at primary schools up to experienced professionals. Some Demonstrators consist mainly in digital technology developments of training products, while others consist more in joint events where people learn from people, participants from teachers, but also the other way round: where via the action of the participants the designers and teachers are put into a position to learn (co-design learning).



## 4. What are the Pilots?

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As regards the expression Pilot, GreenSCENT follows Merriam-Webster's Unabridged Dictionary second definition, namely, a Pilot is

*a guide who leads along a difficult or unknown course: one who takes charge during dangerous or unsettled times: a leader who inspires.*

However, GreenSCENT is more specific because it requires the guide, or teacher, to reside (to work, to support, etc.) at a certain partner institution that utilizes a Demonstrator (Sections 3, 10) for the educational purpose.

There are currently a total of 9 Pilots (Section 11) within GreenSCENT. For each Pilot, there is one single project partner responsible for the implementation of the training activity – with a few exceptions. First, there is the case where a demonstrator activity (Youth design assemblies) is being offered to EU citizens; the responsible partner then is the Demonstrator partner. Second, GreenSCENT is currently making the experience that the given educational activities are so successful that other piloting institutions (i.e., also outside of the GreenSCENT consortium) do show interest. That is, in the end (updated report), there may be more pilot activities listed than planned in the GA.

The importance of the role of the teachers working for the piloting of the Demonstrators will become clear in this report. Equally clear should become as well the importance of having a common framework, such that the Demonstrator development, the pilot implementation, the joint educational activities and the assessment of impacts and behavioural changes is performed in a rational, structured approach: the GreenSCENT Competence Framework (1<sup>st</sup> release confidentially published as D1.1 in M12; other deliverables to follow by M34).



## 5. Who are the Stakeholders?

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It may be illustrative to read in full what ChatGPT writes:

*A stakeholder is an individual, group, organization, or entity that has an interest or concern in a particular project, organization, or system. Stakeholders can be either internal or external to the entity in question, and they can have varying degrees of influence and involvement. The concept of stakeholders is commonly used in business, project management, and public policy to identify and manage the interests and concerns of those who can affect or are affected by a particular initiative. Stakeholders can include:*

*Internal Stakeholders: These are individuals or groups within the organization. They might include employees, managers, shareholders, and board members. Internal stakeholders have a direct interest in the organization's success.*

*External Stakeholders: These are individuals or groups outside the organization who are affected by its actions. They can include customers, suppliers, government agencies, regulatory bodies, competitors, and the general public.*

*Primary Stakeholders: These are those who have a direct and immediate interest in the organization's activities and outcomes. For a business, primary stakeholders might include employees, customers, and shareholders.*

*Secondary Stakeholders: These are individuals or groups who have an indirect or less immediate interest but can still be influenced or affected. Secondary stakeholders might include the media, advocacy groups, or trade associations.*

*Key Stakeholders: These are the stakeholders who have the most significant influence and interest in a project or organization. Identifying key stakeholders is crucial for effective stakeholder management.*

*Stakeholder analysis involves identifying and understanding the various stakeholders, their interests, concerns, and potential impact on the project or organization. Effective stakeholder management includes strategies to engage and communicate with stakeholders, address their concerns, and build positive relationships to ensure the success of the project or organization while minimizing conflicts and risks.*

*Understanding and managing stakeholders is essential in decision-making, project planning, risk assessment, and corporate social responsibility, as it helps organizations make informed and ethical choices that consider the interests and concerns of all relevant parties.*

In the following sections, we consider the various stakeholder groups listed by GreenSCENT's GA: primary and secondary schools, Higher Education Institutions (HEIs) and EU citizens, whereby we will employ the categories suggested by the chatbot.



As the GA at various places reveals, GreenSCENT does have a genuine interest to spread its message about the EU Green Deal, about how the project implements its educational vision. Hence, the exploitation of project results and the approach of stakeholder groups (WP6) carries an important role. Here in D5.2, which reports about work done in WP5, we focus on the various stakeholder groups that are being approached via the demonstrator activities performed at the pilot sites. Other stakeholders mentioned in the GA, such as environmental activists, NGOs, sister projects, industry and policy makers, will be dealt with in other reports of the project.

## 5.1 Primary and Secondary Schools

The direct concern of schools is teaching. Hence, primary and secondary schools constitute primary stakeholders, because they can learn, employ and adapt teaching methods and devices developed within the project.

There are a number of schools involved as partners within GreenSCENT: EA, MAYK, RST and RGSMART. These four entities represent internal stakeholders.

In principle, other schools could be external stakeholders, but the project has no focus on targeting those. It is expected that these external candidates will be approached in the future indirectly, namely by setting good examples from the four internal stakeholders.

Given the number of schools in countries and over the EU, it seems a challenge beyond the scope of the project to try to identify key stakeholders from schools.

## 5.2 HEIs

The direct concern of HEIs, including universities, is twofold: teaching and research. Since GreenSCENT develops Demonstrators directed also on participants performing research (not 'only' on students), such as the Climathon, also HEIs should belong to primary stakeholders.

Within GreenSCENT, the following partners are HEIs and, hence, internal stakeholders: UNINETTUNO, UAB and UNSPMF.

External stakeholders of the project are thought to be targeted via the Climathon Demonstrator, which will possibly bring in the future external researchers to the activities (with a focus on the EU, see Section 10.6.4). Another product of interest to HEIs is thought to be developed with regards to the progress assessment methodology (WP4).

Again, given the number of universities in countries and over the EU, it seems a challenge beyond the scope of the project to try to identify key stakeholders from HEIs.

## 5.3 EU Citizens

It seems fair to say that one direct concern of human beings (including EU citizens) is to learn.

Given the multitude of possible interactions between GreenSCENT and EU citizens, it becomes evident that this stakeholder group is very important for the success of the project. EU citizens have the external, primary and secondary stakeholder attributes. Almost certainly, some key individuals (in their later life) will be reached by the project's demonstrator activities.



## 5.4 Methods of Invitation and Communication

Evidently, what counts for the success of the demonstrator activities implemented at the pilot sites, is to reach out to many potential participants. GreenSCENT therefore avoids imposing too severe restrictions on the ways of invitation and communication; the most relevant restriction is to obey the project's rules regarding ethics and privacy (Section 8).

What other methodical avenues to follow depends on the specific demonstrator–pilot characteristics. This regards which party sends out invitations and makes advertisements: it can be demonstrator or pilot partners. For example, for the digital technology Demonstrators, such as the Environmental Monitoring App (Section 10.1), the pilot partners doing the implementation are better suited than the App designer (ENG). As another example, the Climathon demonstrator activity delivered at HEIs has also been advertised by the Demonstrator partner (CRA) owing to its experience in dealing with HEIs on similar activities.

Also the methods of communications follow the “anything goes” rule (exception: ethics). For example, while email may be a good option for approaching researchers at HEIs, social media should be better suited to reach out to pupils. Above all, however, should still stand the personal contact between participants and persons responsible for the pilot or demonstrator partners. For example, in the case of the Climathon, reaching out to pupils from participating pilot schools is best achieved via the direct contact between the pupils and the teachers (or directors) at the schools.

## 5.5 Incentives and the Motivation of Stakeholders

We agree with ChatGPD that a stakeholder should have an interest or concern in a particular demonstrator–pilot event. It is GreenSCENT's firm belief that the event itself should be attractive enough to capture the interest of participants and to lead to their engagement. Owing to the tremendous importance of the EU's Green Deal programme, which will directly impact the lifestyles of so many people, the attractiveness of the events should be no problem.

“Minor incentives”, such as (1) certificates of participation, (2) mentioning of an event and participants in (social) media, however, should do no harm, and they will be allowed (conditional on agreement with ethics and privacy). In exceptional circumstances, there may even be “major incentives”, such as the advisory support of the winning team in the Open Innovation Food Challenge organized by AGO for EU Citizens; in that case, the recipient is the young team of pupils from Novi Sad, Serbia, and the advice is given by GreenSCENT's consortium partner CSRC for marketing their idea. The idea of incentives in the form of a financial contribution is sought to be incompatible with ethics and is, hence, not been followed within GreenSCENT.



## 6. GreenSCENT Pilot Workshops

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In order to help to achieve a successful implementation of the demonstrator–pilot activities, various types of workshops are being held within GreenSCENT. This section closely follows the GA in their description.

### 6.1 Instructional Co-Design Workshops

In this type of workshop, the teachers and professors from the partner institutions implementing the pilot locally are engaged by GreenSCENT experts (e.g., from the partners who develop demonstrator tools) in co-designing the training activity. The training programs and contents are packed as a training kit, and published as an open access resource for the EU educational community in the context of WP4. This procedure contributes to the definition of an evaluation instrument assessing the learning performances of students after the preparatory training (Section 6.2) and the use of the GreenSCENT demonstrators (Section 10). Existing tools may require re-developing following co-design workshops to facilitate the GreenSCENT demonstration activities. The instructional co-design workshops have been carried out within Subtask 5.1.1 (Leader: CRA), and the report by CRA about the workshops has been submitted as Deliverable D5.1 in M18 (June 2023).

### 6.2 Preparatory Training Workshops

Here, a series of workshops will be conducted at each pilot site. The teachers, professors and GreenSCENT experts engage students and prepare them for participating and interacting with the demonstrators, which constitute the “core” of the pilot activities. The training will be done both in class (for traditional schools and universities), online (for UNINETTUNO, a full online university), or blended using both in-class activities and digital contents. The preparatory training workshops are carried out within Subtask 5.1.2 (Leader: CRA), they are expected to finish in M24 (December 2023).

### 6.3 Experimental Workshops

This phase will engage students in being active co-constructors of knowledge, using a collaborative and learning-by-doing approach. It will be implemented according to the educational level of the class, and to the focus of the pilot in terms of competence areas and levels. The GreenSCENT Demonstrators will interact with students experimenting and “analysing” their knowledge through a “science in the classroom” approach. It is planned to conduct one workshop per pilot. Participants will be carefully selected to ensure a balanced representation of different target groups to provide a realistic microcosm picture of the local citizens, which have the potential to become ambassadors for climate action, sustainable development and environmental protection by sharing their knowledge, experience and engagement with their families, local communities, public and private decision makers, as well as through communication and the use of social media. The experimental workshops will be carried out within Subtask 5.1.3 (Leader: CRA) and are expected to finish in M30 (June 2024).

### 6.4 Final Assessment

This task will both measure learning performances of students, teachers and professors' opinions about the GreenSCENT Competence Framework and its implementation, and students' and citizens' behavioural



changes, using assessment and evaluation methodologies and tools developed in WP4. The assessment will take place during the pilot activities; a first assessment will be done at the beginning of the pilots (especially pilots in schools and universities) creating a baseline that will be compared with the results of the second assessment, performed as the last step of the pilot activities. Finally, these activities will lead to deliverable D5.3. This final assessment and validation of the GreenSCENT implementation will be carried out within Task 5.4 (Leader: UNSPMF) and is expected to finish in M30 (June 2024).



## 7. Roles of the Partners

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Many from the set of GreenSCENT partners work in the project within WP5 on the development and adaptation of demonstrator tools: ENG, UAB, AGO, CRA, 4S, BSC and DBT. And also many work on the implementation of these tools at the pilot sites: BSC, EA, MAYK, VTT, RST, RGSMART, UNINETTUNO, UAB and UNSPMF. WP5 is strengthened by the work of partners on ethics (UAB) and the assessment of progress and behavioural change (CSRC, ECQA and UNINETTUNO). The work in WP5 benefits from the close collaboration among above mentioned partners.

The roles of the partners working as Demonstrators are described in Section 3, and of those working as Pilots in Section 4. Then there are the stakeholders (Section 5), who benefit from these activities; stakeholders may either be from within the GreenSCENT consortium (e.g., pupils at EA or RGSMART) or outside of (e.g., EU citizens). Teachers are usually assumed to come from the piloting institution, but they may also come from elsewhere; for example, for the Climathon demonstrator activity given online by CRA for partners EA and RGSMART, the team at RGSMART was strengthened by the presence of Prof. Dr. Biljana Basarin from UNSPMF, which resides in the same city (Novi Sad, Serbia).





## 8. Ethics and Privacy

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Ethical approval was sought and approved by the Ethical Committee at UAB at the beginning of this project. UAB manages the ethics of this project, which includes piloting activities.

Piloting participants were also provided with an information sheet, which outlined the purpose of the GreenSCENT project. This is done to ensure that participants or their guardians have a clear understanding of the project's goals before engaging in the activity.

### 8.1 Procedure

Each pilot partner is responsible for the administration, translation and storage of the consent forms for their piloting activity. Piloting partners are advised to print out a physical copy of the consent form and, when signed, to store at each pilot site. UAB will collect the consent forms intermittently throughout the course of the project at our in-person meetings. Consent forms will not be stored online.

Regarding confidentiality, all pilot participants' identity will be kept confidential and only members of the research team will have access to the data gathered during the piloting activities. Pseudonyms will always be used if case studies are presented. All participation is voluntary in all pilot activities, with participants free to withdraw from piloting activities without the need to explain.

### 8.2 Consent Forms

For the piloting activities, UAB developed three different consent forms:

- (1) assent form for minors (below the age of 18),
- (2) informed consent form for legal guardians of participants below age of 18,
- and
- (3) informed consent form for participants of age of 18 or older.

Each of these consent forms were adapted to align with the specific requirements of each piloting activity. For example, the description and associated risks outlined in the consent form for the microplastics activity (Section 10.4) differed slightly from those on the consent form for the Climathon activity (Section 10.6).

### 8.3 Data Storage

Each piloting site is responsible for the administration, translation and storage of the consent forms. UAB recommends that piloting partners generate a physical copy of the consent form and, once signed, store it at the respective pilot site. UAB will periodically gather these consent forms during our face-to-face meetings throughout the duration of the project. Subsequently, these consent forms will be securely kept at UAB and will be destroyed five years after the completion of the project. When the project is finished and all data have been analysed, the whole database will be anonymized and made available to other interested researchers.

## 9. Challenges, Risks and Mitigation Actions

The Periodic Technical Report (PTR) about the first project half (M1 to M18), Section 6 therein, listed critical implementation risk and mitigation actions. In relation to this pilot operation plan from WP5, the following entries are relevant (Tables 1, 2). Within these tables, we also comment on the current state (M22) from our perspective in WP5.

**Table 1.** Foreseen risks for WP5, applied mitigation measures, comments about state at M18 from PTR and comments about state at M22 from WP5.

Risk Number	Description	Applied mitigation measures	Comments (M18)	Comments from WP5 (M22)
8	Incomplete identification of all the involved stakeholders in the different pilots and consequent failure to engage them.	The involvement of leading institutions in each pilot, with extensive knowledge and connections in their respective contexts, is expected to enable a comprehensive identification and successful engagement of all relevant stakeholders.	While, as expected, the consortium includes relevant stakeholders from school, academia, industries and research centres, GreenSCENT managed to engage with external experts and interested stakeholders also beyond the purely educational landscape, through the "stakeholder survey" managed by AGORIZE and reaching hundreds of respondents across several countries, and through communication and dissemination activities targeting citizenship at large, scientific communities, education communities beyond the project consortium, and high level events as reported in D6.8.	As regards the stakeholders for WP5 (Section 5) – primary and secondary schools, HEIs, and EU citizens –, WP5 agrees with the overall positive comments for M18. The piloting activities carried out so far for the schools (Section 11) show an engaged performance of the schools and active participation from pupils. The same is expected also for HEIs, although the current data situation is less complete here (Section 11). The engagement and approach of EU citizens by various communication tools /Section 5.4) is being continued.
9	Communication issues that derive from the diversity of actors between the consortium and the involved communities: technical and non-technical actors, with different levels of education.	In its addressing of the pilot cases, the consortium will strive to promote an inclusive environment, with regular dissemination activities/ establishing clear communication pathways on the progress and applications of the research work.	Pilots, demonstrators and research protocols summarize inputs coming from several fields of expertise: psychology, pedagogy, environmental sciences, engineering, economy, service design, accessibility and media literacy among the others. This approach allowed an integration of visions and insights and the development of a shared commitment in the consortium and among all the involved actors for developing project results and planning pilot activities.	As can be said from the weekly or bi-weekly "WP5 Friday Online Meetings", there is full agreement with the comment from M18 about the involvement and commitment by the various partners. This clear communication indeed delivers a safe mitigation measure.
11	Low level of interest in workshop and pilot participation.	Coordinator and WP leaders clearly explain the scope of GreenSCENT and invite a wide range of participants. Workshops' schedule is arranged taking into account the participants' needs and availability. GreenSCENT will also motivate participants by offering meetings with experts and incentives.	Participation in the project activities was strong and committed; the consortium managed to raise the interest about the project outside the consortium, involving other projects both in discussion and common dissemination activities, and in pilot activities. GreenSCENT was able to interest schools outside the consortium, as for the case of AIRSAFE project in Italy, and with VOLENS association in Romania that will support GreenSCENT in 6 other schools in rural areas of Romania the 2nd reporting period for developing a pilot activity about biodiversity using GreenSCENT competence framework and research protocol (questionnaire).	Also here we fully agree with the comments from M18. In particular, the participation of schools has been a success owing to the important role of the teachers, who happen to know pupils personally, to speak in addition to English, also the local language and, last but not least, to know how to engage. It has to be seen how engagement with participants from HEIs will materialize since the experiences so far in the project are, according to plan, more reduced (than with pupils). The method of "minor incentives" (Section 5.5) seems to work as well.



**Table 2.** Unforeseen risks for WP5, applied mitigation measures, comments about state at M18 from PTR and comments about state at M22 from WP5.

Risk Number	Description	Applied mitigation measures	Comments (M18)	Comments from WP5 (M22)
U1	Complexity of the assessment questionnaire may impact on participants and their responses (overload, drop-outs).	GreenSCENT Competence Questionnaire integrates several modules (biographical and socio-demographic section, brief implicit association testing, general knowledge and skills by GreenSCENT areas, pro-environmental behaviours, values, intentions, explicit attitudes). However, it is built in a modular way in order to adapt to the several audiences and activities in the project: items for primary school students and youth assemblies participants are different, module structure for Open Innovation Challenges participants was lighter) in order to reduce overload and avoid drop-outs.	Risk did not materialize.	Also by M22, that risk has not materialized. The applied measures seem to have worked.
U4	The potential lack of engagement from participants and occurrence of drop-outs could adversely impact the pilots success.	Addressing this risk requires proactive measures to maintain motivation, effective communication. GreenSCENT recruitment strategy will be set up in order to attract and motivate participants. Partners involved in the pilots (both demonstrators and pilots) have extensive experiences in implementation and communication and are fully committed to the objective. Well defined Gantt chart with well-structured operational plan.	Risk did not materialize.	Also by M22, that risk has not materialized. The applied measures seem to have worked.



## 10. Demonstrators

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### 10.1 Environmental Monitoring App (ENG)

#### 10.1.1 Short Description

The GreenSCENT Environmental Monitoring Mobile App has been designed to allow the gathering of environmental reports from citizens on the territory. It implements a seamless pipeline that can effectively show, store and manage various types of geolocated reports, which can include multimedia content (e.g., videos, photos, documents and text) generated by, or made available by, the users of the GreenSCENT platform.

Using the App, any pilot can gather reports on the territory collected by its own authenticated users. Any report must be approved (or rejected) by the administrator of the institution in order to avoid duplicates or inconsistent or irrelevant reports.

Technically speaking, the Environmental Monitoring App is a non-native web application, so it is displayed through the native browser of the mobile platform (Safari for iOS, Chrome for Android), taking the form of a standard App almost indistinguishable from native ones.

Here are the main use cases supported by the App:

- (1) A registered user belonging to an institution (pilot) launches the App and follows the authentication process.
- (2) Now the user can see the list of all the reports already present (list-visualization from the most recent or map-visualization with an overall view on the whole situation of the territory).
- (3) Authenticated users can insert a new geolocated report accompanying it with an accurate description (title plus a more detailed text), photo/video documentation, classification (tags) according to the categories supported by the App.
- (4) The administrator evaluates the report through the Citizen Journalism webtool and decides if it can be approved or it must be rejected.
- (5) Other users belonging to the same pilot can see the report on their App, can consult it seeing all the related details; please note that app is always able to show the current distance between the user's position and the location of the report and open the native navigator App (GMaps for Android, Apple Maps for iPhone) to launch turn-by-turn navigation to reach a point.
- (6) Any report can be enriched by other users, who can add their own comments, updates and new photo/video documentation as well; This process is called "Social Enrichment" and its final goal is to allow the continuous monitoring of the report and the collection of data coming from different users that can confirm the report, update its status or simply enrich the attached documentation.
- (7) The owner of a report or the administrator can put a report in SOLVED state if they deem the issue is no more significant for the territory.



### 10.1.2 Technical Aspects

The technical prerequisites on the side of the pilot partners are: availability of recent iPhones or Android devices with internet connection and availability of at least one computer with internet connection and Google Chrome for the administrator. It is also possible for participants to be involved from home.

The joint use of Citizen Journalism tool (see Section 10.2) is mandatory to have access to the full set of the features of the App as that tool is mandatory to allow administrators to manage the life cycle of the reports.

### 10.1.3 Protocol of the Implementation

The protocol is pilot-dependent. In any case, the users involved must be registered in the pilot space on the platform and must be provided with credentials (username and pwd).

The aspects of implementation that are not pilot-dependent (i.e., the list of the use cases and related procedures) will be treated in the handbook that will be provided by ENG.

For the aspects of implementation that are pilot-dependent, see Section 11.

### 10.1.4 Recruitment (Participants, Procedure, etc.)

The aspects of recruitment are pilot-dependent, see Section 11.

### 10.1.5 Ethical Issues

The major issue is to guarantee the data privacy of participants, especially for participants that are below the age of 18. To use the App, participants must agree to activate the sharing of their geographical position with the App. Any request for consent from participants will be handled by the pilots.

### 10.1.6 Impact

Currently the impact of the Environmental Monitoring App cannot be empirically measured because of a still insufficient amount of data collected in the pilot sites. Theoretically, the impact is rooted in the participants' abilities and willingness to monitor their territory, reporting possible environmental risks (or best practices) stimulating a virtuous circle that pushes more and more people to take care of their territory.

The App should be a democratic tool used by the community (or simple groups of citizens) to coordinate their monitoring activities and to store the related multimedia documentation.

### 10.1.7 Behavioural Change

Currently the behavioural change of the Environmental Monitoring App cannot be empirically measured because of a still insufficient amount of data collected in the pilot sites. Theoretically, the change will concern the way of looking at the territory, pushing people to commit themselves personally to change and not to resign themselves to small (or bigger) environmental emergencies that occur in the living area of a community. The spirit is precisely that of encouraging active behaviour in reporting problems and investigating possible solutions instead of delegating the management of the territory to others.



## 10.2 Citizen Journalism/Greenverse (ENG)

### 10.2.1 Short Description

The tool was designed in order to allow monitoring the reports coming from the Environmental Monitoring App (Section 10.1).

It allows standard users to have a web version of the App with almost the same functionalities with the integration of some administrative features and the access of the full set of the functionalities of the platform about the management and the sharing of the multimedia content. The goal of the demonstrator is basically to make available the multimedia content coming from the reports on the territory for any other use in journalistic communication relating to environmental problems.

The use of the tool is mandatory to allow pilot administrators to manage the reports from the territory (coming for instance from Environmental Monitoring App) and to drive the life cycles (i.e., approval, rejection or solution) of any single issue.

### 10.2.2 Technical Aspects

All the Greenverse web tools are a robust web-application that is accessible through any modern web browser, including popular options such as Google Chrome, Mozilla Firefox, and others that support the HTML 5 standard and WebGL.

A good internet connection (not less than 10Mb/s) is required. It is also possible for participants to be involved from home.

The joint use of Environmental Monitoring App (Section 10.1) is mandatory in order to have access to the full set of the features as Citizen Journalism represents a web version of the mobile tool with some administration features that are missing in the mobile version.

### 10.2.3 Protocol of the Implementation

The protocol is pilot-dependent. In any case, the users involved must be registered in the pilot space on the platform and must be provided with credentials (username and pwd).

The aspects of implementation that are not pilot-dependent (i.e., the list of the use cases and related procedures) will be treated in the handbook that will be provided by ENG.

For the aspects of implementation that are pilot-dependent, see Section 11.

### 10.2.4 Recruitment (Participants, Procedure, etc.)

The aspects of recruitment are pilot-dependent, see Section 11.

### 10.2.5 Ethical Issues

The major issue is to guarantee the data privacy of participants especially for participants that are below the age of 18. During registration a disclaimer is shown with the terms of service of the platform. Any infringement of the policies about content restriction and code of conduct can be reported to the administrator of the pilot and may lead to the removal of the offending content and suspension of the user.



Any request for consent from participants will be handled by the pilots.

### 10.2.6 Impact

Currently the impact of the Citizen Journalism tool cannot be empirically measured because of a still insufficient amount of data collected in the pilot sites. Theoretically, the impact is rooted in the participants' abilities and willingness to monitor their territory, reporting possible environmental risks (or best practices) stimulating a virtuous circle that pushes more and more people to take care of their territory.

The web tool should be a democratic tool used by the community (or simple groups of citizens) to coordinate their monitoring activities and to store the related multimedia documentation.

### 10.2.7 Behavioural Change

Currently the behavioural change of the tool cannot be empirically measured because of a still insufficient amount of data collected in the pilot sites. Theoretically, the change will concern the way of looking at the territory, pushing people to commit themselves personally to change and not to resign themselves to small (or bigger) environmental emergencies that occur in the living area of a community. The spirit is precisely that of encouraging active behaviour in reporting problems and investigating possible solutions instead of delegating the management of the territory to others. Moreover, it aims to make available to any user the multimedia content collected in the monitoring of the territory including all the media items in the global GreenSCENT platform.



## 10.3 Interactive Documentary/Greenverse (ENG)

### 10.3.1 Short Description

The tool was designed to allow the construction of immersive experiences accessible from web/mobile browsers. The construction of these experiences starts from the definition of a background which can be an immersive multimedia element (360° video or photography) or a traditional one (standard film or photography) on which additional multimedia information content can be superimposed, visible by default or activated by specific user behaviours (click/tap hotspots).

Each setting/background is called a “bubble”. Particularly interesting is the possibility of implementing setting changes (actual jumps between the bubbles) depending on specific events (e.g. at a certain point in a video, when an icon is clicked, etc.)

The tool does not require any installation. Users of a pilot registered on greenverse can log in via the web, upload their material (background and content) to the greenverse platform and work on editing through the browser.

The results obtained can be shared via links on social networks, portals, messaging Apps, and it is also possible to generate QR codes.

### 10.3.2 Technical Aspects

All the Greenverse web tools are a robust web-application that is accessible through any modern web browser, including popular options such as Google Chrome, Mozilla Firefox, and others that support the HTML 5 standard and WebGL.

A good internet connection (not less than 10Mb/s) is required. It is also possible for participants to be involved from home.

### 10.3.3 Protocol of the Implementation

The protocol is pilot-dependent. Anyway the users involved must be registered in the pilot space on the platform and must be provided with credentials (username and pwd).

The aspects of implementation that are not pilot-dependent (i.e., the list of the use cases and related procedures) will be treated in the handbook that will be provided by ENG.

For the aspects of implementation that are pilot-dependent, see Section 11.

### 10.3.4 Recruitment (Participants, Procedure, etc.)

The aspects of recruitment are pilot-dependent, see Section 11.

### 10.3.5 Ethical Issues

The major issue is to guarantee the data privacy of participants especially for participants that are below the age of 18. During registration a disclaimer is shown with the terms of service of the platform. Any infringement of the policies about content restriction and code of conduct can be reported to the administrator of the pilot and may lead to the removal of the offending content and suspension of the user





Any request for consent from participants will be handled by the pilots.

### 10.3.6 Impact

Currently the impact of the Interactive Documentary tool cannot be empirically measured because of a still insufficient amount of data collected in the pilot sites. Theoretically, the impact is rooted in the participants' abilities to build interactive documentaries about the environmental topics of the territory around them.

The tool is a free cloud instrument accessible to any user registered to the GreenSCENT platform. It allows the creation of complex, interactive and immersive content without the need to purchase any commercial software or install anything on users' computers. Furthermore, the tool allows to freely distribute the created documentaries through web streaming and to share the access link on any web platform or messaging App. Thus, the promotion of a free and democratic distribution is of environmental content.

### 10.3.7 Behavioural Change

Currently the behavioural change of the tool cannot be empirically measured because of a still insufficient amount of data collected in the pilot sites. Theoretically, the change will concern the way of looking at the territory, pushing people to commit themselves personally to change and not to resign themselves to small (or bigger) environmental emergencies that occur in the living area of a community.

The spirit is to facilitate the creation of engaging content that allows both the documentation of small emergencies that occur in a territory and the addressing of broader discussions relating to global issues. The tool (together with the general characteristics of the platform) facilitates the distribution and sharing of results as much as possible, facilitating the creation of community awareness relating to environmental issues.



## 10.4 Microplastic Citizen Science (UAB)

### 10.4.1 Short Description

The microplastics activity is a collection of tasks designed to transform students into scientists. Students will analyse beach sand and collect data on the presence of microplastics and macroplastics. The objectives of this activity are threefold:

- (1) engage students in scientific research by conducting experiments;
- (2) reflect on the importance of our behaviour to preserve our environment;
- (3) raise awareness among students about the problem of solid waste and microplastics on our coastline.

This activity is linked to the following three Sustainable Development Goals (SDGs): SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action) and SDG 14 (Life Below Water).

Based on STEM and meaningful learning, this activity can be divided into a total of 11 distinct components or lessons, each of which is independent of one another. These include the following units.

- (1) Introduction to the project
- (2) How is our beach?
- (3) How is a beach formed?
- (4) Sieve analysis of a beach sample
- (5) Are we good bathers?
- (6) How many people are there today?
- (7) Waste separation
- (8) Interview the bather
- (9) Study of macro and microplastics
- (10) Plastics in everyday life
- (11) Our responsibility

### 10.4.2 Technical Aspects

The technical prerequisites for this activity will vary based on the particular course segment that students and teachers at each pilot site select. Nevertheless, the training kit for the entire activity includes the following:

- (1) Slides
- (2) Activity instructions
- (3) Reading materials
- (4) Excel spreadsheet (to input data)



- (5) Microplastics kit: Sand container, big spatula or small shovel, small whisk, broom, small container or bag, marker, trays, mesh sieves of varying sizes (2 mm, 1 mm, 0.5 mm, 0.063 mm), scales, magnifying glass, paper, labels, scissors, tape, 5-litre container, blotting paper, jars.
- (6) Plastic containers
- (7) Laptop
- (8) Wi-Fi
- (9) Mobile phone
- (10) Video editing software (conceived as an output of this activity)
- (11) Poster: Crayons, pens, paper (conceived as an output of this activity)

### 10.4.3 Protocol of the Implementation

The protocol and implementation of the microplastics demonstrator will vary for each pilot site. Pilot sites can decide on what part of the microplastics course they wish to focus on. All teaching materials and consent forms were made available to each pilot.

### 10.4.4 Recruitment (Participants, Procedure, etc.)

Participants for the microplastics activity are recruited from the pilot sites of EA in Greece and UNSPMF in Serbia. It is anticipated that in total, between 200–230 participants will take part in the microplastics activity. These participants include both secondary and university level students.

### 10.4.5 Ethical Issues

The main ethical issue present in the microplastics activity relates to the storage of data. As outlined in Section 8 (Ethics and Privacy) in this document, all participants' data taken from each pilot activity will be anonymized and treated with confidentiality. Each pilot site is responsible for the administration and storage of the consent forms. UAB will gather the consent forms intermittently throughout the course of the project and store these in a safe place for five years after the completion of the project, after which they will be destroyed.

Regarding confidentiality, all pilot participants' identity will be kept confidential and only members of the research team will have access to the data gathered during the piloting activities. Pseudonyms will always be used if case studies are presented. All participation is voluntary in all pilot activities, with participants free to withdraw from piloting activities without the need to explain.

### 10.4.6 Impact

The impact of this activity is anticipated to be substantial, potentially leading to positive behavioural change in participants. It is worth noting, however, that as of now, this impact has not undergone testing or validation.



#### 10.4.7 Behavioural Change

It is anticipated that this activity will sensitize students to the issue of microplastics and mesoplastics in our waterways and coastline, fostering their understanding of environmental sustainability and the importance of responsible consumption, more specifically with reference to plastics. These hands-on experiences will not only raise awareness but also inspire a sense of environmental stewardship among participants.



## 10.5 Open Innovation (AGO)

### 10.5.1 Short Description

We have initiated a series of open innovation challenges within GreenSCENT, with the first one being the "Sustainable Food Challenge" targeted at students in Europe. This challenge aimed to inspire a reimagining of how food is produced, distributed, and consumed across the continent. With over 600 participants from all corners of Europe, we culminated in a grand event held in Paris, where the six finalists had the opportunity to pitch their innovative ideas in front of the GreenSCENT Jury.

Our primary goal is to educate and cultivate pro-environmental behaviours through these open innovation challenges, empowering the youth to play a significant role in shaping the future of Europe. In a parallel effort, we recently launched a second program in October 2023, bringing together students and entrepreneurs within the farm-to-fork strategy. This program encourages the collection of groundbreaking ideas and revolutionary solutions, strengthening our commitment to fostering sustainability and positive change in Europe's food systems.

Those open innovation challenges are launched on the GreenSCENT innovation platform powered by AGO. Our platform enables the construction of immersive experiences accessible from web and mobile browsers. Participants can easily create teams and upload all the deliverables on the platform, whereas the admins have all the tools necessary to contact participants and to follow up on the operations KPIs.

### 10.5.2 Technical Aspects

Technical prerequisites and aspects of an open innovation challenge include:

- (1) A stable and user-friendly online platform for seamless entry submissions.
- (2) Clear guidelines for file formats and submission methods.
- (3) Compatibility with various devices, including laptops or mobile devices.
- (4) Compatibility with modern web browsers to ensure broad accessibility.
- (5) A good internet connection to facilitate participation and access to the platform.
- (6) Robust data security measures for protecting participant information.
- (7) Availability of technical support and resources to assist participants with potential issues.
- (8) A well-maintained technical infrastructure to minimize technical barriers and enable participants to focus on their creative contributions.

### 10.5.3 Protocol of the Implementation

The protocol to scope and prepare an Open Innovation challenge on the GreenSCENT platform is:



- (1) Define your challenge objective: Clearly articulate the challenge you want to address and its specific objectives. What problem are you trying to solve, and what outcomes do you expect?
- (2) Create a challenge brief: Prepare a detailed challenge brief that includes essential information such as the problem statement, target audience, evaluation criteria, and any relevant guidelines.
- (3) Set up your challenge on the platform :Sign in to your account or create one if you don't have an account yet. Click on the "Create a Challenge" or similar button to initiate the setup process.
- (4) Configure challenge details: Fill in all required information, including the challenge title, description, and key dates. Specify the start and end dates for submissions, as well as the deadline for judging.
- (5) Define evaluation criteria: Outline the criteria that will be used to assess submissions. These criteria should be aligned with your challenge objectives.
- (6) Set prizes and incentives: Determine the rewards or prizes for winners. Prizes can motivate participants and attract a broader audience.

Once the scoping protocol has been finalized, here are the key steps to implement and run an Open Innovation challenge:

- (1) Promote your challenge: Use Agorize's promotional tools to reach potential participants. Share your challenge on social media, your website, and other relevant channels to maximize visibility.
- (2) Manage submissions: Regularly monitor and review submissions on the Agorize platform. You can communicate with participants, provide feedback, and ask for clarifications if needed.
- (3) Onboard your jury members and mentors: Make sure that all jury members and mentors have the information that is necessary to fulfil their role within your challenge.
- (4) Select winners: As the submission deadline passes, engage your panel of judges to evaluate the entries based on the predefined criteria. Once the winners are selected, announce the results on the platform. Recognize and reward the winning participants.
- (5) Organize the final event and implement winning solutions: Each challenge generally ends with a final event in which the best teams or project owners have the opportunity to pitch their solution in front of a final jury. This is also an opportunity to reward the winning ideas and create networking opportunities. Depending on the nature of the challenge, work on implementing or integrating the winning solutions into your organization.
- (6) Engage with participants: Keep the conversation going with participants, gather feedback on the challenge process, and maintain engagement for future challenges.



- (7) Evaluate and learn: After the challenge is complete, evaluate its success in meeting the defined objectives. Identify areas for improvement and apply lessons learned to future challenges.
- (8) Close the challenge: Officially close the challenge on the Agorize platform and archive it for reference.
- (9) Iterate and plan future challenges: Use the insights gained from this challenge to plan and launch future open innovation challenges on Agorize.

#### 10.5.4 Recruitment (Participants, Procedure, etc.)

The Recruitment is pilot dependent, as for each challenge, a dedicated communication strategy is defined based on the targeted audience and geographical scope. Generally, we actively conduct school presentations and foster partnerships with universities and businesses, tapping into academic and professional networks to draw in potential participants. Our social media presence and strategically crafted email campaigns keep individuals well-informed about our ongoing challenges. Moreover, we prioritize targeted outreach to specific communities, ensuring that our invitations resonate with the right audience. This multipronged approach empowers us to curate a diverse and dynamic community of innovators and creative thinkers, enriching the challenge experience for all involved.

In a nutshell we work with a multichannel approach including:

- (1) Demand generation: On top of leveraging our database, we always look out for new ways to increase the reach and quality of applicants.
- (2) Listing on Agorize.com and on relevant websites of the ecosystem
- (3) Email and direct message campaigns: Distribution of direct emails and newsletters to our global network.
- (4) Social media: Organic and paid campaigns across social media channels including Facebook, Instagram, Twitter and LinkedIn.
- (5) Participants management: Respond to emails and inquiries on social media regarding the program.
- (6) Partners: Activation of our network and creation of new partnerships.

#### 10.5.5 Ethical Issues

Ethical issues we can encounter when launching an open innovation challenge on the GreenSCENT platform are:

- (1) Intellectual property rights: Ensuring proper protection and clear guidelines regarding the ownership and usage of participants' ideas. This ownership is specified in our challenge rules that dictate all main participation principles to our GreenSCENT operations. Indeed, we specify that the intellectual property resides with the participant of the challenge.
- (2) Transparency and fairness: Establishing a transparent and fair evaluation process to maintain trust among participants. Thanks to



the Agorize platform, we have put in place a fair evaluation process, thanks to which all jury members evaluate independently the challenge deliverables based on pre-defined criteria. Projects with the highest grades are selected to be part of the final.

- (3) Privacy and data protection: Complying with privacy and data protection regulations to handle participant data responsibly and ethically. This issue is mitigated by the implementation of dedicated Terms and Conditions and Privacy Policy for the GreenSCENT platform.
- (4) Accessibility and inclusivity: Promoting inclusivity to ensure a diverse range of participants can engage in the challenge. To maximize inclusivity, our challenges pages are tested with a contrast checker to increase accessibility.
- (5) Feedback and recognition: Providing constructive feedback and recognizing participants for their contributions are important. Failing to do so can be seen as disrespectful and unethical. We try as far as possible to engage jury members and mentors from the GreenSCENT consortium to provide participants with feedback on their projects.

### 10.5.6 Impact

Impacts of our open innovation challenges can include:

- (1) Fostering innovation: Open innovation challenges drive the generation of creative and innovative solutions to pressing sustainability issues, contributing to progress and problem-solving.
- (2) Citizen engagement: Involving citizens actively in sustainability initiatives empowers them to play a role in shaping their communities and the environment, fostering a sense of ownership and responsibility.
- (3) Youth empowerment: Engaging students and young innovators empowers the youth to contribute to real-world sustainability challenges, helping shape Europe's future and encouraging a sense of agency.
- (4) Educational value: Open innovation challenges provide experiential learning opportunities, allowing participants to gain practical insights into sustainability and the Green Deal, helping bridge the gap between theory and practice.
- (5) Social awareness: The ripple effect of open innovation challenges raises awareness of environmental issues within participants' networks, contributing to a growing consciousness of sustainability in society and encouraging broader engagement.





### 10.5.7 Behavioural Change

We anticipate that our Open Innovation programs have the potential to ignite pro-environmental behavioural changes. By engaging citizens, especially the youth, in crafting innovative solutions to sustainability issues, they not only address pressing environmental concerns but also instil a sense of responsibility and stewardship. As participants actively contribute to shaping Europe's sustainable future, they are likely to adopt more pro-environmental behaviours in their daily lives. The challenge's outcomes serve as inspiring examples, demonstrating that individuals can make a tangible impact on environmental issues. Over time, this collective awareness and behavioural shift can contribute to a broader cultural change towards more sustainable practices and attitudes, ultimately fostering a greener and more sustainable Europe. Nonetheless, the direct impact remains difficult to measure.



## 10.6 Climathon (CRA)

### 10.6.1 Short Description

The expression “Climathon” is a combination of the words “Hackathon” (a joint offline or online coding and analysis event) and “climate”. Within GreenSCENT, it means a joint online climate data analysis event. The implementation basically consists in (1) the delivery and explanations of course slides and (2) the setting of tasks.

The Climathon is implemented at HEIs and also at schools (see Section 11). The typical timescale of implementation is in the order of 3 days.

### 10.6.2 Technical Aspects

The technical prerequisites, on the one hand, of the pilot partners are: internet connection and availability of computers. It is also possible for participants to be involved from home. The technical supply items, on the other, of the demonstrator partner are: course slides, climate data and analysis software.

### 10.6.3 Protocol of the Implementation

The protocol to prepare the Climathon activity within the GreenSCENT project is as follows:

- (1) Define your scientific learning sub-disciplines from (a) climatology, (b) meteorology and (c) statistical sciences. Clearly set the specific learning objectives you wish to address.
- (2) Create new, or adapt existing, learning media in order to achieve the learning objectives from step (1). These media formats may include: (a) slides, (b) videos, (c) software and (d) online chat platforms:
- (3) Prepare a list of essential information for participants about objectives, media and preparation.
- (4) Prepare a list of essential information for teachers about objectives, media and preparation. Discuss with teachers beforehand about the feasibility and best implementation practice. If needed, adapt lists (3) and (4).
- (5) Configure course details: title, short description and key dates and times.
- (6) Define assessment criteria: Outline the criteria that will be used to evaluate course contributions. These criteria should be aligned with your course objectives (1).
- (7) Set incentives: Determine the rewards or prizes for successful participants. These can generate motivation and attract a broader audience.

The aspects of implementation that are not pilot-dependent (i.e., only demonstrator-dependent) consist in the Training Kits, which are described in D5.1.



For the aspects of implementation that are pilot-dependent, see Section 11.

#### 10.6.4 Recruitment (Participants, Procedure, etc.)

The participants for HEIs comprise hired personnel (professors, postdocs and PhD students) and university students. The participants for schools are pupils at a later stage of their school career (minimum age about 15 years, minimum school year about final or final minus 1).

The procedure to recruit participants from HEIs is via CRA's usual avenue (note that CRA teaches similar, but longer courses on a commercial basis outside of GreenSCENT): (1) adoption of long internal email lists; (2) distribution to specific newsgroups from the areas of climate and environmental sciences, ecology, geosciences, physics, mathematics and statistics; and (3) posting on professional social media (i.e., LinkedIn). Interested participants complete a registration form sent to CRA. Preference is given to participants from HEIs within the GreenSCENT consortium (i.e., UAB, UNINETTUNO and UNSPMF). In the case of free spaces (the maximum number of participants per event is in the order of 20), also other HEI researchers can participate; then participants from EU member states are preferred.

The procedure to recruit participants from schools (i.e., EA and RGSMART) is via the schools themselves: heads of schools and/or teachers directly approach pupils or make school-internal advertisements.

#### 10.6.5 Ethical Issues

The major issue is to guarantee the data privacy of participants. This is in response to the EU's GDPR. For participants from HEIs this is achieved via information and request of agreement in the Climathon registration form. For participants from schools (i.e., pupils below the age of 18), privacy is achieved via information and request of completed (by parents) consent forms. UAB is thanked for their cooperation on ethical issues in the project.

#### 10.6.6 Impact

Currently the impact of the Climathon cannot be empirically measured because of an insufficient amount of implementation data collected at the pilot sites. Theoretically, the impact of the Climathon is rooted in the participants' abilities of performing basic science: data, analysis, uncertainties and interpretation. These abilities will permeate through to (1) the various fields of scientific applications the researchers work in (for participants from HEIs) or (2) the various fields of study the pupils will take up after their school career (for participants from schools). It is difficult to measure such a type of impact because of (1) the longevity of the impact and (2) the possible existence of other events, which may have a similar theoretical impact.

#### 10.6.7 Behavioural Change

An imaginable change in the behaviour of participants (with regard to the theme climate change) should be easier to measure than a long-term impact because it is thought to be shorter-lived. Currently the behavioural change of participants imposed by the Climathon cannot be empirically measured because of an insufficient amount of implementation data collected at the pilot sites. It is expected that during the completion of the GreenSCENT project, a sufficient amount of data will be available owing to the questionnaire and assessment methodology to be completed in WP4.



## 10.7 CleanAir@Schools (4S)

### 10.7.1 Short Description

The CleanAir@Schools activity empowers pupils to measure air pollution in different areas around their school or neighbourhood. This activity is focused on improving the air quality around schools, providing schools with both the necessary tools to carry it out. It also delivers the didactic material to analyse problems related to air pollution and promote a healthier school environment.

Pollution levels are measured by passive dosimeters placed at strategic points around the school. The duration of sampling can be between 2 and 4 weeks, after which the tubes are collected and sent to the laboratory for analysis.

Any school can participate in this activity and each school is free to organize itself as it wishes. It is an activity mainly aimed at 5th and 6th grade of primary school, but also other age groups can be involved.

Apart from the main component of the activity (measuring air quality), a series of independent educational units are being developed to support the activity. These are:

- (1) Analysis of meteorology (2 units)
- (2) GIS (1 unit)
- (3) Visit an air quality monitoring station/facility (1 unit)
- (4) Mobility to/from school (1 unit)
- (5) Reduce exposure (1 unit)
- (6) Improve air quality (1 unit)
- (7) Vehicle count (1 unit)
- (8) Air quality data analysis and mapping (4 units)
- (9) Measure Particulate Matter (1 unit)
- (10) Analyse the results of CleanAir@Schools measurements (4 units)
- (11) Understand the effects of air dispersion (1 unit)

### 10.7.2 Technical Aspects

The technical prerequisites for the CleanAir@Schools activity are defined within a training kit for the main activity:

- (1) School guide
- (2) Presentation on air pollution
- (3) Presentation on CleanAir@Schools activity
- (4) Online questionnaire to recruit schools and gather practical information
- (5) CleanAir@School: NO<sub>2</sub> passive samplers, supports to mount samplers, cable ties, duplicated QR codes stickers, deployment sheet, zip bags or containers (to be provided by 4S-Innova)
- (6) 2/3-step ladder



- (7) Pliers
- (8) High visibility vest (*optional*)
- (9) Laptop/PC
- (10) Wi-Fi/data
- (11) Mobile phone/tablet (digital implementation)

Please note that the educational units may require further equipment/material which is specified in each unit.

### 10.7.3 Protocol of the Implementation

The protocol and implementation of the CleanAir@Schools demonstrator is standard. However, it may vary for each pilot site, depending on several factors. Pilot sites can decide on what part of the CleanAir@Schools course they wish to focus on. All teaching materials and consent form were made available to each pilot site.

In some cases, the participants (individual school) will register via a web form which will allow us to register the school for the activity. The users involved must be registered. This will allow us to provide them with credentials (username and pwd) for the CleanAir@School's web interface.

The practical part of the activity in each school consists of four phases:

- (1) Introduction to the activity and air pollution: An internal tutoring session to explain to the students what the task consists of and choose among all the most suitable points to measure pollution in the school environment.
- (2) Design of monitoring campaign with students with CleanAir@School's web interface.
- (3) Placement and collection of tubes with CleanAir@School's App: Two days dedicated field trips. One to place the sensors, and another, approximately 4 weeks later, to remove them (about 3 hours each day).
- (4) Data analysis of results: A final tutoring session to comment on the results and what can be done to improve them.

The CleanAir@Schools activity will last approximately 8 to 10 weeks.

### 10.7.4 Recruitment (Participants, Procedure, etc.)

Participants for the CleanAir@Schools activity are recruited from the pilot sites of EA (Greece) and UNSPMF (Serbia), and as well directly from schools in Catalonia and other parts of Spain. It is anticipated that in total between 800 and 1000 participants will take part in the CleanAir@Schools activity. These participants include both primary and secondary level students.

### 10.7.5 Ethical Issues

Ethical issues are taken into account under the CleanAir@Schools activity.



No personal data is stored or required to take action. Despite this, as outlined in Section 8 (Ethics and Privacy) in this document, all data taken from each pilot activity will be anonymized and treated with confidentiality. Each pilot site is responsible for the administration and storage of the consent forms. UAB will gather the consent forms intermittently throughout the course of the project and store these in a safe place for five years after the completion of the project, after which they will be destroyed.

Regarding confidentiality, all pilot participants' identity will be kept confidential. All information is generalized at school level. All participation is voluntary in all pilot activities, with participants free to withdraw from piloting activities without the need to explain.

In relation to accessibility and inclusivity, we especially promote inclusivity to ensure a diverse range of participants who can engage in the activity. To maximize inclusivity, CleanAir@Schools activity can be carried out both digital-platform-based and paper-based (analogue). IT platforms have been developed following accessibility guidelines.

Feedback and recognition to participants is also important. Providing constructive feedback and recognizing participants for their contributions are important. Failing to do so is seen as disrespectful and unethical.

## 10.7.6 Impact

CleanAir@Schools aims to create healthier school environments and promote environmental awareness among the younger generation. Impacts can be summarised as follows:

- (1) Citizen engagement: Involving citizens actively in environmental initiatives empowers them to play a role in shaping their communities and the environment, fostering a sense of ownership and responsibility.
- (2) Youth empowerment: Engaging students to contribute to real-world environmental challenges.
- (3) Educational value: CleanAir@Schools provides experiential learning opportunities, allowing participants to gain practical insights into measuring air pollution and analysing the results.
- (4) Social awareness: The activity raises awareness of environmental issues within participants' networks, contributing to a growing consciousness of sustainability in society and encouraging broader engagement.

## 10.7.7 Behavioural Change

The aim of the study is to involve citizens in carrying out air quality measurements around schools. Students, teachers and parents become aware of environmental problems and how they are conditioned by their own habits, mainly mobility, and thus try to make a change in them motivated by the results of this study.

This activity will also make the educational community aware of the issues relating to air pollution in our cities. It will increase their understanding of environmental sustainability and the importance of responsible mobility, more specifically with reference to day to day transportation to the school. These hands-on experiences will not only raise awareness, but also inspire a sense of environmental stewardship among participants.



## 10.8 GreenSCENT Augmented Reality App (BSC)

### 10.8.1 Short Description

The GreenSCENT Augmented Reality App includes a CleanAir@Schools application with the aim to inform, educate and promote behavioural changes related to air quality topics. Aimed primarily at children aged between 10 and 15 years, the app involves a series of lessons, games and challenges on the basics of air quality and air pollution.

The application consists of 11 lessons:

- (1) The air we breathe
- (2) Air Pollution
- (3) What we can't see
- (4) A matter of habits
- (5) Air pollution has no boundaries
- (6) The Air Quality Index
- (7) The colours of air quality
- (8) Comparing air quality
- (9) A risk to our health
- (10) Actions we can take
- (11) Cleaner air for all

Each lesson consists of two sections:

**Discover.** Where the users will be able to explore and learn the basic concepts about air quality through different interactions like Card slideshow, clickable hotspots on images, Accordions and Augmented Reality 3D maps.

**Challenge.** In this section of the lessons, users will be able to evaluate their knowledge on the concepts they learned in the "Discover " section through a quiz that consists of questions regarding the lesson with interactions such as "Multiple Choice" or "True or False".

After achieving the challenge correctly on each lesson, the user will earn a trophy that will appear in the profile section where the collection of trophies can be seen.

### 10.8.2 Technical Aspects

The requirements are:

- Wi-Fi/data
- Mobile phone/tablet with camera

To explore the Augmented Reality maps, the phone should make use of the camera and allow permissions for it to use it so the 3D elements can appear and the user can be able to explore them.



The application consists of a web-app, this decision was taken to allow users from different native environments to be able to use the application. The application is designed to be mobile-first, but we decided to also let it be accessible on desktop devices so we increase the accessibility and more users can use it even if they don't have access to a mobile phone.

### 10.8.3 Protocol of the Implementation

The protocol for implementation is simple, depending on the amount of mobiles available, the activity can be done in groups, preferably from 2 to 4, but not restrictive to these numbers. The usual time needed for completing all the lessons is one hour.

Important points that were taken into account for the design of this application were inclusivity, accessibility and flexibility. Since the activity can be done as "homework" where the teacher can evaluate if the students earned all the trophies and use the time in class to share experiences, allow more questions or even make a contest on which group takes less time to earn all the trophies, all depending on the time the teachers have for activity as well as how many devices are available.

Some resources will be uploaded in the "Resources" section with different ideas and extra questions and materials for the teachers to be creative if they want to implement the activity in a more flexible way.

### 10.8.4 Recruitment (Participants, Procedure, etc.)

Participants for the CleanAir@Schools activity are recruited from the pilot sites of EA in Greece, MAYK in Finland, RGSMART in Serbia, RST in Romania and l'Institut Architecte Manuel Raspall in Spain. It is anticipated that this activity has at least one group in each of the pilot sites mentioned. These participants include both primary and secondary level students.

### 10.8.5 Ethical Issues

As outlined in Section 8, all participants' data taken from each pilot activity will be anonymized and treated with confidentiality. Each pilot site is responsible for the administration and storage of the consent forms.

In the CleanAir@Schools application, all ethical considerations are made. There is no need to store or use personal data. The section "profile" does not save any personal data, it only saves the progress of the user locally and this can be erased too in the profile section.

### 10.8.6 Impact

By providing them with comprehensive knowledge about air quality, the CleanAir@Schools application aims to raise awareness and empower students to take action.

Potential impacts of the CleanAir@Schools app include the following:

- (1) **Increased Awareness.** The application will help students understand the importance of air quality and its impact on their health and well-being. It will share with them important lessons about the composition of the air they breathe and the factors that contribute to air pollution.
- (2) **Behavioural Change.** By learning how their daily habits and activities can affect air quality, students will be motivated to make





more informed choices. They will understand the importance of reducing pollution sources, such as avoiding unnecessary vehicle emissions or reducing energy consumption.

- (3) **Empowerment.** The application will equip students with the knowledge and tools to read the air quality index, interpret air quality maps, and understand the potential risks to their health. This empowers them to make informed decisions about outdoor activities and take necessary precautions when air quality is poor.
- (4) **Collective Action.** Students will be encouraged to share their knowledge and promote awareness of air quality among their peers, families, and communities. This can lead to a collective effort in implementing actions to improve air quality, such as advocating for cleaner transportation or supporting initiatives to reduce pollution sources.

### 10.8.7 Behavioural Change

The CleanAir@Schools application will not only let students learn about the factors that contribute to air pollution but also highlight the potential behavioural changes they can make to reduce their environmental impact. For example, it will emphasise the importance of using alternative modes of transportation such as walking, cycling, or public transportation instead of relying heavily on private vehicles.

By understanding the negative effects of exposure to bad air quality, students will be able to read air quality maps and make more informed choices that allows them to have less exposure to pollutants in outdoor activities.



## 10.9 Youth Design Assemblies (DBT)

### 10.9.1 Short Description

The objective of the Youth Design Assemblies (YDAs) is to engage young, lay citizens in inspiring the development of the content for the pilots developed in WP5 and the corresponding curriculum in WP4. Generally, the participants in the YDAs have been discussing their thoughts, questions, wishes and ideas for improvements and additions to the GreenSCENT Competence Framework and the content in each pilot presented to them. They have received feedback from WP1 and pilots on how their thoughts, questions, wishes and ideas have inspired the work in GreenSCENT. Within a year and a half, the four YDAs convened roughly once every second month (digitally) to provide feedback to content produced in WP4 and WP5. During Phase 2 of the project (autumn 2023), the YDAs worked as a pilot in the GreenSCENT project, as the four YDAs travelled to meet their co-participants in their own YDA physically in dedicated events organized in Italy, Denmark, Spain and Serbia.

### 10.9.2 Technical Aspects

Several technical issues and challenges have to be considered regarding the YDAs, especially (but not exclusively) in connection to the online meetings.

- (1) Access to functioning computers, smartphones and other digital/technical equipment: All participants have access to the necessary equipment. It is possible that participants who are recruited through partner schools borrow equipment if needed.
- (2) Internet accessibility: Some participants may not have a stable connection at home, resulting in minor connection outages.
- (3) Language, lack of simultaneous online translation: Language barriers have been countered by making it clear during recruitment that all meetings will be convened in English. The participants all speak and understand English on a sufficient level.
- (4) Monotony/lack of excitement: The online meeting format posed a challenge in regards to maintaining the participants' attention and interest during the meetings. DBT has put much effort into developing an interactive and engaging meeting design and format, which meant that the participants were generally active and interested throughout the meetings.
- (5) Tiredness after a "long school day" or plain fatigue with online schooling after COVID: Even though online meetings have become a familiar concept for students since COVID, many young people feel despair and fatigue with the concept of online meetings and online schooling. This was countered throughout the interactive meeting design and by designing the content with the participants' key interests in mind.
- (6) Social barriers—relationship building: Despite DBT's efforts to create social and trust instilling spaces within the four YDAs, the social relations between the participants do not come as natural as they do in physical meetings. DBT have made an effort to create and nurture confidential and trust-inspiring spaces, by dividing participants into



smaller break out rooms, encouraging small talk and group work, guiding the participants to discuss and present topics to each other, and by maintaining a clear and trustworthy relation between the facilitator (DBT) and the participants in between-meetings.

- (7) Busy schedules for participants (education, extracurricular activities, social life, jobs, family, and other types of voluntary/activist work): The YDAs predominantly consist of very active and busy young people with busy schedules. This makes it even more important to create interesting and relevant meetings.

Language barriers have been solved by making it clear during recruitment that all meetings will be convened in English. The participants all speak and understand English on a sufficient level. During the in-person meetings, the participants were able to use their smartphones to connect to Wi-Fi or mobile network, in order to test and use the apps that they worked with during the meeting. The in-person meetings (pilot activities) were convened in locations with a stable and fast Wi-Fi connection and with access to necessary IT equipment. Overall, the in-person meetings have been conducted without major technical faults. The YDAs tested two apps (GreenSCENT Citizen Journalism and CleanAir@Schools) during the in-person meetings and reported several technical issues in the apps. This feedback will be analysed and handed over to the relevant partners.

### 10.9.3 Protocol of the Implementation

The protocol of the implementation of the Youth Assemblies can be divided into two phases: (A) Recruitment and design of the YDAs and (B) Organisation and conduction of the YDAs. The details are as follows.

#### (A) Recruitment and design of the YDAs

- (1) Developing a recruitment guide for partners.
- (2) Creating an online application formula with respect to GDPR policies and parental consent.
- (3) Assisting partners in recruitment (while also recruiting in Denmark).
- (4) Selecting participants among applications, ensuring diversity and representability.
- (5) Formally inviting the final participants to join the YDAs and presenting the tentative program for the next 1.5 years.

#### (B) Organisation and conduction of the YDAs.

- (1) Dividing the participants into 4 YDAs.
- (2) Designing an engaging and interactive meeting concept using accessible and stable online platforms (Zoom, Mural).
- (3) Designing interesting and relevant content for 7 separate online meetings and 4 in-person meetings, considering how to include the various pilots and GreenSCENT content.
- (4) Preparing each meeting in detail and coordinating with partners and other "guests".
- (5) Establishing a clear and trusted communication between facilitator (DBT) and participants.



#### 10.9.4 Recruitment (Participants, Procedure, etc.)

The KPI is to involve at least 60 young people from Italy, Spain, Serbia, Finland, Romania, Greece and Denmark in the YDAs. Each partner in these countries has been responsible for recruiting 12 participants. Presently, there are 56 active participants aged between 14 and 24 years in the YDAs, not including those 21 participants who have dropped out along the way. It has not been possible to withhold all participants in the YDAs, which has led to dropouts (though within the expected dropout level). Dropout issues were solved by further relation building, designing engaging meetings, contacting supplementary participants and accepting a slight imbalance regarding nationality (number of participants per country ranges from 7 in Italy to 10 in Serbia). Desired age span was extended due to challenges in recruitment.

DBT asked the recruiting partners to recruit with diversity in mind, to ensure diversity with regards to age, gender, education, occupation, and geographical zone of residency. In the recruitment and in the final selection of participants, we have strived for representativeness, but also for diversity, by considering the following criteria:

- (1) Diversity: Strive for diversity in the recruitment when looking at gender, type of studies, urban/rural, income, etc.
- (2) Inclusion: Strive to include minorities and vulnerable groups (persons with disabilities, persons from ethnic minorities, persons with refugee background, etc.).
- (3) Age: Young people in the age group between 17 and 25 years.
- (4) Language: Participants with all language backgrounds and ethnicities are welcome. However, for the YDAs to function, they must be able to speak and read English.
- (5) Occupation: The participant must be a student or have an interest in climate change, environmental issues, sustainability, or design/co-design.

In the application form, the applicants for the YDAs are asked to provide information on their eventual minority role, such as disability, ethnicity, gender, social background, etc., in order for DBT to select a diverse group of participants.

#### 10.9.5 Ethical Issues

The main ethical issues considered by DBT in relation to the in-person meetings, are related to diversity and representativeness among the participants. For instance, a large percentage of the participants are enrolled, or plan to enrol, in university, and most live in large or medium-sized cities. Few – but some – represent a minority in terms of (dis)ability, gender and ethnicity. Much work has been done in this regard during the recruitment process (Section 10.9.3). Another ethical issue is related to the language of communication. For practical reasons, all meetings (online and in-person) have been conducted in English, which meant that it was not possible to join a YDA without being able to speak English. Similarly, there are no participants with severe visual or hearing impairment in the YDAs, which can be partly explained by the fact that DBT has not advertised specifically for these groups to join the YDAs.

#### 10.9.6 Impact

Currently, the impact of the YDAs has not been empirically measured. However, DBT judges that the participants, through their participation and engagement, have developed skills related to co-creation, action-



taking, intercultural collaboration, debate and discussion, didactics, digital accessibility and app testing. And they have gained in-depth knowledge of The European Green Deal, the Green Competences, the GreenSCENT Competence Framework and app development. Most crucially, the participants have experienced that they can play a role and have a say in important matters, such as the green transition and green education in Europe, which will strengthen their further engagement in political and social matters.

In terms of impact on the tested apps and the GreenSCENT Competence Framework, the YDAs have provided valuable feedback to the tools, which will provide the relevant partners with unique insights as to how the tools can be further developed and improved.

### 10.9.7 Behavioural Change

The behavioural change among the YDA participants is described as “Impact” (Section 10.9.6).



## 11. Pilot Implementations

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The demonstrator activity Citizen Journalism/Greenverse (Section 10.2) strongly depends on the demonstrator activity Environmental Monitoring App (Section 10.1). Therefore, within this Section 11, we treat the situation that a pilot partner implements both activities as follows. We describe the full implementation only in the first subsection, while in the second subsection we refer to the first one.

### 11.1 Pilot Partner UAB (ES)

#### 11.1.1 Demonstrator Activity *GreenSCENT Augmented Reality App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, please see a description of a preliminary implementation by pilot partner EA (Section 11.2.7).

- 11.1.1.1 *Context*
- 11.1.1.2 *Stakeholders*
- 11.1.1.3 *User Recruitment and Invitation*
- 11.1.1.4 *Pilot Team, Roles*
- 11.1.1.5 *Implementation Tasks and Schedule*
- 11.1.1.6 *Links to the Curriculum*
- 11.1.1.7 *What are the KPIs?*
- 11.1.1.8 *Specific Risks and Mitigation*

#### 11.1.2 Demonstrator Activity *Youth Design Assemblies*

##### 11.1.2.1 *Context*

The YDAs are designed to engage youth people in the GreenSCENT project through bi-monthly online workshops facilitated by GreenSCENT partners. The discussions in these meetings span a diverse range of topics concerning the state of the planet and our society. Insights from these discussions go towards the development of the GreenSCENT project, acting as a sounding block for the development of our tools and learning materials.

In addition to these online workshops, YDA participants also have the opportunity to participate in in-person meetings, one of which was held in Barcelona, Spain from 8 to 10 September 2023. This meeting was held in the Residencia de Investigadores in the neighbourhood of Raval in Barcelona.

##### 11.1.2.2 *Stakeholders*

The stakeholders in the YDA in Spain include the following:



- (1) UAB who took care of the logistics of this event
- (2) YDA participants
- (3) YDA organisers (DBT)
- (4) 4S who coordinated the air quality demonstrator with YDA participants.

### 11.1.2.3 *User Recruitment and Invitation*

YDA participants from Spain were recruited via email and social media channels. Each prospective YDA participant was invited to meet with the Spanish recruiter to discuss why they wanted to join the YDA. This was an important step, as it allowed prospective YDA participants to ask questions and clarify any issues that they may have had regarding their participation in this activity.

### 11.1.2.4 *Pilot team, Roles*

As previously mentioned, UAB were in charge of coordinating the pilot with inputs from DBT and 4S on the pilot programme.

### 11.1.2.5 *Implementation Tasks and Schedule*

The schedule for this activity was as follows:

<b>Friday 08.09</b>	
<b>Time</b>	<b>Activity name</b>
14.00-16.15	Check in at the hotel/hostel
16.15-17.45	Welcome and settling in Welcome, presentation on the program for the weekend, get to know each other. Building relationships.
17.45-18.00	Break
18.00-18.30	Getting started: Zero pollution Introduction to the selected competence (ZERO POLLUTION) in focus
18.30-19.30	Getting started: Citizen journalism Conducting citizen journalism with the GreenSCENT app + GreenVERSE net website (360) event pre-test if there is time
<b>Saturday 09.09</b>	
8.30-9.00	Breakfast
9.00-9.15	Good morning and a short presentation of today's program
9.15-10.15	CleanAir@Schools activity – presentation by Jaume and Maria
10.15-10.30	Get ready to walk
12.00-12.30	Q&A with Jaume and Maria
12.30-13.00	Break and walk to the restaurant
18.00-19.15	Working with the GreenVERSE website and/or writing blog posts
19.15-19.30	Follow up on the days' activities and a few words about tomorrow



19.30-19.45	Break
8.30-9.00	Breakfast and check out
9.00 9:05	Good morning and a short presentation of today's program
9:05 -10.00	App feedback workshop (evaluating the GreenVERSE website and GreenSCENT app)
10.00-10.10	Break
10.10-12.30	Competence workshop

#### 11.1.2.6 *Links to the Curriculum*

This activity can be linked to the following third level course in the Barcelona area:

Bachelor's Degree in Environmental Science (UAB)

#### 11.1.2.7 *What are the KPIs?*

Number of participants: (8 students).

#### 11.1.2.8 *Specific Risks and Mitigation*

The specific risks identified for this activity concerned the safety of the YDA participants in the city of Barcelona. This risk was mitigated by adult supervision during outdoor activities in the city.





## 11.2 Pilot Partner EA (GR)

### 11.2.1 Demonstrator Activity *Environmental Monitoring App*

#### 11.2.1.1 *Context*

The GreenSCENT Environmental Monitoring App has been designed to allow the gathering of environmental reports from citizens on the territory. It implements a seamless pipeline that can effectively show, store and manage various types of geo-located reports, which can include multimedia content (e.g., videos, photos, documents and text) generated by, or made available by, the users of the GreenSCENT platform.

Both the Environmental Monitoring App and Citizen Journalism demonstrators will be linked to other activities piloted at EA, for example, the Environmental Monitoring App and the CleanAir@Schools in order to monitor and report areas of increased air pollution levels or using the Citizen Journalism to suggest potential areas of nature-based solutions integration for increasing air quality and/or regulating greenhouse gases (GHGs) in the air for the city of Athens.

#### 11.2.1.2 *Stakeholders*

The stakeholders in the Interactive Documentary activity at EA are:

- (1) secondary school students (7th to 9th grade),
- (2) parents,
- (3) school principals,
- (4) teachers,
- (5) researchers.

#### 11.2.1.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for the GreenVerse activities focus on inclusivity, aiming to engage all students. The emphasis will be on encouraging active participation from students of different backgrounds, fostering a collective effort to address different sustainability challenges, comprehensively within and outside of the school community.

Taken into consideration skills such as consistency, diligence and, most of all, willingness, the teams are formed. This effort is undertaken to achieve comprehensive participation, by extending invitations to more students, seeking to create a more holistic and representative involvement of all students of 7th to 9th grade to the GreenSCENT demonstrators.

#### 11.2.1.4 *Pilot team, Roles*

The pilot team for the GreenVerse activities (comprising currently three teachers and one science educator) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and informal settings inside and outside the school. The school principal leads the integration of the activity into the curriculum under the Skills Labs programme, ensuring its alignment with learning objectives, targeted competences to be developed and assessed, and fostering a widespread and inclusive participation. Additionally, the inclusion of the researchers provides vital scientific and technical



support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within and outside the school environment.

#### 11.2.1.5 *Implementation Tasks and Schedule*

October 2023 to November 2023: Instructional co-design workshops and training sessions on the pre-pilot implementation planning (ENG partner presented the GreenVerse app).

January 2024: Co-designing workshops with the teachers (internally at EA) in order to prepare the activities, the activities and link the GreenVerse apps to ongoing sustainability projects.

February 2024 to May 2024: Piloting phase.

#### 11.2.1.6 *Links to the Curriculum*

The GreenVerse activities are linked into the lower secondary school curriculum. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution, urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics.

#### 11.2.1.7 *What are the KPIs?*

Students and teachers participated: 50 students and 3 teachers.

Environmental reports prepared by the students: 10 reports.

#### 11.2.1.8 *Specific Risks and Mitigation*

Risk: technical issues with the GreenVerse app; mitigation: continuous support from the GreenSCENT partners (ENG).

### 11.2.2 *Demonstrator Activity Citizen Journalism/Greenverse*

See Section 11.2.1.

11.2.2.1	<i>Context</i>
11.2.2.2	<i>Stakeholders</i>
11.2.2.3	<i>User Recruitment and Invitation</i>
11.2.2.4	<i>Pilot Team, Roles</i>
11.2.2.5	<i>Implementation Tasks and Schedule</i>
11.2.2.6	<i>Links to the Curriculum</i>
11.2.2.7	<i>What are the KPIs?</i>
11.2.2.8	<i>Specific Risks and Mitigation</i>



### 11.2.3 Demonstrator Activity *Interactive Documentary*

#### 11.2.3.1 *Context*

The tool was designed to allow the construction of immersive experiences accessible from web/mobile browsers. The construction of these experiences starts from the definition of a background which can be an immersive multimedia element (360° video or photography) or a traditional one (standard film or photography) on which additional multimedia information content can be superimposed, visible by default or activated by specific user behaviours (click/tap hotspots).

For this reason, EA tests the Interactive Documentary demonstrator with the lower secondary school students and teachers for developing immersive experiences of the school sustainability practices applied.

#### 11.2.3.2 *Stakeholders*

The stakeholders in the Interactive Documentary activity at EA are:

- (1) secondary school students (7th to 9th grade),
- (2) school principals,
- (3) teachers,
- (4) researchers.

#### 11.2.3.3 *User Recruitment and Invitation*

During the user Recruitment and invitation phase for the Interactive Documentary demonstrator, the emphasis is on engaging the students (15 in total) who participated during the co-design workshops held in May 2022.

Taking into consideration skills such as consistency, diligence and, most of all, willingness, the teams are formed. This effort is undertaken to achieve comprehensive participation, by extending invitations to more students that are willing to participate in the activity under the guidance and support of their schoolmates (acting as mentors) who have already tested the Interactive Documentary interface.

#### 11.2.3.4 *Pilot Team, Roles*

The pilot team for the GreenVerse activities (currently comprising three teachers and one science educator) plays a pivotal role in facilitating the piloting activities. The school principal leads the integration of the activity into the curriculum, ensuring its alignment with learning objectives, targeted competences to be developed and assessed and fostering a widespread and inclusive participation. Additionally, the inclusion of the researchers provides vital scientific and technical support, enriching the initiative with evidence-based insights and guidance on addressing and integrating sustainability challenges effectively within the school environment.

#### 11.2.3.5 *Implementation Tasks and Schedule*

May 2022: Co-design workshop (in-person) with UNINETTUNO researchers.



October 2023 to November 2023: Instructional co-design workshops and training sessions on the pre-pilot implementation planning.

February 2024 to May 2024: Piloting phase.

The main phases are as follows:

- (1) take pictures of the school surroundings scenario;
- (2) build the scenario environment in the platform;
- (3) immersive and interactive experience design;
- (4) documentary: research for contents production and annotation;
- (5) user experience: GoLive with the interactive immersive environment.

#### 11.2.3.6 *Links to the Curriculum*

The Interactive Documentary demonstrators will be linked into the lower secondary school curriculum. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects on sustainability school practices, art and the SDGs.

#### 11.2.3.7 *What are the KPIs?*

Students and teachers participated: 20 students and 2 teachers.

Interactive Documentaries prepared by the students: 5 interactive documentaries.

#### 11.2.3.8 *Specific Risks and Mitigation*

Risk: technical issues with the GreenVerse app; mitigation: continuous support from the GreenSCENT partners (UNINETTUNO and ENG).

### 11.2.4 *Demonstrator Activity Microplastic Citizen Science*

#### 11.2.4.1 *Context*

The microplastics activity is a collection of tasks designed to transform students into scientists. At EA, the activity will be pilot-tested with the primary school students. Thus, students will analyse the sand from a beach in the broader area of the Attiki region, Greece, and collect data on the presence of microplastics and macroplastics. The objectives of this activity are threefold:

- (1) engage students in scientific research by conducting experiments;
- (2) reflect on the importance of our behaviour to preserve our environment;
- (3) raise awareness among students about the problem of solid waste and microplastics on our coastline.



This activity is linked to the following three SDGs: SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action) and SDG 14 (Life Below Water).

#### 11.2.4.2 *Stakeholders*

The stakeholders in the Microplastics activity at EA include the following:

- (1) primary school students (150),
- (2) school principals (2),
- (3) teachers (6),
- (4) researchers (1 researcher from EA and 1 researcher from UAB).

#### 11.2.4.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for the Microplastics activity focuses on inclusivity, aiming to engage all students (150 students, 9th grade). The emphasis is on encouraging active participation from students of different backgrounds, fostering a collective effort to address the issue of Microplastics comprehensively within and outside the school community.

#### 11.2.4.4 *Pilot Team, Roles*

The piloting team for the Microplastics activity at the school (comprising currently six teachers and two science educators) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and non-formal settings. The school principal leads the integration of the activity into the curriculum, ensuring its alignment with learning objectives, targeted competences to be developed and assessed, and fostering a widespread and inclusive participation. Additionally, the inclusion of a researcher provides vital scientific support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within the school environment.

#### 11.2.4.5 *Implementation Tasks and Schedule*

February 2023: Introductory presentation of the content and the educational resources for the Microplastics activity (under the WP5 pilot-testing planning activities).

May 2023: Presentation and co-design activity for the Microplastics activity during the GreenSCENT project meeting in Barcelona.

September 2023 to December 2023: Co-designing the Microplastics activity with the EA teachers and researchers. Identifying links to the curriculum and ongoing activities of the school.

January 2024 to February 2024: Pilot implementation period.

#### 11.2.4.6 *Links to the Curriculum*

The Microplastics activity is linked to the 4th Grade Learning for Sustainability Education Programme under the thematic areas of 'Water resources management and pollution' and 'Water and health'.



#### 11.2.4.7 *What are the KPIs?*

Students and teachers participated: 150 students and 6 teachers.

#### 11.2.4.8 *Specific Risks and Mitigation*

Nothing to be identified.

### 11.2.5 *Demonstrator Activity Climathon*

#### 11.2.5.1 *Context*

The Climathon activity is originally a course in climate data analysis designed in format and content for participants from HEIs. For the implementation at schools, the format was changed (more breaks, time for teachers to interact with participants) and the content was severely reduced.

The major educational impetus is to teach young participants the need and methodical tools of a quantitative approach in climate and data analysis. This is in order to meet the future challenges associated with anthropogenically enhanced climate warming within the context of the European Green Deal.

The Climathon activity for pilot partner EA is done online jointly also for pilot partner RGSMART (Section 11.5.4).

#### 11.2.5.2 *Stakeholders*

The stakeholders in the Climathon at EA include the following:

- (1) students,
- (2) school principals,
- (3) teachers,
- (4) researchers (1 from EA, 1 from CRA and 1 from UNSPMF).

#### 11.2.5.3 *User Recruitment and Invitation*

Climathon participants at EA were recruited based on their interest in climate-related topics. Students of the 9th and 10th grade were invited to participate as part of their overall Climate Change projects that are, or will be, piloted during the school year (i.e., skills labs, science clubs). Since the Climathon is originally a course in climate data analysis, which is an advanced topic, a maximum number of 15 students was set, in order to be able for the facilitators (teachers and/or researchers) to support the students during the course. In the end, a number of 6 students registered for the Climathon course.

#### 11.2.5.4 *Pilot Team, Roles*

The pilot team consisted of one researcher and a science educator (as facilitators) and 6 students of the 9th and 10th Grade. During the course, one of the facilitators (researcher) was supporting the students answering questions related to climate data acquisition, analysis and visualization as well as the second



facilitator (science educator) was guiding them to link the topics of the course to different climate-related projects of the curriculum.

### 11.2.5.5 *Implementation Tasks and Schedule*

The schedule for this activity was as follows:

<b>Day 1, Wednesday, 11. October 2023</b>	
<b>Time</b>	<b>Description</b>
08.30–09.00	Technical preparations at CRA, EA and RGSMART
09.00–09.15	Welcome, presentation of course developer and lecturer Dr. Manfred Mudelsee (CRA) as well of local teachers and representatives Loukas Katikas (EA) and Jelena Desnica (RGSMART)
09.15–10.00	Lecture: Climate. climate system; climate variables (temperature, precipitation, wind speed); surface-air temperature time series, global; surface-air temperature time series, local (Potsdam, Germany); paleoclimate rainfall time series; proxy variables
10.00–10.15	Break
10.15–11.00	Lecture: Climate (continued). climate equation; trend component; extreme component; noise component; scientific method; Karl Popper; Plato; first principles of physics; statistical inference
11.00–11.15	Break
11.15–12.00	Exercises. How do the first principles of physics lead to the climate equation, or something else? What is a 90% confidence band? Do you have examples of concepts for other complex system than the climate?
<b>Day 2, Thursday, 12. October 2023</b>	
<b>Time</b>	<b>Description</b>
08.55–09.00	Technical preparations at CRA, EA and RGSMART
09.00–09.45	Lecture: Climate Data. Temperature time series; measurement devices; invention of thermometer; daily measurement practices
09.45–10.15	Break
10.15–11.00	Lecture: Climate Data (continued). Mean monthly versus mean monthly temperature time series; sample size; leap days; GISTEMP global, monthly-mean, surface-air temperature time series
11.00–11.15	Break
11.15–12.00	Exercises. How many days comprises the time interval from 01/01/1893 to 31/12/2018? Data homogeneity rural versus urban temperature measurement stations. Data file and text editor. Find for your preferred station (town) the temperature data in the internet.
<b>Day 3, Friday, 13. October 2023</b>	
<b>Time</b>	<b>Description</b>
08.55–09.00	Technical preparations at CRA, EA and RGSMART
09.00–09.45	Lecture: Climate Data Analysis. Trend component definition; linear trend model. How to infer linear trend components? Uncertainties.
09.45–10.15	Break
10.15–11.00	Lecture: Climate Data (continued). Statistical inference. Idea of least-squares trend estimation. Calculation of least squares trend estimates for the GISTEMP series.
11.00–11.15	Break
11.15–12.00	Exercises. Software LINFIT. Replication of calculation of least squares trend estimates for the GISTEMP series. Calculation of least squares trend estimates for the series from the preferred stations (Day 2). Discussion: Nonlinear trend models.
12.00	Farewell



### 11.2.5.6 *Links to the Curriculum*

The Climathon activity is linked into the high school curriculum since it integrates relevant material into already existing subjects via interdisciplinary activities. Subjects such as science, skills labs, as well as extracurricular activities such as TEDx and Young Scientists Groups lend themselves to projects and discussions on climate change and climate data analysis that allow students to get introduced to more complex scientific topics.

### 11.2.5.7 *What are the KPIs?*

Number of participants (students): 6.

Number of education stakeholders engaged: 3.

### 11.2.5.8 *Specific Risks and Mitigation*

Nothing to be identified.

## 11.2.6 *Demonstrator Activity CleanAir@Schools*

### 11.2.6.1 *Context*

In case of EA, the pollution levels are measured by passive dosimeters placed at strategic points around the school (10 to 12 dosimeters) as well as nearby to the students' residential areas or neighbourhoods (150 dosimeters) in the broader area of Athens. At least 5 dosimeters are placed next to the official air pollution stations located in Athens (2 stations).

The main idea is to export data and maps of the air pollution levels for the city of Athens. The follow-up activities will focus on localized awareness-raising campaigns at different districts or areas of Athens with increased air pollution levels.

The CleanAir@Schools activity empowers pupils to measure air pollution in different areas around their school or neighbourhood. This activity is focused on improving the air quality around schools, providing schools with both the necessary tools to carry it out. It also delivers the didactic material to analyse problems related to air pollution and promote a healthier school environment.

Apart from the main component of the activity (measuring air quality), a series of independent educational units are being developed to support the activity. These are:

- (1) analysis of meteorology (meteorological reports);
- (2) GIS (mapping and interpolation schemes);
- (3) mobility to/from school/home;
- (4) reduce exposure;
- (5) improve air quality (nature-based solutions);
- (6) air quality data analysis and mapping (reading and plotting data files such as CSV files)
- (7) analyse the results of CleanAir@Schools measurements (producing reports, posters and awareness-raising campaigns)





- (8) understand the effects of air dispersion

#### 11.2.6.2 Stakeholders

The stakeholders (including their numbers) in the CleanAir@Schools activity at EA include the following:

- (1) students (150),
- (2) students as mentors (15),
- (3) parents,
- (4) teachers and science educators (6),
- (5) school principals (2),
- (6) researchers (2).

#### 11.2.6.3 *User Recruitment and Invitation*

In the CleanAir@schools project, EA has to select 150 students out of a total of 520 that we accommodate in junior high school. We decide to engage students from the 7th, 8th and 9th grade, accordingly. The criteria were specific in our effort to make the procedure easier but worthwhile at the same time. We select the participants based on their willingness to participate in activities, their diligence and, most of all, their eagerness to enrich their knowledge on green issues.

#### 11.2.6.4 *Pilot Team, Roles*

The pilot team comprised 150 students of the 7th, 8th and 9th Grade, 2 high-school principals, 6 teachers and educators and 1 researcher. During the co-design, training and piloting sessions, the school principals and the researcher examined the entire structure and content of the activity, the links to the curriculum and the timeline for implementing CleanAir@Schools.

Moreover, 12 students (out of 150 students in total) acted as mentors for co-facilitating and supporting their schoolmates during the pilot implementation period.

#### 11.2.6.5 *Implementation Tasks and Schedule*

17th March 2023: Co-Design Workshop and training (teachers and researchers)

26th September 2023: Training session (Students as mentors: 12, teachers: 4, school principal: 1, researcher: 1).

October to November 2023: Training sessions (3) with the students as mentors for co-facilitating the activity with their schoolmates.

November 2023: Training sessions (2) with the teachers and science educators on the timeline and the technical aspects of the activity. Additional activities were added during the pilot implementation period (2 months in total) to keep the students engaged. For example, the weather report on a daily basis as long as the tubes are installed, data analysis using GIS platforms when the air pollution data will be received, air pollution reports and awareness-raising campaigns right after the end of the activity.

21st to 23rd November 2023: All dosimeters were installed at EA. A number of 15 students, 3 teachers, 2 school principals and 1 researcher participated.



23rd to 25th November 2023: All dosimeters at the students' neighbourhoods were installed. All teachers (6) facilitated the process along with researchers and the school principals. Moreover, all parents were informed and invited to support the students during the installation process.

#### Outlook

23rd December 2023: All dosimeters are collected and delivered to the 4S team for analysing the samples.

January 2024: The results are sent and delivered to the students (point data maps and raw data measurements of the broader area of Athens and EA with the air pollution levels at all areas).

#### 11.2.6.6 *Links to the Curriculum*

The CleanAir@Schools is hard-wired into the high school curriculum since they integrate relevant material into already existing subjects by creating interesting activities. Subjects such as science, geography, biology, skills labs, as well as extracurricular activities, such as TEDx and Young Scientists Groups — lend themselves to discussions on air-pollution and hands-on activities that allow students to observe and understand air pollution and its effects on peoples' health and the environment.

These CleanAir@Schools demonstrator fosters an interdisciplinary approach in both junior and senior high school by incorporating elements of not only the above-mentioned subjects, but also of mathematics and even arts through maps and posters so that the students will communicate their findings.

#### 11.2.6.7 *What are the KPIs?*

Students and teachers participated: 150 students and 6 teachers.

Number of tubes placed inside and outside the school: minimum 80.

#### 11.2.6.8 *Specific Risks and Mitigation*

Risk: technical issues with the CleanAir@Schools app; mitigation: continuous support from the GreenSCENT partners (4S).

Risk: lack of interest and level of engagement; mitigation: preparing side activities during the air pollution monitoring (1 month) and sample analysis (1 month) periods.

#### 11.2.7 *Demonstrator Activity Augmented Reality App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, we describe here a preliminary implementation.

#### 11.2.7.1 *Context*

The CleanAir@Schools application aims to inform, educate and promote behavioural changes related to air quality topics. Aimed at the primary school students of EA (typically 10 years old), the app involves a series of lessons, games and challenges on the basics of air quality and air pollution.



The application consist on 11 lessons that are pilot-tested including:

- (1) The air we breathe
- (2) Air pollution
- (3) What we can't see
- (4) A matter of habits
- (5) Air pollution has no boundaries
- (6) The Air Quality Index
- (7) The colours of air quality
- (8) Comparing air quality
- (9) A risk to our health
- (10) Actions we can take
- (11) Cleaner air for all

#### **11.2.7.2** *Stakeholders*

The stakeholders in the CleanAir@Schools application at EA include:

- (1) students,
- (2) teachers and science educators,
- (3) school principals,
- (4) researchers.

#### **11.2.7.3** *User Recruitment and Invitation*

The user recruitment and invitation phase for the school's CleanAir@Schools activity focuses on inclusivity, aiming to engage all of the students (150 students). The emphasis is on encouraging active participation from students of different grades (10th to 11th Grade) and backgrounds, fostering a collective effort to address the issue of air pollution comprehensively within the school community.

#### **11.2.7.4** *Pilot Team, Roles*

The piloting team for the CleanAir@Schools activity at the school (comprising currently six teachers and two science educators) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources. The school principal leads the integration of the activity into the curriculum, ensuring its alignment with learning objectives, targeted competences to be developed and assessed and fostering a widespread and inclusive participation. Additionally, the inclusion of a researcher provides vital scientific support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within the school environment.



### 11.2.7.5 *Implementation Tasks and Schedule*

May 2022: Co-design workshop (in-person) with the teachers and students of the primary school.

April 2023 to May 2023: Orchestrating the piloting activities for the next school year (in combination with the CleanAir@Schools demonstrator).

April 2024 to May 2024: Pilot implementation period.

### 11.2.7.6 *Links to the Curriculum*

The CleanAir@Schools application and activity is linked to the 5th Grade Learning for Sustainability Education Programme under the thematic area of 'Emission of carbon dioxide carbon dioxide and air pollutants'.

### 11.2.7.7 *What are the KPIs?*

Students and teachers to participate: 100 students and 6 teachers.

### 11.2.7.8 *Specific Risks and Mitigation*

Risk: technical issues with the CleanAir@Schools app; mitigation: continuous support from the GreenSCENT partners (BSC).

Risk: level of difficulty for primary school students to high; mitigation: teachers and researchers support the adaptation of the GreenApp content and the piloting process.

## 11.2.8 *Demonstrator Activity Youth Design Assemblies*

### 11.2.8.1 *Context*

The objective of the YDAs is to engage the upper secondary school students in inspiring the development of the content for the pilots developed in WP5 and the corresponding curriculum in WP4. Generally, the participants in the YDAs are discussing their thoughts, questions, wishes and ideas for improvements and additions to the GreenSCENT Competence Framework and the content in each pilot presented to them. They receive feedback from WP1 and pilots on how their thoughts, questions, wishes and ideas are inspiring the work in GreenSCENT. Within a year and a half, the four YDAs convene roughly once every second month (online) to provide feedback to content produced in WP4 and WP5. During phase 2 of the project (in autumn 2023), the YDAs act as a pilot in the GreenSCENT project, as the four YDAs moved to meet their co-participants in their own YDA physically in selected events organized in Italy, Denmark, Spain and Serbia.

### 11.2.8.2 *Stakeholders*

The stakeholders during the Youth Assemblies on behalf of EA include the following:

- (1) students (9),
- (2) teachers and science educators (8),
- (3) school principals (2),



(4) researchers (4 or 3 from DBT and 1 from EA).

### 11.2.8.3 *User Recruitment and Invitation*

Recruiting young students for assemblies lends itself to much discussion and thought-provoking procedures. The YDA recruitment was a tall order for us but we eventually reached a consensus to recruit with diversity in mind, with regards to age, gender and interest.

Taking into consideration skills such as consistency, diligence and, most of all, willingness, we formed the teams that were engaged in the YDAs. Communication skills are also an important factor to bear in mind.

The major interest, however, was the feedback the pilot organizers received from the participants. It turns out that the meetings' targets came to fruition and that our criteria of choice were the right ones.

### 11.2.8.4 *Pilot Team, Roles*

On behalf of EA, two school principals and one researcher helped the YDA meetings in terms of supporting the students mainly during the in-person meetings in Denmark, Spain, Italy and Serbia. In addition, the pilot team, in cooperation with the students, provided the participants with computers in situations when the online meetings were scheduled during school hours.

### 11.2.8.5 *Implementation Tasks and Schedule*

May 2022 to June 2022: Recruitment phase.

September 25th 2022, for all YDAs: Joint online kick-off meeting (introduction and getting to know the participants).

October 25th to 26th, 2022: Online meeting (co-design on the GreenSCENT Competence Framework).

November 30th to December 1st, 2022: Online meeting (co-design on the GreenSCENT Competence Framework Knowledge Graph).

February 1st to 2nd, 2023: Online meeting (co-design on the GreenVerse apps).

April 12th to 13th, 2023: Online meeting (co-design on the GreenVerse apps).

June 7th to 8th, 2023: Online meeting (co-design on the air pollution activity, CleanAir@Schools activity and app).

September 1st to 3rd, 2023 for YDA 1: In-person meeting in Denmark (Copenhagen, energy efficiency).

September 8th to 10th, 2023 for YDA 2: In-person meeting in Spain (Barcelona, air pollution, CleanAir@Schools).

September 22nd to 24th, 2023 for YDA 3: In-person meeting in Italy (Rome, From Farm to Fork).

October 6th to 8th, 2023 for YDA 4: In-person meeting in Serbia (Novi-Sad, circular economy).

November 15th to 16th, 2023: Online meeting (Taking action! Meeting the Danish Youth Delegate to the UN on climate and biodiversity).

January 20th, 2024 for all YDAs: Final joint online meeting.



#### 11.2.8.6

#### *Links to the Curriculum*

All thematic areas addressed during the online and in-person meetings for the YDAs are linked to the national Learning for Sustainability Education Programme, the Skills Labs and the Sustainability Clubs of the school (depending on the pupils' grade). For instance, the From Farm to Fork and Air Pollution activities are linked to the 9th grade Skills Labs under the topics of 'Sustainable Food Systems – Local products of Greece' and 'Sustainability Citizenship'.

#### 11.2.8.7

#### *What are the KPIs?*

Number of Greek participants: (9 students)

Means of verification for participating in the online and in-person meetings (attendance list, travel reports).

#### 11.2.8.8

#### *Specific Risks and Mitigation*

The risks occurred mainly on the participants' dropout rate and/or the inability to attend the online meetings. To overcome those challenges, during the recruitment phase, a number of 12 students were recruited in total. In instances where students of the YDA could not attend online meetings, facilitators took proactive measures. They provided follow-up discussions and regular updates to ensure the participants' continued engagement and inclusion in the YDA activities.



## 11.3 Pilot Partner MAYK (FI)

### 11.3.1 Demonstrator Activity *Environmental Monitoring App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, we describe here a preliminary implementation.

#### 11.3.1.1 *Context*

The GreenSCENT Environmental Monitoring App is designed to collect environmental evidence from residents throughout a specific urban area. It implements a continuous pipeline that can efficiently exhibit, store, and manage various types of geo-located reports, which can contain multimedia information (e.g., videos, images, documents, and text) generated or made available by GreenSCENT platform users.

Both the Environmental Monitoring App and the Citizen Journalism demonstrators will be linked to other activities piloted at MAYK, such as using the Environmental Monitoring App and the CleanAir@Schools to monitor and report areas of increased air pollution levels, or using Citizen Journalism to suggest potential areas of nature-based solutions integration for increasing air quality and/or regulating GHGs in the air for the city of Helsinki, Finland.

#### 11.3.1.2 *Stakeholders*

The stakeholders in the Environmental Monitoring App activity at MAYK are:

- (1) faculty students,
- (2) school principals,
- (3) educators,
- (4) researchers,
- (5) parents.

#### 11.3.1.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for the Environmental Monitoring App activities focus on inclusivity, aiming to engage all students. The emphasis will be on encouraging active participation from students of different backgrounds, fostering a collective effort to address different sustainability challenges, comprehensively within and outside of the school community.

Taken into consideration skills such as consistency, diligence and, most of all, willingness, the teams are formed. This effort is undertaken to achieve comprehensive participation, by extending invitations to more students, seeking to create a more holistic and representative involvement of all students of different educational levels to the GreenSCENT demonstrators.



### 11.3.1.4

#### *Pilot Team, Roles*

The pilot team for the Environmental Monitoring App activities (comprising 2 researchers and 10 educators) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and informal settings inside and outside the school and university. The school principal leads the integration of the activity into the curriculum under the Skills Labs programme, ensuring its alignment with learning objectives, targeted competences to be developed and assessed, and fostering a widespread and inclusive participation. Additionally, the inclusion of the researchers provides vital scientific and technical support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within and outside the school environment.

### 11.3.1.5

#### *Implementation Tasks and Schedule*

ECQA and CSRC participated and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards in line with WP4.

Under the guidance of ECQA and CSRC, the "Climate Change" skill card was tested, discussed and fine-tuned by teachers of Lower Secondary and High Schools. They provided ECQA and CSRC with valuable insights in the concrete needs of this target group. For example, only 10 to 14 statements or learning outcomes per area are considered useful and feasible, and the statements should be summarized on a higher level. This is highly important feedback for the GreenSCENT design and exploitation of results. The feedback and input from teachers will be considered to tailor the skill cards and certification process to the needs of schools.

May 2023: Preliminary co-design workshops with UNINETTUNO research team.

January 2024: Instructional co-design workshops and training sessions on the pre-pilot implementation planning to prepare the pilot activities with the VTT team.

March 2024 to May 2024: Piloting phase.

### 11.3.1.6

#### *Links to the Curriculum*

The Environmental Monitoring App activities are linked into the secondary school curriculum. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution, urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics. The educational tool can be connected to the courses dealing with sustainability topics, the European Green Deal, and the SDGs by assigning educational tasks consisting of transforming theoretical research on sustainability into an immersive experience.

### 11.3.1.7

#### *What are the KPIs?*

The KPIs (aim or minimum aim) are:

- (1) minimum 50 students,
- (2) 10 educators,
- (3) 2 researchers;
- (4) minimum 10 environmental reports prepared by the students.





### 11.3.1.8 *Specific Risks and Mitigation*

Risk: technical issues with the Environmental Monitoring app; mitigation: continuous support from the GreenSCENT partners (ENG).

### 11.3.2 *Demonstrator Activity CleanAir@Schools*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, we describe here a preliminary implementation.

#### 11.3.2.1 *Context*

MAYK will measure pollution levels by passive dosimeters placed at strategic points around the wider area of the school.

The main idea is to export data and maps of the air pollution levels from the urban areas of Helsinki. The follow-up activities will focus on localized awareness-raising campaigns at different districts or areas of Helsinki with increased air pollution levels.

The CleanAir@Schools activity empowers pupils to measure air pollution in different areas around their school or neighbourhood. This activity is focused on improving the air quality around pilots, providing pilots with both the necessary tools to carry it out. It also delivers the didactic material to analyse problems related to air pollution and promote a healthier school environment.

Apart from the main component of the activity (measuring air quality), a series of independent educational units are being developed to support the activity. These are:

- (1) analysis of meteorology (meteorological reports);
- (2) GIS (mapping and interpolation schemes);
- (3) mobility to/from educational institution/home;
- (4) reduce exposure;
- (5) improve air quality (nature-based solutions);
- (6) air quality data analysis and mapping (reading and plotting data files such as CSV files);
- (7) analyse the results of CleanAir@Schools measurements (producing reports, posters and awareness-raising campaigns);
- (8) understand the effects of air dispersion.

#### 11.3.2.2 *Stakeholders*

The stakeholders in the CleanAir@Schools activity at MAYK are:

- (1) faculty students,
- (2) school principals,



- (3) educators,
- (4) researchers,
- (5) parents.

### 11.3.2.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for the CleanAir@Schools activities focus on inclusivity, aiming to engage all students. The emphasis will be on encouraging active participation from students of different backgrounds, fostering a collective effort to address different sustainability challenges, comprehensively within and outside of the school community.

Taken into consideration skills such as consistency, diligence and, most of all, willingness, the teams are formed. This effort is undertaken to achieve comprehensive participation, by extending invitations to more students, seeking to create a more holistic and representative involvement of all students of different educational levels to the GreenSCENT demonstrators.

### 11.3.2.4 *Pilot Team, Roles*

The pilot team comprised 10 educators, 2 researchers, and minimum 50 students from secondary school. During the co-design workshops, training and piloting sessions, the educators and researchers examined the entire structure and content of the activity, the links to the curriculum and the timeline for implementing CleanAir@Schools activities under different formal and informal settings inside and outside the school. Educators and researchers acted as mentors for co-facilitating and supporting their students during the pilot implementation period.

### 11.3.2.5 *Implementation Tasks and Schedule*

ECQA and CSRC participated and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards in line with WP4.

Under the guidance of ECQA and CSRC, the "Climate Change" skill card was tested, discussed and fine-tuned by teachers of Lower Secondary and High Schools. They provided ECQA and CSRC with valuable insights in the concrete needs of this target group. For example, only 10 to 14 statements or learning outcomes per area are considered useful and feasible, and the statements should be summarized on a higher level. This is highly important feedback for the GreenSCENT design and exploitation of results. The feedback and input from teachers will be considered to tailor the skill cards and certification process to the needs of schools.

January 2024: Instructional co-design workshops and training sessions on the pre-pilot implementation planning to prepare the pilot activities with the VTT team.

March 2024 to May 2024: Piloting phase.

### 11.3.2.6 *Links to the Curriculum*

The CleanAir@Schools activities are linked into the secondary school curriculum. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution,



urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics.

#### 11.3.2.7 *What are the KPIs?*

The KPIs (aim or minimum aim) are:

- (1) minimum 50 students,
- (2) 10 educators,
- (3) 2 researchers;
- (4) minimum 30 dosimeters placed around the faculty.

#### 11.3.2.8 *Specific Risks and Mitigation*

Risk: technical issues with the CleanAir@Schools app; mitigation: continuous support from the GreenSCENT partners (4S).

Risk: lack of interest and level of engagement; mitigation: preparing side activities during the air pollution monitoring (1 month) and sample analysis (1 month) periods.

### 11.3.3 *Demonstrator Activity Augmented Reality App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, please see a description of a preliminary implementation by pilot partner EA (Section 11.2.7).

#### 11.3.3.1 *Context*

The Interactive Documentary authoring tool facilitates the creation of immersive experiences that can be accessed via internet browsers. Developing these experiences begins with creating a 360° background by using 360° videos or images, in which additional multimedia resources can be visualised, or activated by specific user interactions (click/tap hotspots, hyperlinks).

As a result, MAYK tests the GreenVerse Interactive Documentary demonstrator with university professors, researchers and students to create immersive experiences on sustainability according to the school's sustainability policies and courses.

#### 11.3.3.2 *Stakeholders*

The stakeholders in the Interactive Documentary activity at MAYK are:

- (1) faculty students,
- (2) school principals,
- (3) educators,



- (4) researchers,
- (5) parents.

#### 11.3.3.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for the Interactive Documentary activities focus on inclusivity, aiming to engage all students. The emphasis will be on encouraging active participation from students of different backgrounds, fostering a collective effort to address different sustainability challenges, comprehensively within and outside of the school community.

Taken into consideration skills such as consistency, diligence and, most of all, willingness, the teams are formed. This effort is undertaken to achieve comprehensive participation, by extending invitations to more students, seeking to create a more holistic and representative involvement of all students of different educational levels to the GreenSCENT demonstrators.

#### 11.3.3.4 *Pilot Team, Roles*

The pilot team for the GreenVerse activities (currently comprising 10 educators and 2 researchers) plays a pivotal role in facilitating the piloting activities. The school principal leads the integration of the activity into the curriculum, ensuring its alignment with learning objectives, targeted competences to be developed and assessed and fostering a widespread and inclusive participation. Additionally, the inclusion of the researchers provides vital scientific and technical support, enriching the initiative with evidence-based insights and guidance on addressing and integrating sustainability challenges effectively within the school environment.

#### 11.3.3.5 *Implementation Tasks and Schedule*

May 2023: Preliminary co-design workshops with UNINETTUNO research team.

January 2024: Instructional co-design workshops and training sessions on the pre-pilot implementation planning to prepare the pilot activities with the VTT team.

March 2024 to May 2024: Piloting phase.

#### 11.3.3.6 *Links to the Curriculum*

The Interactive Documentary activities are linked into the secondary school curriculum. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution, urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics. The educational tool can be connected to the courses dealing with sustainability topics, the European Green Deal, and the SDGs by assigning educational tasks consisting of transforming theoretical research on sustainability into an immersive experience.

#### 11.3.3.7 *What are the KPIs?*

The KPIs (aim or minimum aim) are:



- (1) minimum 50 students,
- (2) 10 educators,
- (3) 2 researchers;
- (4) minimum 10 immersive interactive documentaries generated by the students.

#### **11.3.3.8** *Specific Risks and Mitigation*

Risk: technical issues with the Interactive Documentary demonstrator; mitigation: continuous support from the GreenSCENT partners (ENG).



## 11.4 Pilot Partner RST (RO)

### 11.4.1 Demonstrator Activity *Environmental Monitoring App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023). The completion of this subsection is therefore not fully presented.

#### 11.4.1.1 *Context*

#### 11.4.1.2 *Stakeholders*

Students

Teachers

School managers

Parents

#### 11.4.1.3 *User Recruitment and Invitation*

Our goal is to engage all students aged between 14 and 16 years. The emphasis will be on encouraging active participation of students, as well as developing a collaborative effort to address various sustainability concerns both within and outside of the school community. Teams are established by taking into account skills such as consistency, diligence, and, most importantly, willingness.

We aim to ensure comprehensive engagement by inviting additional children, with the goal of creating a more holistic and representational involvement of all year-10 students in the GreenSCENT demonstration.

#### 11.4.1.4 *Pilot Team, Roles*

The pilot team for the GreenVerse activities (8 teachers) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and informal settings inside and outside the school.

#### 11.4.1.5 *Implementation Tasks and Schedule*

October 2023 to November 2023: Instructional co-design workshops

February 2024: Co-designing workshops with the teachers in order to prepare the activities, the activities and link the GreenVerse apps to ongoing sustainability projects.

March 2024 to May 2024: Piloting phase

ECQA and CSRC participated and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards in line with WP4.

Under the guidance of ECQA and CSRC, the "Climate Change" skill card was tested, discussed and fine-tuned by teachers of Lower Secondary and High Schools. They provided ECQA and CSRC with valuable insights in the concrete needs of this target group.



#### 11.4.1.6 *Links to the Curriculum*

The GreenVerse activities are included into the curriculum of the so-called Key Stage 2 groups. They create interdisciplinary activities to incorporate pertinent material into already established subjects. The lessons in Personal, Social, Health and Economic Education (PSHEE), science, humanities, as well as arts are perfect occasions to teach the children about sustainability and climate.

#### 11.4.1.7 *What are the KPIs?*

Participation of 8 teachers and 50 students.

Number of environmental reports prepared by the students: 10.

#### 11.4.1.8 *Specific Risks and Mitigation*

Risk: technical issues with the GreenVerse app; mitigation: continuous support from the GreenSCENT partners (ENG).

### 11.4.2 *Demonstrator Activity Citizen Journalism/Greenverse*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023). The completion of this subsection is therefore not fully presented.

#### 11.4.2.1 *Context*

#### 11.4.2.2 *Stakeholders*

Students

Teachers

School managers

Parents

#### 11.4.2.3 *User Recruitment and Invitation*

#### 11.4.2.4 *Pilot Team, Roles*

#### 11.4.2.5 *Implementation Tasks and Schedule*

ECQA and CSRC participated and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards in line with WP4.

Under the guidance of ECQA and CSRC, the "Climate Change" skill card was tested, discussed and fine-tuned by teachers of Lower Secondary and High Schools. They provided ECQA and CSRC with valuable insights in the concrete needs of this target group.



- 11.4.2.6 *Links to the Curriculum*
- 11.4.2.7 *What are the KPIs?*
- 11.4.2.8 *Specific Risks and Mitigation*

### 11.4.3 *Demonstrator Activity Interactive Documentary*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023). The completion of this subsection is therefore not fully presented.

#### 11.4.3.1 *Context*

The tool was designed to allow the construction of immersive experiences accessible from web/mobile browsers. The construction of these experiences starts from the definition of a background, which can be an immersive multimedia element (360° video or photography) or a traditional one (standard film or photography), on which additional multimedia information content can be superimposed, visible by default or activated by specific user behaviours (click/tab hotspots).

#### 11.4.3.2 *Stakeholders*

Students (8 to 10 years old, 40 students)

Teachers (5)

School managers

Parents

#### 11.4.3.3 *User Recruitment and Invitation*

During the user recruitment and invitation phase for the Interactive Documentary demonstrator, the emphasis is on engaging the students (20) who participated during the co-design workshops held in April 2022. Recruitment and selection of the teachers and students was conducted two months prior to the workshop.

#### 11.4.3.4 *Pilot Team, Roles*

The pilot team for the GreenVerse activities (currently comprising 4 teachers) plays a pivotal role in facilitating the piloting activities. They lead the integration of the activity into the curriculum, ensuring its alignment with learning objectives, targeted competences to be developed and assessed and fostering a widespread and inclusive participation.

#### 11.4.3.5 *Implementation Tasks and Schedule*

May 2022: Co-design workshop (in-person) with UNINETTUNO researchers.





October 2023 to November 2023: Instructional co-design workshops and training sessions on the pre-pilot implementation planning.

February 2024 to May 2024: Piloting phase.

ECQA and CSRC participated and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards in line with WP4.

Under the guidance of ECQA and CSRC, the "Climate Change" skill card was tested, discussed and fine-tuned by teachers of Lower Secondary and High Schools. They provided ECQA and CSRC with valuable insights in the concrete needs of this target group.

#### 11.4.3.6 *Links to the Curriculum*

The students from the Key Stage 2 groups (Section 11.4.1.6) create interdisciplinary activities to incorporate pertinent material into already established subjects. The PSHEE lessons, science, humanities, as well as arts are perfect occasions to teach the children about sustainability and climate.

#### 11.4.3.7 *What are the KPIs?*

Interactive documentaries prepared by the students: 5 interactive documentaries.

#### 11.4.3.8 *Specific Risks and Mitigation*

Risk: technical issues with the GreenVerse app; mitigation: continuous support from the GreenSCENT partners (UNINETTUNO and ENG)

### 11.4.4 *Demonstrator Activity CleanAir@Schools*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023). The completion of this subsection is therefore not fully presented.

#### 11.4.4.1 *Context*

The CleanAir@Schools activity empowers pupils to measure air pollution in different areas around their school or neighbourhood. This activity is focused on improving the air quality around schools. It also delivers the didactic material to analyse problems related to air pollution and promote a healthier school environment.

Pollution levels are measured by passive dosimeters placed at strategic points around the school. The duration of sampling can be between 2 and 4 weeks, after which the tubes are collected and sent to the laboratory for analysis.

#### 11.4.4.2 *Stakeholders*

Students

Teachers

School managers



## Parents

### 11.4.4.3 *User Recruitment and Invitation*

### 11.4.4.4 *Pilot Team, Roles*

### 11.4.4.5 *Implementation Tasks and Schedule*

ECQA and CSRC participated and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards in line with WP4.

Under the guidance of ECQA and CSRC, the "Climate Change" skill card was tested, discussed and fine-tuned by teachers of Lower Secondary and High Schools. They provided ECQA and CSRC with valuable insights in the concrete needs of this target group.

### 11.4.4.6 *Links to the Curriculum*

### 11.4.4.7 *What are the KPIs?*

### 11.4.4.8 *Specific Risks and Mitigation*

## 11.4.5 *Demonstrator Activity Augmented Reality App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023). The completion of this subsection is therefore not fully presented.

However, please see a description of a preliminary implementation by pilot partner EA (Section 11.2.7).

### 11.4.5.1 *Context*

### 11.4.5.2 *Stakeholders*

### 11.4.5.3 *User Recruitment and Invitation*

### 11.4.5.4 *Pilot Team, Roles*

### 11.4.5.5 *Implementation Tasks and Schedule*

### 11.4.5.6 *Links to the Curriculum*

### 11.4.5.7 *What are the KPIs?*

### 11.4.5.8 *Specific Risks and Mitigation*

## 11.4.6 *Demonstrator Activity Youth Design Assemblies*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023). The completion of this subsection is therefore not fully presented.



#### 11.4.6.1

#### *Context*

The goal of the YDAs is to inspire upper-secondary-school students to generate content for the pilots developed in WP5 and the associated curriculum in WP4. In general, the YDA participants discuss their thoughts, questions, wants, and proposals for changes and additions to the GreenSCENT Competence Framework and the content of each pilot provided to them. WP1 and pilots provide input on how their views, questions, wishes, and ideas are influencing the work of GreenSCENT. Within a year and a half, the four YDAs will meet generally every second month (online) to provide comments on WP4 and WP5 material. During phase 2 of the project (from fall 2023), the YDAs act as a pilot in the GreenSCENT project, as the four YDAs will travel to meet their co-participants in their own YDA physically at selected events in Italy, Denmark, Spain, and Serbia.

#### 11.4.6.2

#### *Stakeholders*

Students

Teachers

School managers

Parents

#### 11.4.6.3

#### *User Recruitment and Invitation*

Recruiting young students for assemblies lends itself to much discussion and thought-provoking procedures. The YDA recruitment was a tall order for us but we eventually reached a consensus to recruit with diversity in mind, with regards to age, gender and interest.

Taking into consideration skills such as consistency, diligence and, most of all, willingness, we formed the teams that were engaged in the YDAs. Communication skills are also an important factor to bear in mind.

#### 11.4.6.4

#### *Pilot Team, Roles*

On behalf of RST, the head of school and 2 teachers got involved in the YDA meetings in terms of supporting the students mainly during the in-person meetings in Denmark and Rome. In addition, the pilot team, offered support to the students in situations when the online meetings were scheduled during school hours.

#### 11.4.6.5

#### *Implementation Tasks and Schedule*

May 2022 to June 2022: Recruitment phase.

September 25th 2022, for all YDAs: Joint online kick-off meeting (introduction and getting to know the participants).

October 25th to 26th, 2022: Online meeting (co-design on the GreenSCENT Competence Framework).

November 30th to December 1st, 2022: Online meeting (co-design on the GreenSCENT Competence Framework Knowledge Graph).

February 1st to 2nd, 2023: Online meeting (co-design on the GreenVerse apps).



April 12th to 13th, 2023: Online meeting (co-design on the GreenVerse apps).

June 7th to 8th, 2023: Online meeting (co-design on the air pollution activity, CleanAir@Schools activity and app).

September 1st to 3rd, 2023 for YDA 1: In-person meeting in Denmark (Copenhagen, energy efficiency).

September 22nd to 24th, 2023 for YDA 3: In-person meeting in Italy (Rome, From Farm to Fork).

October 6th to 8th, 2023 for YDA 4: In-person meeting in Serbia (Novi-Sad, circular economy).

January 20th, 2024 for all YDAs: Final joint online meeting

ECQA and CSRC participated and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards in line with WP4.

Under the guidance of ECQA and CSRC, the "Climate Change" skill card was tested, discussed and fine-tuned by teachers of Lower Secondary and High Schools. They provided ECQA and CSRC with valuable insights in the concrete needs of this target group.

#### **11.4.6.6** *Links to the Curriculum*

All thematic areas addressed during the online and in-person meetings for the YDAs are linked to the different study programs, courses and research centers within the curriculum in the field of climate change, Farm to Form, air pollution, etc.

#### **11.4.6.7** *What are the KPIs?*

Involving 9 students from RST.

#### **11.4.6.8** *Specific Risks and Mitigation*

Risk: Safety of YDA participants during face-to-face meetings; mitigation: constant supervision by adults.



## 11.5 Pilot Partner RGSMART (RS)

### 11.5.1 Demonstrator Activity *Environmental Monitoring App*

#### 11.5.1.1 *Context*

The GreenSCENT Environmental Monitoring App was created to collect environmental reports from residents throughout the area. It implements a continuous pipeline that can efficiently exhibit, store, and manage various types of geo-located reports, which can contain multimedia information (e.g., videos, images, documents, and text) generated or made available by GreenSCENT platform users.

Both the Environmental Monitoring App and the Citizen Journalism demonstrators will be linked to other activities piloted at RGSMART, such as using the Environmental Monitoring App and the CleanAir@Schools to monitor and report areas of increased air pollution levels, or using Citizen Journalism to suggest potential areas of nature-based solutions integration for increasing air quality and/or regulating GHGs in the air for the city of Novi Sad, Serbia.

#### 11.5.1.2 *Stakeholders*

The stakeholders in the activity at RGSMART are:

- (1) high school students
- (2) parents,
- (3) school principals,
- (4) teachers,
- (5) researchers.

#### 11.5.1.3 *User Recruitment and Invitation*

The GreenVerse activities' user recruiting and invitation phase focuses on diversity, with the goal of engaging all pupils. The emphasis will be on encouraging active participation from students from various backgrounds, as well as developing a collaborative effort to address various sustainability concerns both within and outside of the school community.

Teams are established by taking into account skills such as consistency, diligence, and, most importantly, willingness. This attempt is made to attain comprehensive engagement by inviting additional kids, with the goal of creating a more holistic and representational involvement of all 1st to 4th grade students in the GreenSCENT demonstration.

#### 11.5.1.4 *Pilot Team, Roles*

The GreenVerse pilot team is critical in coordinating the piloting activities and integrating/adapting the instructional resources in various formal and informal settings inside and outside the school. The activity is integrated into the curriculum through the Skills Labs program by the school principal, who ensures alignment with learning objectives, specific skills to be developed and measured, and encourages widespread and inclusive participation. Furthermore, the presence of the researchers provides critical scientific and technical support, supplementing the project with evidence- and challenge-based insights and guidance on effectively addressing the topic within and outside the school environment.



### 11.5.1.5 *Implementation Tasks and Schedule*

October 2023 to November 2023: Instructional co-design workshops and training sessions on the pre-pilot implementation planning (ENG partner presented the GreenVerse app).

January 2024: Co-designing workshops with the teachers in order to prepare the activities, the activities and link the GreenVerse apps to ongoing sustainability projects.

February 2024 to May 2024: Piloting phase

### 11.5.1.6 *Links to the Curriculum*

The GreenVerse activities are included into the curriculum of the lower secondary school. They create interdisciplinary activities to incorporate pertinent material into already established subjects. Subjects like science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions about air pollution, urban sustainability, and climate resilience, as well as more complex topics like nature-based solutions and sustainable schools/cities that introduce students to more complex scientific topics.

### 11.5.1.7 *What are the KPIs?*

Students and teachers participated: 50 students and 2 teachers.

Environmental reports prepared by the students: 10 reports.

### 11.5.1.8 *Specific Risks and Mitigation*

Risk: technical issues with the GreenVerse app; mitigation: continuous support from the GreenSCENT partners (ENG).

## 11.5.2 *Demonstrator Activity Citizen Journalism/Greenverse*

See Section 11.5.1.

11.5.2.1	<i>Context</i>
11.5.2.2	<i>Stakeholders</i>
11.5.2.3	<i>User Recruitment and Invitation</i>
11.5.2.4	<i>Pilot Team, Roles</i>
11.5.2.5	<i>Implementation Tasks and Schedule</i>
11.5.2.6	<i>Links to the Curriculum</i>
11.5.2.7	<i>What are the KPIs?</i>
11.5.2.8	<i>Specific Risks and Mitigation</i>



### 11.5.3 Demonstrator Activity *Interactive Documentary*

#### 11.5.3.1 *Context*

The tool was created to facilitate the creation of immersive experiences that can be accessed via web/mobile browsers. The development of these experiences begins with the creation of a background, which can be an immersive multimedia element (360° video or photography) or a traditional one (standard film or photography), on which additional multimedia information content can be superimposed, visible by default, or activated by specific user behaviours (click/tap hotspots).

As a result, RGSMART pilots the Interactive Documentary demonstration with high school students and instructors in order to create immersive experiences of the school's sustainability policies

#### 11.5.3.2 *Stakeholders*

The stakeholders in the Interactive Documentary activity at RGSMART are:

- (1) secondary school students
- (2) school principals,
- (3) teachers,
- (4) researchers.

#### 11.5.3.3 *User Recruitment and Invitation*

The emphasis throughout the user recruitment and invitation phase for the Interactive Documentary demonstration is on engaging the students who participated in the co-design workshops held in May 2022.

Teams are established by taking into account skills such as consistency, diligence, and, most importantly, willingness. This effort is made to obtain widespread participation by inviting more students who are willing to participate in the activity with the advice and support of their classmates (acting as mentors) who have already tested the Interactive Documentary interface.

#### 11.5.3.4 *Pilot Team, Roles*

The GreenVerse pilot team is critical in coordinating the piloting activities. The activity is integrated into the curriculum by the school principal, who ensures alignment with learning objectives, specific competences to be developed and measured, and encourages extensive and inclusive participation. Furthermore, the academics' participation provides critical scientific and technical assistance, supplementing the project with evidence-based insights and recommendations on efficiently addressing and integrating sustainability concerns within the school environment.

#### 11.5.3.5 *Implementation Tasks and Schedule*

May 2022: Co-design workshop (in-person) with UNINETTUNO researchers.

October 2023 to November 2023: Instructional co-design workshops and training sessions on the pre-pilot implementation planning.



February 2024 to May 2024: Piloting phase

#### 11.5.3.6 *Links to the Curriculum*

The Interactive Documentary demonstrators will be integrated into the curriculum of high school. They create interdisciplinary activities to incorporate pertinent material into already established subjects. Science and skills laboratories, as well as extracurricular activities, lend themselves to initiatives on sustainability, art, and the SDGs.

#### 11.5.3.7 *What are the KPIs?*

Students and teachers participated: 20 students and 2 teachers.

Interactive documentaries prepared by the students: 5 interactive documentaries

#### 11.5.3.8 *Specific Risks and Mitigation*

Risk: technical issues with the GreenVerse app; mitigation: continuous support from the GreenSCENT partners (UNINETTUNO and ENG).

### 11.5.4 *Demonstrator Activity Climathon*

#### 11.5.4.1 *Context*

The Climathon activity began as a climate data analysis course geared in format and content for HEI participants. The format was adjusted for classroom implementation (more breaks, more time for teachers to interact with participants) and the content was drastically reduced.

The primary pedagogical drive is to teach young participants the importance of a quantitative approach to climate and data analysis, as well as the methodological tools for doing so. This is in order to tackle the future problems of anthropogenically accelerated climate change within the context of the European Green Deal.

The Climathon activity for pilot partner RGSMART is carried out online in collaboration with pilot partner EA (Section 11.2.5).

#### 11.5.4.2 *Stakeholders*

The stakeholders in the Climathon at RGSMART include the following:

- (1) students,
- (2) school principals,
- (3) teachers,
- (4) researchers.





### 11.5.4.3

### *User Recruitment and Invitation*

Participants in the RGSMART Climathon were chosen based on their interest in climate-related issues. Students in the first and second grades were invited to participate as part of their overall Climate Change projects that are currently being launched or will be piloted during the school year (i.e., skills labs, scientific clubs). Because the Climathon began as a course in climate data analysis, a more complex topic, a cap of 20 students was set in order for the facilitators (teachers and/or researchers) to support the students throughout the course.

### 11.5.4.4

### *Pilot Team, Roles*

The pilot team included one researcher, one science educator (as facilitator), and students. During the course, one of the facilitators (researcher) assisted students in answering questions about climate data acquisition, analysis, and visualization, while the second facilitator (science educator) guided them in connecting the course topics to various climate-related projects in the curriculum.

### 11.5.4.5

### *Implementation Tasks and Schedule*

The schedule for this activity was as follows:

<b>Day 1, Wednesday, 11. October 2023</b>	
<b>Time</b>	<b>Description</b>
08.30–09.00	Technical preparations at CRA, EA and RGSMART
09.00–09.15	Welcome, presentation of course developer and lecturer Dr. Manfred Mudelsee (CRA) as well of local teacher Aleksandar Radisic (GSMART) and representatives Biljana Basarin (UNSMPPF) and Jelena Desnica (GSMART)
09.15–10.00	Lecture: Climate. climate system; climate variables (temperature, precipitation, wind speed); surface-air temperature time series, global; surface-air temperature time series, local (Potsdam, Germany); paleoclimate rainfall time series; proxy variables
10.00–10.15	Break
10.15–11.00	Lecture: Climate (continued). climate equation; trend component; extreme component; noise component; scientific method; Karl Popper; Plato; first principles of physics; statistical inference
11.00–11.15	Break
11.15–12.00	Exercises. How do the first principles of physics lead to the climate equation, or something else? What is a 90% confidence band? Do you have examples of concepts for other complex system than the climate?
<b>Day 2, Thursday, 12. October 2023</b>	
<b>Time</b>	<b>Description</b>
08.55–09.00	Technical preparations at CRA, EA and GSMART
09.00–09.45	Lecture: Climate Data. Temperature time series; measurement devices; invention of thermometer; daily measurement practices
09.45–10.15	Break
10.15–11.00	Lecture: Climate Data (continued). Mean monthly versus mean monthly temperature time series; sample size; leap days; GISTEMP global, monthly-mean, surface-air temperature time series
11.00–11.15	Break



11.15–12.00	Exercises. How many days comprises the time interval from 01/01/1893 to 31/12/2018? Data homogeneity rural versus urban temperature measurement stations. Data file and text editor. Find for your preferred station (town) the temperature data in the internet.
<b>Day 3, Friday, 13. October 2023</b>	
<b>Time</b>	<b>Description</b>
08.55–09.00	Technical preparations at CRA, EA and GSMART
09.00–09.45	Lecture: Climate Data Analysis. Trend component definition; linear trend model. How to infer linear trend components? Uncertainties.
09.45–10.15	Break
10.15–11.00	Lecture: Climate Data (continued). Statistical inference. Idea of least-squares trend estimation. Calculation of least squares trend estimates for the GISTEMP series.
11.00–11.15	Break
11.15–12.00	Exercises. Software LINFIT. Replication of calculation of least squares trend estimates for the GISTEMP series. Calculation of least squares trend estimates for the series from the preferred stations (Day 2). Discussion: Nonlinear trend models.
12.00	Farewell

#### 11.5.4.6 *Links to the Curriculum*

The Climathon activity is linked to the high school curriculum because it incorporates important material into pre-existing disciplines through interdisciplinary activities. Science, skills labs, and extracurricular activities (e.g., TEDx Talks) and Young Scientists Groups all lend themselves to projects and conversations on climate change and climate data analysis that introduce students to more complicated scientific subjects.

#### 11.5.4.7 *What are the KPIs?*

Number of participants (students): 20.

Number of education stakeholders engaged: 3.

#### 11.5.4.8 *Specific Risks and Mitigation*

Nothing to be identified.

### 11.5.5 *Demonstrator Activity Augmented Reality App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, please see a description of a preliminary implementation by pilot partner EA (Section 11.2.7).



11.5.5.1	<i>Context</i>
11.5.5.2	<i>Stakeholders</i>
11.5.5.3	<i>User Recruitment and Invitation</i>
11.5.5.4	<i>Pilot Team, Roles</i>
11.5.5.5	<i>Implementation Tasks and Schedule</i>
11.5.5.6	<i>Links to the Curriculum</i>
11.5.5.7	<i>What are the KPIs?</i>
11.5.5.8	<i>Specific Risks and Mitigation</i>

## 11.5.6 Demonstrator Activity *CleanAir@Schools*

### 11.5.6.1 *Context*

This activity aims to inform, educate and promote behavioural changes related to air quality topics..

The application consist on 11 lessons that are pilot-tested including:

- (1) The air we breathe.
- (2) Air pollution.
- (3) What we can't see.
- (4) A matter of habits.
- (5) Air pollution has no boundaries.
- (6) The Air Quality Index.
- (7) The colours of air quality.
- (8) Comparing air quality.
- (9) A risk to our health.
- (10) Actions we can take.
- (11) Cleaner air for all.

### 11.5.6.2 *Stakeholders*

The stakeholders in the CleanAir@Schools application at RGSMART include:

- (1) students,
- (2) teachers and science educators,
- (3) school principals,
- (4) researchers.



### 11.5.6.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for RGSMART's CleanAir@Schools activity focuses on inclusivity, aiming to engage all of the students. The emphasis is on encouraging active participation from students of different grades and backgrounds, fostering a collective effort to address the issue of air pollution comprehensively within the school community.

### 11.5.6.4 *Pilot Team, Roles*

The CleanAir@Schools piloting team at RGSMART (currently six teachers and two science educators) is a critical factor in facilitating the piloting activities and integrating or adapting teaching resources. The activity is integrated into the curriculum by the school principal, who ensures alignment with learning objectives, specific competences to be developed and measured, and encourages extensive and inclusive participation. Furthermore, the participation of a researcher provides critical scientific support, supplementing the initiative with evidence- and challenge-based insights and recommendations on how to effectively engage the topic within the educational setting.

### 11.5.6.5 *Implementation Tasks and Schedule*

May 2022: Co-design workshop (in-person) with the teachers and students of the primary school.

April 2023 to May 2023: Orchestrating the piloting activities for the next school year (in combination with the CleanAir@Schools demonstrator).

April 2024 to May 2024: Pilot implementation period

### 11.5.6.6 *Links to the Curriculum*

The CleanAir@Schools application and activity is linked to RGSMART's "Learning for Sustainability Education" programme under the thematic area of "Emission of carbon dioxide carbon dioxide and air pollutants."

### 11.5.6.7 *What are the KPIs?*

Students and teachers participated: 50 students and 6 teachers.

Number of tubes placed inside and outside the school: minimum 25.

### 11.5.6.8 *Specific Risks and Mitigation*

Risk: technical issues with the CleanAir@Schools app; mitigation: continuous support from the GreenSCENT partners (BSC).



## 11.5.7 Demonstrator Activity *Youth Design Assemblies*

### 11.5.7.1 *Context*

The goal of the YDAs is to inspire upper-secondary-school students to generate content for the pilots developed in WP5 and the associated curriculum in WP4. In general, the YDA participants discuss their thoughts, questions, wants, and proposals for changes and additions to the GreenSCENT Competence Framework and the content of each pilot provided to them. WP1 and pilots provide input on how their views, questions, wishes, and ideas are influencing the work of GreenSCENT. Within a year and a half, the four YDAs will meet generally every second month (online) to provide comments on WP4 and WP5 material. During phase 2 of the project (from fall 2023), the YDAs will act as a pilot in the GreenSCENT project, as the four YDAs will travel to meet their co-participants in their own YDA physically at selected events in Italy, Denmark, Spain, and Serbia.

### 11.5.7.2 *Stakeholders*

The stakeholders for the YDAs on behalf of RGSMART include the following:

- (1) students,
- (2) teachers and science educators,
- (3) school principals,
- (4) researchers.

### 11.5.7.3 *User Recruitment and Invitation*

Recruiting young students for assemblies lends itself to much discussion and thought-provoking procedures. The YDA recruitment was a tall order for us but we eventually reached a consensus to recruit with diversity in mind, with regards to age, gender and interest.

Taking into consideration skills such as consistency, diligence and, most of all, willingness, we formed the teams that were engaged in the YDAs. Communication skills are also an important factor to bear in mind.

The major interest, however, was the feedback the pilot organizers received from the participants. It turns out that the meetings' targets came to fruition and that our criteria of choice were the right ones.

### 11.5.7.4 *Pilot Team, Roles*

On behalf of RGSMART, two school principals and one researcher helped the YDA meetings in terms of supporting the students mainly during the in-person meetings in Denmark, Spain, Italy and Serbia. In addition, the pilot team, in cooperation with the students, provided the participants with computers in situations when the online meetings were scheduled during school hours.

### 11.5.7.5 *Implementation Tasks and Schedule*

May 2022 to June 2022: Recruitment phase.



September 25th 2022, for all YDAs: Joint online kick-off meeting (introduction and getting to know the participants).

October 25th to 26th, 2022: Online meeting (co-design on the GreenSCENT Competence Framework).

November 30th to December 1st, 2022: Online meeting (co-design on the GreenSCENT Competence Framework Knowledge Graph).

February 1st to 2nd, 2023: Online meeting (co-design on the GreenVerse apps).

April 12th to 13th, 2023: Online meeting (co-design on the GreenVerse apps).

June 7th to 8th, 2023: Online meeting (co-design on the air pollution activity, CleanAir@Schools activity and app).

September 1st to 3rd, 2023 for YDA 1: In-person meeting in Denmark (Copenhagen, energy efficiency).

September 8th to 10th, 2023 for YDA 2: In-person meeting in Spain (Barcelona, air pollution, CleanAir@Schools).

September 22nd to 24th, 2023 for YDA 3: In-person meeting in Italy (Rome, From Farm to Fork).

October 6th to 8th, 2023 for YDA 4: In-person meeting in Serbia (Novi-Sad, circular economy).

November 15th to 16th, 2023: Online meeting (Taking action! Meeting the Danish Youth Delegate to the UN on climate and biodiversity).

January 20th, 2024 for all YDAs: Final joint online meeting

#### 11.5.7.6 *Links to the Curriculum*

For RGSMART, all thematic areas addressed during the YDAs' online and in-person meetings are related to the national Learning for Sustainability Education Programme, the school's Skills Labs, and the school's Sustainability Clubs (depending on the students' grade).

#### 11.5.7.7 *What are the KPIs?*

Number of Serbian students:9

Means of verification for participating in the online and in-person meetings (attendance list, travel reports).

#### 11.5.7.8 *Specific Risks and Mitigation*

The risks were primarily due to the dropout of participants and/or the inability to attend the online meetings. To overcome these obstacles, a total of 12 students were recruited throughout the recruitment round. When YDA students were unable to attend online meetings, then the facilitators took pre-emptive actions. They offered follow-up talks and frequent updates to ensure that participants remained engaged and included in YDA operations.



## 11.6 Pilot Partner UNINETTUNO (IT)

### 11.6.1 Demonstrator Activity *Environmental Monitoring App*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, we describe here a preliminary implementation.

#### 11.6.1.1 *Context*

The GreenSCENT Environmental Monitoring App is designed to collect environmental evidence from residents throughout a specific urban area. It implements a continuous pipeline that can efficiently exhibit, store, and manage various types of geo-located reports, which can contain multimedia information (e.g., videos, images, documents, and text) generated or made available by GreenSCENT platform users.

Both the Environmental Monitoring App and the Citizen Journalism demonstrators will be linked to other activities piloted at UNINETTUNO and Scuola Marco Polo, such as using the Environmental Monitoring App and the CleanAir@Schools to monitor and report areas of increased air pollution levels, or using Citizen Journalism to suggest potential areas of nature-based solutions integration for increasing air quality and/or regulating GHGs in the air for the city of Rome, Italy.

#### 11.6.1.2 *Stakeholders*

The stakeholders in the Environmental Monitoring App activity at UNINETTUNO and Scuola Marco Polo are:

- (1) faculty students,
- (2) parents,
- (3) school principals,
- (4) educators,
- (5) professors,
- (6) researchers.

#### 11.6.1.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for the Environmental Monitoring App activities focus on inclusivity, aiming to engage all students. The emphasis will be on encouraging active participation from students of different backgrounds, fostering a collective effort to address different sustainability challenges, comprehensively within and outside of the school community.

Taken into consideration skills such as consistency, diligence and, most of all, willingness, the teams are formed. This effort is undertaken to achieve comprehensive participation, by extending invitations to more students, seeking to create a more holistic and representative involvement of all students of different educational levels to the GreenSCENT demonstrators.



#### 11.6.1.4 *Pilot Team, Roles*

The pilot team for the Environmental Monitoring App activities (comprising 4 researchers, 10 educators, and 7 professors) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and informal settings inside and outside the school and university. The school principal leads the integration of the activity into the curriculum under the Skills Labs programme, ensuring its alignment with learning objectives, targeted competences to be developed and assessed, and fostering a widespread and inclusive participation. Additionally, the inclusion of the researchers provides vital scientific and technical support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within and outside the school environment.

#### 11.6.1.5 *Implementation Tasks and Schedule*

January to February 2024: Instructional co-design workshops and training sessions on the pre-pilot implementation planning to prepare the pilot activities.

March 2024 to May 2024: Piloting phase.

#### 11.6.1.6 *Links to the Curriculum*

The Environmental Monitoring App activities are linked into the primary school, BSc, and MSc curricula. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution, urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics.

Considering the university, the tool integrates relevant material into already existing courses concerning Psychology, Communication Sciences, Economics, and Engineering, by creating interdisciplinary learning activities. The educational tool can be connected to the courses dealing with sustainability topics, the European Green Deal, and the SDGs by assigning educational tasks consisting of transforming theoretical research on sustainability into an immersive experience.

#### 11.6.1.7 *What are the KPIs?*

The KPIs (aim or minimum aim) are:

- (1) minimum 150 students,
- (2) 7 professors,
- (3) 10 educators,
- (4) 4 researchers,
- (5) minimum 20 environmental reports prepared by the students.

#### 11.6.1.8 *Specific Risks and Mitigation*

Risk: technical issues with the Environmental Monitoring app; mitigation: continuous support from the GreenSCENT partners (ENG).





## 11.6.2 Demonstrator Activity *Citizen Journalism/Greenverse*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, we describe here a preliminary implementation.

### 11.6.2.1 *Context*

The Citizen Journalism/Greenverse is designed to allow monitoring the reports coming from the Environmental Monitoring App (Section 10.1).

It allows standard users to have a web version of the App with almost the same functionalities with the integration of some administrative features and the access of the full set of the functionalities of the platform about the management and the sharing of the multimedia content. The goal of the demonstrator is basically to make available the multimedia content coming from the reports on the territory for any other use in journalistic communication relating to environmental problems.

The use of the tool is mandatory to allow pilot administrators to manage the reports from the territory (coming for instance from Environmental Monitoring App) and to drive the life cycles (i.e., approval, rejection or solution) of any single issue.

### 11.6.2.2 *Stakeholders*

The stakeholders in the Citizen Journalism/Greenverse activity at UNINETTUNO and Scuola Marco Polo are:

- (1) faculty students,
- (2) parents,
- (3) school principals,
- (4) educators,
- (5) professors,
- (6) researchers.

### 11.6.2.3 *User Recruitment and Invitation*

The Citizen Journalism/Greenverse activities are linked into the primary school, BSc, and MSc curricula. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution, urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics.

Considering the university, the tool integrates relevant material into already existing courses concerning Psychology, Communication Sciences, Economics, and Engineering, by creating interdisciplinary learning activities. The educational tool can be connected to the courses dealing with sustainability topics, the European Green Deal, and the SDGs by assigning educational tasks consisting of transforming theoretical research on sustainability into an immersive experience.



#### 11.6.2.4 *Pilot Team, Roles*

The pilot team for the Citizen Journalism/Greenverse activities at the faculty (comprising 7 professors and 2 researchers) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and informal settings. The professors integrate the activity into the curriculum of the courses by ensuring its alignment with learning objectives, targeted competencies to be developed and assessed, and fostering widespread and inclusive participation. Additionally, researchers provide technical support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within and outside the university environment.

#### 11.6.2.5 *Implementation Tasks and Schedule*

January to February 2024: Instructional co-design workshops and training sessions on the pre-pilot implementation planning to prepare the pilot activities.

March 2024 to May 2024: Piloting phase.

#### 11.6.2.6 *Links to the Curriculum*

The Citizen Journalism/Greenverse activities are linked into the primary school, BSc, and MSc curricula. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution, urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics.

Considering the university, the tool integrates relevant material into already existing courses concerning Psychology, Communication Sciences, Economics, and Engineering, by creating interdisciplinary learning activities. The educational tool can be connected to the courses dealing with sustainability topics, the European Green Deal, and the SDGs by assigning educational tasks consisting of transforming theoretical research on sustainability into an immersive experience.

#### 11.6.2.7 *What are the KPIs?*

The KPIs (aim or minimum aim) are:

- (1) minimum 150 students,
- (2) 7 professors,
- (3) 10 educators,
- (4) 4 researchers,
- (5) minimum 20 environmental reports prepared by the students.

#### 11.6.2.8 *Specific Risks and Mitigation*

Risk: technical issues with the Citizen Journalism/Greenverse app; mitigation: continuous support from the GreenSCENT partners (ENG).



### 11.6.3 Demonstrator Activity *Interactive Documentary*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, we describe here a preliminary implementation of the pilots, which are also described in the deliverable D1.7

#### 11.6.3.1 *Context*

The Interactive Documentary authoring tool facilitates the creation of immersive experiences that can be accessed via internet browsers. Developing these experiences begins with creating a 360° background by using 360° videos or images, in which additional multimedia resources can be visualised, or activated by specific user interactions (click/tap hotspots, hyperlinks).

As a result, UNINETTUNO tests the GreenVerse Interactive Documentary demonstrator with university professors, researchers, and students to create immersive experiences on sustainability according to the school's sustainability policies and courses.

#### 11.6.3.2 *Stakeholders*

The stakeholders in the Interactive Documentary activity at UNINETTUNO are:

- (1) university students,
- (2) professors,
- (3) researchers.

#### 11.6.3.3 *User Recruitment and Invitation*

UNINETTUNO research team tests the Interactive Documentary inside an integrated and multidisciplinary course dispensed during UNINETTUNO's regular programme.

The students are recruited within a regular university course. The students are engaged by assigning them an educational challenge that must be tackled by developing an interactive documentary report. Students collaborate by creating many team groups. Teams are established by taking into account skills such as consistency, diligence, and, most importantly, willingness.

#### 11.6.3.4 *Pilot Team, Roles*

The pilot team for the Interactive Documentary activities at the faculty (comprising 7 professors and 2 researchers) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and informal settings. The professors integrate the activity into the curriculum of the courses by ensuring its alignment with learning objectives, targeted competencies to be developed and assessed, and fostering widespread and inclusive participation. Additionally, researchers provide technical support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within and outside the university environment.



### 11.6.3.5 *Implementation Tasks and Schedule*

From May 2022 to September 2022: Preliminary activities within 2 courses of UNINETTUNO's regular programme

From January 2024 to February 2024: Instructional co-design workshops and training sessions on the pre-pilot implementation planning to prepare the pilot activities.

From March 2024 to May 2024: Pilot activities within 4 courses of UNINETTUNO's regular programme.

### 11.6.3.6 *Links to the Curriculum*

The Interactive Documentary demonstrator is linked to the BSc and MSc curriculum being an additional educational tool that can be connected to several courses and used to motivate and engage students to dive deeper into the sustainability education. The tool integrates relevant material into already existing courses concerning Psychology, Communication Sciences, Economics, and Engineering, by creating interdisciplinary learning activities. The educational tool can be connected to the courses dealing with sustainability topics, the European Green Deal, and the SDGs by assigning educational tasks consisting of transforming theoretical research on sustainability into an immersive experience.

### 11.6.3.7 *What are the KPIs?*

The KPIs (aim or minimum aim) are:

- (1) minimum 50 students of different levels of age,
- (2) 7 professors,
- (3) 2 researchers,
- (5) minimum 10 immersive interactive documentaries generated by the students.

### 11.6.3.8 *Specific Risks and Mitigation*

Risk: technical issues with the Interactive Documentary demonstrator; mitigation: continuous support from the GreenSCENT partners (ENG).

## 11.6.4 *Demonstrator Activity Climathon*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

### 11.6.4.1 *Context*

### 11.6.4.2 *Stakeholders*

### 11.6.4.3 *User Recruitment and Invitation*



11.6.4.4	<i>Pilot Team, Roles</i>
11.6.4.5	<i>Implementation Tasks and Schedule</i>
11.6.4.6	<i>Links to the Curriculum</i>
11.6.4.7	<i>What are the KPIs?</i>
11.6.4.8	<i>Specific Risks and Mitigation</i>

## 11.6.5 Demonstrator Activity *CleanAir@Schools*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

However, we describe here a preliminary implementation.

### 11.6.5.1 *Context*

UNINETTUNO will measure pollution levels by passive dosimeters placed at strategic points around the wider area of the school "Ist. Comprensivo Cocconi, Scuola Marco Polo".

The main idea is to export data and maps of the air pollution levels from the urban areas of Rome. The follow-up activities will focus on localized awareness-raising campaigns at different districts or areas of Rome with increased air pollution levels.

The CleanAir@Schools activity empowers pupils to measure air pollution in different areas around their school, university or neighbourhood. This activity is focused on improving the air quality around pilots, providing pilots with both the necessary tools to carry it out. It also delivers the didactic material to analyse problems related to air pollution and promote a healthier school environment.

Apart from the main component of the activity (measuring air quality), a series of independent educational units are being developed to support the activity. These are:

- (1) analysis of meteorology (meteorological reports);
- (2) GIS (mapping and interpolation schemes);
- (3) mobility to/from educational institution/home;
- (4) reduce exposure;
- (5) improve air quality (nature-based solutions);
- (6) air quality data analysis and mapping (reading and plotting data files such as CSV files);
- (7) analyse the results of CleanAir@Schools measurements (producing reports, posters and awareness-raising campaigns);
- (8) understand the effects of air dispersion.

### 11.6.5.2 *Stakeholders*

The stakeholders in the CleanAir@Schools activity at Scuola Marco Polo are:



- (1) faculty students,
- (2) educators,
- (3) researchers,
- (4) parents,
- (5) school principals.

#### 11.6.5.3 *User Recruitment and Invitation*

The recruitment comes from the direct interest of the educational institution to participate in the GreenSCENT activities. The students were selected based on teachers' recommendations and on their willingness to participate in activities, their diligence and, most of all, their eagerness to enrich their knowledge on green issues.

#### 11.6.5.4 *Pilot Team, Roles*

The pilot team comprised 4 educators, 10 researchers and 10 classes of students from primary school. During the co-design workshops, training and piloting sessions, the educators and researchers examined the entire structure and content of the activity, the links to the curriculum and the timeline for implementing CleanAir@Schools activities under different formal and informal settings inside and outside the school. Educators and researchers acted as mentors for co-facilitating and supporting their students during the pilot implementation period.

#### 11.6.5.5 *Implementation Tasks and Schedule*

January 2024: Instructional co-design workshops and training sessions on the pre-pilot implementation planning to prepare the pilot activities.

January 2024 to February 2024: piloting session to install the dosimeters at the faculty and receive results from them.

#### 11.6.5.6 *Links to the Curriculum*

The CleanAir@Schools activities are linked into the primary school curriculum. They integrate relevant material into already existing subjects by creating interdisciplinary activities. Subjects such as science or skills labs, as well as extracurricular activities, lend themselves to projects and discussions on air pollution, urban sustainability and climate resilience as well as to more complex topics such as nature-based solutions and sustainable schools/cities that allow students to get introduced to more complex scientific topics.

#### 11.6.5.7 *What are the KPIs?*

The KPIs (aim or minimum aim) are:

- (1) 4 researchers,
- (2) 10 educators,



- (3) 10 classes of students,
- (5) minimum 30 dosimeters placed around the faculty.

#### 11.6.5.8

#### *Specific Risks and Mitigation*

Risk: technical issues with the CleanAir@Schools app; mitigation: continuous support from the GreenSCENT partners (4S).

Risk: lack of interest and level of engagement; mitigation: preparing side activities during the air pollution monitoring (1 month) and sample analysis (1 month) periods.



## 11.7 Pilot Partner UNSPMF (RS)

### 11.7.1 Demonstrator Activity *Interactive Documentary*

#### 11.7.1.1 *Context*

The tool was designed to allow the construction of immersive experiences accessible from web/mobile browsers. The construction of these experiences starts from the definition of a background, which can be an immersive multimedia element (360° video or photography) or a traditional one (standard film or photography), on which additional multimedia information content can be superimposed, visible by default or activated by specific user behaviours (click/tab hotspots).

For this reason, UNSPMF tests the Interactive Documentary demonstrator with the university students and teachers for developing immersive experiences of the school sustainability practices applied.

#### 11.7.1.2 *Stakeholders*

The stakeholders in the Interactive Documentary activity at UNSPMF are:

- (1) faculty students (12),
- (2) university professors (6),
- (3) educational/science managers (1).

#### 11.7.1.3 *User Recruitment and Invitation*

During the user recruitment and invitation phase for the Interactive Documentary demonstrator, the emphasis is on engaging the students (12 in total) who participated during the co-design workshops held in May 2022. Recruitment and selection of the teachers and students was conducted two months prior to the workshop.

Taking into consideration skills such as consistency, diligence and, most of all, willingness, the teams are formed. This effort is undertaken to achieve comprehensive participation, by extending invitations to more students that are willing to participate in the activity under the guidance and support of their professors (acting as mentors) who have already tested the Interactive Documentary interface.

#### 11.7.1.4 *Pilot Team, Roles*

The pilot team for the GreenVerse activities (currently comprising 6 teachers and one educational/science manager) plays a pivotal role in facilitating the piloting activities. The educational manager leads the integration of the activity into the curriculum, ensuring its alignment with learning objectives, targeted competences to be developed and assessed and fostering a widespread and inclusive participation. Additionally, the inclusion of the teachers provides vital scientific and technical support, enriching the initiative with evidence-based insights and guidance on addressing and integrating sustainability challenges effectively within the faculty environment.

#### 11.7.1.5 *Implementation Tasks and Schedule*

May 2022: Co-design workshop (in-person) with UNINETTUNO researchers.





October 2023 to November 2023: Instructional co-design workshops and training sessions on the pre-pilot implementation planning.

February 2024 to May 2024: Piloting phase.

#### 11.7.1.6 *Links to the Curriculum*

The Interactive Documentary demonstrators will be linked into the BSc and MSc curriculum being an interesting educational tool that can be connected to several courses and used to motivate and engage students to dive deeper into the topic. They integrate relevant material into already existing courses by creating interdisciplinary activities. The educational tool will be connected to the courses dealing with sustainability topics, the European Green Deal and the SDGs.

#### 11.7.1.7 *What are the KPIs?*

Students and teachers participated: 12 students, 6 teachers and 1 educational manager.

Interactive Documentaries prepared by the students: 5 interactive documentaries.

#### 11.7.1.8 *Specific Risks and Mitigation*

Risk: technical issues with the GreenVerse app; mitigation: continuous support from the GreenSCENT partners (UNINETTUNO and ENG).

### 11.7.2 *Demonstrator Activity Microplastic Citizen Science*

#### 11.7.2.1 *Context*

The microplastics activity is a collection of tasks designed to transform students into scientists. At UNSPMF, the activity will be pilot-tested with the University students. Thus, students will analyse the sand from a city beach, on a Danube river bank,, and collect data on the presence of microplastics and macroplastics. The objectives of this activity are threefold:

- (1) engage students in scientific research by conducting experiments;
- (2) reflect on the importance of our behaviour to preserve our environment;
- (3) raise awareness among students about the problem of solid waste and microplastics on our river bank.

This activity is linked to the following three SDGs: SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action) and SDG 14 (Life Below Water).

#### 11.7.2.2 *Stakeholders*

The stakeholders in the Microplastics activity at UNSPMF include the following:

- (1) faculty students (50),
- (2) faculty managers (2),



- (3) faculty teachers (6),
- (4) researchers (2 researchers from UNSPMF and 1 researcher from UAB).

### 11.7.2.3 *User Recruitment and Invitation*

The user recruitment and invitation phase for the Microplastics activity focuses on inclusivity, aiming to engage all students (40 students, different educational levels focusing on BSc and MSc students). The emphasis is on encouraging active participation from students of different backgrounds, fostering a collective effort to address the issue of Microplastics comprehensively within and outside the faculty community.

### 11.7.2.4 *Pilot Team, Roles*

The piloting team for the Microplastics activity at the faculty (comprising currently six teachers, two researchers and two faculty managers) plays a pivotal role in facilitating the piloting activities and integrating/adapting the educational resources under different formal and non-formal settings. The departmental vice-head for education leads the integration of the activity into the curriculum/courses, ensuring its alignment with learning objectives, targeted competences to be developed and assessed, and fostering a widespread and inclusive participation. Additionally, teachers provide educational components especially focusing on educational tools and approaches, while the inclusion of a researcher provides vital scientific support, enriching the initiative with evidence- and challenge-based insights and guidance on addressing the topic effectively within the school environment.

### 11.7.2.5 *Implementation Tasks and Schedule*

February 2023: Introductory presentation of the content and the educational resources for the Microplastics activity (under the WP5 pilot-testing planning activities).

May 2023: Presentation and co-design activity for the Microplastics activity during the GreenSCENT project meeting in Barcelona.

September 2023 to February 2024: Co-designing the Microplastics activity with the UNSPMF management, teachers and researchers. Identifying links to the curriculum and ongoing activities of the school.

March 2024 to April 2024: Pilot implementation period.

### 11.7.2.6 *Links to the Curriculum*

At UNSPMF, the Microplastics activity is linked to the BSc study program in geography (24.G24402 Environmental Geography, 24.G24705 Natural Disasters and Hazards in Geography, 24.G24513 Medical Geography, DG303 Hydrogeology, 24.G24819 Geoecology of Vojvodina), BSc study program in tourism (DM.M24501 Tourism and Sustainable Development), MSc in geography and geoinformatics (MGI501 Methods for the analysis of geographic data), MSc in tourism (MM.MM2437 Natural Resource Management in Tourism).



### 11.7.2.7 *What are the KPIs?*

Students, teachers, researchers and management participated: 50 students, 6 teachers, 2 researchers and 2 faculty managers.

### 11.7.2.8 *Specific Risks and Mitigation*

Risk: Low level of motivation for the students; mitigation: extensive communication and promotion will be applied.

## 11.7.3 *Demonstrator Activity Climathon*

This activity has not been carried out within the period between project start (January 2022) and submission due date of D5.2 (31 December 2023).

### 11.7.3.1 *Context*

The Climathon activity will support the development of competences and raise awareness regarding the adaptation to climate change and the methodological tools needed to analyse the challenges using the vast amount of available data. Climathon will focus on organisation of different training activities such as practical training and (online) courses in climate time series analysis. The courses will be based on the book *Climate Time Series Analysis: Classical Statistical and Bootstrap Methods*, 2nd edition, authored by CRA's CEO Dr. Manfred Mudelsee and published by Springer in 2014.

### 11.7.3.2 *Stakeholders*

The stakeholders in the Climathon at EA include the following:

- (1) faculty students MSc and PhD level (15),
- (2) faculty management (1),
- (3) teachers and researchers with background in geosciences, environmental sciences, physics or meteorology (5).
- (4) researcher from CRA (1).

### 11.7.3.3 *User Recruitment and Invitation*

Climathon participants will be recruited based on their interest in climate-related topics. Students from the study program of geography, physics and meteorology, environmental studies and geosciences of MSc and PhD level will be invited to participate as part of their overall climate change projects that will be piloted during spring semester. Planned number of students is 15, and professors and researchers from UNSPMF will facilitate educational material delivered by a researcher from CRA.



#### 11.7.3.4 *Pilot Team, Roles*

The pilot team will consist of 5 researchers from UNSPMF, 1 researcher from CRA and 15 students from the study program of geography, physics and meteorology, environmental studies and geosciences of MSc and PhD level. UNSPMF researchers will facilitate the course implementation and the course will be delivered by CRA researcher.

#### 11.7.3.5 *Implementation Tasks and Schedule*

The final agenda will be defined before the recruitment and invitation.

#### 11.7.3.6 *Links to the Curriculum*

At UNSPMF, the Climathon activity is linked to the BSc study program in geography (G104 Climatology with the basis of meteorology, DG302 Global Climate Change, G102 Mathematical Geography with basics of Astronomy, G206 Environmental Geography), MSc study program in geography (MGI501 Methods for the analysis of geographic data), PhD study program in geography (DRG101 Global climate changes and water management, DGT102 Mathematic and statistical research methods in geography and tourism, DRG111 Environment, Planning and Geoecology).

#### 11.7.3.7 *What are the KPIs?*

Number of students participating (15).

#### 11.7.3.8 *Specific Risks and Mitigation*

Risk: low level of motivation by the students; mitigation: extensive communication and promotion will be applied.

### 11.7.4 *Demonstrator Activity CleanAir@Schools*

#### 11.7.4.1 *Context*

In case of UNSPMF, the pollution levels are measured by passive dosimeters placed at strategic points around the wider area of the University of Novi Sad Campus (25 dosimeters) and also elementary school "Jovan Jovanovic Zmaj" was included in the pilot area in the peri-urban area, where 25 dosimeters were placed.

The main idea is to export data and maps of the air pollution levels for the city of Novi Sad both in urban and peri-urban areas. The follow-up activities will focus on localized awareness-raising campaigns at different districts or areas of Novi Sad with increased air pollution levels.

The CleanAir@Schools activity empowers pupils to measure air pollution in different areas around their school, university or neighbourhood. This activity is focused on improving the air quality around pilots, providing pilots with both the necessary tools to carry it out. It also delivers the didactic material to analyse problems related to air pollution and promote a healthier school environment.

Apart from the main component of the activity (measuring air quality), a series of independent educational units are being developed to support the activity. These are:



- (1) analysis of meteorology (meteorological reports);
- (2) GIS (mapping and interpolation schemes);
- (3) mobility to/from educational institution/home;
- (4) reduce exposure;
- (5) improve air quality (nature-based solutions);
- (6) air quality data analysis and mapping (reading and plotting data files such as CSV files);
- (7) analyse the results of CleanAir@Schools measurements (producing reports, posters and awareness-raising campaigns);
- (8) understand the effects of air dispersion.

#### 11.7.4.2 *Stakeholders*

The stakeholders (including their numbers) in the CleanAir@Schools activity at UNSPMF include the following:

- (1) faculty students (10),
- (2) pupils (25),
- (3) parents (5),
- (4) teachers (4),
- (5) school principal (1),
- (6) faculty management (1).

#### 11.7.4.3 *User Recruitment and Invitation*

In the CleanAir@Schools project, UNSPMF-selected students and pupils based on teachers' recommendations, after which they were asked to sign the consent forms, for elementary pupils parents were invited to participate and sign the consent forms. We select the participants based on their willingness to participate in activities, their diligence and, most of all, their eagerness to enrich their knowledge on green issues.

#### 11.7.4.4 *Pilot Team, Roles*

The pilot team comprised 10 students of BSC and MSc level of education and 25 pupils from elementary school, 5 parents of elementary pupils and 4 teachers. During the co-design, training and piloting sessions, the faculty manager, school principal and the researcher examined the entire structure and content of the activity, the links to the curriculum and the timeline for implementing CleanAir@Schools.

Teachers acted as mentors for co-facilitating and supporting their students during the pilot implementation period.



#### 11.7.4.5 *Implementation Tasks and Schedule*

17th March 2023: Co-Design Workshop and training (teachers, faculty manager and school principal)

26th September 2023: Training session (teachers, faculty manager and school principal).

October to November 2023: Training sessions (3) with the teachers co-facilitating the activity with the students and pupils

November 2023: Training sessions (2) with the teachers on the timeline and the technical aspects of the activity. Additional activities were added during the pilot implementation period (2 months in total) to keep the students engaged. For example, the weather report on a daily basis as long as the tubes are installed, data analysis using GIS platforms when the air pollution data will be received, air pollution reports and awareness-raising campaigns right after the end of the activity.

22nd November 2023: All dosimeters were installed at UNSPMF and Elementary school "Jovan Jovanovic Zmaj".

22nd December All dosimeters will be collected and delivered to the 4S team for analysing the samples.

January 2024: The results will be delivered to the students (point data maps and raw data measurements of the broader area of Novi Sad and UNSPMF with the air pollution levels at all areas).

#### 11.7.4.6 *Links to the Curriculum*

At UNSPMF, the CleanAir@Schools activity is linked to the BSc study program in geography (G104 Climatology with the basis of meteorology, DG302 Global Climate Change, G102 Mathematical Geography with basics of Astronomy, G206 Environmental Geography), MSc study program in geography (MGI501 Methods for the analysis of geographic data), PhD study program in geography (DRG101 Global climate changes and water management, DGT102 Mathematic and statistical research methods in geography and tourism, DRG111 Environment, Planning and Geoecology).

#### 11.7.4.7 *What are the KPIs?*

Students, pupils and teachers participated: 10 students, 25 pupils and 4 teachers.

Number of tubes placed inside and outside the Novi Sad area: minimum 50.

#### 11.7.4.8 *Specific Risks and Mitigation*

Risk: technical issues with the CleanAir@Schools app; mitigation: continuous support from the GreenSCENT partners (4S).

Risk: lack of interest and level of engagement; mitigation: preparing side activities during the air pollution monitoring (1 month) and sample analysis (1 month) periods.

### 11.7.5 *Demonstrator Activity Youth Design Assemblies*

#### 11.7.5.1 *Context*

The objective of the YDAs is to engage faculty students in inspiring the development of the content for the pilots developed in WP5 and the corresponding curriculum in WP4. Generally, the participants in the YDAs



are discussing their thoughts, questions, wishes and ideas for improvements and additions to the GreenSCENT Competence Framework and the content in each pilot presented to them. They receive feedback from WP1 and pilots on how their thoughts, questions, wishes and ideas are inspiring the work in GreenSCENT. Within a year and a half, the four convened YDAs convene roughly once every second month (online) to provide feedback to content produced in WP4 and WP5. During phase 2 of the project (in autumn 2023), the YDAs act as a pilot in the GreenSCENT project, as the four YDAs moved to meet their co-participants in their own YDA physically in selected events organized in Italy, Denmark, Spain and Serbia.

#### 11.7.5.2 *Stakeholders*

The stakeholders during the YDAs on behalf of UNSPMF include the following:

- (1) faculty students (2),
- (2) teachers and science educators (2),
- (3) faculty management (1),
- (4) industrial partners (2),
- (5) participants (5 from Denmark, 2 from Spain, 2 from Finland, 4 from Greece).

#### 11.7.5.3 *User Recruitment and Invitation*

Recruiting young students for assemblies lends itself to much discussion and thought-provoking procedures. The YDA recruitment was a tall order for us but we eventually reached a consensus to recruit with diversity in mind, with regards to age, gender and interest. Taking into consideration skills such as consistency, diligence and, most of all, willingness, we formed the teams that were engaged in the YDAs. Communication skills are also an important factor to bear in mind. The major interest, however, was the feedback the pilot organisers received from the participants. It turns out that the meeting's targets came to fruition and that our criteria of choice were the right ones. Database with recruited students were defined, and DBT invited and reached the final participants.

#### 11.7.5.4 *Pilot Team, Roles*

On behalf of UNSPMF, two university professors and one faculty manager helped the YDA meetings in terms of supporting the students mainly during the in-person meetings in Denmark, Spain, Italy and Serbia. In addition, the pilot team, in cooperation with the students, provided the participants with computers in situations when the online meetings were scheduled during school hours.

#### 11.7.5.5 *Implementation Tasks and Schedule*

May 2022 to June 2022: Recruitment phase.

September 25th 2022, for all YDAs: Joint online kick-off meeting (introduction and getting to know the participants).

October 25th to 26th, 2022: Online meeting (co-design on the GreenSCENT Competence Framework).



November 30th to December 1st, 2022: Online meeting (co-design on the GreenSCENT Competence Framework Knowledge Graph).

February 1st to 2nd, 2023: Online meeting (co-design on the GreenVerse apps).

April 12th to 13th, 2023: Online meeting (co-design on the GreenVerse apps).

June 7th to 8th, 2023: Online meeting (co-design on the air pollution activity, CleanAir@Schools activity and app).

September 1st to 3rd, 2023 for YDA 1: In-person meeting in Denmark (Copenhagen, energy efficiency).

September 8th to 10th, 2023 for YDA 2: In-person meeting in Spain (Barcelona, air pollution, CleanAir@Schools).

September 22nd to 24th, 2023 for YDA 3: In-person meeting in Italy (Rome, From Farm to Fork).

October 6th to 8th, 2023 for YDA 4: In-person meeting in Serbia (Novi-Sad, circular economy).

November 15th to 16th, 2023: Online meeting (Taking action! Meeting the Danish Youth Delegate to the UN on climate and biodiversity).

January 20th, 2024 for all YDAs: Final joint online meeting.

#### 11.7.5.6 *Links to the Curriculum*

All thematic areas addressed during the online and in-person meetings for the YDAs are linked to the different study programs, courses and research centers within the faculty in the field of climate change, Farm to Fork, air pollution etc.

#### 11.7.5.7 *What are the KPIs?*

Number of Serbian participants:

- (1) faculty professors: 2,
- (2) faculty manager: 1,
- (3) faculty students: 3.

#### 11.7.5.8 *Specific Risks and Mitigation*

The risks occurred mainly on the participants' dropout rate and/or the inability to attend the online meetings. The mitigation measures to overcome those challenges are as follows. During the recruitment phase, a number of 15 students were recruited in total. In instances where students of the YDA could not attend online meetings, facilitators took proactive measures. They provided follow-up discussions and regular updates to ensure the participants' continued engagement and inclusion in the YDA activities.





## 11.8 Pilot Partner Citizens (EU)

### 11.8.1 Demonstrator Activity *Open Innovation*

#### 11.8.1.1 *Context*

We have initiated a series of open innovation challenges within GreenSCENT, with the first one being the "Sustainable Food Challenge" targeted at students in Europe. This challenge aimed to inspire a reimagining of how food is produced, distributed, and consumed across the continent. With over 600 participants from all corners of Europe, we culminated in a grand event held in Paris, where the six finalists had the opportunity to pitch their innovative ideas in front of the GreenSCENT Jury.

Our primary goal is to educate and cultivate pro-environmental behaviours through these open innovation challenges, empowering the youth to play a significant role in shaping the future of Europe. In a parallel effort, we recently launched a second program in October 2023, bringing together students and entrepreneurs within the farm-to-fork strategy. This program encourages the collection of groundbreaking ideas and revolutionary solutions, strengthening our commitment to fostering sustainability and positive change in Europe's food systems.

Those open innovation challenges are launched on the GreenSCENT innovation platform powered by AGO. Our platform enables the construction of immersive experiences accessible from web and mobile browsers. Participants can easily create teams and upload all the deliverables on the platform, whereas the admins have all the tools necessary to contact participants and to follow up on the operations KPIs.

#### 11.8.1.2 *Stakeholders*

The stakeholders of the first open innovation challenge include the following:

- (1) 2 Partner Professors in French universities:
  - (1.1) Toulouse School of Management,
  - (1.2) Institut Supérieur de Gestion, Paris;
- (2) 7 Partners across Europe;
- (3) 6 Student associations and ambassadors:
  - (3.1) ESA: Ecole Supérieure d'Agricultures d'Angers,
  - (3.2) Ecole des Hautes-Etudes d'Ingénieur Junia,
  - (3.3) Centrale Supélec Université Paris-Saclay,
  - (3.4) Ecole Vétérinaire de Lyon,
  - (3.5) Ecole des Hautes-Etudes d'Ingénieur Junia,
  - (3.6) Sup'Biotech, Institut Supérieur des Biotechnologies de Paris.

#### 11.8.1.3 *User Recruitment and Invitation*

We adapt our communication strategy based on the targeted audience and geographical scope. Generally, we actively conduct school presentations and foster partnerships with universities and businesses, tapping into academic and professional networks to draw in potential participants. Our social media presence and



strategically crafted email campaigns keep individuals well-informed about our ongoing challenges. Moreover, we prioritize targeted outreach to specific communities, ensuring that our invitations resonate with the right audience. This multipronged approach empowers us to curate a diverse and dynamic community of innovators and creative thinkers, enriching the challenge experience for all involved.

Any student enrolled in a European university can participate in our GreenSCENT open innovation challenges. For 2024, we also opened a challenge directed to European startups and entrepreneurs.

In a nutshell, we work with a multichannel approach including:

- (1) Demand generation: On top of leveraging our database, we always look out for new ways to increase the reach and quality of applicants.
- (2) Listing on Agorize.com and on relevant websites of the ecosystem
- (3) Email and direct message campaigns: Distribution of direct emails and newsletters to our global network.
- (4) Social media: Organic and paid campaigns across social media channels including Facebook, Instagram, Twitter and LinkedIn.
- (5) Participants management: Respond to emails and inquiries on social media regarding the program.
- (6) Partners: Activation of our network and creation of new partnerships.

#### 11.8.1.4 *Pilot Team, Roles*

The AGO team and its partners were in charge of recruiting participants for this operation. During school presentation, the AGO team provide some insights about the challenge theme and some tips to submit their idea. Additional information and presentation templates were also directly provided on the platform to support participants. Students could also ask their questions via the platform in case they have encountered any issues.

#### 11.8.1.5 *Implementation Tasks and Schedule*

The first open innovation challenge was divided into 4 main steps which contained the sub-steps described in the pilot protocol:

- (1) ideation: from 16 February 2023 to 14 May 2023:
  - (1.1) ideal duration: minimum 8 weeks;
  - (1.2) promote your challenge: use AGO's promotional tools to reach potential participants; share your challenge on social media, your website, and other relevant channels to maximize visibility;
  - (1.3) manage submissions: regularly monitor and review submissions on the AGO platform; one can communicate with participants, provide feedback, and ask for clarifications if needed;
- (2) evaluation: from 15 May 2023 to 31 May 2023:
  - (2.1) ideal duration: minimum 2 weeks;



- (2.2) have on board your jury members: make sure that all jury members have the information that is necessary to fulfil their role within your challenge;
- (2.3) select winners: as the submission deadline passes, engage your panel of judges to evaluate the entries based on the predefined criteria; once the winners are selected, announce the results on the platform; recognize and reward the winning participants;
- (3) mentoring: from 1 June 2023 to 25 June 2023:
  - (3.1) ideal duration: minimum 4 weeks;
  - (3.2) have on board your mentors: make sure that all mentors have the information that is necessary to fulfil their role within your challenge;
- (4) final event: 7 July 2023:
  - (4.1) organize the final event and implement winning solutions: each challenge generally ends with a final event in which the best teams or project owners have the opportunity to pitch their solution in front of a final jury; this is also an opportunity to reward the winning ideas and create networking opportunities; depending on the nature of the challenge, work on implementing or integrating the winning solutions into your organization.

#### 11.8.1.6

#### *Links to the Curriculum*

The participants have worked mainly with the Farm to Fork Green Competence Areas from the GreenSCENT Competence Framework. In addition, we have identified transversal competences that were needed by the students to successfully participate in the open innovation challenge such as:

- (1) problem-solving,
- (2) circular system thinking,
- (3) new business model,
- (4) fostering new opportunities,
- (5) critical thinking skills,
- (6) transdisciplinary,
- (7) awareness of losses and waste,
- (8) management.

#### 11.8.1.7

#### *What are the KPIs?*

Minimum number of participants in citizen engagement/open innovation pilots: 5000. (This value includes participants to the challenge and voters of the public vote.)



### 11.8.1.8 *Specific Risks and Mitigation*

Intellectual Property (IP)-related risks:

**Risk:** Participants may submit valuable ideas or solutions that could be similar to existing IP, or they may inadvertently disclose proprietary information.

**Mitigation:** Clearly define IP rights and confidentiality terms in the challenge rules and agreements. Encourage participants to only share non-confidential information. Consider using a two-step submission process where initial submissions are high-level ideas, and detailed solutions are shared only with selected finalists.

Quality and Relevance of Submissions:

**Risk:** You may receive a large volume of submissions, but the quality and relevance of ideas or solutions may vary.

**Mitigation:** Establish clear evaluation criteria and assemble a diverse panel of expert judges to assess submissions. Use pre-screening mechanisms or a two-stage submission process to filter out irrelevant or low-quality entries.

Lack of Engagement or Interest:

**Risk:** Participants may lose interest or disengage if the challenge lacks excitement or fails to offer meaningful rewards.

**Mitigation:** Create an engaging challenge with clear objectives, inspiring goals, and attractive incentives, such as recognition, or collaboration opportunities. Maintain regular communication with participants to keep them engaged throughout the challenge.

## 11.8.2 *Demonstrator Activity CleanAir@Schools*

### 11.8.2.1 *Context*

The CleanAir@Schools activity is carried out at the same time in various primary and secondary schools in Spain (Girona, Barcelona and Basauri).

CleanAir@Schools focuses on improving the air quality around schools, providing schools with both the necessary tools to carry it out and the didactic material to analyse problems related to air pollution and promote a healthier school environment.

Pollution levels are measured by passive dosimeters placed at strategic points around the school. The duration of sampling can be between 2 and 4 weeks, after which the tubes are collected and sent to the laboratory for analysis.

In each city, each school has a chosen 20 points to measure air pollution. The pollution levels are measured at strategic points in and around the wider area of the schools, 3 within the school and 17 at the surrounding area of each school.

Apart from the main component of the activity (measuring air quality), a series of independent educational units are being developed to support the activity. These are:

- (1) analysis of meteorology (meteorological reports);



- (2) GIS (mapping and interpolation schemes);
- (3) mobility to/from educational institution/home;
- (4) reduce exposure;
- (5) improve air quality (nature-based solutions);
- (6) air quality data analysis and mapping (reading and plotting data files such as CSV files);
- (7) analyse the results of CleanAir@Schools measurements (producing reports, posters and awareness-raising campaigns);
- (8) understand the effects of air dispersion.

After the measurements are taken and analysed, the results are exported in tables and maps. Then, the schools are encouraged to carry out at least an educational unit to explore the results. Moreover, schools can partner with other schools to compare the activity. The follow-up activities may focus on localized awareness-raising campaigns.

#### 11.8.2.2 *Stakeholders*

The stakeholders (including their numbers) in the CleanAir@Schools activity first campaign include the following:

- (1) Girona: 10 schools;
- (2) Barcelona: 7 schools;
- (3) Basauri: 15 schools.

The stakeholders (including their numbers) in the CleanAir@Schools activity second campaign include the following:

- (1) Girona: 10 schools;
- (2) Barcelona: 3 schools;
- (3) Basauri: 10 schools
- (4) Madrid: 7 schools;
- (5) Terrassa: 7 schools;
- (6) Salt : 3 schools;
- (7) Romania: 2 schools;
- (8) Italy: 1 school.

#### 11.8.2.3 *User Recruitment and Invitation*

Any school can participate in this activity and each school is free to organize itself as it wishes. It is an activity mainly aimed at pupils of 5th and 6th grade at primary school, but other age groups can be involved.



The recruitment and invitation are different, depending on cities and schools. The participant schools expect willingness to participate in activity. Girona's and Barcelona's recruitments have been done via both the environmental and educational sections of the respective municipalities. Once the schools have engaged with the activity, contact has been done directly with experts from 4s.

In relation to the schools in Basauri, recruitment was done via a local NGO. For Madrid, Terrassa and Salt, recruitment has been done via the municipality. For schools in Romania and school in Rome, recruitment was done via the other GreenScent Partners.

#### 11.8.2.4 *Pilot Team, Roles*

4S is responsible for the pilot and demonstrator activities. Schools are prompted to participate in an activity, a presentation or a workshop online, whereby 8 schools from Girona and 7 schools from Barcelona are present and 4S researchers explain the activity.

#### 11.8.2.5 *Implementation Tasks and Schedule*

<b>Overview of tasks for the CleanAir@Schools activity</b>	
Step 1	Presentation of CleanAir@Schools at municipality/NGO/Partner level.
Step 2	Mailing to all potential schools with brief explanation on the activity plus inscription form.
Step 3	Selection of participants based on information on inscription form. Key parameters: <ul style="list-style-type: none"> <li>• at least one contact engaged with activity;</li> <li>• ensure grade of primary/secondary school is suitable;</li> <li>• dates proposed to carry out the activity are suitable;</li> <li>• school is available to do the deployment/collection within same day;</li> <li>• capable to carry out outdoor activities with students.</li> </ul>
Step 4	Online Workshop CleanAir@Schools with participants.
Step 5	Provision of air quality sensors to schools.
Step 6	Preparation of location with CleanAir@Schools web interface & installation of CleanAir@Schools mobile app.
Step 7	Deployment Day - student go out in the field to deploy NO <sub>2</sub> passive samplers.
Step 8	Collection Day - student go out in the field to collect NO <sub>2</sub> passive samplers.
Step 9	All sensors are collected and experts ensure all information is correctly stored in database (via mobile app) or in deployment sheets provided.
Step 10	All sensors sent back for analysis.
Step 11	Results received. 4S experts carry out quality control of data.



Step 12	Data is prepared in forms of tables and maps.
Step 13	Data is sent to school.
Step 14	Online workshop for CleanAir@Schools with participants to present the overall results + encourage follow up activities.
Step 15	Schools are encouraged to work on results and work on behavioural change.

### 11.8.2.6 *Links to the Curriculum*

The CleanAir@Schools is hard-wired into the high school curriculum since they integrate relevant material into already existing subjects by creating interesting activities. Subjects such as science, geography, biology, skills labs, as well as extracurricular activities, such as TEDx and Young Scientists Groups — lend themselves to discussions on air-pollution and hands-on activities that allow students to observe and understand air pollution and its effects on peoples' health and the environment.

These CleanAir@Schools demonstrator fosters an interdisciplinary approach by incorporating elements of not only the above-mentioned subjects, but also of mathematics and even arts through maps and posters, such that the students will be able to communicate their findings.

### 11.8.2.7 *What are the KPIs?*

Schools participating first campaign: 32 schools.

Number of tubes placed inside and outside the schools: around 340 samplers.

Schools participating second campaign: 43 schools.

Number of tubes placed inside and outside the schools: minimum 800 samplers.

### 11.8.2.8 *Specific Risks and Mitigation*

Risk: technical issues with the CleanAir@Schools app; mitigation: continuous support from 4S team.

Risk: lack of interest and level of engagement; mitigation: preparing side activities during the air pollution monitoring (1 month) and sample analysis (1 month) periods.

Risk: change of school's responsible person; mitigation: continuous support from 4S team (stepping in, if necessary). Workshop recorded and detailed programme provided.

Risk: school's busy agendas; mitigation: clear from offset on total hours required to perform the activity, flexibility upon difficulties and provision of a web interface plus app to facilitate the preparation of the activity.

## 11.8.3 *Demonstrator Activity Youth Design Assemblies*

### 11.8.3.1 *Context*

The objective of the YDAs is to engage young, lay citizens in inspiring the development of the content for the pilots developed in WP5 and the corresponding curriculum in WP4. Generally, the participants in the YDAs



have been discussing their thoughts, questions, wishes and ideas for improvements and additions to the GreenSCENT Competence Framework and the content in each pilot presented to them. They have received feedback from WP1 and pilots on how their thoughts, questions, wishes and ideas have inspired the work within GreenSCENT. Within a year and a half, the four YDAs convene roughly once every second month (online) to provide feedback to content produced in WP4 and WP5. During Phase 2 of the project (autumn 2023), the YDAs worked as a pilot in the GreenSCENT project, as the four YDAs travelled to meet their co-participants in their own YDA physically in dedicated events organized in Italy, Denmark, Spain and Serbia.

### 11.8.3.2 *Stakeholders*

Stakeholders in the Youth Assembly demonstrator activity are: WP4, WP5 pilot partners and the participants in the four Youth Assemblies.

### 11.8.3.3 *User Recruitment and Invitation*

The recruitment and formal invitation of the YDA participants were conducted as follows:

- (1) Developing a recruitment guide for partners.
- (2) Creating an online application formula with respect to GDPR policies and parental consent.
- (3) Assisting partners in recruitment (while also recruiting in Denmark).
- (4) Selecting participants among applications, ensuring diversity and representability (see).
- (5) Formally inviting the final participants to join the YDAs and presenting the tentative program for the next 1.5 years.

DBT asked the recruiting partners to recruit with diversity in mind, to ensure diversity with regards to age, gender, education, occupation, and geographical zone of residency. In the recruitment and in the final selection of participants, we have strived for representativeness, but also for diversity, by considering the following criteria:

- (1) Diversity: Strive for diversity in the recruitment when looking at gender, type of studies, urban/rural, income, etc.
- (2) Inclusion: Strive to include minorities and vulnerable groups (persons with disabilities, persons from ethnic minorities, persons with refugee background, etc.).
- (3) Age: Young people in the age group between 17 and 25 years.
- (4) Language: Participants with all language backgrounds and ethnicities are welcome. However, for the YDAs to function, they must be able to speak and read English.
- (5) Occupation: The participant must be a student or have an interest in climate change, environmental issues, sustainability, or design/co-design.

In the application formular, the applicants for the YDAs are asked to provide information on their eventual minority role, such as disability, ethnicity, gender, social background, etc., in order for DBT to select a diverse group of participants.



#### 11.8.3.4

#### *Pilot Team, Roles*

DBT have been responsible for the pilot and demonstrator activities, inviting pilots from WP5 to co-create activities for the YDAs.

#### 11.8.3.5

#### *Implementation Tasks and Schedule*

<b>Overview of workshops in the YDAs</b>	
October 2022	Introduction to the YDAs
November 2022	YDAs generated ideas and provided feedback on the first draft of the GreenSCENT Competence Framework
February 2023	YDAs developed ideas on the use of 4 demonstrators:  (1) Interactive documentaries (2) Citizen Journalism (3) Crowdsourced Environmental Monitoring (4) AR app
May 2023	YDAs worked with the demonstrator CleanAir@Schools
June 2023	YDAs provided feedback on prototypes of 4 GreenSCENT demonstrators:  (1) Interactive documentaries (2) Citizen Journalism (3) Crowdsourced Environmental Monitoring (4) AR app
September – October 2023	In-person events (YDA pilot activities):  The YDAs' participants met in person in four different European Cities to work with a specific competence regarding the European Green Deal:  (1) Copenhagen, 1-3rd of September 2023: Clean Energy (Agenda 1) (2) Barcelona, 8-10th of September 2023: Zero Pollution (Agenda 2) (3) Rome, 22-24th of September 2023: Farm to Fork (Agenda 3) (4) Novi Sad, 6-8th of October 2023: Circular Economy (Agenda 4)



November 2023	<p>Wednesday 22nd of November, 16:00 to 19:00 (UTC+1) (YDA 1+2) and Thursday 23rd of November, 16:00 to 19:00 (UTC+1) (YDA 3+4): The topic was Taking action! The YDAs had the honour of meeting the Danish Youth Delegate to the UN on Climate &amp; Biodiversity, Ms. Lise Coermann Nygaard. We discussed how to take action and make a change for the Climate and the Environment.</p> <p>ECQA and CSRC participated in the workshop and provided an overview of the certification of GreenSCENT competences, and an introduction to the selected current versions of the GreenSCENT skills cards, in line with WP4. Under the guidance of ECQA and CSRC, the following skill cards were tested, discussed and fine-tuned by YDA participants (aged 16 and above): Clean Air, Zero Pollution and Farm to Fork. The Youth Assemblies provided ECQA and CSRC with valuable insights in the concrete needs of the target groups for the advanced and professional levels.</p>
January 2024	<p>Wednesday 17th of January 16:00 to 19:00 (UTC+1): For the final January meeting, the topic is the Celebration and Goodbye, as we celebrate the participants' engagement in the YDAs for the past 1.5 years. We look back at what we learned and experienced, and finally the YDA participants receive the GreenSCENT YDA Certificate. We will also revisit the GreenSCENT Competence Framework, which has been amended and finalized according to feedback from the YDAs. This final meeting will be a joint meeting where all four YDAs will participate together.</p>

#### 11.8.3.6 *Links to the Curriculum*

During the YDA workshops (online and in-person), the participants have worked with all eight Green Competence Areas from the GreenSCENT Competence Framework. That one in bold has been assessed more thoroughly: Biodiversity, Circular Economy, Clean Energy, Climate Change, From Farm to Fork, Green Building, Smart Mobility, **Zero Pollution**.

#### 11.8.3.7 *What are the KPIs?*

The KPI is to involve at least 60 young people from Italy, Spain, Serbia, Finland, Romania, Greece and Denmark in the YDAs. Each partner in these countries has been responsible for recruiting 12 participants.

#### 11.8.3.8 *Specific Risks and Mitigation*

Most risks in the YDA demonstrator activity (the online workshops) are related to the online and digital format of the workshop.

Several technical issues and challenges have to be considered regarding the YDAs, especially (but not exclusively) in connection to the online meetings.

- (1) Access to functioning computer, smartphone and other digital/technical equipment: All participants have access to the necessary equipment. It is possible that participants who are recruited through partner schools borrow equipment if needed.



- (2) Internet accessibility: Some participants may not have a stable connection at home, resulting in minor connection outages.
- (3) Language, lack of simultaneous online translation: Language barriers have been countered by making it clear during recruitment that all meetings will be convened in English. The participants all speak and understand English on a sufficient level.
- (4) Monotony/lack of excitement: The online meeting format posed a challenge in regards to maintaining the participants' attention and interest during the meetings. DBT has put much effort into developing an interactive and engaging meeting design and format, which meant that the participants were generally active and interested throughout the meetings.
- (5) Tiredness after a "long school day" or plain fatigue with online schooling after COVID: Even though online meetings have become a familiar concept for students since COVID, many young people feel despair and fatigue with the concept of online meetings and online schooling. This was countered throughout the interactive meeting design and by designing the content with the participants' key interests in mind.
- (6) Social barriers–relationship building: Despite DBT's efforts to create social and trust instilling spaces within the four YDAs, the social relations between the participants do not come as natural as they do in physical meetings. DBT have made an effort to create and nurture confidential and trust-inspiring spaces, by dividing participants into smaller break out rooms, encouraging small talk and group work, guiding the participants to discuss and present topics to each other, and by maintaining a clear and trustworthy relation between the facilitator (DBT) and the participants in between-meetings.
- (7) Busy schedules for participants (education, extracurricular activities, social life, jobs, family, other voluntary/activist work): The YDAs predominantly consist of very active and busy young people with busy schedules. This makes it even more important to create interesting and relevant meetings.

Language barriers have been solved by making it clear during recruitment that all meetings will be convened in English. The participants all speak and understood English on a sufficient level.