



Innovative Measurement Tool towards Urban Environmental Awareness

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The IMPETUS application

<https://impetus.climatescan.org>

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1 APP

1.1 Purpose of this app

This measurement tool developed under the IMPETUS project aims to raise urban environmental awareness by reducing the friction in participating in citizen science projects concerning the environment. Anyone can contribute to the research community regarding environmental issues by using this app to collect measurements and other relevant data through small experiments and questionnaires (IMPETUS activities). All activities are designed to be answered without being an expert in this field and without requiring much time. All necessary information for the experiments is shown directly in the app and described so that the procedure can be effortlessly completed for non-experts.

The available measurements (IOs) are:

- Water Biological and Microplastic Pollution (WBaMP),
- Flooding,
- Heat Stress,
- Riverine Plastic Waste Measurements (RPWM),
- Street Scan Scorecards,
- Questionnaires about Neighbourhood & Well-being and Perception of Living Area.

1.2 Operational Guidelines & Prerequisites

- This app uses the database of "ClimateScan", so users must create an account under www.climatescan.nl first. Then they can log in to the app using the credentials (email, password) of their ClimateScan account.
- This app uses GPS location to identify the region where the user is conducting the measurements. It asks for permission to access and save GPS coordinates. Users shall grant access if they want to find their location automated and, in that way, faster on the map. The location module collects the data as anonymously as possible (the app saves no additional user data, only the coordinates of the tracked place) and no additional tracking data without the user's approval. If the users do not grant access to the location permissions, they need to give the location of their measurements on the map manually.
- This app runs only online, so the users must have internet access while they use it, and no data is saved local on the device except for some needed cached data of the session.
- Users should not refresh the app because this will automatically change the session and, therefore, will automatically result in a log-out of the user!

1.3 Instructions (How-to use the app)

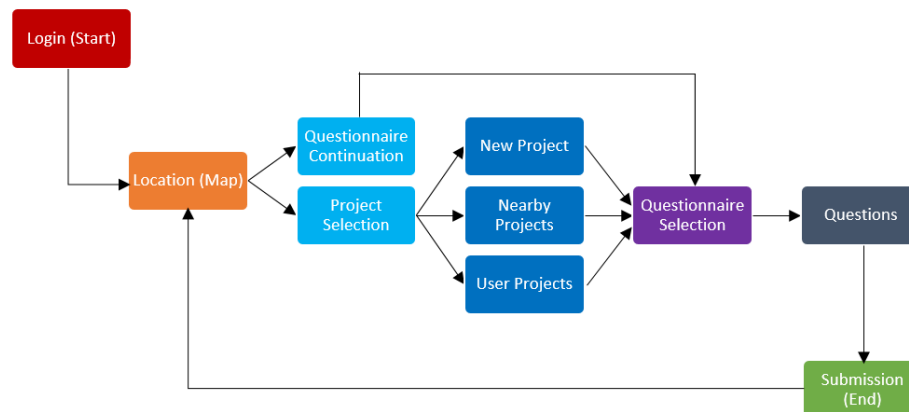


Figure 1.1. flowchart of the app from login to submission

Steps to follow:

1. Login page: Starting page

This is the starting page of the app. The users should fill in the form with the email and password of their **ClimateScan** account. By clicking the button "Let's Go", the user can proceed to step 2.

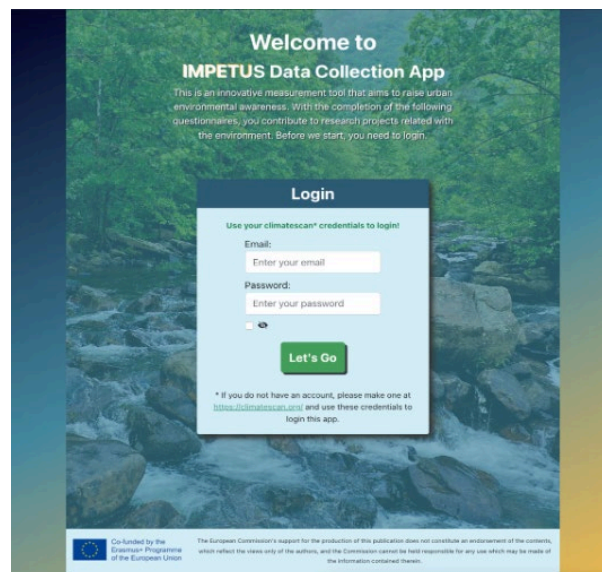


Figure 1.2. login screen

2. Information page

After a successful login, the user will see information with instructions on how to use the app and what steps to follow. By clicking the "Let's Start" button, the user will start the data collection and continue to the 1st step, the location of interest.

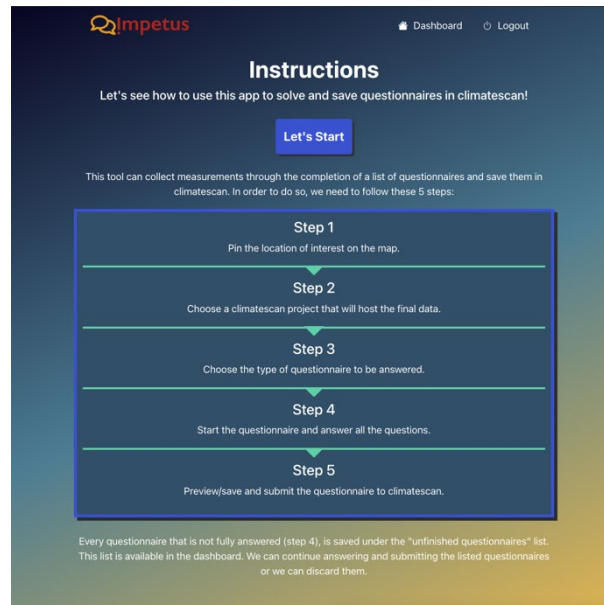


Figure 1.3. instruction screen

3. Location page (1st step)

The app asks the users to give the location of the conducted measurement area. The location shown on the map is the user's location if the user grants permission to use the GPS location of the user's device or the city of Groningen (in the Netherlands) by default. If access is not granted, the user can change the location manually by moving the pin to the appropriate place on the shown map. The selected GPS coordinates are saved by clicking the "Next Step" button, and the user can proceed to step 2 – the project selection.

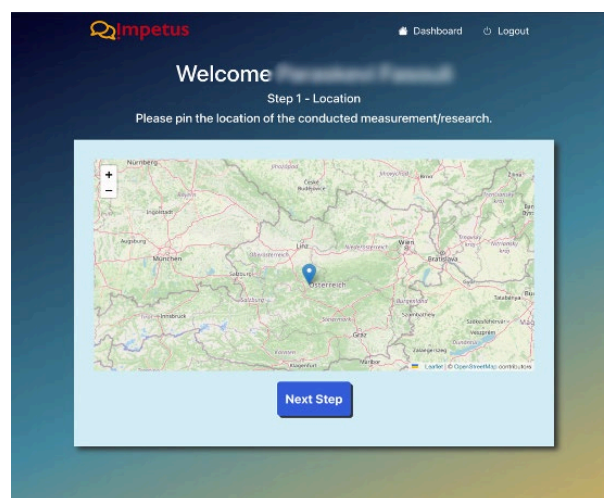


Figure 1.4. location selection screen

4. Dashboard page (2nd step)

After saving the location of the place that the measurements are conducted, the user will see the dashboard page where he can choose between two options (step 4.1 or step 4.2).

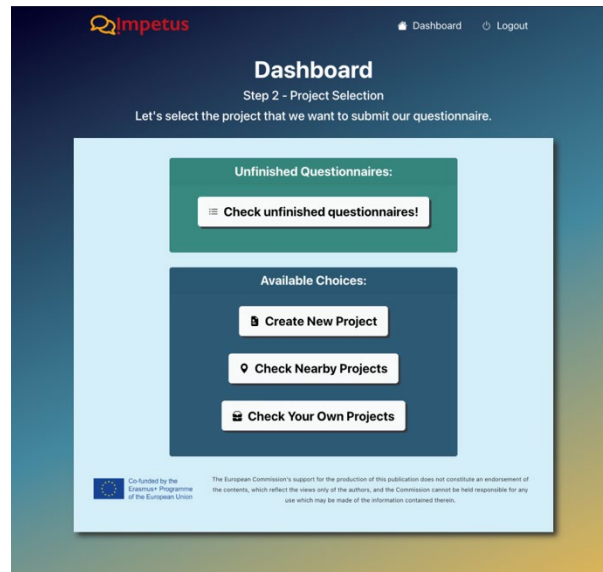


Figure 1.5. dashboard screen

4.1. Questionnaire continuation (Option 1)

By clicking "Check unfinished questionnaires", the user can see a list of all the questionnaires not finished. The list shows all questionnaires still open to be submitted to ClimateScan. The data are saved on the app server and stay there till they get finished or deleted by the user.

Finished questionnaires are submitted to ClimateScan and deleted from the app server and, therefore, cannot be changed afterwards! By selecting one from the list, the user can continue to fill it up and finally submit it to the ClimateScan server. On this screen, there is also the option of deleting one if the user does not want to finish it. Be aware that deleted data cannot be restored.

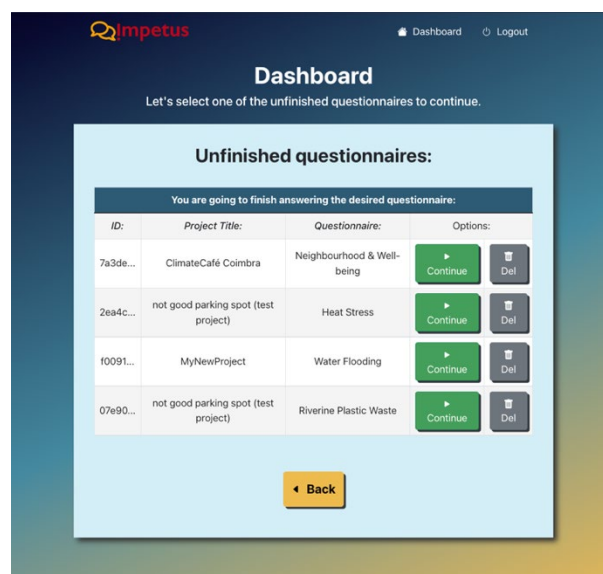


Figure 1.6. Questionnaire continuation interface.

4.2. Project Selection (Option 2)

The users can also start a new questionnaire by choosing between the three options described in detail in 4.2.1, 4.2.2, or 4.2.3. Please notice that newly created projects from this app will use the pin coordinates from step 1 as the location. Polygon areas are available only through project creation directly in ClimateScan.

4.2.1. Create a new project (Option 1)

By clicking the "Create New Project" button, the users will see a form that asks for a project title, a category, and a short description. All fields are mandatory! By filling it in and clicking the "Continue" button, the users will create a new project. This project is saved on the app server and not in ClimateScan until the users submit a questionnaire under it, which happens in the next step (step 3, described in detail in chapter 5, "Questionnaire Selection").

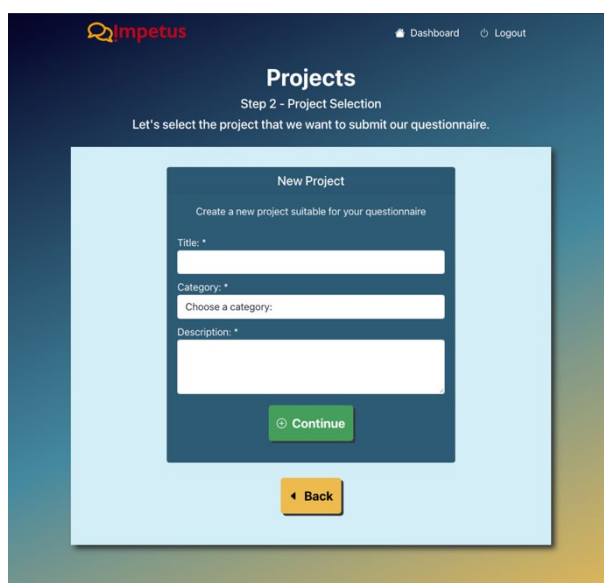


Figure 1.7. "Create a New Project" screen

4.2.2. Select a nearby project (Option 2)

By clicking the "Check Nearby Projects" button, the user will see a list of the ten nearest projects available nearby the GPS / pin location the users selected in step 1. These projects already exist in ClimateScan. The list shows the project's title and the distance from the user's location. By clicking the "Select" button, the users will choose the selected project to add a questionnaire to it, which can be selected in the following screen (step 3, described in detail in chapter 5, "Questionnaire Selection").

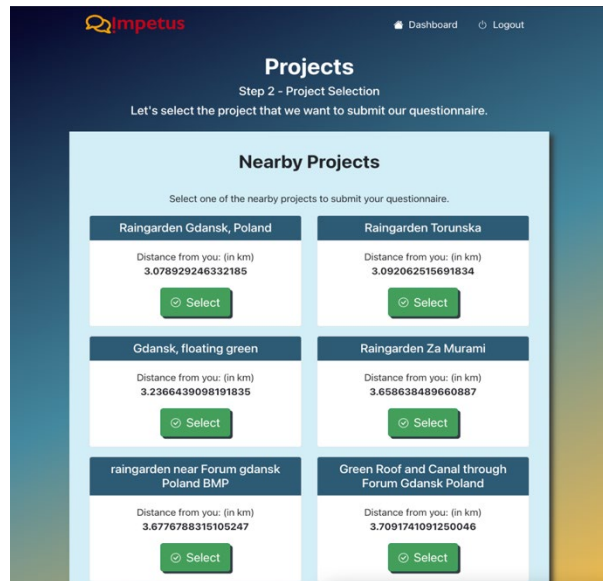


Figure 1.8. "Check Nearby Projects" screen

4.2.3. Select one of your own projects (Option 3)

By clicking the "Check Your Own Projects" button, the users will see a list of the projects that the users have already created before in ClimateScan. If the users have created a project without linking a questionnaire, for whatever reason, this project can also be found in this screen. Additional to the ability to select those "unfinished" projects, the option of deleting them is given on this screen. The list contains the title of the project, the category it belongs to and a link to check them directly in ClimateScan. By clicking the "Select" button, the users will be able to add a questionnaire to this project, proceeding to step 3. (described in detail in chapter 5, "Questionnaire Selection").

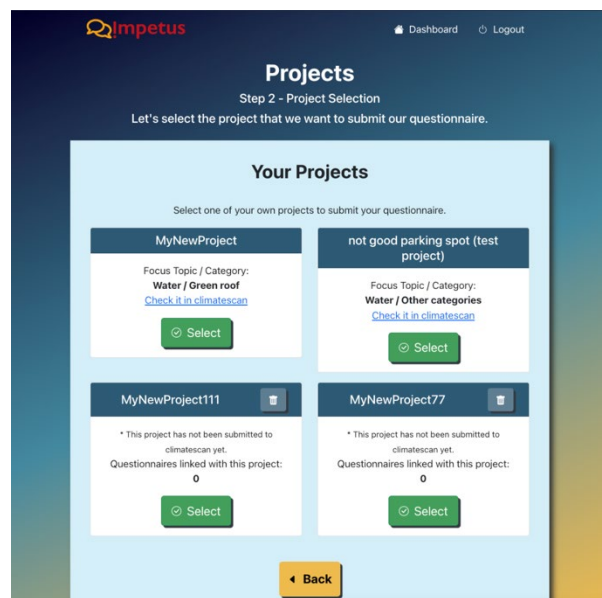


Figure 1.9. "Check Your Own Projects" screen

5. Questionnaire Selection (Step 3)

After selecting the appropriate project to submit a questionnaire, the users will see a list of the available questionnaires they can choose to fill out.

- Water Biological and Microplastic Pollution (WBaMP),
- Flooding,
- Heat Stress,
- Riverine Plastic Waste Measurements (RPWM),
- Street Scan Scorecards,
- Questionnaire about Neighbourhood,
- Questionnaire about Well-being and Perception of Living Area.

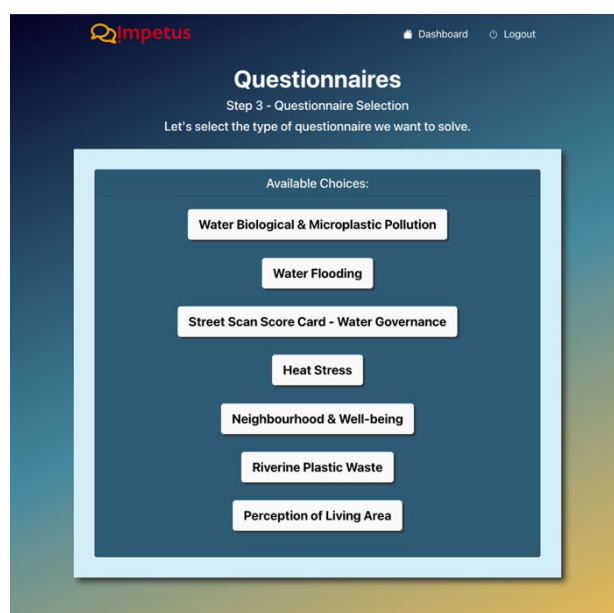


Figure 1.10. questionnaire selection screen

A summary screen shows the users the selected information until this point to ensure that everything is selected as wished. There is the option to make the answered questionnaire publicly available under the selected project **in ClimateScan** or to keep it private under the selected project and therefore only visible for the users themselves and the group of scientists in ClimateScan with administrator rights. The users can start the questionnaire by proceeding to step 4.

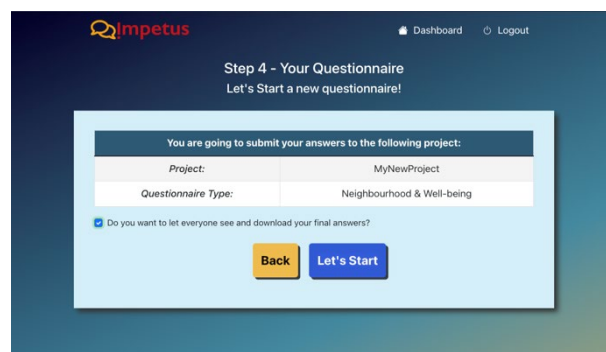


Figure 1.11. summary screen before start of the questionnaire

6. Questionnaire

This step is the actual questionnaire. The users can answer the questions shown one by one. The answer is saved by clicking the “Next” button, and the next question is shown. By clicking the “Back” button, the users can see the previous question, including the given answer. If an image is asked to be uploaded, the users can see a preview of the selected image to ensure it is correct. When a new measurement is asked, the users can see relevant information and instructions on measuring safely and correctly.

At the end of the questionnaire, the user automatically goes to step 5 – the preview.

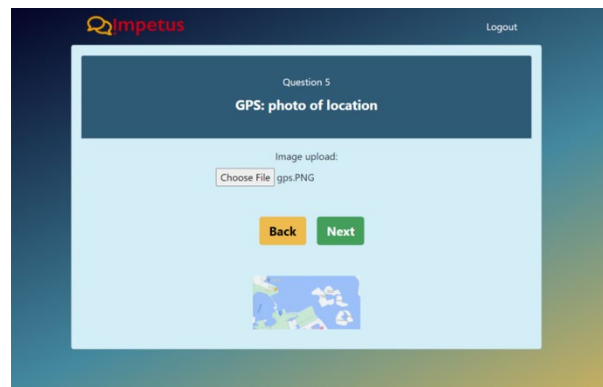


Figure 1.12. Example of the image upload screen

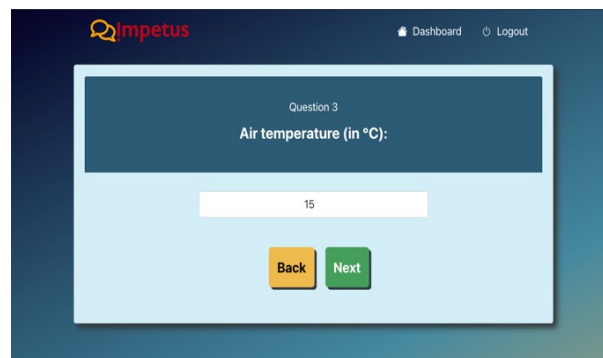


Figure 1.13. Example of a text / value input screen

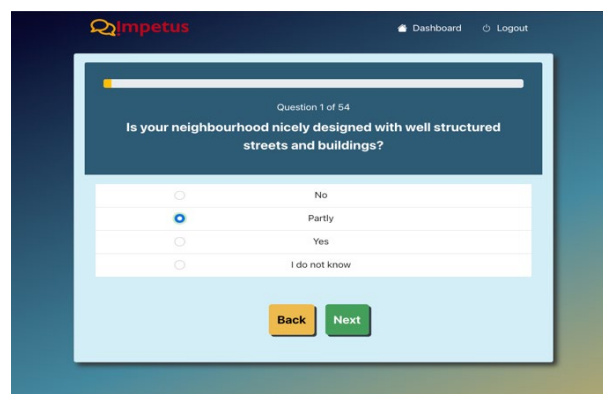


Figure 1.14. Example of a choice selection screen

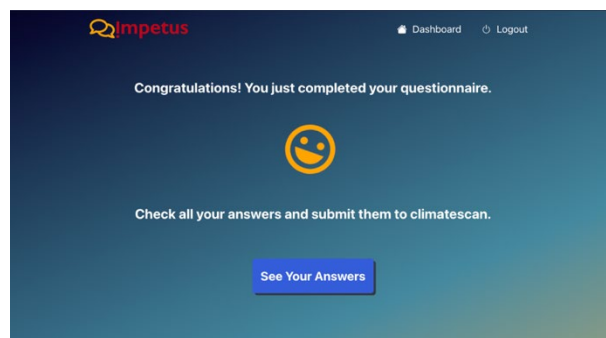


Figure 1.15. questionnaire end screen

7. Submission of results

In the preview panel, the users can see all the answers given on the questionnaire. Additionally, there is also a "Save" button to save the answer locally on their device. The "Submit Your Answers" button sends the answers to ClimateScan under the selected project. It also deletes all the data from the app server if ClimateScan acknowledges the reception of the data.

The users can also start a new questionnaire or push these answers to the "unfinished questionnaire" list by clicking the "Dashboard" button or the "Logout" button.

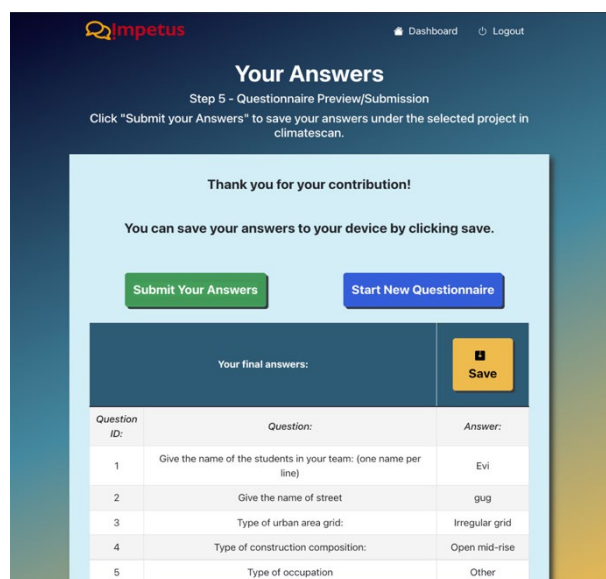


Figure 1.16. preview of the answers screen with possibility to save and submit

The link to the app can be found at the IMPETUS website (<https://impetus.aau.at>) or directly under <https://impetus.climatescan.org/>. The link to the GitHub repository containing the app's source code can also be found at <https://impetus.aau.at>.

See: <https://impetus.aau.at/outputs/>

Folder: The IMPETUS application

- [The IMPETUS application instruction.pdf](#)