

CitiSense

From Knowledge To Action

Summary

Provide a brief overview of your proposed project

Crowd sourced air pollution projects usually focus on the creation of sensor networks and visualization tools. In implementing these projects, citizens are engaged mostly via do-it-yourself workshops and through training events. Yet, democratized science must go beyond collecting information – it must enable citizens to take scientifically grounded actions that effectively address their problems, needs, and concerns.

To transform citizen science (CS) data and information into actions, this project proposal builds on Air Data from Arnhems Peil, an existing CS initiative in Arnhem, the Netherlands. The objective is to make air pollution reduction as accessible and interesting to the public as weather forecast and gardening.

The CS community will apply practicable, localized air pollution forecasts to act in advance and to anticipate adverse conditions. Building on more awareness, citizens will be engaged to dynamically design sustainable air pollution mitigation actions with nature-based solutions (NBS).

To maintain an outstanding user-experience, researchers from the Institute for Housing and Urban Development Studies (IHS) will take the role of supporters who transfer and activate the knowledge, facilitate utilizing technologies, and help citizens to define their roles and responsibilities.

What does your project look like at the moment; how many participants does it have, what do they do?

The Air Data CS project started in October 2019. Over 200 air pollution sensors have been built (130 units installed and maintained by citizens). An active user community participates regularly in surveys and join research groups or (political) actions. 17 volunteers help build new devices, write code and documentation. In the near future a new Environmental Data Monitor (EDM) environment will allow every citizen to create personalized views of localized air quality, heat stress information and NBS.

1. Idea

1.1 Strength and novelty of the idea

Describe the core idea of your application in one sentence.

Don't leave citizens in the dust – empower the citizen science community by extending their capabilities with air pollution forecasts and with know-how in co-creating sustainable nature-based solutions to counteract air pollution now.

What is new or different about it? Has it been tried before?

The integration of CS observation-based localized air pollution forecasts in CS networks is new. By extending the capabilities of the CS community, its status as an observer evolves into a pro-active doer. This project facilitates citizens to enter the second stage in their do-it-yourself process: learning how short-term forecasts can lead to long term sustainable solutions. The dedicated air pollution forecast method was developed by IHS as part of the [CSEOL Sentinel Citizen pilot project](#).

Who are the key stakeholders? Who will be (positively or negatively) impacted by the pilot and how?

The main stakeholders are the citizens, the CS community “Arnhems Peil” and the municipality of Arnhem. Together they will benefit from extended network functionalities and scientifically grounded know-how in order to join forces and to create awareness and community-based responsibility.

1.2 Relevance to the call

What pollution-related issues does your idea address?

While air pollution data has become available and accessible to a broad community, citizens still feel incapacitated to take advantage of these data. This project addresses the untapped resources of the community to take advantage of highly beneficial air pollution information, specifically forecasts, and learn about low-hanging fruits to combat air pollution using their ambient natural ecosystem.

Which EU territories will the pilot cover? Be specific – if international, note countries, if regional regions, cities etc.

The pilot will concentrate on the city of Arnhem, capital of the province Gelderland in The Netherlands (population ~160'000). Although located outside of the Randstad (NL) and Ruhr area (G), local air quality is often significantly affected by these big agglomerations. Such conditions make this provincial city an ideal case to study various air pollution conditions, applicable to other mid-sized cities in EU.

Which activities in your proposed pilot will involve citizen scientists and/or the public?

To further democratize science, we want to engage the community in two online meetings and two online workshops as well as a field lab experiment as follows: **Inception meeting** (2h) to establish a common ground for the stakeholders involved and to lay the foundation for collaborations; **Workshop 1** (4h) to build the capacity of the CS community in applying practicable, localized air pollution forecasts; **Workshop 2** (4h) to build the capacity of the CS community in designing sustainable air pollution mitigation actions using NBS; **Field lab experiment** (instructions given at the workshops) where citizens will allocate a green space area in their neighborhood and install new CS sensors for long-term observations and evaluations of NBS; **Wrap up meeting** (2h) to summarize the results of the project and discuss ongoing and future actions among the stakeholders.

1.3 Open approach

Which (if any) data do you intend to gather or produce? How much of this will be openly available?

All required data, including Copernicus Atmospheric Monitoring Services data for air pollution forecasts, are freely accessible and can be used for this project without restrictions. The information required for the workshops will be provided by the stakeholders and collected by the community. Air pollution data, incl. forecasts, and information about the field labs are freely accessible via the portals.

Which other outputs will the pilot have? Which will be openly available?

The information and findings collected during the workshops will be analysed thoroughly and published via the platform of the CS community. These reports will be actively promoted via the networks of the stakeholders and through the local press to increase public awareness.

Do you rely on personal data? If so, how will you store this data?

All pilots will be expected to comply with the General Data Protection Regulation 2016/679 (GDPR).

In specific cases, it is possible that information about NBS, that will be used during the workshops, originates from private properties. When processing such information, it will be either anonymized or not used at all on the platforms and in the reports. All workshop participants will be requested to state their preferences about sharing contact information and photographs taken during the workshops.

2. Impact

2.1 Value proposition

Why is this funding important? What problem will it allow you to address?

Funding Importance: 1) to implement and integrate the added-value functionality on the CS data portals, 2) to engage with the community and the broader public by organizing workshops and field labs and 3) to support field lab activities and for information dissemination.

Problem addressed: air pollution forecasts significantly increase the functionality, actionability and usability of the community-based air pollution observation system. This will increase momentum and strengthen awareness for the problem (reduce the gap between information and action).

What are the end-benefits of your pilot? How will things be different at the end of the six months pilot? How about in a year, or five, or a decade?

The short-term benefits are the extended possibilities of air pollution forecasts for new applications, such as outdoor activity planning. In the field labs the community will apply the knowledge about NBS to mitigate air pollution and implement long lasting green space observation and evaluation systems.

2.2 Sustainability

How will you ensure the sustainability of the work beyond the end of the funding? Please indicate any additional sources of funding/support you may need and how you plan to secure it.

With the permanent installation of the air pollution forecast system on the CS community platform, the sustainability of the project is maintained beyond its lifetime. The project will qualify the dynamic and active CS community to continue implementing the sustainable NBS in field labs and other activities.

How will your participation in ACTION change your sustainability planning?

Sustainability, a core property of this project, will be persistent throughout the project. The Arnhems Peil and [EDSP ECO foundation](#) are passionate about a Sustainable Future, responsible for actions to protect the planet, end poverty or grow prosperity. Working with universities and public/private organizations the project team supports the transitioning process towards a circular economy and building solutions to ensure that the earth will continue to be a safe place to live for future generations.

3. Implementation

3.1 Planned activities

How will you engage your existing and/or any new participants in the pilot? What will they be asked to do, what data will they collect or produce? What will change from their current engagement? How many citizen scientists do you plan to engage by the end of the project?

Stakeholders will be asked to co-design a field lab experiment to evaluate natural, urban ecosystems on neighborhood scales. These experiments will be assessed by the project team and discussed with the stakeholders to give dedicated, scientifically grounded advice. Conclusions from these field experiments will be published in an online repository with information specifically focusing on the capacities for the CS community. The average team size is 5 and the number of field labs is scalable.

Beyond the activities described above, what activities will your team participate in? E.g. public dissemination, research publications, meetings with stakeholders, etc.

The project team will carefully monitor and adjust the process. Besides managerial activities, the research team wants to collect meta-data and learnings to compile a research database to evaluate

the project and to scientifically analyse the data. If possible, this analysis will be used to disseminate the results of the project at conferences and via peer-reviewed journals.

How do you intend to attract and maintain engagement from citizen scientists and other stakeholders? Why will people want to contribute? How important is online engagement for their engagement?

The project team is picking up the online character of the project and stays in close contact with the community via online channels and platforms to ensure continuous engagement and to exchange data and communicate during the project lifecycle. The upcoming EMD repository will allow to share code and templates, motivating the online community to join our effort or copy the repository.

3.2 Team

Who are the core members of your team? What are their relevant skills and experience?

Dr. Alexander Los: Assistant Professor at IHS (Erasmus University Rotterdam), climatologist, lecturer and researcher in urban environmental and climate change related (citizen science) projects.

Elena Ensenado: Urban Environment, sustainability, and climate change specialist at IHS. Specialist in nature-based solutions for smart and resilient cities.

Jeroen Spaander: Management EDSP BV/ECO foundation, Arnhem, Project Manager, (Azure-) Cloud Specialist, Microsoft Certified Trainer, Solutions Consultant and project leader, First Aid / BHV.

Tell us about your experience with online engagement and managing an online citizen science project. What do you currently do, what tools are you using at the moment?

Alexander Los: Lecturing subjects “urban air pollution”, “urban environment, sustainability and climate change”, and “energy transition”. Has extensive, certified experience in online teaching.

Members of the CS community “Arnhems Peil” / EDSP ECO foundation [currently run 25 projects](#) and are experienced online eco-warriors with a broad range of skills.

What expertise do you think you’re missing? How could ACTION help?

The dedicated trainings and tailored resources offered by the ACTION accelerator covers relevant subjects which will give the project team the opportunity to increase and deepen their knowledge.

3.3 How will you use the €20k

	Cost over 6 months	Overhead (25%)	Total in euro
Personnel	14'320	3'580	17'900
Travel	900		900
Equipment	700		700
Other goods and services	500		500
Subcontracting	-	n/a	-
Grand total in euro			20'000

Explain the main cost items briefly.

The gross of the expenses are labor costs (forecast method implementation, preparing workshops and meeting, developing field lab experiments). A small amount will be reserved to support the mobile sensor network development (15% rule). Also administration, travel and other costs have been added.