D7.3 - Report on outcomes of the field trials in Kifisos

Smart Toolbox for Engaging Citizens into a People-Centric Observation Web

Abstract

Whilst citizen participation in environmental policy making is still in its infancy, there are signs of a growing level of interest. The majority of citizens, though, both as individuals and as groups often feel disengaged from influencing environmental policies. They also remain unaware of publicly available information, such as the GEOSS or Copernicus initiatives. The SCENT project will alleviate this barrier. It will enable citizens to become the 'eyes' of the policy makers by monitoring land-cover/use changes in their everyday activities. This is done through a constellation of smart collaborative technologies delivered by the SCENT toolbox in TRLs 6-8.

The aim of this deliverable is to describe the outputs from the organisation of the citizen science field campaigns in Kifisos river basin in Attica, Greece, consisting one of the large-scale demonstrations areas where the SCENT toolbox was validated. It describes in detail different aspects regarding the organization and execution of the field campaigns, an overview of the citizen-generated data, the feedback received from the participants and the evaluation of the overall campaign experience whilst concludes with recommendations to support the design and realization of such activities.

Keywords: citizen science, field campaigns, Kifisos river basin

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EDITOR	**DATE**
Athanasios Chaldeakis / ATTICA	15-07-2019
CONTRIBUTORS	**DATE**
Thaine H. Assumpção / IHE Delft	10-07-2019
Phuoc Phung / IHE Delft	10-07-2019
Valantis Tsiakos / ICCS	15-08-2019
Maria Krommyda / ICCS	18-08-2019
Evi Brousta /ICCS	18-07-2019
Harris Georgiou / HRTA	20-07-2019
Iouliani Theona / ATTICA	20-07-2019
Mary Miska / ATTICA	20-07-2019
REVIEWED BY	**DATE**
Harris Georgiou / HRTA	26-07-2019
Valantis Tsiakos / ICCS	26-07-2019
APPROVED BY	**DATE**
Evangelos Sdongos / ICCS	01-08-2019
Tony Hughes / CARR	01-08-2019
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Acronyms and abbreviations

Abbreviation	Description
EC	European Commission
EASME	Executive Agency for Small and Medium Enterprises
PoI(s)	Point(s) of Interest
LC/LU	Land Cover/Land Use

Table 1: List of Abbreviations

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Executive Summary

The report describes the outcomes from the organisation of the citizen science field campaigns in Kifisos river basin in Attica, Greece. The field campaigns focused on the collection of information about land cover / land use elements as well as river and soil parameters while covering both rural and urban environments. In these activities the respective components of the Scent toolbox were utilised, allowing authorities to design and set the parameters (i.e. type of data to be collected, points of interest, etc.) of the campaign (through the Scent Campaign Manager), as well as the citizens to carry out the campaigns using mobile and gaming applications (Scent Explore & Scent Measure). Governmental policy makers and NGOs were some of the stakeholders that were involved in the project and played an important role towards addressing a broad network of 70 stakeholders including local municipalities, educational institutions, NGOs, citizen-led communities, individual citizens, walking groups and scouts.

Besides describing the technical activities behind the implementation of the campaigns, the deliverable also illustrates activities carried out as regards the user experience, including the evaluation of the overall campaign experience. The report concludes by providing the lessons and recommendations towards facilitating the conduction of citizen science campaigns.

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1 Introduction

1.1 Purpose of the Document

This document aims to describe the places of the Kifisos pilot where the field trips have taken place, the methodology followed in the organization of the field trips, and an overview of newly generated text and imagery data relevant to these sites.

1.2 Intended readership

This deliverable is public, and can therefore be accessed by anyone with an interest in it. In particular the report can provide key insights to relevant stakeholders that want to learn more and get involved with the conduction of citizen-science campaigns. Such stakeholders include:

- General public and volunteer organisations with an interest and sensitivity in environmental issues;
- Policy makers and public authorities (local, regional or national) associated with monitoring and preservation of the local ecosystem;
- Environmental protection and conservation agencies, NGOs and other environmental organisations at local, regional, national and EU level involved in the protection of the environment.

1.3 Relationship with other SCENT deliverables

The starting points for this deliverable are D1.1 ("SCENT Stakeholder analysis and End User Requirements") & D1.2 ("Benchmarking of available in-situ infrastructure") describing the end user requirements and existing in-situ monitoring systems in each pilot area respectively as well as D1.4 ("SCENT toolbox system architecture definition") defining the high-level SCENT toolbox system architecture deployed in the pilots. In addition, this deliverable was written in parallel with D7.2 that presents the outcomes of the field trials in Danube Delta, and is in close relation with D8.2 ("Communication strategy and plan ") which presents the Communication strategy and plan for citizen engagement, and D8.5 ("Information Packs for Citizen led communities, networks and associations") providing relevant communication resources to facilitate the interaction with citizen and relevant stakeholders. The deliverable complies also with the relevant procedures described in D8.3 Data Management and POPD Requirements (mid-term review update) and D9.3 Ethical Issues Clearance Plan. Finally, D7.3 will provide with useful information and data for deliverable D7.4 ("Evaluation of SCENT toolbox").

1.4 Document structure

The document is subdivided into four main sections. The first section provides details of the Kifisos pilot sites including the description of the pilot campaign places, the types of thematic campaigns conducted and the routes and points of Interest selection rationale. The second section is presenting the organization of the field campaigns, the methodology and the detailed descriptions of the five campaigns conducted in Kifisos river basin. The third section is associated with the evaluation of the field campaign activities, illustrating different aspect from the feedback received from the participants. The report concludes with lessons learnt and a summary of recommendations to facilitate the undertaking of relevant initiatives.

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2 Kifisos pilot sites

2.1 Description of the places of the Kifisos pilot

The large-scale demonstrations of Scent project in Greece took place in the upper river basin of Kifisos in Athens. The area of the basin is approximately 136 km^2, with the elevations ranging from over 1000 metres above mean sea level (m.a.s.l.) in Parnitha Mt. to around 80 m.a.s.l in the outlet of the basin in Filadelfeia, whilst almost 60% of its watershed is urbanised (metropolitan area of Athens). The land cover has altered through the years, transitioning from rural to urban and, in many parts of the basin, industrial, as the city was expanding.

The hydrologic network has also been heavily engineered, aiming at supporting the expansion of the constructions. In many cases, however, the hydraulic works were poorly designed. Also, there are many areas where there are illegal constructions even within the main river course. As a result, during periods of heavy and rapid rain events, the river floods, due to insufficiency of the drainage network, causing severe damage in the infrastructure around the river. This is an aspect of major importance especially at the downstream part, where the main port of the city of Athens, the Piraeus port - a major transportation hub that is served by railway network and major roads, is located.

The areas where the field trips - campaigns were organized, consist of different characteristics while covering both rural and urban environments. An overview of the areas visited by the volunteers and their spatial distribution in the Kifisos catchment is presented in Figure 1. Details about the pilot areas are provided as follows:

- Varympompi-Kryoneri: The area is located at the most upstream part of Kifisos pilot basin, where the river bed is being at its natural course. The river flow in this part appear rather low but, at a large scale, having measurements at the margins of the hydrological basin has very high significance. A pressure transducer sensor has been installed during SCENT project in that area providing continuous measurements of the water level. The measurements performed in the specific areas during the field trips included mainly river measurements (water level and water velocity) as well as the collection of information about the general physical conditions of the soil through portable sensors, in the most upstream part that is primarily covered by forest.
- Floga - Thrakomakedones: The area is located at the northwest part of Kifisos pilot basin and it shows a heterogeneity of land uses, from urban to commercial and even agricultural to some extent. It lies in the vicinity of the basin boundaries, while the elevation is higher compared to the other areas where the Scent campaigns took place. This area was indicated by the hydrological models as being an area with high sensitivity with respect to land cover / land use (LC/LU).
- Monastiri: A pressure transducer sensor has been installed during Scent project in that area providing continuous measurements of the water level. The area was appropriate for arranging campaigns for river stage, river velocity and portable sensors applications. The main advantage for this selection was that all the conducted measurements (i.e. different devices -portable and in situ-, the volunteers and scientific personnel, using flow meters within the stream) could be conducted simultaneously. This gives the possibility to perform a more effective evaluation,

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assessment and inter-comparison between data collected by the volunteers (using Scent Explore) and the data collected using more standard hydrological methods.

- EYDAP: This visit was performed in the vicinity of the facilities of the main water utility of the region (Athens Water Supply and Sewerage Company, EYDAP), located approximately in the central part of the pilot basin. In that area, finding a passage with safe accessibility to the river course has been a major advantage. The identified passage was both very engaging for the volunteers but also ideal for performing measurements with the portable sensors, along with river stage and velocity measurements.
- Agios Fanourios: This point was selected for performing water level and water velocity measurements that would complement the continuous measurements as provided by the installed river measuring stations. The portable sensors were also used in this case; however, a number of difficulties were faced due to the highly compacted soils within that location.
- Filadelfeia (upper part): The upper part of Filadelfeia is highly urbanized and for that reason the focus of the campaigns performed was on observations of LC/LU. However, points where the volunteers could approach the river safely and perform water level and velocity measurements were also identified in order to be utilized for such purposes.
- Filadelfeia (engineered/constructed river part): The engineered part of the river watercourse is of major importance in terms of its hydrologic and hydraulic characteristics. It is the most downstream part at which the river is not tunnelled. Also, this location is additionally the output of the hydrological models built within the framework of Scent. As a result, the conducted measurements were primarily focused on parameters such as LC/LU as well as water level and velocity. The latter were performed at specific points were the level measuring devices were pre-installed within the river bank prior to the field trips.
- Kifisia-Kokkinaras: These sites are located to the southeast part of the river basin and were selected for performing water level and water velocity measurements as well as for acquiring soil measurements (soil moisture and air temperature) through the use of portable sensors.
- Acharnes: The area is located at the northwest part of Kifisos basin and it provides a heterogeneity of land uses, from urban to commercial and rural to some extent. This area was indicated by the hydrological models as being an area with sensitivity with respect to land cover / land use.

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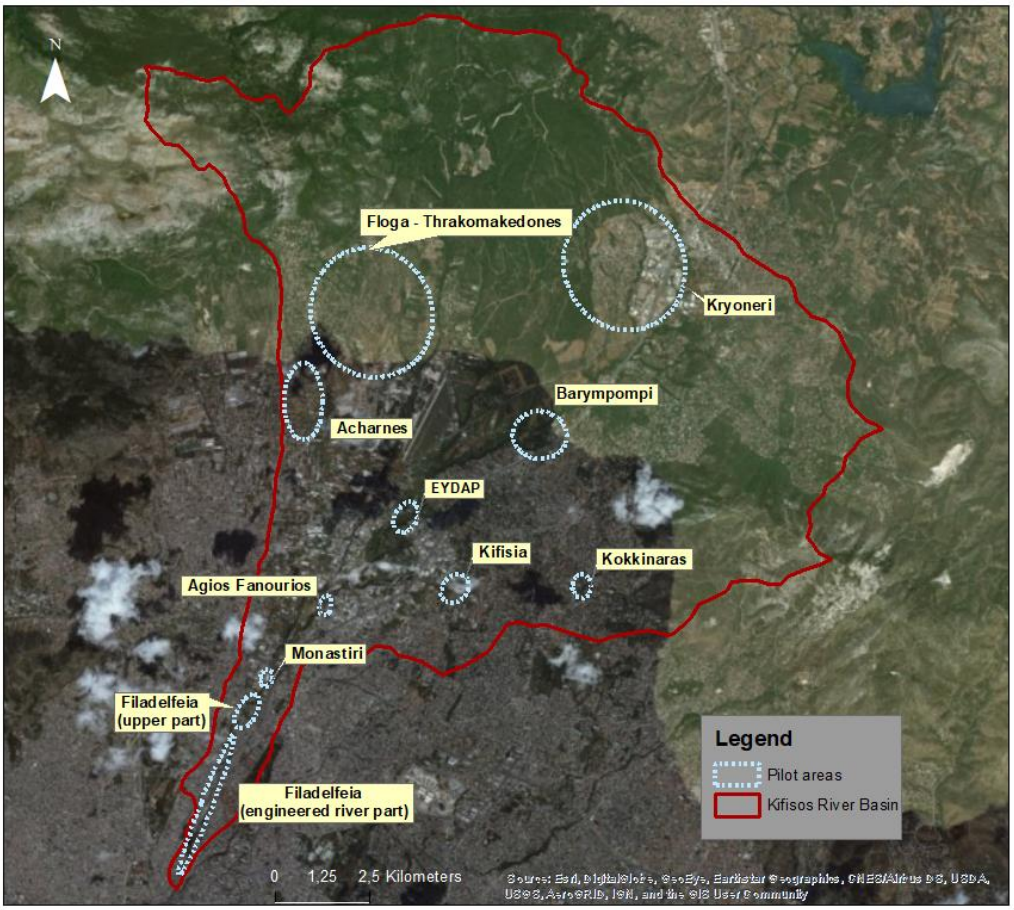

Figure 1 Map of the areas visited by the volunteers in the context of Scent campaigns.

2.2 Types of thematic campaigns conducted

The filed visits organized in the context of Scent Citizen Observatory were associated to a thematic focus that was aligned with project's goals and types of information needed in the areas of interest. In the case of Kifisos, several thematic campaigns were conducted focusing on the collection of LC/LU images, river parameters, soil measurements and urban obstacles. The concept of the thematic campaigns was carefully chosen, to allow the organization of a dedicated workshop at the start of each campaign where volunteers will not only be informed about the project and but also be trained in the use of the Scent tools and applications they will use during the campaign.

2.2.1 Land Cover / Land Use (LC/LU)

The LC/LU image collection includes observations about the natural environment (e.g. forest areas, vegetation cover, bare soil etc.) and the manmade environment (e.g. built areas, pavements, parks etc.). In Kifisos, the focus was in changes in the coating of the engineered part of the river (changes from concrete to stone or to soil river bank), that affect the roughness coefficients as well as on monitoring artificially sealed areas (imperviousness) in the upstream part of the river basin.

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Figure 2 Change from stone built to concrete river bank coating (left), and transition from natural to engineered channel bottom (right).

2.2.2 River data collection

River data collection involves the acquisition of measurements related to the water level and water surface flow velocity. The water level in Kifisos was measured either by the use of portable measuring rods or by taking photos of painted rods that have already been installed in specific locations of the river network. The measurements of water velocity were performed by recording videos of a pre-defined floating object (i.e. tennis ball) moving on the surface of a river.

Figure 3 Location of one of the rods along Kifisos

2.2.3 Measurements of soil moisture and air temperature

Soil moisture and air temperature are parameters connected to hydrology which, in the case of Kifisos, is modelled as a way to obtain flow estimates. Moreover, this is a complex variable to be used for calibration and validation of models, which is under study by the scientific community. Thus, low cost,

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portable sensors were used by citizens along with user friendly mobile application (Scent Measure), so as to monitor and record these parameters in different areas of the Kifisos river basin.

Figure 4 Rural area in Varymbombi suitable for soil moisture sensors installation

2.3 Routes and Points of Interest selection rationale

In Kifisos catchment, floods are studied through a cascade of models: a hydrological model that simulates how rainfall is transformed into runoff and a hydrodynamic model that simulates the water depths and velocities in the downstream part of the catchment. In these models, different types of datasets are used to describe flood processes. Therefore, the rationale for the selection of points of interest and routes varies according to the type of thematic campaign executed, as explained in the following subsections.

Model results vary in time and space, depending on the flow conditions at the boundary of the considered modelled domain. PoIs need to be selected based on specific locations in the model, hence the PoIs and routes selection was designed and proposed jointly by modelling experts, and the partners in the ground to make the field surveys and logistics. This activity was also supported by Region of Attica, who is the beneficiary of the model and has set the main objectives for the latter.

2.3.1 Land Cover/Land Use campaigns

Land cover information is used for hydrological models to define how pervious an area is (i.e. how much water is entering the soil). For flood modelling, it is used to characterize how rough the surface is, i.e. how much opposition the flow encounters when passing through a land feature. In contrast to the Danube Delta, citizens perform the routes by walking and therefore, they can cover a very small portion of Kifisos catchment. As a result, a sensitivity analysis was carried out to evaluate in which areas of Kifisos the land cover affected the flow the most (D6.2). This provided a priority list of areas to analyse.

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Because land cover varies in categories, meaning that they are invariant over patches of land with the same land cover, it is only necessary that points within each land cover segment are taken. Based on all of this, there were two main principles guiding the definition of PoIs and routes for LC/LU:

- Representativeness of land cover classes: all the main land cover features over the entire area should be captured;
- Spatial coverage: cover as much of the terrain as possible.

For representativeness, based on google earth imagery, it was evaluated where different land cover classes were located as shown in Figure 5. Based on this information, routes were designed to maximize representativeness and spatial coverage.

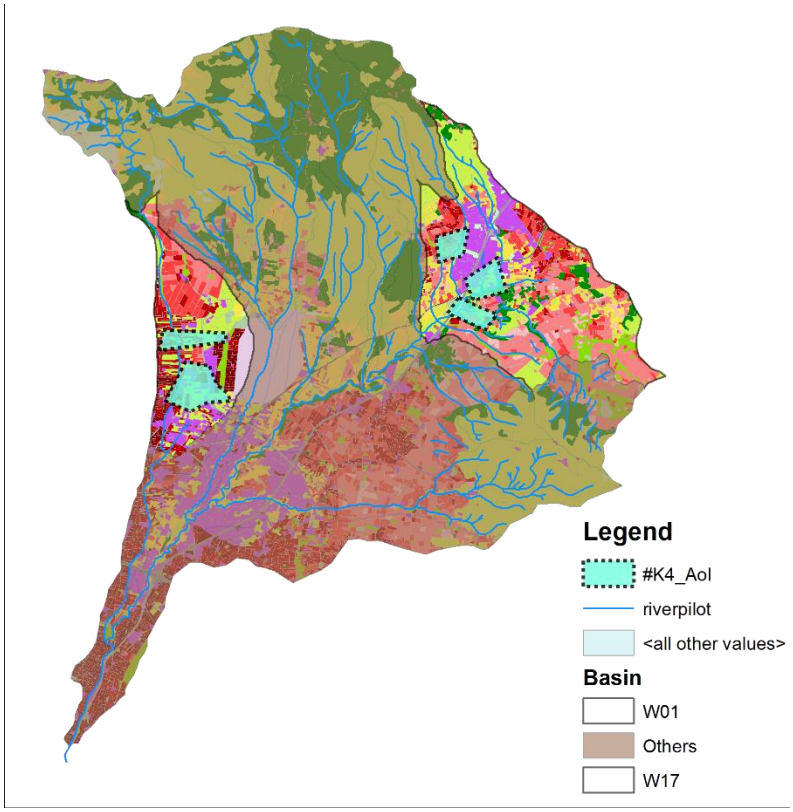

Figure 5 Kifisos catchment areas of interest for the second land cover campaign. W01 and W17 are the most sensitive basins for land cover, after the sub-basin already surveyed in the first campaign.

As mentioned in the previous sections, routes were designed to last 30 minutes to 2 hours and to pass through walkable terrain. The routes were surveyed to verify their accessibility and security.

2.3.2 River Data Collection campaigns

The priority of location of POIs for collecting crowdsourced water depths and velocities was:

1. Telemetric stations locations
2. For hydrodynamic modelling
    - At the location of the downstream boundary condition
    - at PoIs within modelled river reach, for calibration and validation

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3. For hydrological modelling
    - At the outlet of sub-basins, for calibration and validation of calculated runoff values
4. For testing the tools: other locations

The first priority was to select points where traditional data was available because the crowdsourced methods used are novel and need to be evaluated for their quality by comparison with traditional data. Secondly, priorities were given according to the measured variable's contribution to modelling. Finally, extra locations residing on the modelled rivers were proposed, based on Google Satellite imagery, to have available extra options in case the previous ones are not possible.

After setting up the priorities, it was important to survey the locations in order to determine accessibility and water conditions and security. The following aspects were considered:

- Accessibility
    - Transport network close
    - Possibility to enter into the river bed (if no gauge is available)
- Water conditions
    - Quantity
        - Sufficient for water level measurement
        - Sufficient for velocity measurement
    - Hydraulic appropriateness
        - Straight channel
        - Smooth, "direct" flow (no swirls)
        - It is possible to infer cross-sectional information
- Security
    - Citizens can walk towards the PoI location
    - Citizens can go close to the river bank

Surveying was carried out for Priorities #1 and #2, as show in Figure 6. Almost all locations were possible to be visited, as expected, as they are located in areas of regular cross-sections or cross-sections that had been surveyed. Only two telemetric stations could not be visited by citizens due to highly difficult access (in the central part of the catchment) and bad weather conditions.

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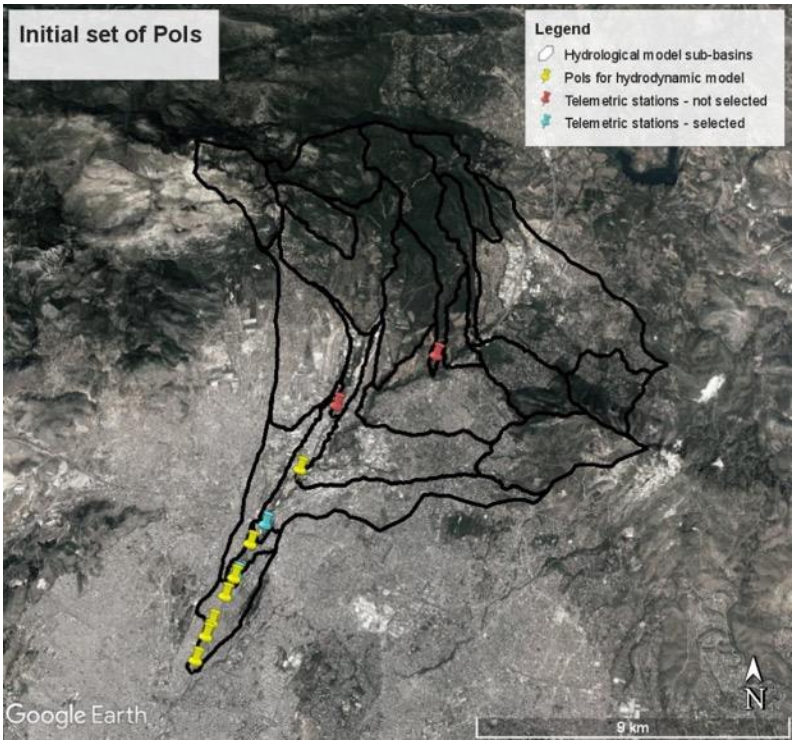

Figure 6 PoIs according to priorities #1 and #2

The PoIs for priorities #3 and #4 were prioritized from downstream to upstream and were also surveyed as shown in Figure 7. This time, the two main struggles were that in most of the locations there was not enough water to do measurements and where there was, the location was not suitable for citizens to do the measurements. As the water levels changed with the time of the year, which PoIs were available also changed.

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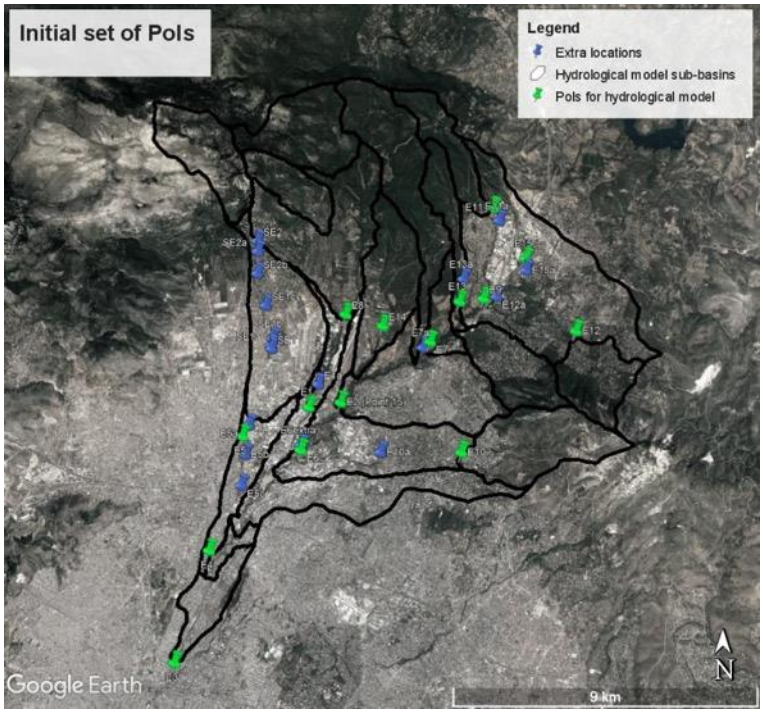

Figure 7 PoIs according to priorities #3 and #4

2.3.3 Soil moisture/Air temperature campaigns

Soil moisture and air temperature data collection was combined and fulfilled at the same time as the other campaigns. These measurements are combined with information concerning the physical and hydrologic properties of the soils aiming to provide accurate products in the context of hydrological modelling.

2.4 Drone Campaigns

In addition to the citizen campaigns, additional campaigns for the collection of drone data were conducted. Different areas over the Kifisos catchment were covered, differently for the dry and wet season and for different purposes.

Drone campaigns were carried out during the period 21 January to 22 February 2019. The drone operator is an experienced helicopter pilot with an understanding of the needs of the projects and bureaucracy tasks for drone flights. The drone flew according to the flight plans, and flight permission was requested from the local civil aviation authority.

Three main areas were proposed to be covered by drones in Kifisos River Catchment. The first one located in a mountainous area upper in the North. The second area is River Corridor with 12 km section of the river and its 100-m full floodplain buffering from the river. And the most downstream is Urban area (2.3 km^2) including 2.8 km concrete river.

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Table 2. Summary of collected image properties in Kifisos.

Flown areas	**Urban area**		**River corridor**	**W10**
	Downstream half	Upstream half		
Drone	DJI Phantom 4 Pro	DJI Mavic 2 Zoom		DJI Phantom 4 Pro
Image size	4864 x 3648	4000 x 3000		4864 x 3648
ISO speed	200	200		200
Exposure time	1/1250	1/1250		1/1250
Geotag	Yes	Yes		Yes
Flight height	150 m	150 m		120 m
GCPs collected	Yes	Yes	No	No

In order to make the best out of the drone short battery life (approximately 20 – 30 minutes), we split each of the three large drone flight areas into smaller subareas. Two drones were employed to capture photos. Only in the North catchment area, besides RGB photos, spectral images (Green, Red, NIR) were collected using MAPIR camera attached under a drone platform. The covered areas are shown in Figure 8, not as complete as expected plan because of challenges regarding to civil aviation restrictions and safety issues.

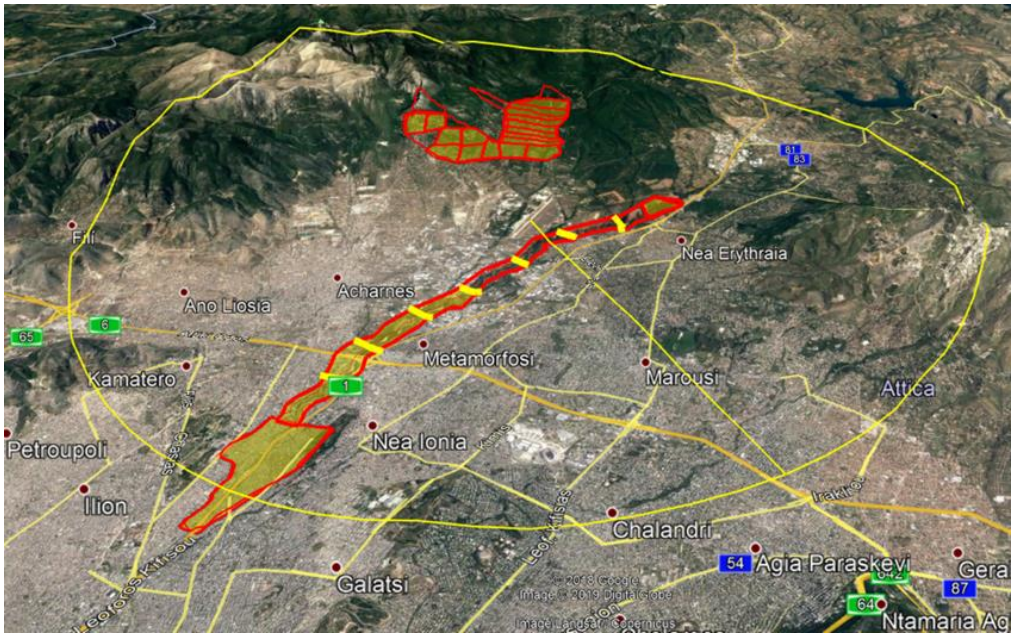

Figure 8 Drone flight blocks in Kifisos River Catchment. Yellow-filled polygon indicating the accomplished area, the yellow circle is a buffer ring (R > 5km) from the Tatoi Airport.

Ground control point surveying

GCPs is a crucial requirement for accurate DEM reconstruction. dGNSS techniques were used to collect GCPs. A different survey approach was conducted here in Kifisos, NTRIP (Networked Transport of RTCM (Radio Technical Commission for Maritime Services) via Internet Protocol) service was applied to survey in order to gain better signal and accuracy in a dense urban area (Figure 9). The NTRIP station DYNG00GRC (outskirt of Dionysos, Northeast of Attica) was used.

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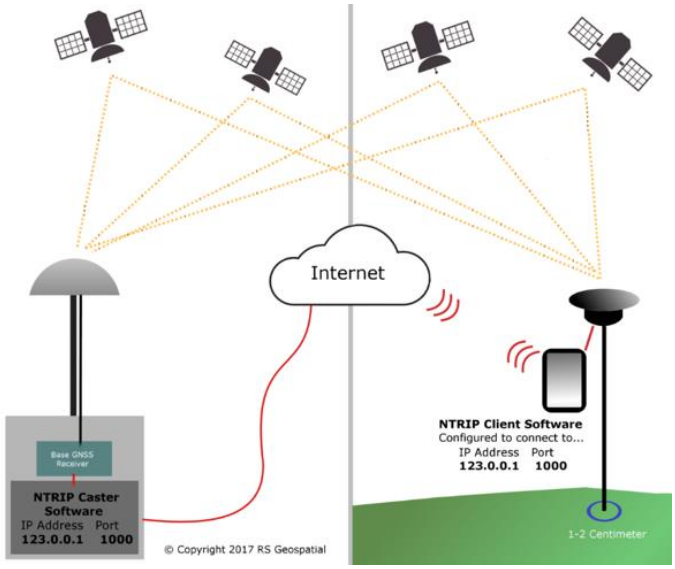

Figure 9 NTRIP configuration scheme[1]

In urban areas, laying out printed GCPs is not necessary, it is possible to use high contrast physical features or patterns on the ground which are visible from above (i.e. corners of the pedestrian sidewalk, border of coloured pavement, or manhole covers or any other clearly visible features). The task of GCP surveying was carried out during the participation of IHE representatives on the field work. Based on the estimation of 3 – 4 GCPs per 100 photos (Sanz-Ablanedo et al., 2018), in Urban area, 27 points were at high accuracy out of 44 points collected. The points were processed to be suitable for Greek coordinate system (Greek Grid + EGM96). Due to time limits, no GCPs were collected in the River Corridor and in the sub basin in the North.

Challenges for the drone campaigns

Hardware failure is also a threat in this case as DJI Phantom 4 Pro of the operator failed to respond during missions in urban area. There was a severe technical issue with the hardware of on-board GNSS receiver of the drone. The mission was halted and rescheduled to another day with a replacement of DJI Mavic 2 Zoom. The active private airport Tatoi is located on the Northwest of the River Corridor flight areas. As there was a high chance that our drone flights interfere and endanger the aviation activity, the authority's approval only permitted to fly at 30 m maximum in within 5 km reach of the airport. In practice it is unfavourable to acquire aerial photos in such large area as RC as the footprint of low altitude flights is much smaller than one at a greater height, causing a significant increase in number of images and time.

The weather in Athens was unusual in the campaign period. Rainy and/ or heavy windy condition occurred more occasionally during day time. In addition, the local operators had severe health issues at the time of the drone campaign. These two unanticipated challenges slowed down the data collection.

[1] https://www.anatumfieldsolutions.com/What-is-NTRIP_b_42.html

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3 Organization of field campaigns

3.1 Campaign organization methodology

The overall approach for the organization of the field trips / campaigns in Kifisos requires and supports a stronger partnership between the authorities, stakeholders and citizens leading to clear identification of data needs, with shared understanding and purpose by all involved parties. The data collection took place in the context of targeted campaigns, in which the respective components of the Scent toolbox were utilised, allowing authorities to design and set the parameters (i.e. type of data to be collected, points of interest, etc.) of the campaign (through the Scent Campaign Manager), as well as the citizens to carry out the campaigns using mobile and gaming applications (Scent Explore & Scent Measure).

The main building blocks for the organization of the campaigns include the following:

1. **Formulation of the data collection needs**: This involves the initial set of activities towards the organization of the field trips / campaigns, ranging from the high-level definition of the thematic focus of the campaign and the overall duration (i.e. campaign duration, areas to be visited etc.), to the set-up of the necessary preparatory infrastructure (i.e. online registration forms).
2. **Engaging with and mobilising volunteers**: It consists one of most significant steps towards the realisation of the campaigns. Different methods are employed in order to support the communication of the activities to different target groups as well as to efficiently incentivize, motivate and mobilise them so as to participate in the context of the campaigns.
3. **Campaign design and considerations**: Having established the expected number of volunteers, the campaigns are designed and details about their realization are specified. Such details include, among other things, the definition of the exact points of interest and the routes that will be conducted by the volunteers, the formulation of the teams, arrangement of transportation and logistics, production and/or acquisition of auxiliary material and planning/implementation of measures for ensuring the safety of the participants. Volunteering profiles and case study characteristics are also taken into consideration during this process.

3.1.1 Formulation of the data collection needs

The data collection campaigns were organized in frequent time intervals covering the collection of the parameters under investigation in both the dry and wet periods of Kifisos river basin. In addition, the goal was to align the campaigns with other related events (i.e. aiming to create awareness of environmental issues) and/or national holidays so as to boost the participation levels of interested groups, individuals and stakeholders. The scope of the campaigns (thematic focus) as well as the preliminary areas to be covered with the volunteers were defined based on the modelling requirements.

Moreover, online forms were being created aiming to facilitate the registration of the participants to the campaigns and provide useful information about the foreseen activities. The registration forms included the following information:

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- Short overview of the project and its activities
- Explanation of the goal of the campaign, while describing the data collection activity in terms of the observed phenomena, the Scent applications to be used, potential equipment to be provided (i.e. portable sensors) and the process to be followed in the field.
- The dates that the campaign will take place (allowing users to choose the one(s) of interest) including an overview of the time plan (duration) of the activities for each day.
- Useful details regarding the activity such mobile devices software requirements for using the applications, material to be provided, expected weather conditions, suggested outfit etc.
- GDPR compliant consent form.
- Links to project resources i.e., toolbox components, project website, dissemination material etc.

An example of the bilingual (Greek and English) registration forms used is provided in Appendix A1.

3.1.2 Engaging with and mobilizing volunteers, associations and relevant groups

Governmental policy makers (Region of Attica) and NGOs (Hellenic Rescue Team of Attica) were some of the stakeholders that were involved in the project and led the citizen science campaigns in Kifisos river basin. These types of organizations played an important role towards addressing a broad network of stakeholders including local municipalities, educational institutions, NGOs, citizen-led communities, individual citizens, walking groups and scouts.

Engaging with and mobilizing a diverse group of stakeholders was a challenging task, that necessitated the utilization of different communication channels and means of interaction. One-way communication channels were employed, aiming at achieving broad visibility and reaching the general public. These activities include the communication of the citizen-science activities through the project and partners' websites, the compilation and release of newsletters and press releases as well as the dissemination of the events through digital media such as online newspapers and platforms. Specifically, three press releases were issued in Attica Region resulting several articles in popular press, while several news items were included in the project's and the Greek partners websites and newsletters. In addition, two-way communication channels were applied in order to facilitate a more direct and effective interaction with the identified target audiences. Calls-to action, social media campaigns and email exchanges pursuing interactive discussions, were taking place between relevant stakeholders before the conduction of each pilot campaign. Physical meetings, phone calls and B2B discussions with policy makers and representatives of relevant networks, communities and educational institutions also took place, intending to establish a common understanding of the goals of the project and benefits of citizen-science, as well as to mobilize them in actively contributing in the project's campaigns.

During these interactions, particular focus was given to stakeholders that were located and/or were active in the wider areas where the citizen science campaigns were fulfilled. This process resulted in communicating different types of stakeholders as presented in Table 3.

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Table 3 Type and number of stakeholders reached in Attica campaigns

Type of stakeholders	Number
Hikers, walking groups, climbers	4
Cyclists	2
Local Authorities	9
Birdwatchers	1
Photographers	1
Firefighters	2
Civil protection groups	4
Ecological organizations	5
Civil protection authorities	2
Central government/National and Regional authorities	16
Research Institutes/ Academic bodies/Universities	3
Education authorities and structures	12
NGOs	7
TV channels	2

A list with the names of the organisation and their types that has been contacted and reached in the context of the project's Attica campaigns is provided in Appendix A2.

The most important achievement of the engagement activities that took place in Attica region was that a greater number of citizens learned about Citizens Science concept and activities, the Scent Toolbox and how its use can empower them to make a real contribution in the protection of the local environment, paving the road for even more participation in future Citizens Observatories and for further exploiting Scent Technologies after the end of the project duration.

3.1.3 Campaign design and considerations

In general, based on the expected number of volunteers, each of the campaigns in Kifisos was planned for an overall duration of 2-4 days. As mentioned in Section 3.1.1, the organization of each campaign was almost always falling within weekends (including weekdays as well) and/or national holidays, so as to enable the participation of more volunteers. The points of interest and the routes were identified by the project's domain experts, taking into account the identified data needs. Due to the unpredictability of PoIs conditions, the latter were surveyed by field experts prior to each campaign with a special focus on accessibility, safety and guidance.

Safety considerations were an integral part in planning and executing every campaign. The risk assessment included a wide range of possible hazards in the field, from traffic in the adjacent roads and transit through non-urban environment to slippery slides and falls from elevated spots. Swift water operations are not typically the case for Kifisos, since the river flow is generally slow and at low level; however, all the necessary procedures and safety gear were integrated in the campaign planning. During the briefing prior to each campaign day, safety procedures and guidelines were revisited and all participants were given safety guidelines, recommended clothing and shoes, carrying some water especially during sunny days and any prior medical conditions that require special care (allergies, drug prescriptions, etc).

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Figure 10 Identified spot hazard (unprotected edge), near Varymbombi at northern Attica (left); Small pedestrian adjacent to the river bank (elevated) and road, near Filadelfeia at southern Attica (right).

Once it was decided which places were suitable for holding campaigns, logistics efforts were made to group PoIs that were close to each other and to form the routes. The routes were designed to have an average duration of 30 min to 2 hours. In the downstream part of the catchment where many gauges (rods) are available, the citizens would walk through the PoIs, while in most of the other locations they would be transported by bus from one PoI to the next.

The number of routes designed and conducted each campaign day depended on the number of volunteers. To support the efficient realization of the activity, taking into account the local conditions (i.e. urban areas with limited or narrow sidewalks and pavements) and safety considerations, small groups of volunteers were being formed, usually not exceeding 25 people per route.

3.2 Campaign execution

The starting point of each campaign was a central location (public building) in the city center, easily accessible via public transportation so as to facilitate the gathering of volunteers from different parts of the Attica region.

Each day of the campaign, a training session was taken place prior to the field trip, aiming to introduce the Scent project to the participants as well as to explain the goal of the campaign and guide them in using the Scent applications. The repetition of the process was particularly important since the vast majority of the participants in each campaign day was different from the previous ones. Following the conclusion of the training session, volunteers were separated into dedicated groups/ teams related to the data collection purposes. For instance, in the context of river data collection campaigns, volunteer in each route were separated into water level and water velocity teams in order to obtain the relevant measurements. This approach supported the organization of the participants while being in the field and the adaptation to the data collection process per se, whilst also facilitated their deeper understanding about the elements under investigation. An average of 1,5 hours was allocated for the abovementioned process.

Then, participants were transported through shuttle buses to the field visit locations. Upon arrival to each PoI and for the entire length of the visit to each area, safety teams were deployed close to the

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participants and safeguarded an informal “perimeter of action”. Each safety team was equipped with VHF/UHF communications devices, at least one advanced first-aid medpack, as well as several smaller personal first-aid kits, and all members were clearly identified with high-visibility clothing, positioned at the head, at the back and bilaterally to the groups of participants during transit. On-the-spot hazards, e.g. holes or slips on the ground, were guarded against people walking close to them and road traffic was temporarily halted when the groups had to come across. The overall procedure was executed without any medical or safety issue whatsoever in any of the campaigns, other than insignificant insect bites and small skin rashes from nettle plants in the spring.

Following the conduction of the routes, the participants were providing their feedback for the overall campaign experience through dedicated questionnaires and interviews and were transferred back to the starting point of the campaign.

3.2.1 1st Scent Pilot Campaign (Land cover / land use)

The first citizen science campaign in Kifisos river basin took place on 14, 16, 17 & 23 of September 2018, focusing on the collection of images of land cover / land use elements. Following the training session that was conducted in the beginning of each campaign day, the participants were transferred in the respective pilot sites. The foreseen routes were visited by groups of 20-25 being in the field for approximately 2 hours. The safety of the participants was assured by dedicated teams (Hellenic Rescue Team of Attica), protecting the participants in the urban and rural environments.

Figure 11 Training of the participants (upper left), briefing in the pilot site (upper right) and conduction of the routes (lower left & right)

The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

The areas and routes conducted by the participants covered both the upstream and downstream parts of the river basin. In particular, the upstream part (Floga - Thrakomakedones) constitutes a rural area, where the monitoring of changes in imperviousness surfaces is of major importance. In the downstream part, the Filadelfeia pilot site was visited by the participants, including routes in both the upper and engineered part of the river. The routes conducted by the participants in these campaigns are presented in figures 12 & 13.

In the context of this campaign, 1665 images have been collected through Scent Explore application, consisting of LC/LU elements such as sparsely vegetated areas, forest, heathlands, buildings, paved areas, roads and coverage of the river bank (with stone, concrete, low grass, etc).

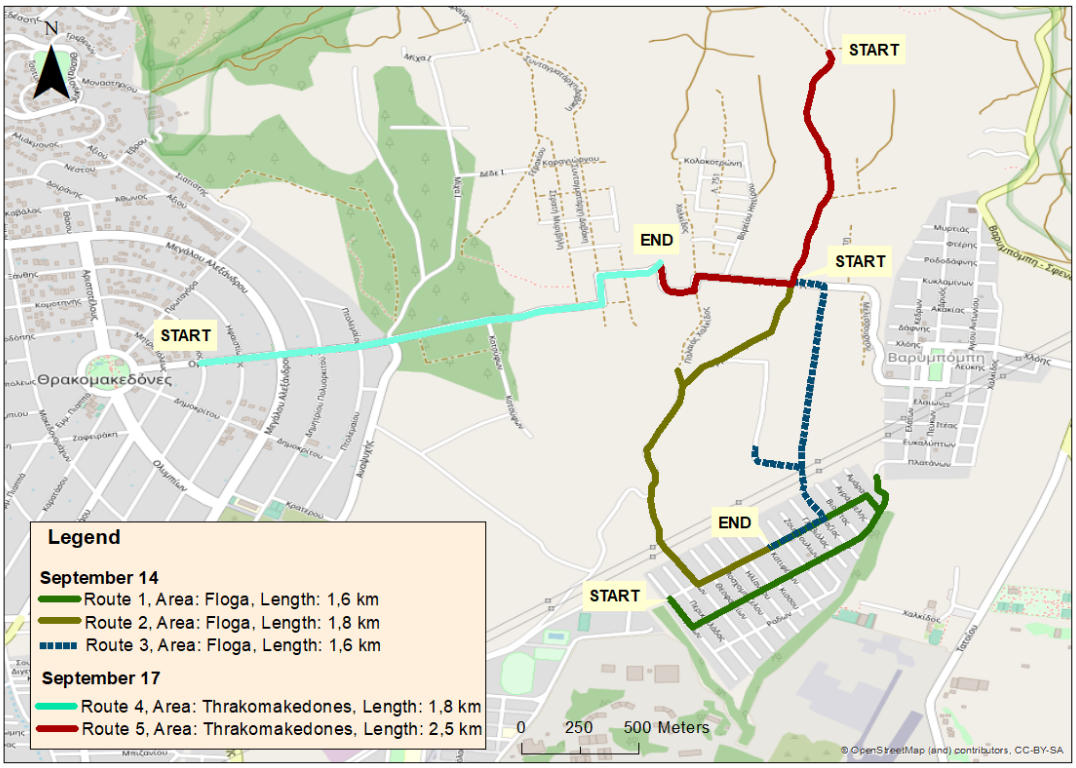

Figure 12 Routes conducted in 1st Kifisos campaign in the upstream part of the catchment

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

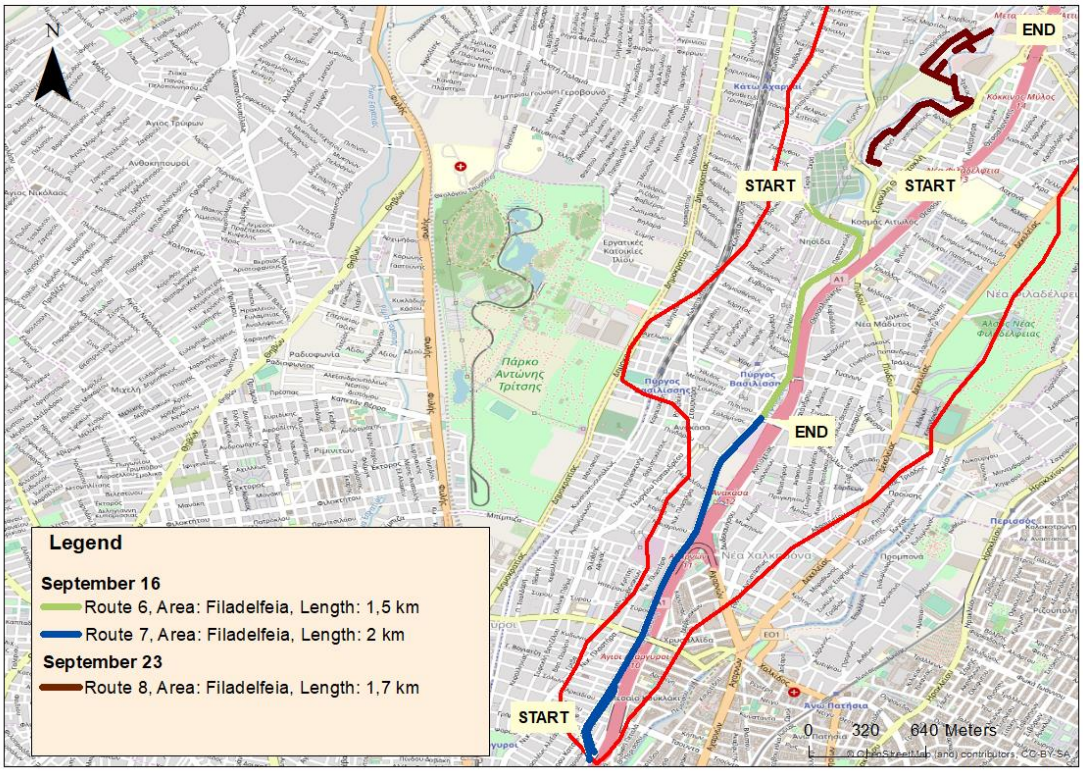

Figure 13 Routes conducted in 1st Kifisos campaign in the downstream part of the catchment

A total number of 183 volunteers joined the campaign, while counting 123 unique participants. Details about the gender and occupation of the participants are presented in Table 4 and Figure 12. Age-wise 35% of the participants were in the range of 35-44 years old, another 35% older (45-54), 17 % much older and 10 % younger (25-34) and only 3 % below 25 years old.

Table 4 1st campaign participant statistics

DATE	PARTICIPANTS	MEN	WOMEN
14.09.2018	65	33	32
16.09.2018	40	20	20
17.09.2018	51	25	26
23.09.2018	27	20	7
TOTAL	183	98	85

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

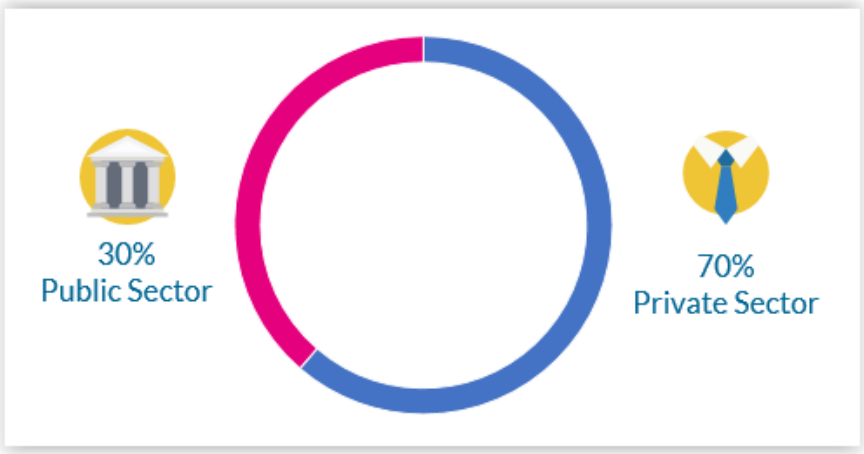

Figure 14 Occupation details of the participants in the 1st Kifisos campaign

3.2.2 2nd Scent Pilot Campaign (River & soil measurements)

The second thematic campaign in Kifisos took place between 15th and 18th of November 2018, focusing on the collection of river (water level and velocity) and soil (soil moisture and air temperature) parameters.

Figure 15 Collection of river and soil parameters in the context of the 2nd Kifisos campaign

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

The foreseen routes were realized by groups of 20-25 volunteers, being in the field for 1 – 1,5 hours. The main challenge in this campaign was the bad weather conditions, that hindered the overall process and didn't allow the execution of the activities in the last day of the campaign. The routes conducted during the total duration of the campaign are presented in the following figures. In the downstream part, collection of the water level was achieved by capturing images of painted rods that had already been installed in specific locations of the river network, whilst in the rest of the points of interest and routes, a member of each group was entering the river with a portable rod so as to facilitate the data acquisition process.

The campaign resulted to the collection of 903 citizens' observations consisting of 135 images of water level information, 298 videos of water surface flow velocity, 248 measurements of soil moisture and air temperature and 222 images of LC/LU elements.

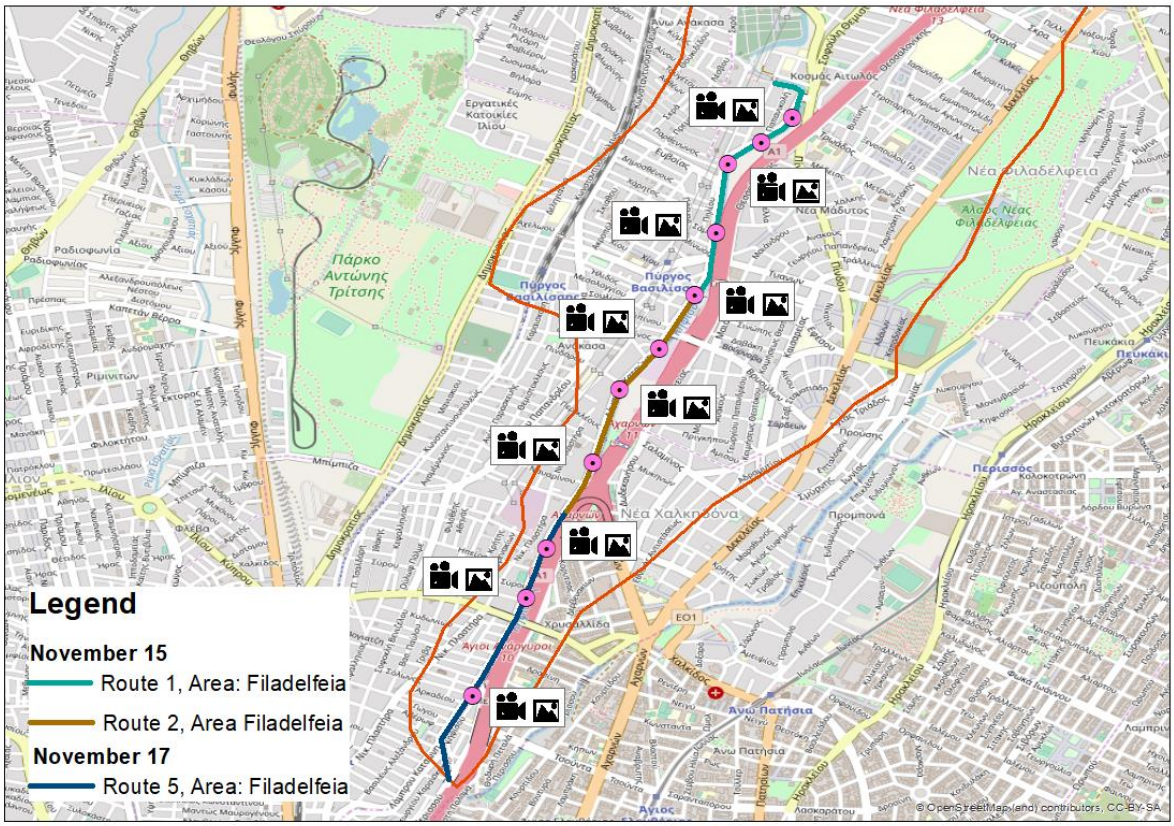

Figure 16 PoIs and route fulfilled by the participants of the 2nd Kifisos campaign on 15th & 17th of November 2018

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 688930.

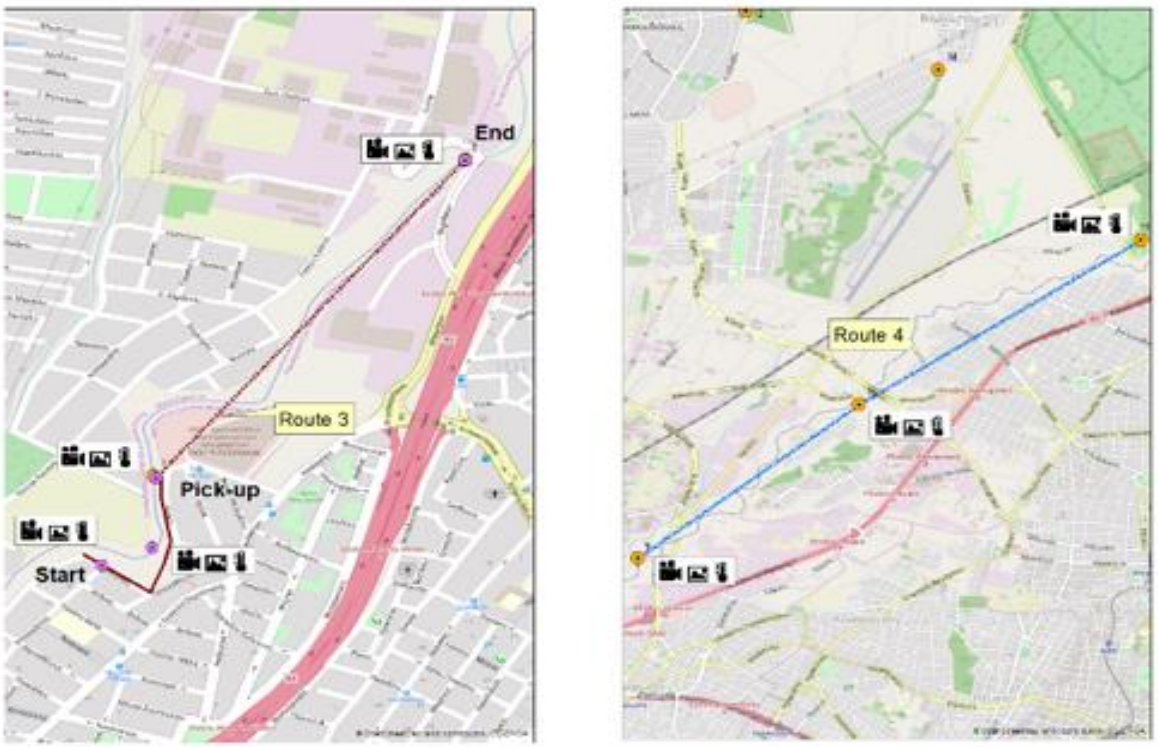

Figure 17 PoIs and route fulfilled by the participants of the 2nd Kifisos campaign on 16th of November 2018

A total number of 129 volunteers joined the campaigns, while counting 55 unique participants. Age-wise 30% of the participants were in the range of 35-44 years old, 35% older (45-54), 13 % much older (55-64), 16 % younger (25-34) and only 4 % below 25 years old.

Table 5 2nd campaign participant statistics

DATE	VOLUNTEERS	MEN	WOMEN
15.11.2018	46	15	31
16.11.2018	57	25	32
17.11.2018	26	11	15
TOTAL	129	51	78

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 688930.

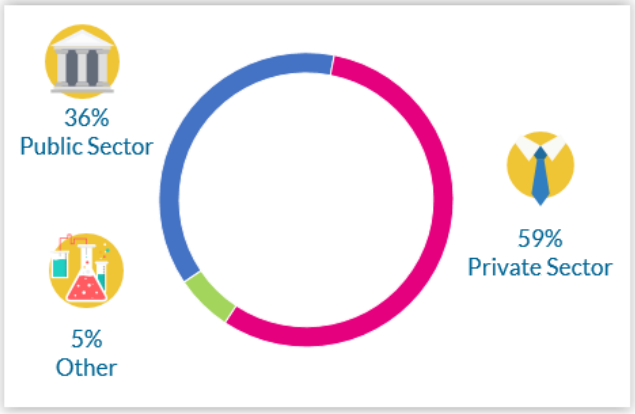

Figure 18 Occupation details of the participants in the 2nd Kifisos campaign

3.2.3 3rd Scent Pilot Campaign (River measurements)

The third thematic campaign in Kifisos took place on February 16th and 17th 2019. This field campaign was focused on river data collection; yet consisting of some key differences compared to the previous ones in terms of its target audience and points of interest. More specifically, the campaign was not opened to the wider public as it was designed to visit some hardly accessible but very important for the data collection purposes, points of interest. Thus, the activities were targeted to specific volunteer teams and associations involving mainly search and rescue, hiking and mountaineering clubs. Extra precautions taken place by the participants using climbing and other safety equipment.

Figure 19 Data collection activities in the context of the 3rd Kifisos campaign

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Over the two days, two specific routes at the north part of Kifisos river basin were visited, covering the areas of Varympompi, Agios Fanourios (Figure 20) and Kokkinaras, Kifisia, and Filadelfeia (Figure 21).

Figure 20 PoIs and route fulfilled by the participants of the 3rd Kifisos campaign on 16th of February 2019

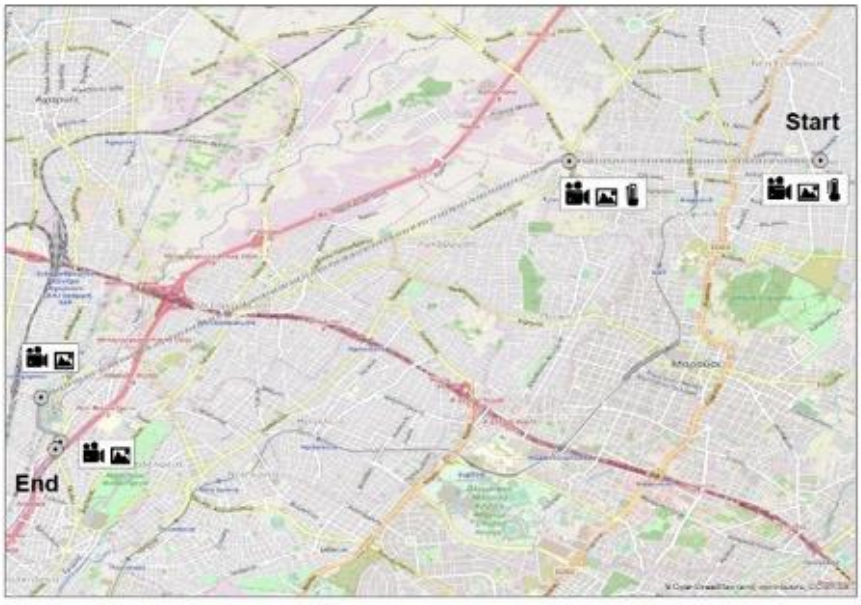

Figure 21 PoIs and route fulfilled by the participants of the 3rd Kifisos campaign on 17th of February 2019

A total number of 38 (with 21 unique individuals) conducted the routes, while resulting to the collection of 167 images with water level information, 212 videos of water surface flow velocity and 214 images of LC/LU elements. Age-wise 52% of the participants were in the range of 35-44 years old, 30% older (45-54), 13 % younger (25-34) and a few above 55 or below 25 years old.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Table 6 3rd campaign participant statistics

DATE	VOLUNTEERS	MEN	WOMEN
16.02.2019	16	11	5
17.02.2019	22	15	7
TOTAL	38	26	12

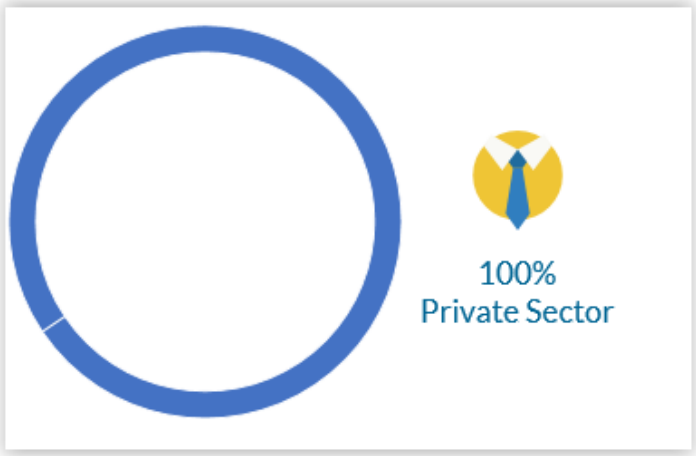

Figure 22 Occupation details of the participants in the 3rd Kifisos campaign

3.2.4 4th Scent Pilot Campaign (Land cover / land use, river data, soil measurements)

The fourth citizen science campaign in Kifisos river basin took place between 11th - 14th of April 2019. The vast majority of the participants were consisting of students from different educational institutions in Attica region. In terms of data collection, this field campaign combined all the thematic areas addressed by the project, involving the acquisition of LC/LU, river and soil observations. However, bad weather conditions didn't allow the completion of the activities in the second day of the campaign (April 12), as well as the realisation of the planned routes for the subsequent day (April 13). Thus, an additional field visit took place on May 13, aiming to conclude the data collection process.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Figure 23 Gathering of participants for the training session in the beginning of the campaign day (left) and conduction of a route in the Filadelfeia pilot site (right).

More specifically, the first day of the campaign the participants visited initially the pilot site of Acharnes, located in the western part of the Kifisos catchment where valuable information about land cover / land use elements was collected. The activities concluded in the pilot site of EYDAP with the acquisition of information about river and soil parameters (Figure 24). In the rest of the campaign duration, two routes were visited in the upstream part of the river basin (Kryoneri pilot site), and one route in the downstream part (Filadelfeia) involving the collection of different parameters as displayed in Figures 25-26.

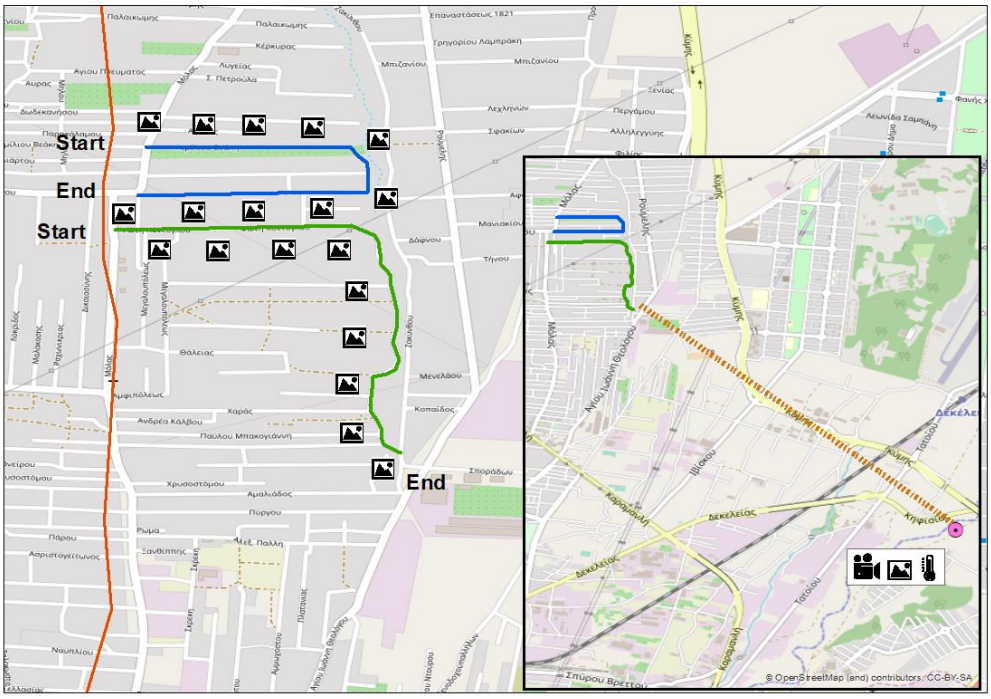

Figure 24 Routes fulfilled by the participants of the 4th Kifisos campaign on 11th of April 2019

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

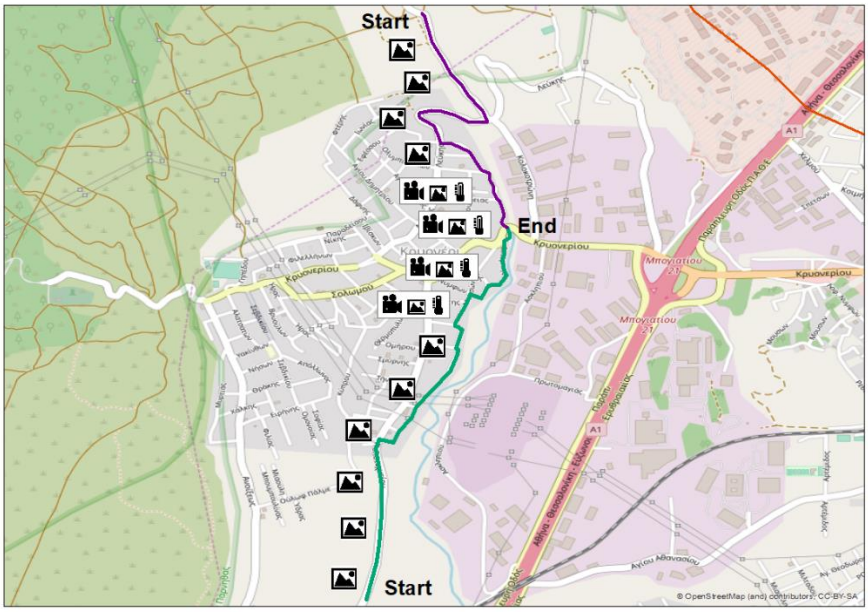

Figure 25 Routes initially visited by the participants of the 4th Kifisos campaign on 12th of April and repeated on 13th of May 2019

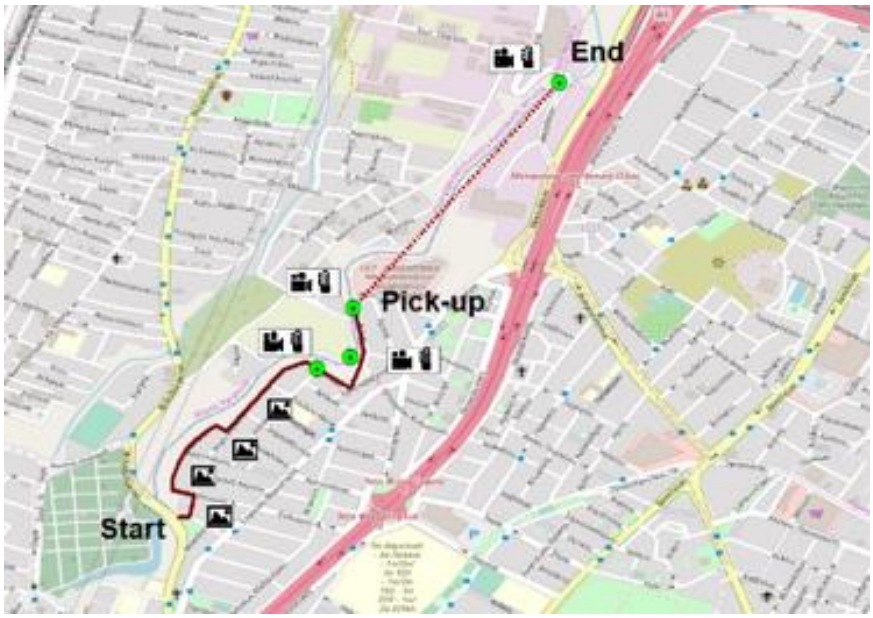

Figure 26 Routes fulfilled by the participants of the 4th Kifisos campaign on 14th of April 2019

A total number of 116 volunteers participated in the fourth campaign, while having 104 unique participants. The campaign resulted to the collection of 1049 images of LC/LU information, 139 images of water level information, 46 videos of water surface flow velocity and 161 measurements of soil moisture and air temperature.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Table 7 4th campaign participant statistics

DATE	VOLUNTEERS	MEN	WOMEN
11.04.2019	12	7	5
12.04.2019	53	25	28
14.04.2019	30	13	17
13.05.2019	21	8	13
Total	116	49	5

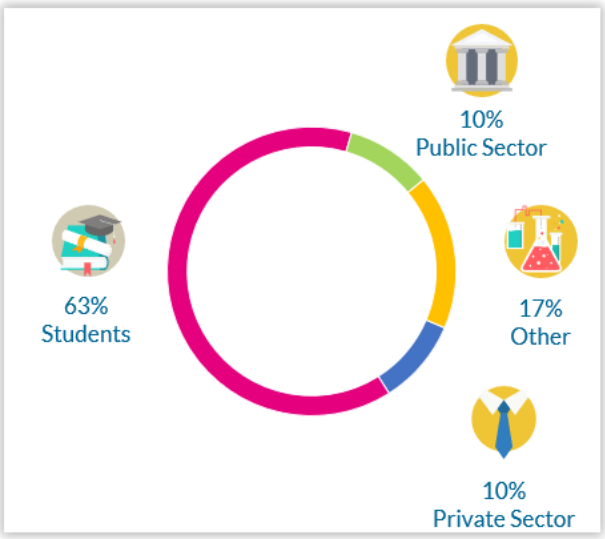

Figure 27 Occupation details of the participants in the 4th Kifisos campaign

3.2.5 5th Scent Pilot Campaign (Land cover / land use, river data, soil measurements)

The last thematic campaign in Kifisos river basin took place in June 2019. This field campaign was linked to the final event of Scent Citizen Observatory (Scent Showcase) and was consisting of two parts:

i) A field visit dedicated to the participants of the final event took place on June 21. Participants interacted with different citizen science data collection concepts involving the acquisition of LC/LU information, river parameters and soil measurements in both urban and rural environments in the Kifisos river basin. In particular two routes were conducted covering the pilot sites of Filadelfeia (upper part), Agios Fanourios and EYDAP. The participants were divided into two groups of 15-17 people while the total duration of the field activities was less than an hour. In addition, a training session didn't take place before the field visit due to the fact that the volunteers were already familiar with project activities as of their participation in the final event.

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ii) A field visit open to wider public took place on June 22, focused on the observation and collection of water level and surface flow velocity data of the river. The execution of the activities in terms of the training and the transfer of the volunteers in the field was the same with the standard one. The points of interest and route conducted were laying in the downstream part of the river basin (Filadelfeia upper and engineered part) whilst the participants remained in field for approximately 2 hours.

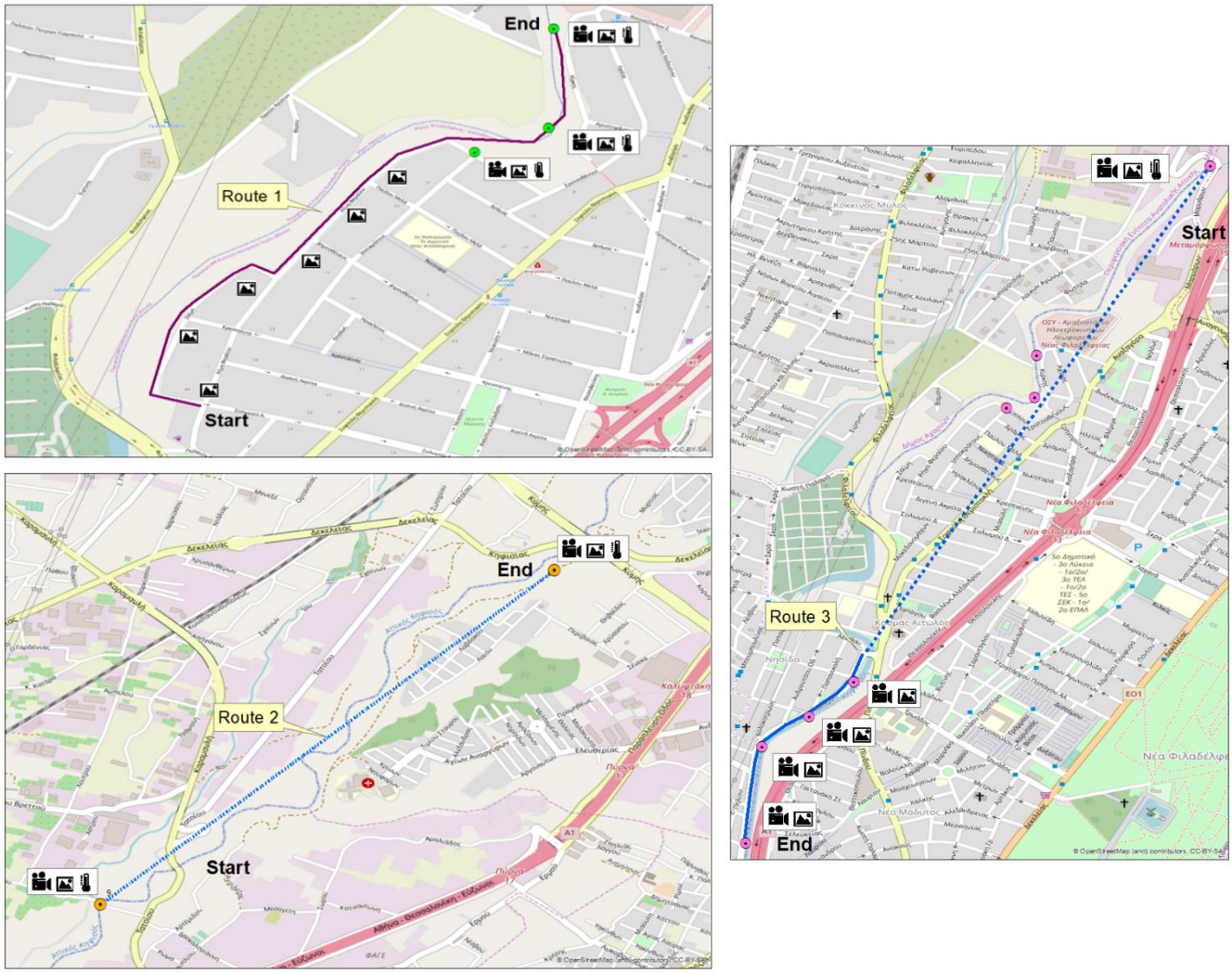

Figure 28 Routes fulfilled by the participants of the 5th Kifisos campaign on 21st (left) and 22nd (right) of June 2019

A total number of 45 participants joined the last thematic campaign in Kifisos, whilst counting 38 unique participants. Gender and occupation details of the participants are presented in Table 17 and Figure 29. The field activities resulted to the collection of 253 images of LC/LU and water level information, 76 videos of water velocity video, and 349 soil moisture and air temperature measurements.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Table 8 5th campaign participant statistics

DATE	VOLUNTEERS	MEN	WOMEN
21.06.2019	32	16	16
22.06.2019	13	9	4
TOTAL	45	25	20

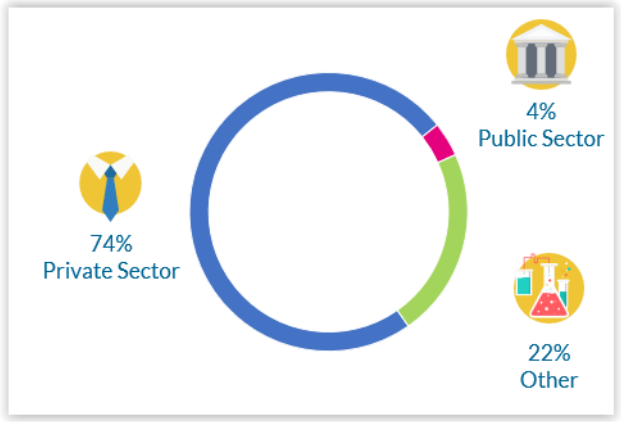

Figure 29 Occupation details of the participants in the 5th Kifisos campaign

Figure 30 Gathering of participants for the Scent Showcase campaign (upper left) and conduction of field visit in the Agios Fanourios pilot site (upper right). Transfer of the participants of the second campaign day (lower left) and start of the route in Monastiri pilot site (upper right).

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3.2.7 Drone Scent Pilot Campaign in Attica

The collected photos from drone missions were processed in the commercial software Agisoft PhotoScan. Additionally, in order to obtain the bare-earth elevation model (terrain model), an algorithm Cloth Simulation Filter (CFS) (D3.1) was used to process the point cloud of the Urban area.

The urban area was the only area that accurate GCPs were collect sufficiently. The outputs of the workflow are correspondingly as high quality. Four outputs of the drone photogrammetry process are the digital surface model (DSM) (Figure 31, left upper), digital terrain model (DTM) (Figure 31, right upper) and orthophotos (Figure 31, lower). The orthophotos and the DSM from drone photogrammetry are at very fine resolution with GSD respectively 4.5 cm and 17.9 cm per pixel. The DTM was coarser, at 1 m per pixel. Basic statistics of the two elevation models are tabulated Table 9

Table 9. Drone-based elevation models statistics of the downstream Kifisos.

	DSM	DTM
Maximum (m)	159.18	134.77
Minimum (m)	56.95	57.96
Mean (m)	99.04	93.69
Standard deviation (m)	14.91	13.12

General relief of the downstream Kifisos is properly defined in the DSM and is preserved in the DTM, inclining from higher in the North and lower in the South. The highest location is in the Northeast of the drone flight area DS where there is a park. The Kifisos River in the middle of DS can be easily pointed out. The river North-South flow direction also adapts to the general relief of the urban area.

Seen in the DTM, non-ground features such as trees and houses were completely removed, leaving a smooth terrain surface. The river is still present but also bridges and cross-overs in the DTM. These man-made elevated infrastructures were unable to be discarded as confirmed by Zhang et al (2016

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 688930.

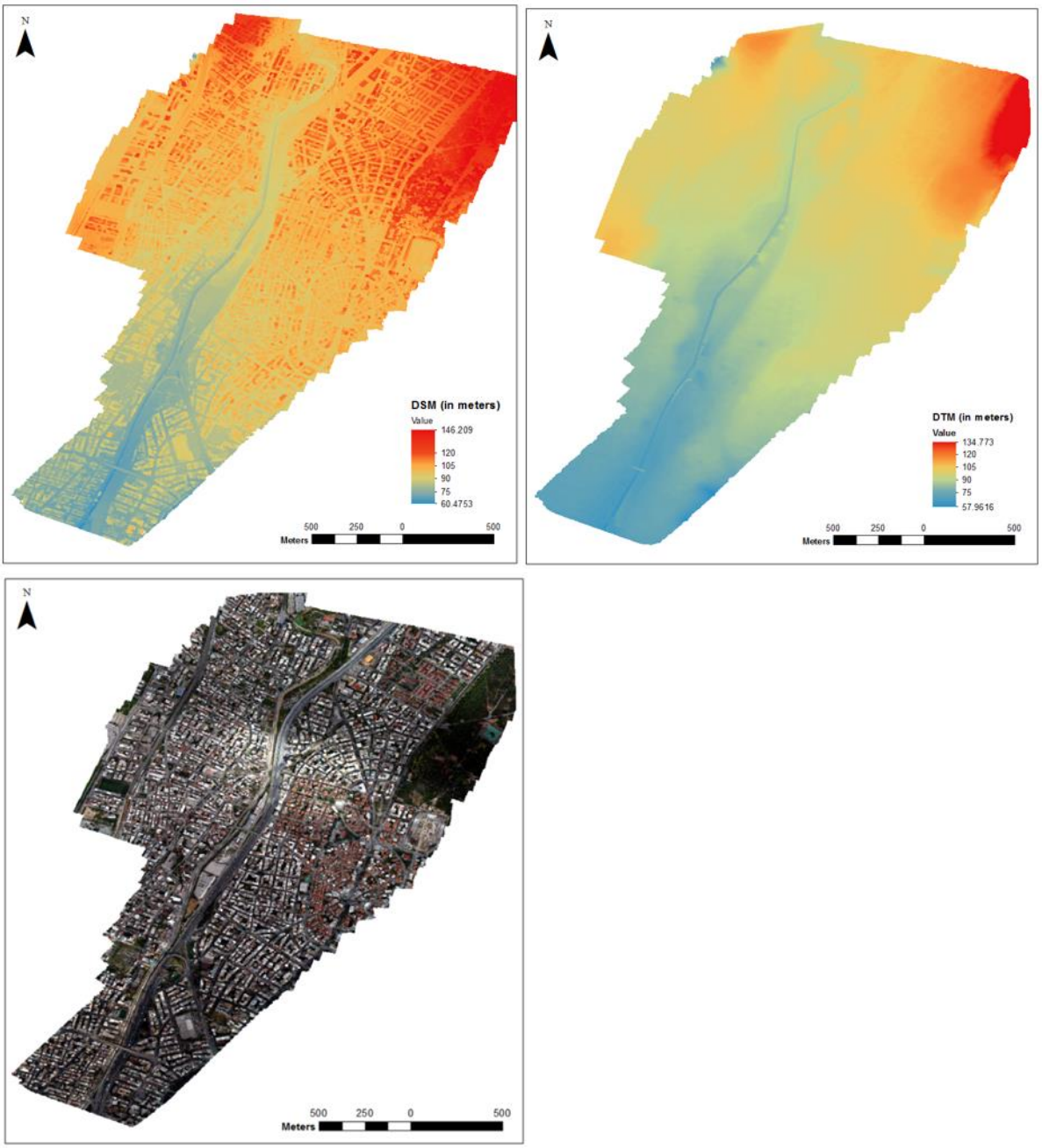

Figure 31 The drone-based terrain outputs for Kifisos Catchment: DSM (left upper) and DTM (right upper) and orthophotos (lower).

Regarding to the River Corridor and northern catchment, due to the insufficiency of required data (i.e. GCPs), outputs of these two areas would not be covered within this project.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 688930.

4. Evaluation of field campaigns

4.1 Thematic campaigns evaluation

In Kifisos pilot area, a total number of 511 participants joined the five citizen science campaigns conducted in the area, while counting 341 unique participants. This section provides the analysis of the campaign activities based on the feedback evaluation questionnaires (Appendix A3) received from the participants and their statistical processing.

The feedback received from each campaign gave useful information in order to better facilitate the conduction of the following ones. The overall feedback received showed that participants were very interested in the Scent toolbox applications as well as in being in contact with the nature during the field work. All participants were satisfied from the experience and in general with the whole organization of the campaigns. The favourable and the unfavourable factors as derived from the feedback of the participants are given in the following tables (Table 10 – 14) whilst improvements conducted based on the feedback received are also provided.

Table 10 Evaluation of 1st campaign (Land cover / land use)

Campaign Experience	
Pros	**Cons**
Many participants considered the areas visited interesting as it was combining both rural and urban environments of the Kifisos river basin.	The weather was very hot (the sun was very strong the time of the field trip) and thus hindering the data collection process. That was more evident in the case of the downstream part of Kifisos catchment, the location of Filadelfeia, an urban area with little vegetation and little opportunity for natural shade.
The majority of the participants were satisfied with the duration of the field visit.	
The time of stops (places to capture “characters”, take pictures) was ideal	
Application Experience	
Pros	**Cons**
Scent Explore application was very engaging	Battery consumption of the app was too high
The existence of the offline mode (collection of data without internet connection and upload later on through WiFi) in Scent Explore application was appreciated from the participants that didn’t want to use their mobile data.	Some users experienced crashes of the application after a certain period of data gathering.
	In some mobile devices the application showed delays.
	Some of the participants found it difficult to select the appropriate taxonomy tag for each of the images captured.

The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

	Problems occurred when running the applications in older smartphones.

During the 1st field campaign in Kifisos river basin, Scent Toolbox components were validated in real-case situations enabling the collection of important LC/LU information. The feedback received from the participants regarding the use of Scent Explore led to technical enhancements and updates so as to ensure the smooth operation of the application in different mobile devices while reducing the energy consumption requirements. In addition, in order to further incentivise the users in the data collection process, various motivational phrases were introduced. Last but not least, prior to the campaign explicit directions were given to participants as to which operating systems are compatible with the Scent application. To further address this issue, some spare smartphones and tablets were available and were given to the participants in cases of incompatibility.

Table 11 Evaluation of the 2nd campaign (River & soil measurements)

Campaign Experience	
Pros	**Cons**
In the context of this campaign the routes and points of interest conducted involved direct contact with the river network creating an enjoyable experience.	As of the bad weather conditions (too cold) occurred during some of the campaign days, some of the people didn't want to remain in the field for the whole duration of the activity.
Participants liked the thematic focus of the campaign and the way that the measurements were collected.	
Participants greatly appreciated the educational aspects of the pilot and felt that through the use of the Scent Apps, they were able to gain a deeper understanding about the environmental conditions surrounding Kifisos river and become acquainted with relevant research processes.	
Creating teams for collecting the different types of measurements (i.e. water level team, water velocity, etc) increased the interest and engagement of the participants.	
Application Experience	
Pros	**Cons**
Participants were really fond of the portable sensors used for the collection of soil measurements.	The taxonomy list provided in the application was too exhausting, requiring from the participants to invest quite the time in order to select the appropriate tags.
Participants commented that the process of measuring the water velocity was fun and appealing.	Some delays were occurred in the application during the video data collection process.
	The time needed to upload the data (images and videos) collected was too long, causing delays to the overall process.

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Based on the feedback received from the 2nd campaign a normal mode for the taxonomy selection was inserted in Scent Explore, allowing users select from a short list of taxonomy tags that were more likely to be found along the points of interest. The users could also view and use the complete taxonomy but this time it should be explicitly chosen through the expert mode. Further to this and in order to enhance the quality of the data provided by the participants, a guide was introduced in the application explaining the type of information that each taxonomy tag refers to. In addition, the duration of a video capture was limited to 15 seconds as the examination of the collected data showed that this was more than enough for the extraction of the water velocity, and thus the uploading time was improved.

Table 12 Evaluation of the 3rd campaign (River measurements)

Campaign Experience	
Pros	**Cons**
The group of participants was experienced in outdoor activities, as it mainly comprised of volunteers from search and rescue, hiking or mountaineering teams and associations. This enabled the team to reach POIs that were more difficult to be approached but that were also crucial for the research and the data collection, in order to obtain a holistic picture on the conditions of Kifisos river.	The time of stops (places to capture "characters", take pictures) was too little
Participants underlined that it was very interesting to be able to put their skills to use and contribute to a research process and gain a deeper understanding of environmental conditions.	
Application Experience	
Pros	**Cons**
Gamification components of Scent Explore application were quite engaging.	Some problems were reported regarding the response time of the application.
It was appreciated the app could be used in offline mode.	

The third campaign highlighted the importance of tailoring the points of interest and routes based on the profiles of the participants. To further improve the user experience, a leader board was created to introduce a competition among the participants regarding the points collected.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Table 13 Evaluation of the 4th campaign (Land cover / land use, river data, soil measurements)

Campaign Experience	
Pros	**Cons**
On the beginning of each day of the campaign extra time was dedicated to familiarize the participants (mainly students) with the applications and to prepare them for what was expected of them during the field work, regarding data gathering.	The weather was unpleasant (light showers and heavy rain at the end)
Students' knowledge about citizen science and environmental monitoring was improved. Students were quick to comprehend the aforementioned concepts and the practical dimensions of data gathering they encountered during the campaign contributed to a deeper understanding.	Students did not like the "low level of water" in some places
Students liked the organization of outdoors activities	
Application Experience	
Pros	**Cons**
Students were very enthusiastic about the gameful elements of the Scent Explore app and were very effective in capturing animal characters and therefore images of the river surroundings.	
A competition took place between the participants	

Table 14 Evaluation of the 5th campaign (Land cover / land use, river data, soil measurements)

Campaign Experience	
Pros	**Cons**
Participants liked the thematic aspects of the campaign and the way that the measurements were collected.	The weather temperature was very high. As the pilot took place well into the summer, the organizing team had to consider the weather conditions, for the purposes of safeguarding the participants. To this end less stops were implemented during the routes.
Many participants considered the areas visited interesting as it was combining both rural and urban environments of the Kifisos river basin.	

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Application Experience	
Pros	**Cons**
Scent Explore and Measure applications were very easy to use.	Some phones were overheating.
Compared to previous campaigns phone battery lasted longer time (depending from phone to phone).	
It was appreciated the idea of the gamification for collecting data that can be used for environmental monitoring	

The feedback received from the volunteers that participated in this final campaign illustrated that it was successfully conducted and appreciated by the participants. Application wise, further optimisation of the applications took place to reduce energy consumption as well as to increase user experience.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

4.2 Overall experience evaluation

Further processing of the evaluation forms received by the participants for all five campaigns confirmed the observations made during the Attica pilots. The evaluation results for each question included in the form are presented in the following graphs. The first graph in each question compares the campaigns, color-coding them for greater legibility. The second graph in each question aggregates the results, reflecting thus the overall experience.

4.2.1 Campaign experience

The first question was about the adequacy of "the time given" for the implementation of the field visit and in order to accomplish the tasks assigned to the volunteers. In general, the duration of the field campaigns was between 1,5 - 2 hours, considering of course in each campaign the particular weather conditions that at times precipitated the process.

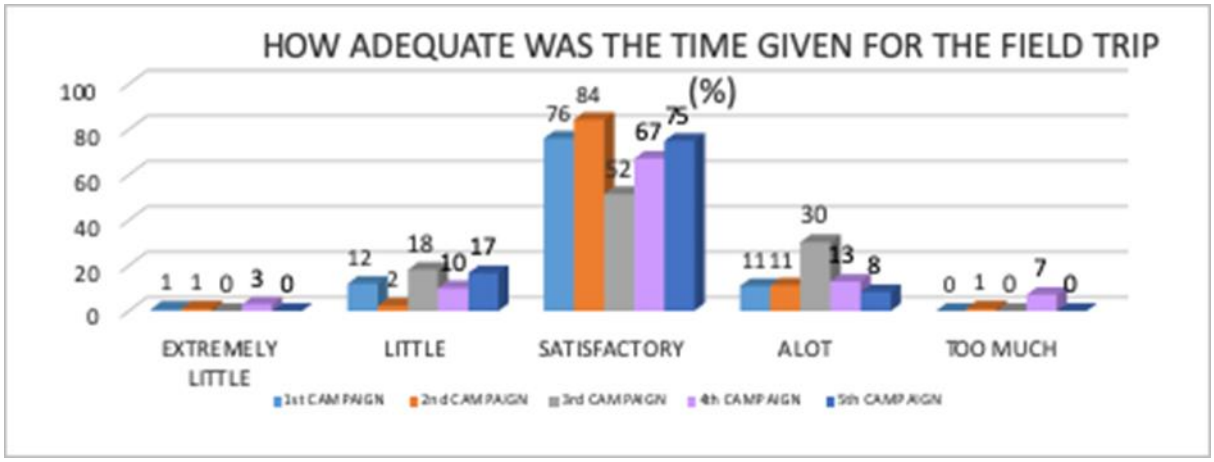

Figure 32 Adequacy of time provided to participants for implementing the field trip per campaign

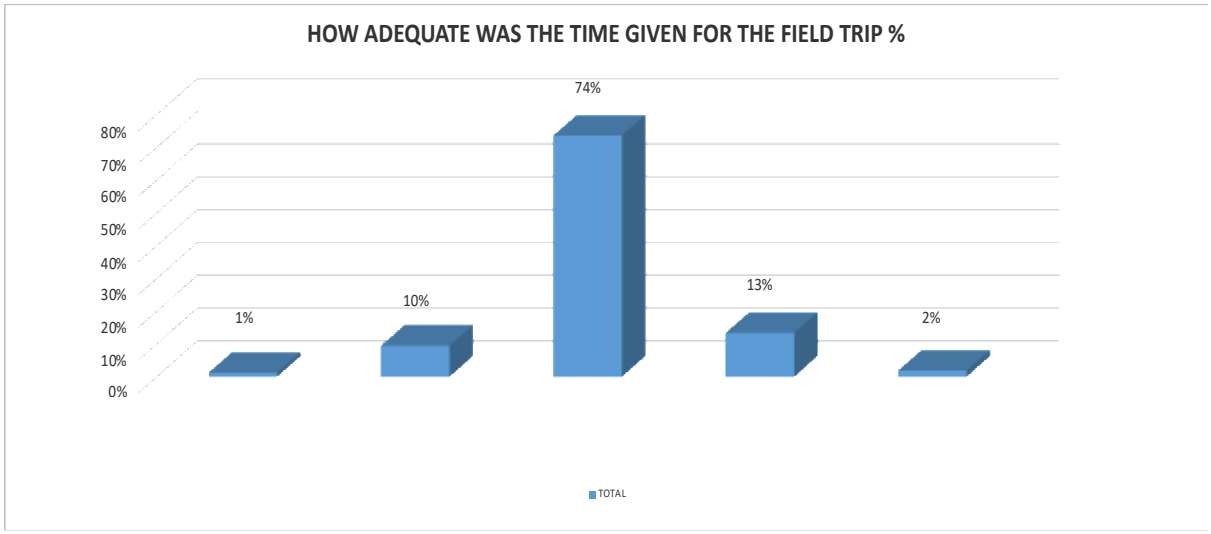

Figure 33 Adequacy of time to participants for implementing the field trip for all campaigns

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

The answers of the participants from the 5 campaigns about the time of the field work, show that 74 % of the volunteers were satisfied from the time spend in the field, as presented in the previous graph. This was also in compliance with the responses received in the following question concerning the maximum amount of the time the volunteers were willing to spend to field activities.

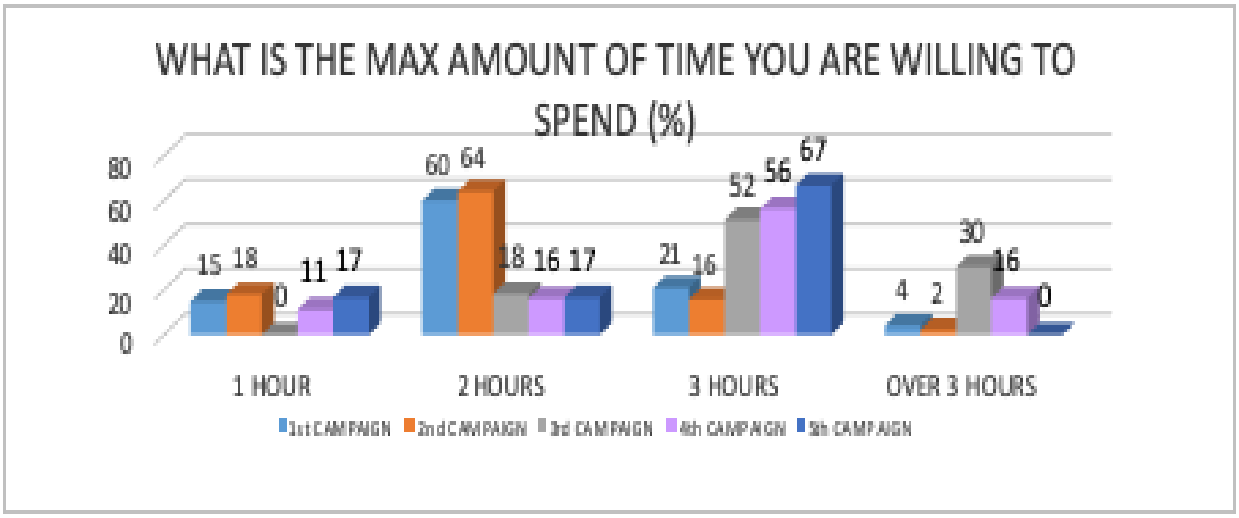

Figure 34 Maximum time to implement the field activity per campaign

The majority of volunteers declared that the max amount of time was between 2-3 hours. Specifically, 47% said that 2 hours were sufficient and 31 % said that 3 hours were enough for collecting data around the river.

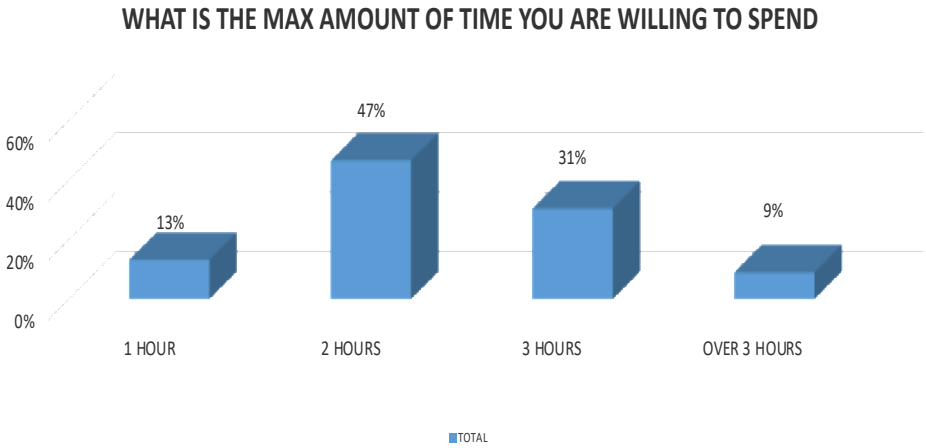

Figure 35 Maximum time to implement the field activity for all campaigns

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The next question was about the feeling of the participants about the activities undertaken in the field visit.

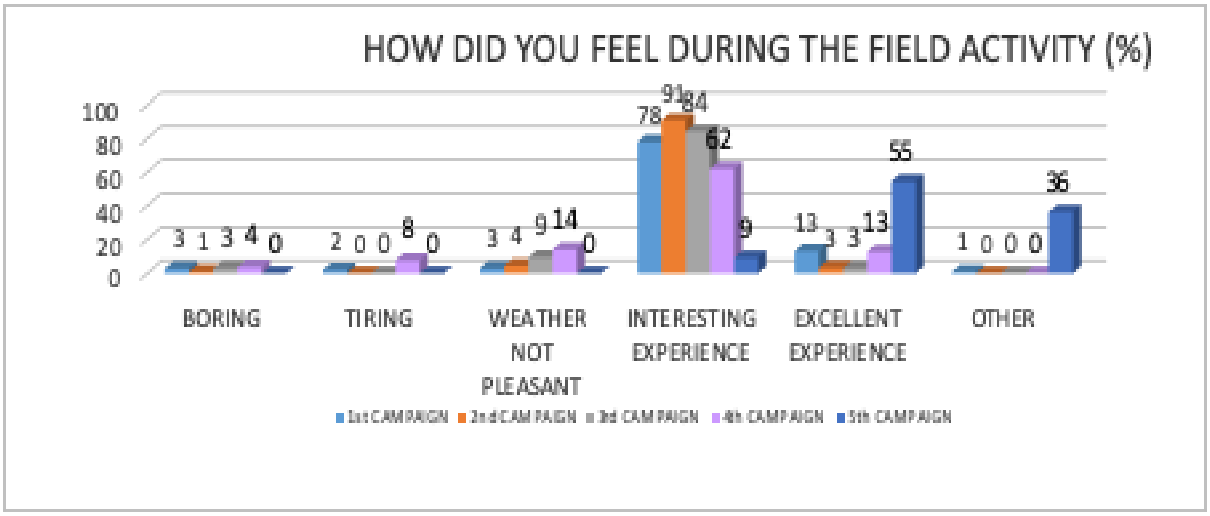

Figure 36 Participant feeling to implement the field activity per campaign

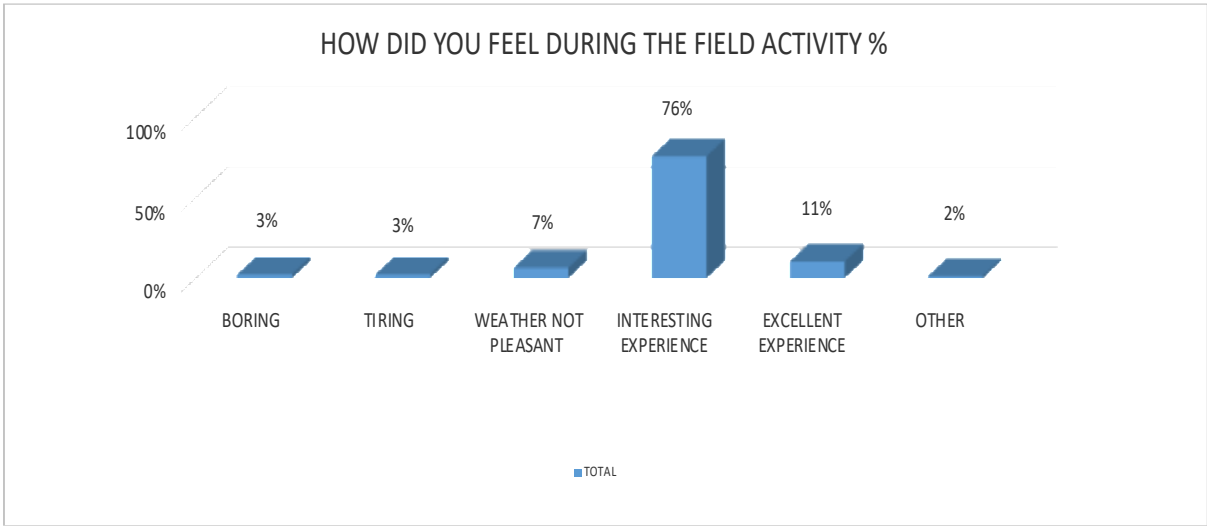

Figure 37 Participant feeling to implement the field activity for all campaigns

About 76% of the volunteers regarded the field visit as an interesting experience and 11% as an excellent experience. Only 3% of the participants thought that the field experience was boring.

The number of time that each group stopped in order to take pictures and/or river data by means of water level and velocity was ideal in four out of five campaigns, that corresponds to 213 participants and 71% of all those that answered the question.

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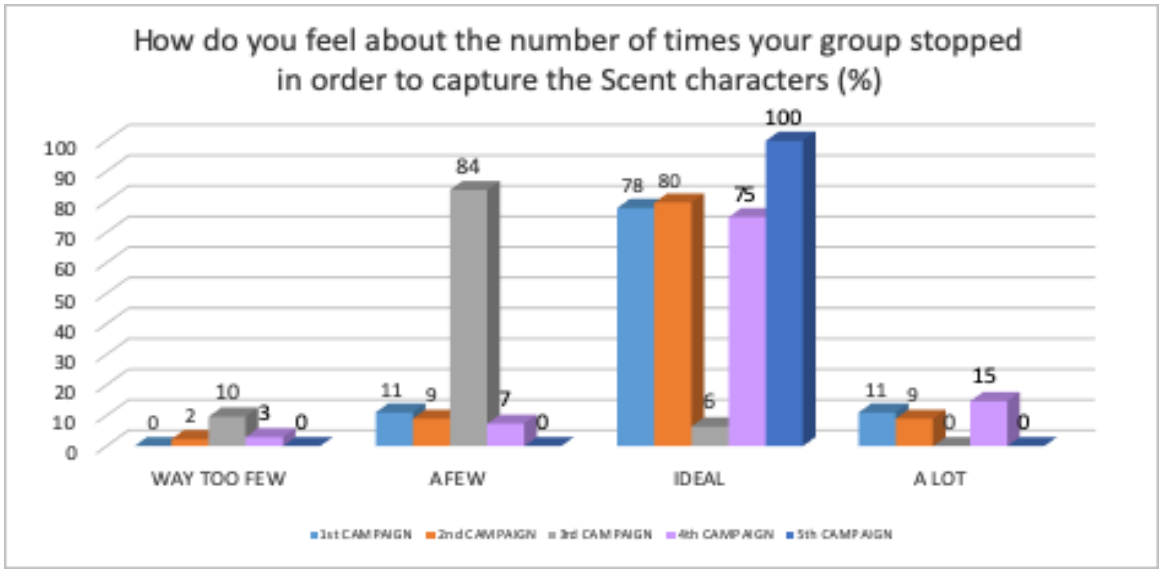

Figure 38 Participant feeling on the number of stops to capture Scent characters per campaign

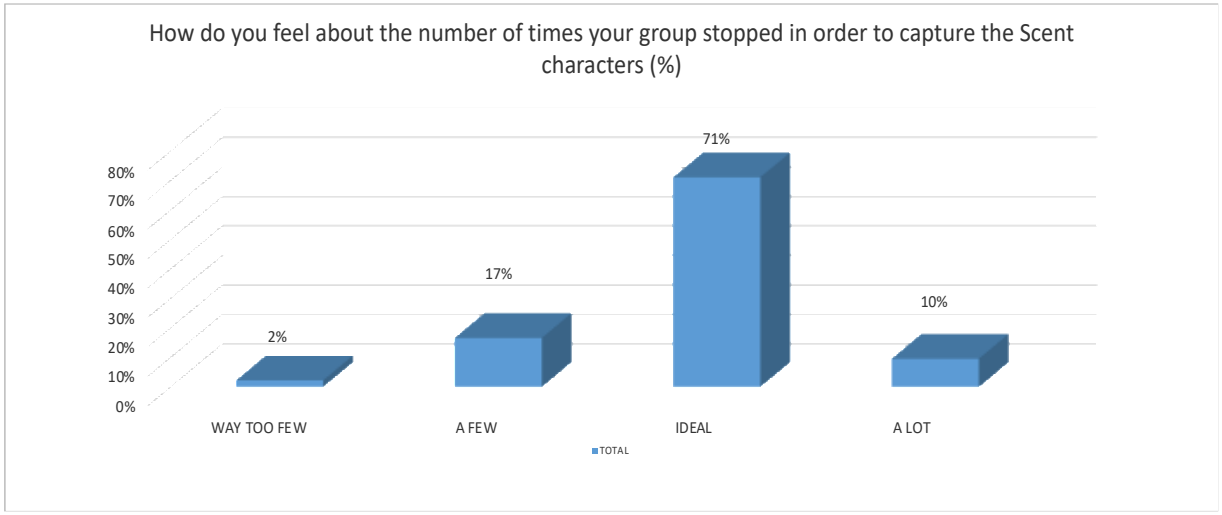

Figure 39 Participant feeling on the number of stops to capture the Scent characters for all campaigns

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Regarding the number of SCENT characters that appeared during the field activity, most of the participants (64%) stated that this number has been ideal. The volunteers of the 5th campaign clearly wanted more characters to challenge them, a finding compatible with the demographics of this group.

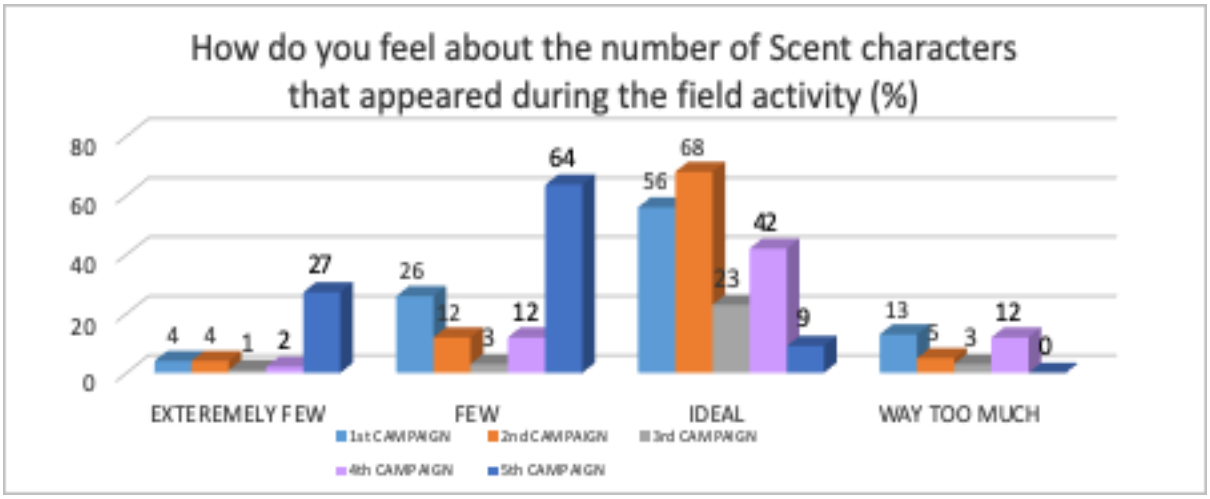

Figure 40 Participant feeling on the number of Scent characters appeared per campaign

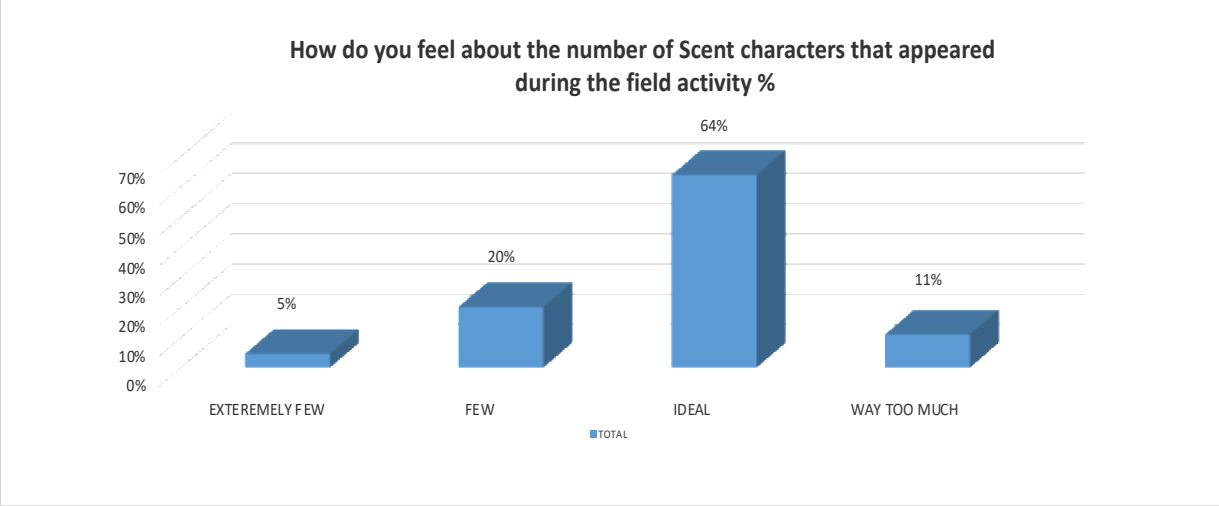

Figure 41 Participant feeling on the number of Scent characters appeared for all campaigns

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Most appealing elements of the field activity was contact with nature. The routes designed gave the opportunity to many volunteers to visit largely unknown and remote locations of the Attica region, so this exploration was regarded as a positive outcome. Furthermore, the gamification aspects of the applications were also appreciated, as 17% of the participants enjoyed using them.

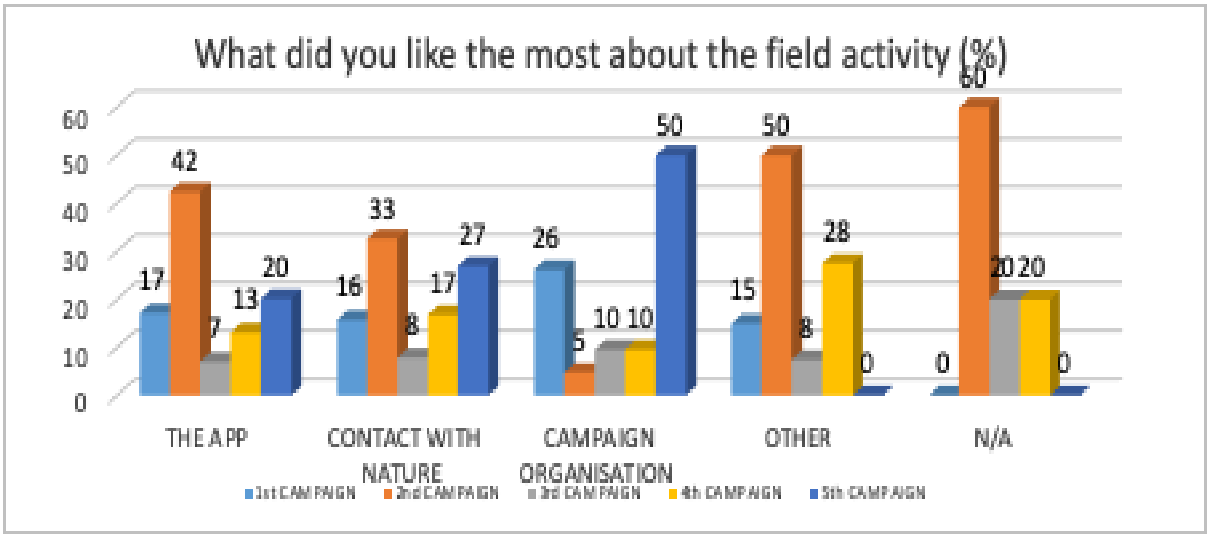

Figure 42 Participant opinion on what they like most about the field activity per campaign

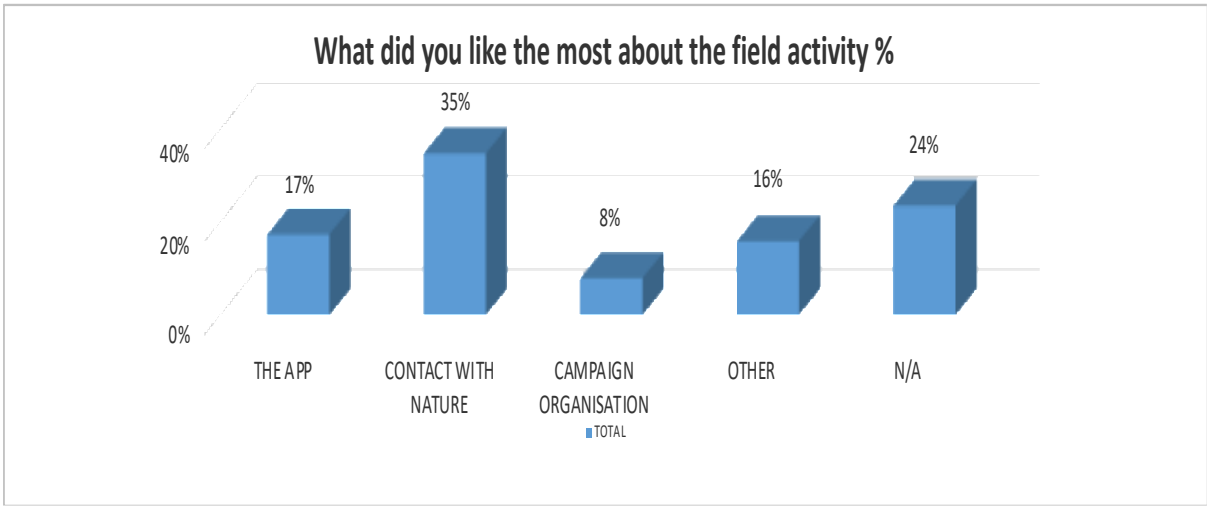

Figure 43 Participant opinion on what they like most about the field activity for all campaigns

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Most participants have stated that there have been no issues to report whilst some of the replies mention the weather conditions, and technical issues related to connectivity and application use. The organizers have considered the issues mentioned and took appropriate measures to improve the organization of the field activity. Tablets and mobile phones have become available to the participants along with free internet access and beter guidance on the app usage. Weather reports have been obtained from reliable sources and beter scheduling of the field activity has been managed.

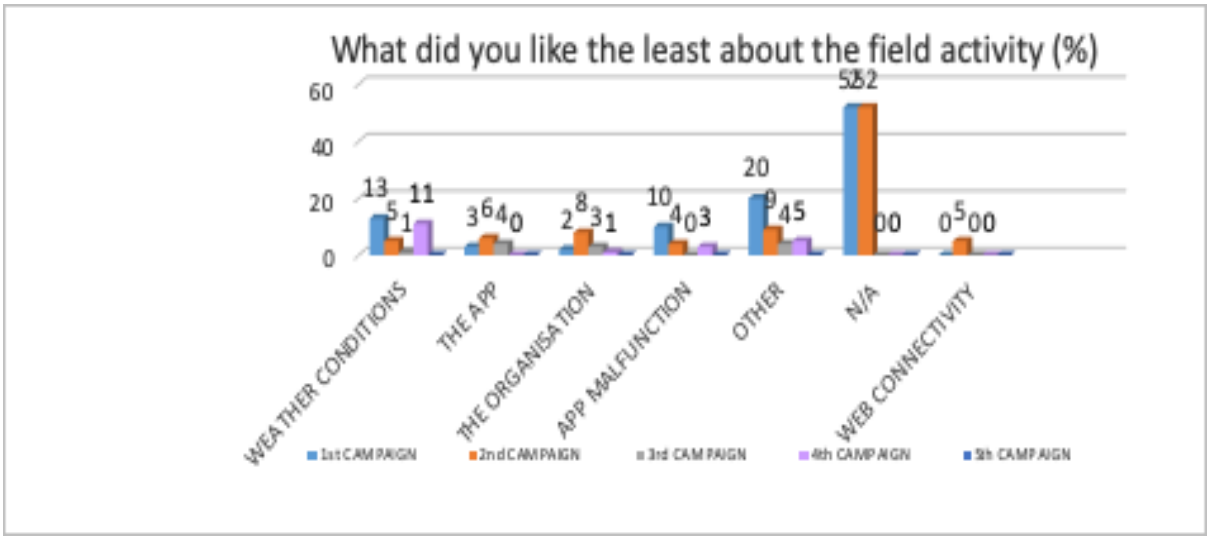

Figure 44 Participant opinion on what they liked the least about the field activity per campaign

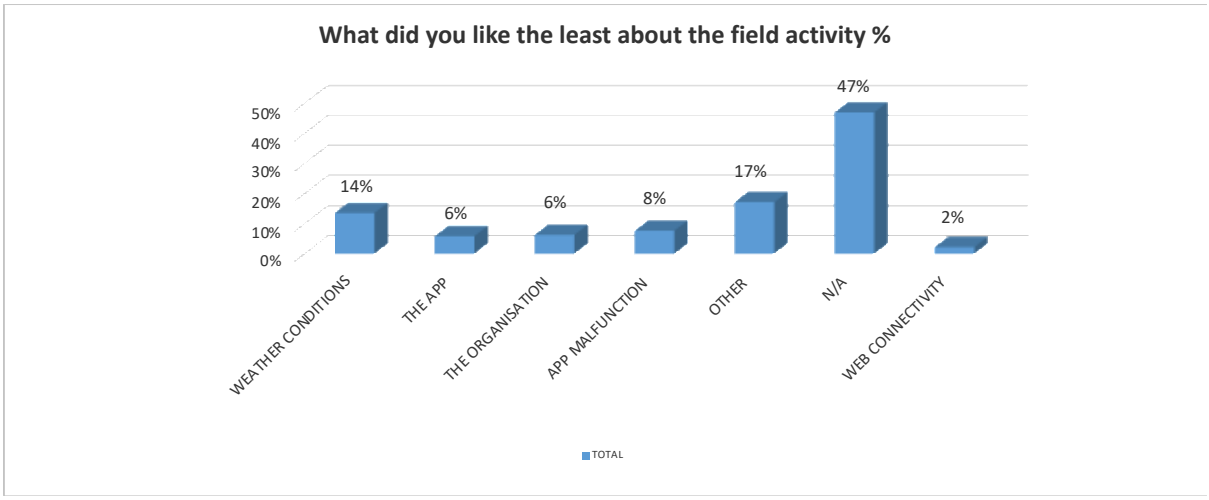

Figure 45 Participant opinion on what they liked the least about the field activity for all campaigns

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

The question regarding potential improvements in the field activity was open-ended which discouraged most volunteers from replying. The feedback received involved issues recurring in all five campaigns that the organising team has managed to address and respond to. Weather conditions were indeed challenging at times. It has to be mentioned that forecasts were obtained in advance, however this is an unpredictable factor that call for flexibility of the process.

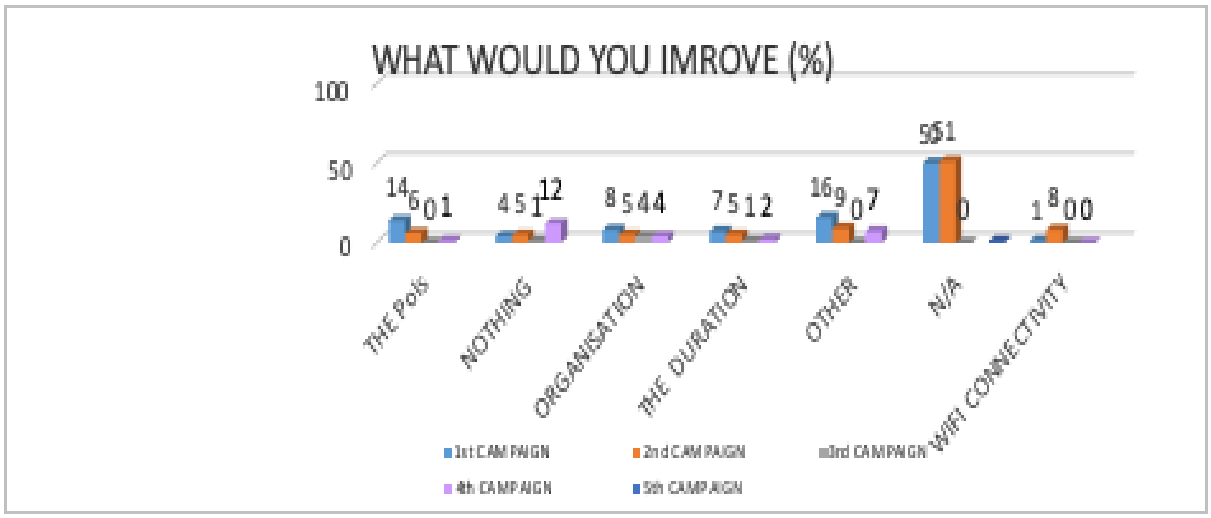

Figure 46 Participant opinion on what they would improve about the field activity per campaign

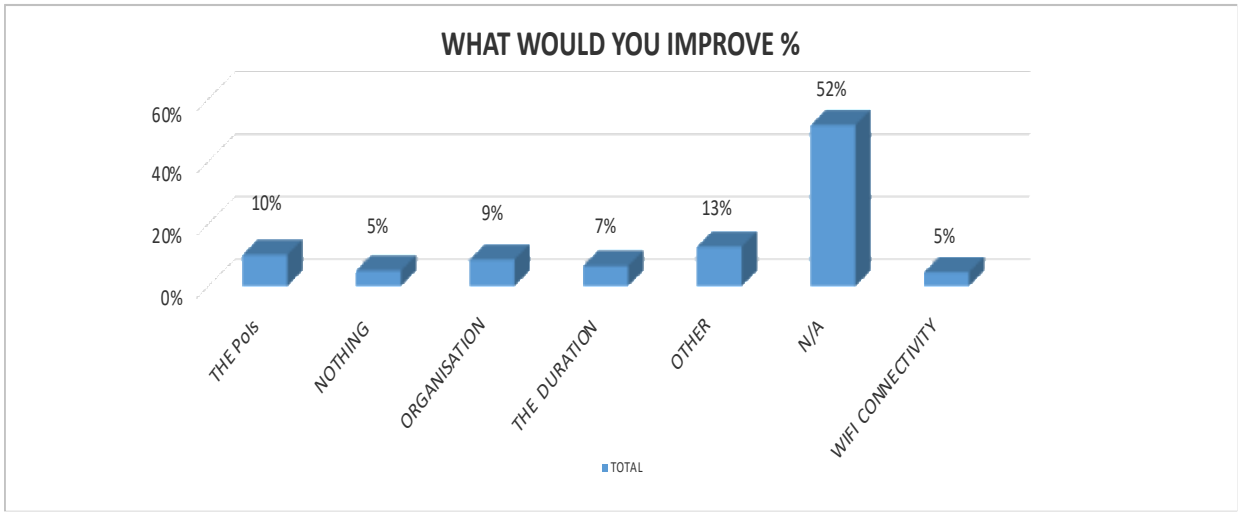

Figure 47 Participant opinion on what they would improve about the field activity for all campaigns

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4.2.2 Application experience

With regards to what the participants liked most about the applications –a question that was added after the first campaign- the most prevalent answer was the easiness to use. That is particularly evident in the answers received during the 5th campaign where the crowd that participated was rather familiar with the use of technology and relevant applications. The Scent characters were also well designed and appealing. It has to be clarified that the question was open ended, therefore 48% of the volunteers decided not to write anything. Their answers fall under the fifth column (indicating OTHER as the response), whereas 1% of the volunteers responded that they didn't know or didn't want to say what they liked the most about the apps (sixth column).

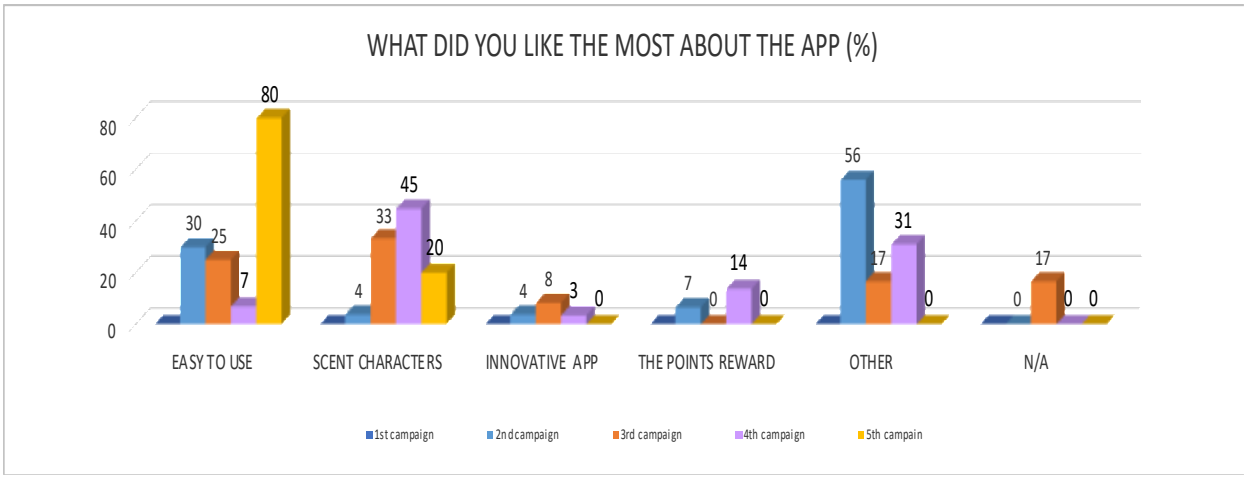

Figure 48 Participant opinion on what they liked most about the apps per campaign

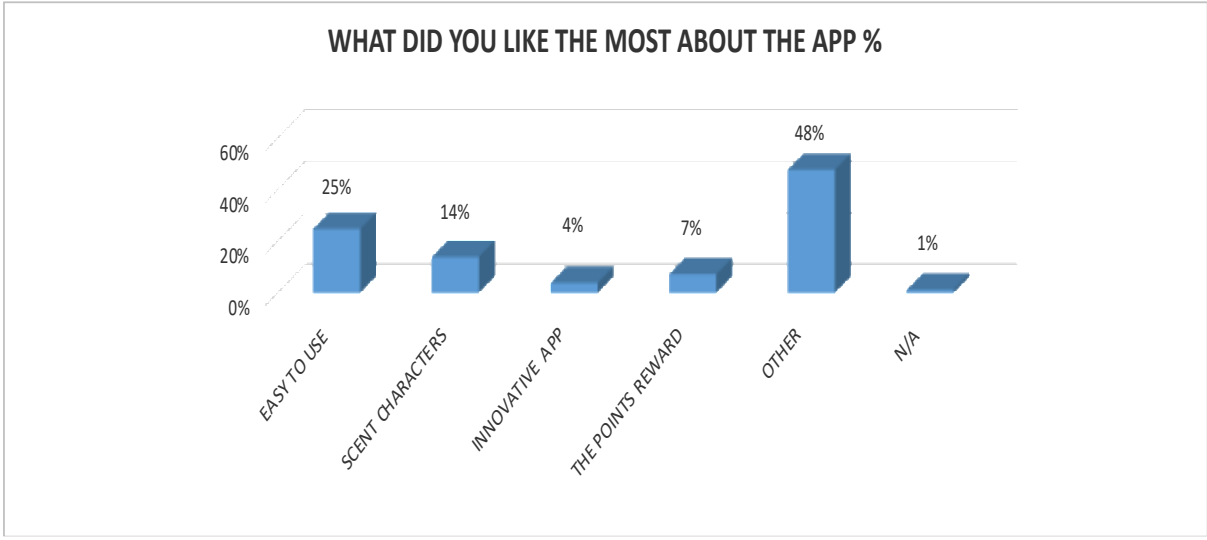

Figure 49 Participant opinion on what they liked most about the apps for all campaigns

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The following question was also open-ended and was inserted in the questionnaire from the 2nd campaign onwards. Therefore, in what concerns the least liked aspect of the application, again most of the volunteers (47%, fifth column, OTHER indication) did not provide an answer, 6% complained for the lack of compatibility with smartphones with older versions of operating systems, whereas 21% commented on an issue not directly related to the applications per se, which was wi-fi connectivity, or lack thereof. It should be noted, that unstable Wi-Fi coverage was anticipated, as many of the routes traversed semi-rural and remote locations, therefore wi-fi hotpots were provided to address this.

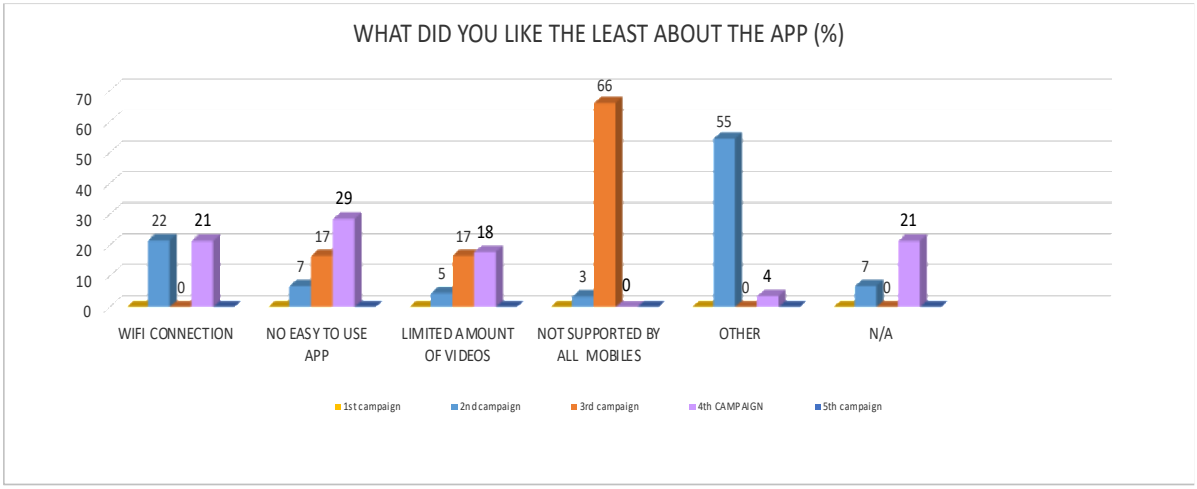

Figure 50 Participant opinion on what they liked less about the apps per campaign

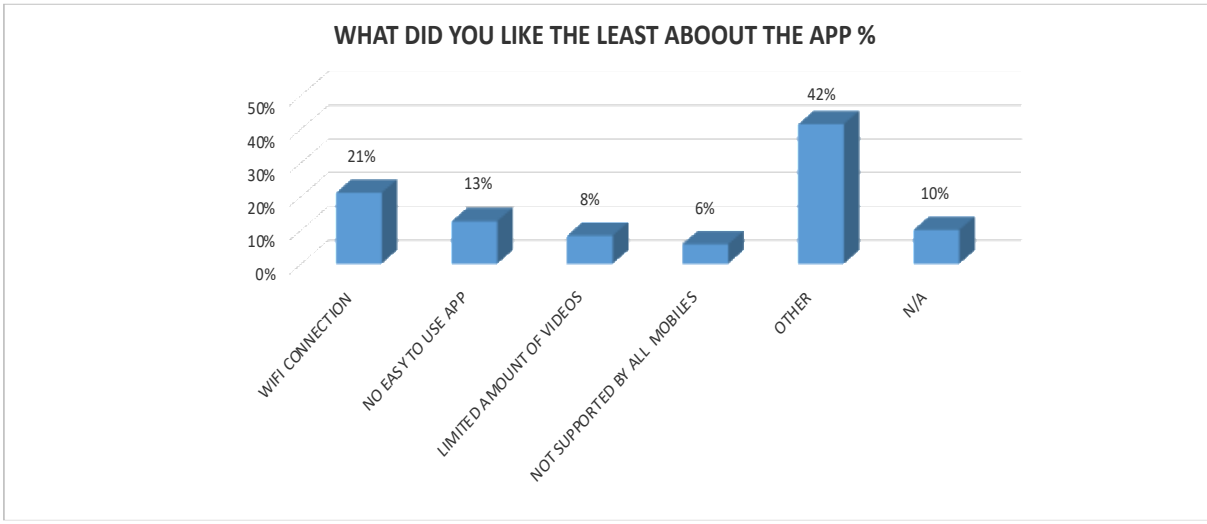

Figure 51 Participant opinion on what they liked less about the apps for all campaigns

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In what concerns specifically "Scent Explore", the majority of the participants did not face any problems regarding using the app and capturing the SCENT characters.

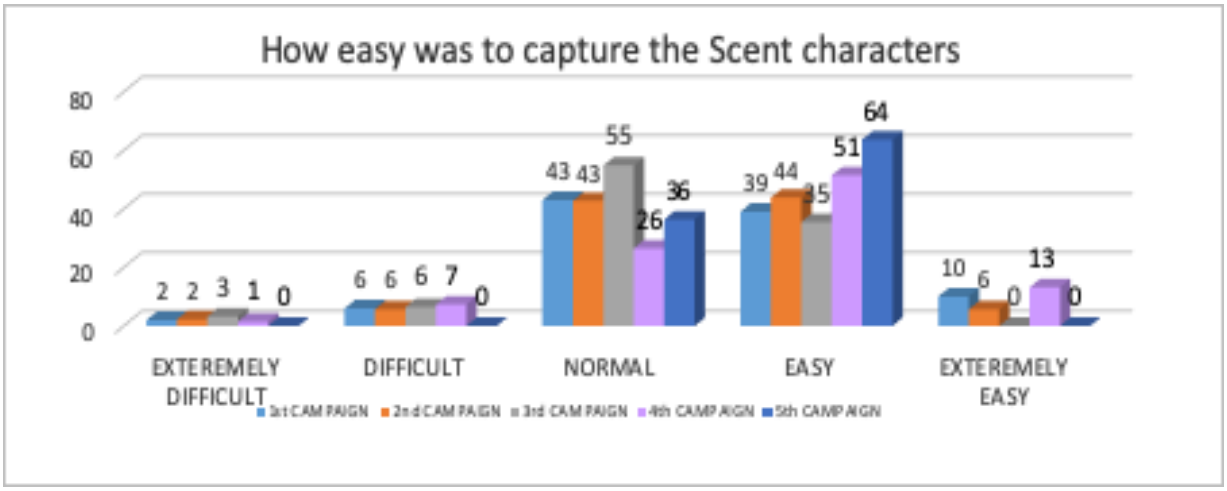

Figure 52 Participant easiness to capture the Scent characters per campaign

For the 84 % of the participants the game objectives were normal (40 %) or easy (44 %) to achieve. The overall results for all five campaign are presented in the following graph.

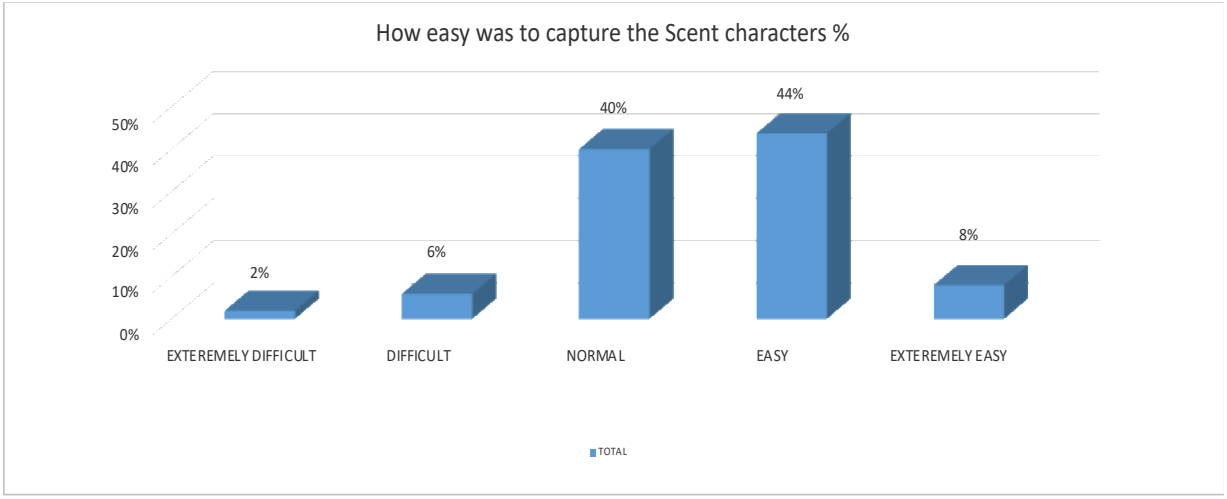

Figure 53 Participant easiness to capture the Scent characters for all campaigns

4.2.3 Demographics

Demographics of the volunteers that participated in the Kifisos field campaigns, in Attica are presented in the following graphs and refer to data related to age, gender and level of education. Most prevalent age groups among the participants during all of the campaigns were 35-44 and 45-54 years old, that comprised the 26% and 27% of all participants respectively. As is evident by the graphs, the fourth campaign was specifically addressed to students (mostly teenagers, under 18 years old). However, it succeeded in attracting a large number of volunteers, therefore students make the 22% of the overall participants.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

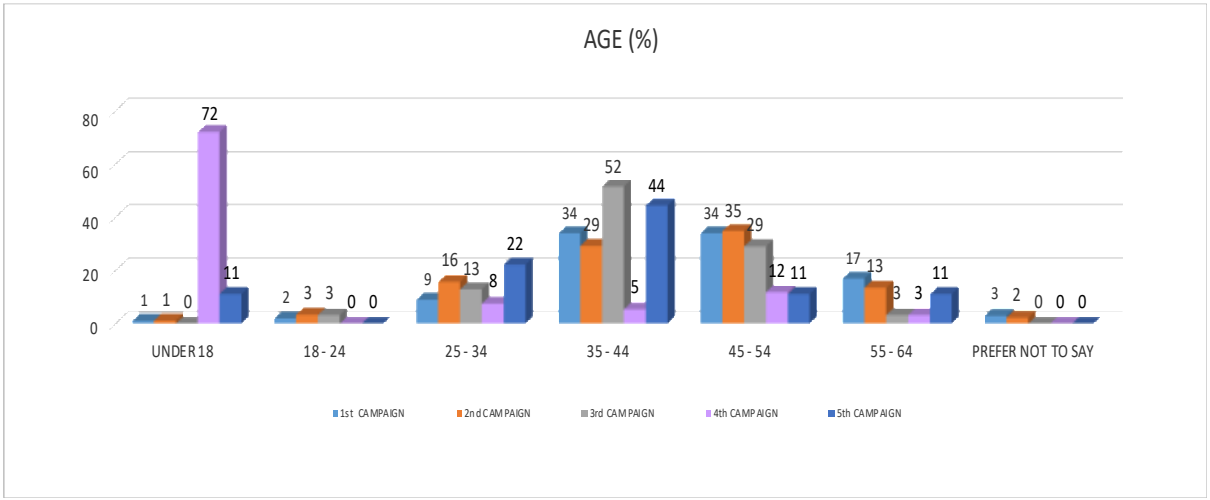

Figure 54 Participant age per campaign

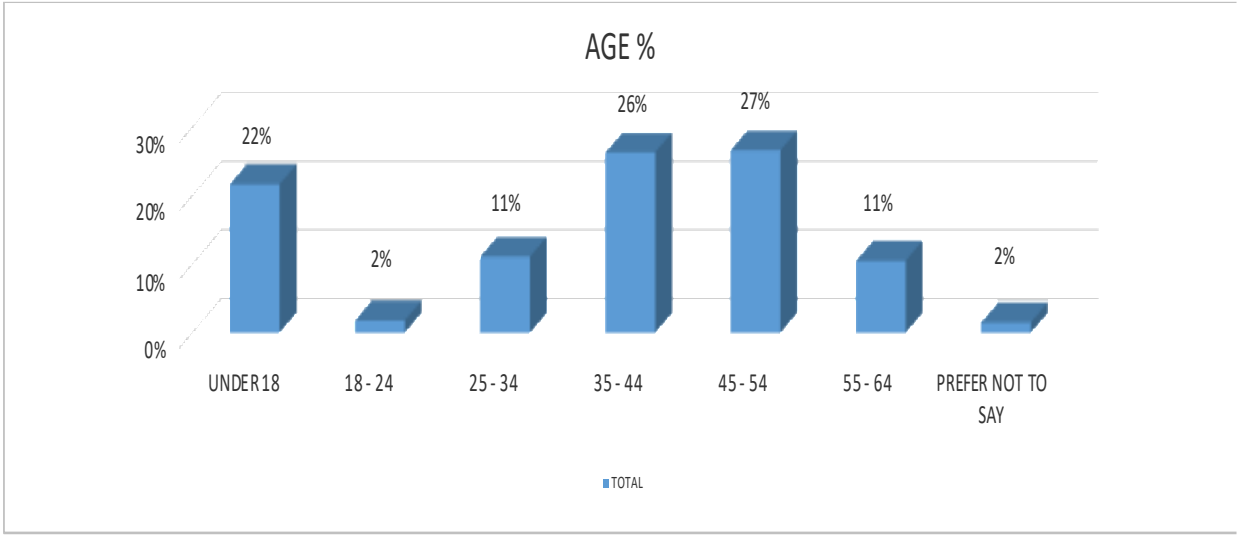

Figure 55 Participant age for all campaigns

Gender representation among men and women was absolutely balanced, while in what concerns the level of education, apart from students most volunteers had a higher education, or master's degree.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

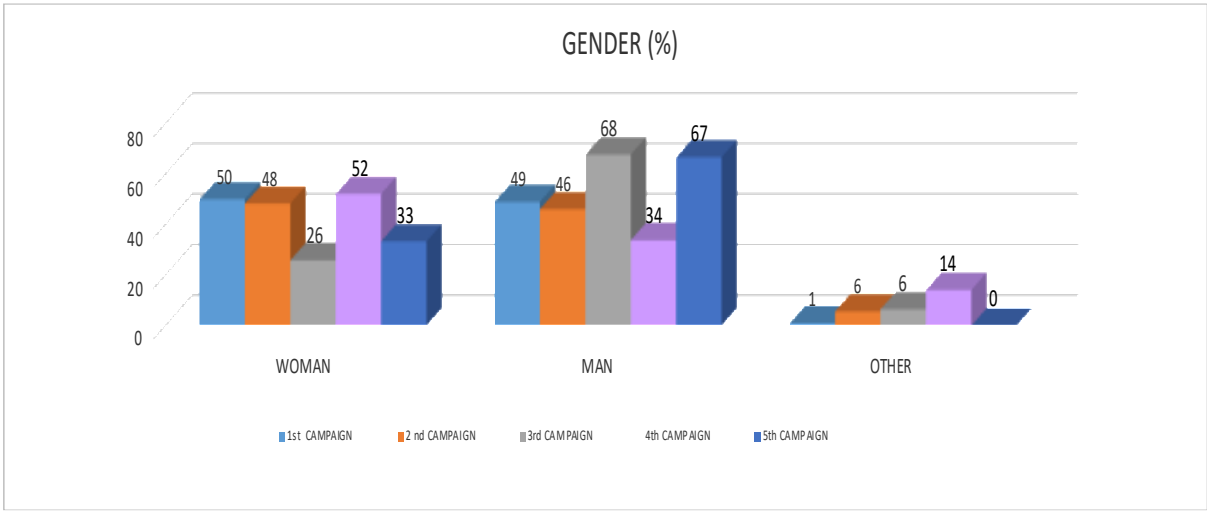

Figure 56 Participant gender per campaign

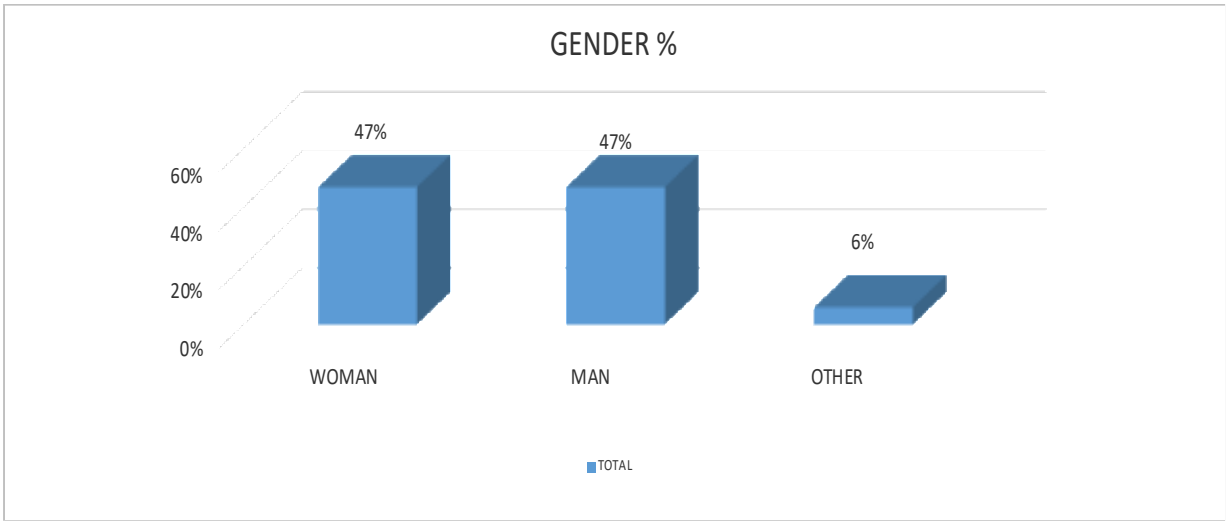

Figure 57 Participant gender for all campaigns

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

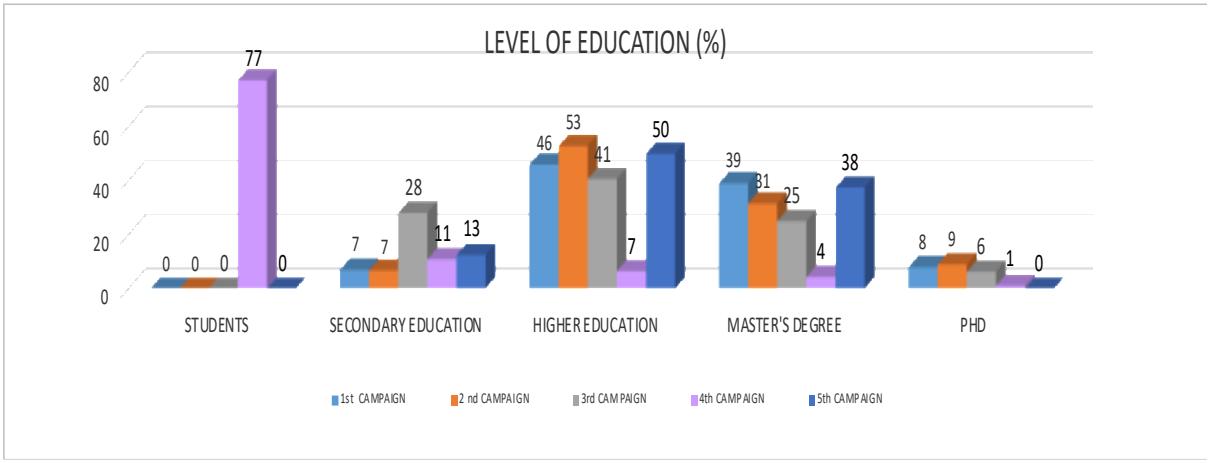

Figure 58 Participant education level per campaign

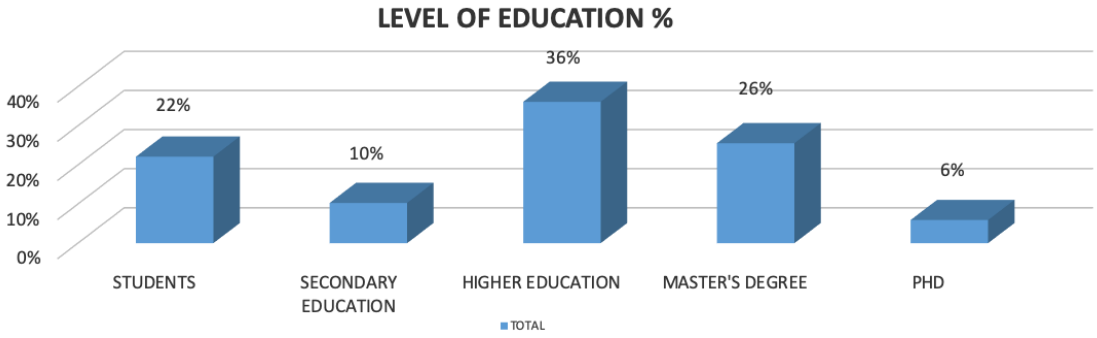

Figure 59 Participant education level for all campaigns

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5. Recommendations

During the implementation of the Scent pilot campaigns in Kifisos river basin, in Attica region various practical and technical challenges emerged. Benefitting from this experience, this section provides insights towards streamlining the organisation of citizen science campaigns. The key recommendations are presented as follows:

- **Citizen engagement.** One of the most important factors that deem a campaign successful is to ensure the participation of an adequate number of volunteers, for the purposes of establishing a citizen observatory. Appropriate communication channels should be employed to reach individuals, teams and associations already interested in environmental issues. To this end it is regarded as useful to collaborate with local authorities, adjacent to the areas of interest and involve them both in: a) the recruiting process of individuals residing in those areas that may be personally invested in contributing to such a cause, b) the environmental monitoring efforts.
- **Route planning.** Carefully selection of the routes that will be explored in each campaign is prerequisite. When it comes to organised field activities, it is of primary significance, that a designated team examines the routes beforehand and identifies the POIs, in order to achieve the best results in terms of data collection, but also to present an interesting and stimulating experience in the nature, that motivates the participants. The length of the route and therefore the time spend in the field should be carefully considered according to the demographics and profiles of the participants, however the potential for flexibility and adaptation while on the field is useful, depending on the particular weather conditions or unexpected instances.
- **Safety management.** In the case of the Kifisos river basin, in Attica, the locations visited during the campaigns were urban and semi-rural and their access was not extremely difficult or dangerous. However, it is strongly suggested that a team that specialises in search and rescue situations, follows the volunteers at all times to safeguard them and prevent any accidents. Such a specialist provides useful information on the optimum navigation manners while on the field and can guide a group of around 25 adults, whereas for children and minors, smaller groups should be created.
- **Training and support.** Once the group of volunteers of a campaign is assembled, dispatching detailed information about the requirements of their participation is extremely helpful. With this knowledge at hand, organising a training workshop for the participants prior to visiting the field is essential. In the workshop, clear instructions as to what is expected from the volunteers and which are the tasks they should accomplish should be provided. Then it is important to familiarise the participants with the applications and the technology to be used and ensure all equipment is working smoothly. Of course, support is beneficial even while on the field. It is quite important that members of the organising team, experienced on technical matters accompany the volunteers, address questions, and offer help in resolving technical issues.
- **Precautionary measures.** To ensure a smooth campaign flow and unobstructed participation by the volunteers, careful planning is required in terms of available infrastructures and equipment. It is useful to ensure the provision of power banks, wi-fi hotspots or have additional smartphones

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and tablets to be used by the volunteers, in order to address potential connectivity, compatibility or energy consumption issues.

- **Incentives for participation.** Feedback received from volunteers offered useful insights on the elements that can boost participation, motivate the volunteers and foster their engagement. The gamification aspects of the applications prove to be very appealing and contributed in making the field work a fun experience, promoting collaboration, socialization and competition that subsequently lead to success in terms of data gathered. Furthermore, volunteers greatly appreciated the promotional material (fabric tote bags, hats, t-shirts, stationary etc.) that were provided, as well as the certifications of attendance, so the impact of this kind of incentives should not be overlooked.

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6. Conclusions

The citizen science field campaigns conducted in Kifisos river basin in Attica, constitute an integral part of Scent Citizen Observatory, showcasing the applicability and added value proposition of Scent toolbox in engaging citizens with environmental monitoring. In the context of the field campaigns, a variety of citizen-generated data were produced, that were not available before, while contributing with information regarding the status of land cover and land use, changes occurred in the soil conditions (soil moisture and air temperature) as well as parameters of the river such as water level and water surface velocity. The organisation of the field campaigns was successfully monitored and supported by the strong collaboration between the involved partners, authorities, stakeholders and citizens leading to clear identification of data needs, with shared understanding and purpose by all involved parties.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

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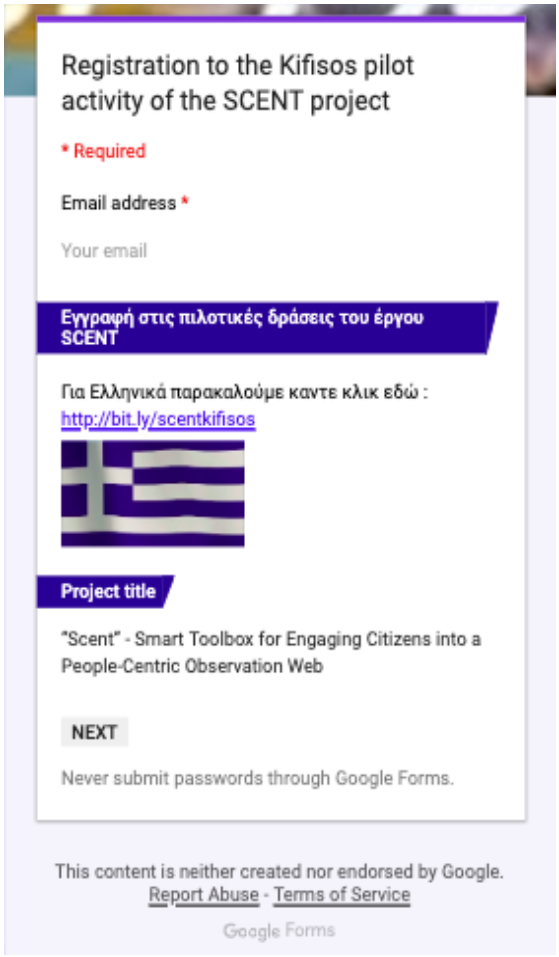
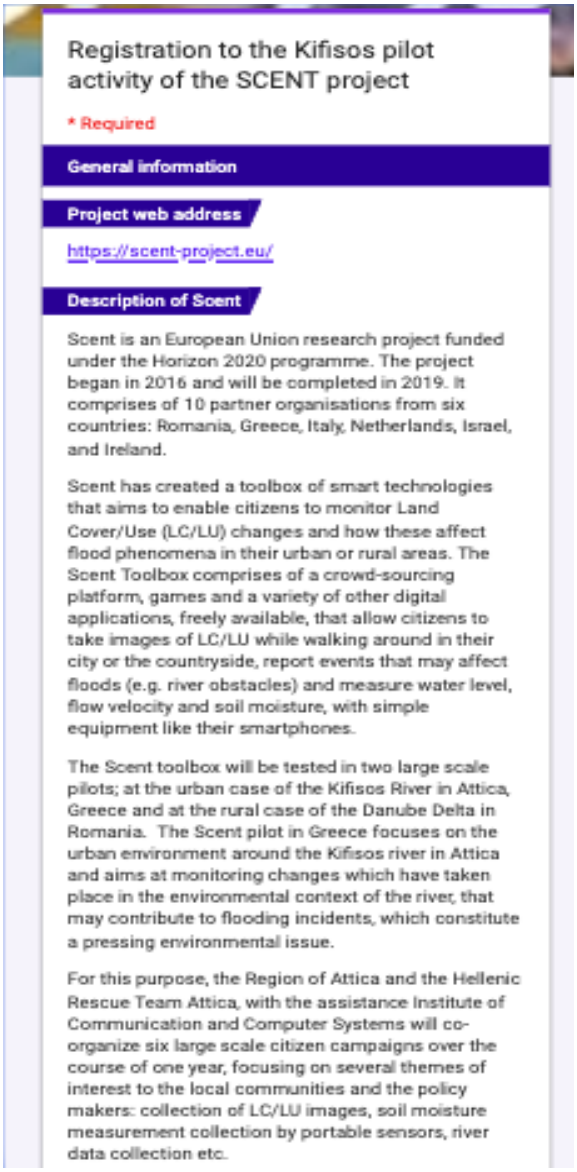
Appendices

A1: SCENT Registration Forms

The online registration forms for each campaign have been available in google docs to facilitate the registration of the volunteers. An example of the bilingual (Greek and English) registration forms is presented in the following screenshots.





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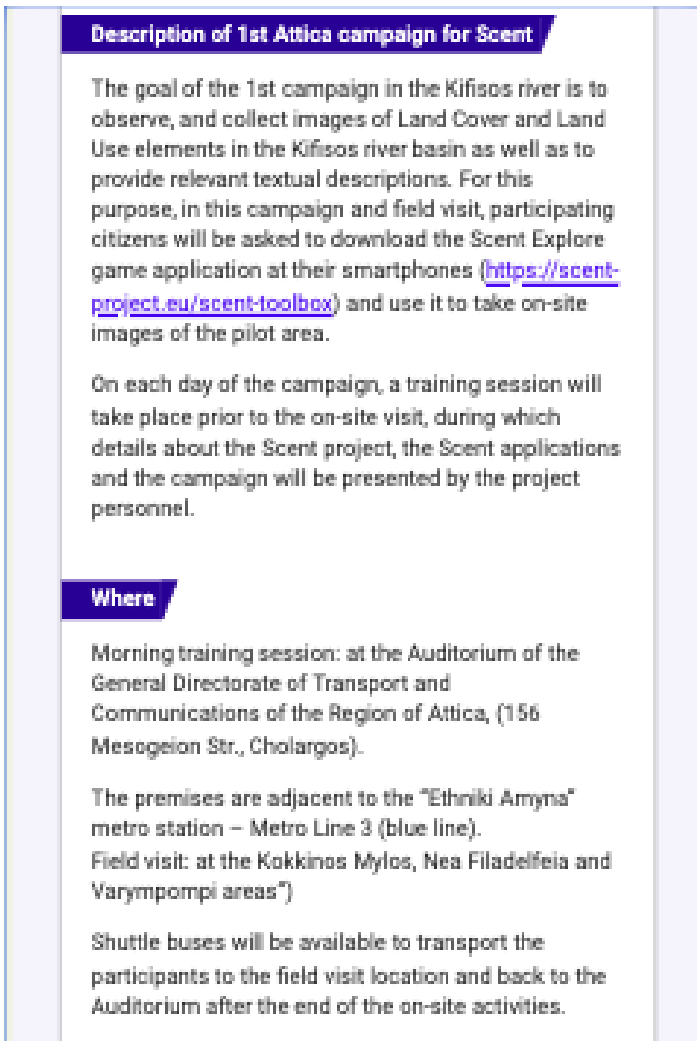


Description of 1st Attica campaign for Scent

The goal of the 1st campaign in the Kifisos river is to observe, and collect images of Land Cover and Land Use elements in the Kifisos river basin as well as to provide relevant textual descriptions. For this purpose, in this campaign and field visit, participating citizens will be asked to download the Scent Explore game application at their smartphones (https://scent-project.eu/scent-toolbox) and use it to take on-site images of the pilot area.

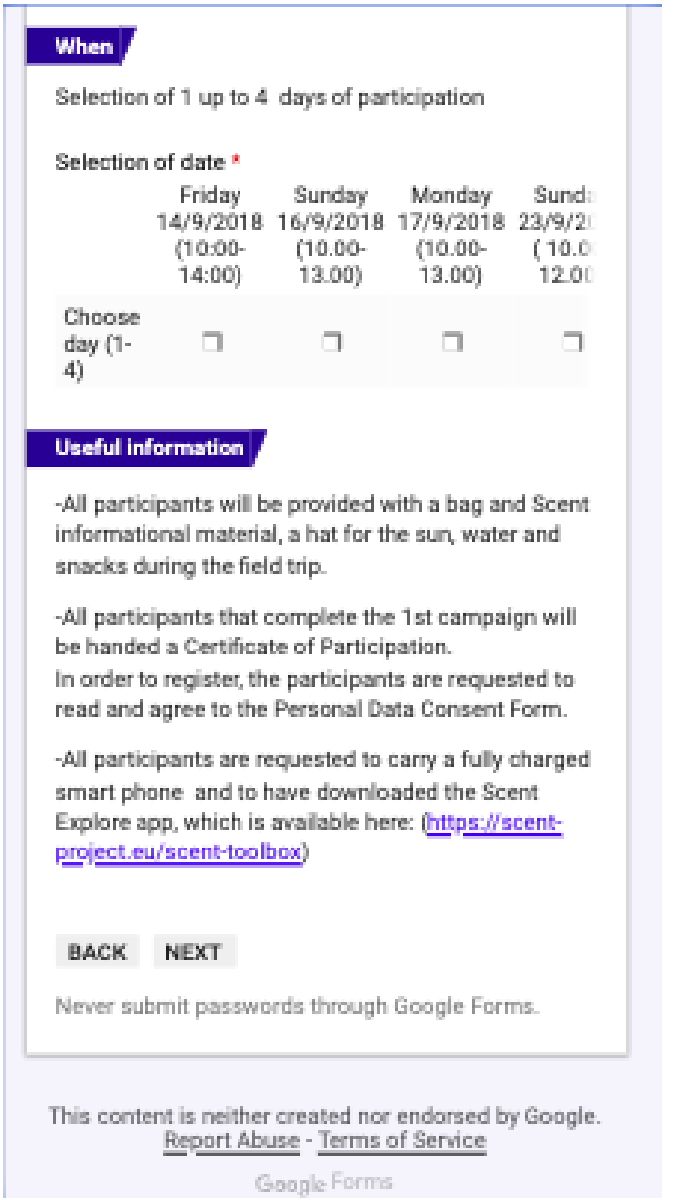
On each day of the campaign, a training session will take place prior to the on-site visit, during which details about the Scent project, the Scent applications and the campaign will be presented by the project personnel.

Where

Morning training session: at the Auditorium of the General Directorate of Transport and Communications of the Region of Attica, (156 Mesogeion Str., Cholargos).

The premises are adjacent to the "Ethniki Amyna" metro station – Metro Line 3 (blue line).
Field visit: at the Kokkinos Mylos, Nea Filadelfeia and Varympompi areas")

Shuttle buses will be available to transport the participants to the field visit location and back to the Auditorium after the end of the on-site activities.



When

Selection of 1 up to 4 days of participation

Selection of date *

	Friday 14/9/2018 (10:00-14:00)	Sunday 16/9/2018 (10.00-13.00)	Monday 17/9/2018 (10.00-13.00)	Sund 23/9/2 (10.0 12.0
Choose day (1-4)	☐	☐	☐	☐

Useful information

-All participants will be provided with a bag and Scent informational material, a hat for the sun, water and snacks during the field trip.

-All participants that complete the 1st campaign will be handed a Certificate of Participation.
In order to register, the participants are requested to read and agree to the Personal Data Consent Form.

-All participants are requested to carry a fully charged smart phone and to have downloaded the Scent Explore app, which is available here: (https://scent-project.eu/scent-toolbox)

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Registration to the Kifisos pilot activity of the SCENT project

* Required

Personal data policy

Personal data policy

SCENT Information Sheet for the training workshops/campaigns

Introduction

In the context of the European Union's Horizon 2020 Programme for Research and Innovation, the project SCENT has received funding under Grant Agreement No. 688930, which was signed between the Executive Agency for Small and Medium-Sized Enterprises (EASME) and the Consortium, consisting of the following partners:

- Institute of Communications and Computer Systems-ICCS (Project Coordinator), Greece
- IBM Research Haifa (IBM), Israel
- IHE Delft Institute for Water Education (IHE), Netherlands
- XTeam Software Solutions (XTEAM), Italy
- U-Hopper (UH), Italy
- C.C.I.C.C. (CARR), Ireland
- Hellenic Rescue Team Attica (HRTA), Greece
- Region of Attica (ATTICA), Greece
- Danube Delta National Institute (DDNI), Romania
- Romanian Ornithological Society (SOR), Romania

The project aims to investigate how citizens may help to improve monitoring critical environmental phenomena such as floods and their potential consequences by providing timely information on the land-use changes of their environment. This is done through low-cost equipment that most citizens have or may easily obtain (e.g. their smartphones) and through taking photos of their environment at regions that are really important for assessing flood (e.g. images of forest areas being burnt or converted to crops, images of river banks that are filled with debris). These images are then used for improving land-cover and land-use maps with updated and detailed information and for improving flood modelling. The performance and accuracy of the SCENT toolbox will be validated in two large scale demonstration campaigns that will be executed in parts of the Kifisos river basin in Attica, Greece and parts of the Danube Delta region in Romania.

Purpose of data collection

This particular activity to which you are invited to participate today relates to a workshop/ training session, which is organised in the context of SCENT project. Your registration details will be collected by the workshop organisers and will be used in the scope of the project's research activities. During this activity, you will be initially introduced to the objectives and activities of the project. You will be presented with details about the pilot area and the thematic campaign that you will participate in the coming days. You will be also trained by SCENT consortium partners towards the use of the software applications developed under the project, that you will utilise during the thematic campaign. Last but not least, at the end of the campaign, you will be asked to evaluate the SCENT tools and the overall campaign

Types of data collected

The personal data that will be collected during this activity, include the name, email address and role/profession of participants. The consortium will pursue to minimize the amount of personal data collected through this activity.

Data storage and retention

Your personal data will be collected by ATTICA & HRTA and DDNI & SOR, which will be responsible for the invitations of volunteers to the pilot campaigns as well as the organization of training activities and workshops, for the Greek and Romanian case respectively and will be maintained until the end of the project (September 2019).

Data processing and lawful basis for processing

ATTICA & HRTA and DDNI & SOR respectively will process your data, collected on the basis of consent, during workshops and training and evaluation activities of the project.

Voluntary Participation

The participation in this campaign is voluntary. You may choose not to take part or subsequently cease participation at any time.

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Right to withdraw consent
You have the right to withdraw your consent at any time by emailing to scentgdpr@yahoo.comyour contact details (i.e. name, email address), using as subject "Request to withdraw consent from Scent project". The data provided, up to the moment of withdrawal (of consent), can be used in the project. In case you wish to withdraw your consent, the data processing will be terminated. However, you cannot withdraw consent to processing that has already taken place.

Right to lodge a complaint
You have the right to lodge a complaint with the Hellenic Supervisory Authority, without prejudice to any other administrative or judicial remedy, if you consider that the processing of your personal data infringes the provisions of GDPR regulation.

Right of access
You have the right to access your personal data and supplementary information (i.e. purposes of processing, the data types collected, etc) at any time , by emailing to scentgdpr@yahoo.com your relevant request and contact details (i.e. name, email address) and, using as subject "Request to data access from Scent project".

Right to rectification
You have the right to obtain from ATTICA & HRTA and DDNI & SOR respectively and without undue delay the rectification of inaccurate personal data concerning yourself, by emailing to scentgdpr@yahoo.com your relevant request and contact details (i.e. name, email address) and, using as subject "Request to data rectification from Scent project".

Right to erasure
You have the right to request the deletion or removal of your personal data without undue delay, by emailing to scentgdpr@yahoo.com your relevant request and contact details (i.e. name, email address) and, using as subject "Request to data erasure from Scent project".

Right to restrict processing
You have the right to 'block' or suppress processing of your personal data, by emailing to scentgdpr@yahoo.com your relevant request and contact details (i.e. name, email address) and, using as subject "Request to data restrict processing from Scent project".

Right to data portability
You have the right to obtain and reuse your personal data for your own purposes across different services. In case you need a copy of your personal data, you have to email to scentgdpr@yahoo.com your relevant request along with your contact details (i.e. name, email address), while using as subject "Request to data portability from Scent project". In such cases, we will provide you with your personal data in a structured, commonly used and machine-readable form, free of charge and within 1 month upon reception of your relevant request.

SCENT Informed consent form for workshops
You are being asked to participate in a research study for the SCENT project. Participation is completely voluntary. Please read the information about the project, its aims, and the gathering of user requirements and needs in the SCENT Information Sheet and ask questions about anything that you do not understand.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 688930.

Your consent

SCENT Informed consent form for workshops

You are being asked to participate in a research study for the SCENT project. Participation is completely voluntary. Please read the information about the project, its aims, and the gathering of user requirements and needs in the SCENT Information Sheet and ask questions about anything that you do not understand.

I, the undersigned, confirm that :

-I have read and understood the information about the project, as provided in the SCENT Information Sheet.
-I have been given the opportunity to ask questions about the project and my participation.
-I voluntarily agree to participate in the project.
-I am aware of the data that will be collected during this activity.
-I understand I can withdraw my consent regarding my participation in the project any time without specific reasons. Such withdrawal shall be given as easy as I gave my consent.
-I understand I will not be penalised for withdrawing my consent nor will I be questioned on the reasons of such
withdrawal. The procedures regarding confidentiality have been clearly explained (in this case anonymisation of data) to
me. If applicable, separate terms of consent for interviews, audio, video or other forms of data collection have been
explained and provided to me.
-It is clear to me that my data will be processed with regard to research, publications, sharing and archiving purposes..
-I understand that at the end of this project my data will either be destroyed or reused only upon my consent.

I confirm and accept the above *

☐ Acceptance

Select only one of the following: *

○ I am above 18 years old and no parental consensus is required

○ I consent voluntarily for my child to participate as a participant in this study

Select only one of the following: *

○ I agree my name to be included in reports, publications and other research outputs of the project as well as any other information I have provided.

○ I do not wish my name to be included in this project.

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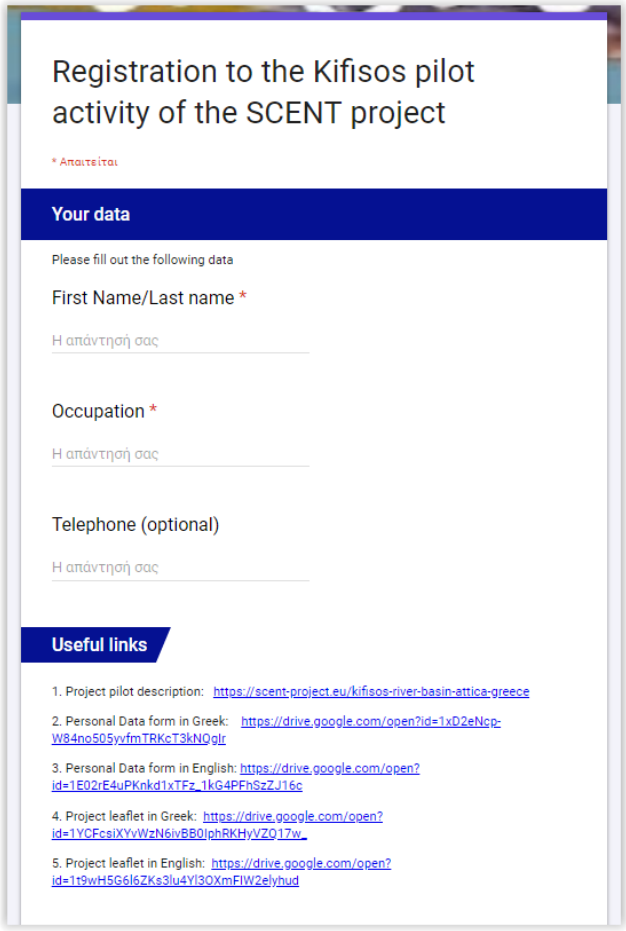


Registration to the Kifisos pilot activity of the SCENT project

* Απαιτείται

Your data

Please fill out the following data

First Name/Last name *

Η απάντησή σας

Occupation *

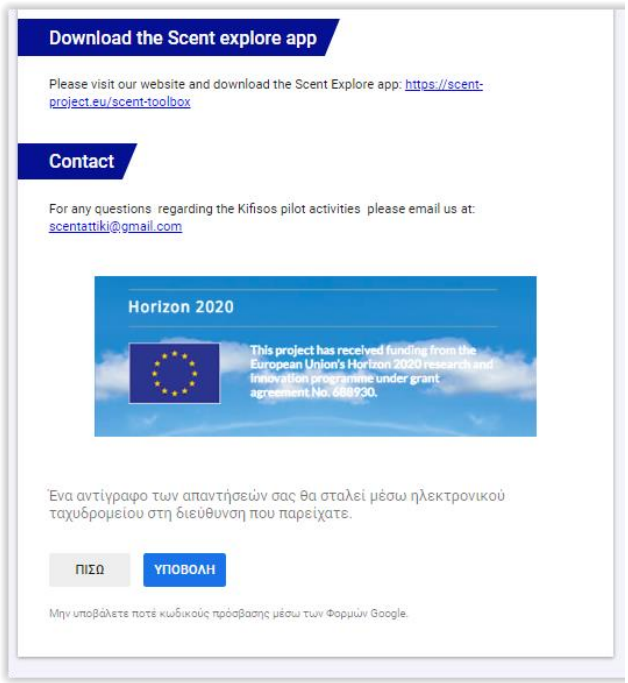
Η απάντησή σας

Telephone (optional)

Η απάντησή σας

Useful links

1. Project pilot description: https://scent-project.eu/kifisos-river-basin-attica-greece
2. Personal Data form in Greek: https://drive.google.com/open?id=1xD2eNcp-W84no505yvfmTRKcT3kNQgIr
3. Personal Data form in English: https://drive.google.com/open?id=1E02rE4uPKnkd1xTFz_1kG4PFhSzZJ16c
4. Project leaflet in Greek: https://drive.google.com/open?id=1YCFcsiXYvWzN6ivBB0IphRKHyVZQ17w_
5. Project leaflet in English: https://drive.google.com/open?id=1t9wH5G6l6ZKs3lu4Yl3OXmFIW2elyhud



Download the Scent explore app

Please visit our website and download the Scent Explore app: https://scent-project.eu/scent-toolbox

Contact

For any questions regarding the Kifisos pilot activities please email us at: scentattiki@gmail.com

Horizon 2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 688930.

Ένα αντίγραφο των απαντήσεών σας θα σταλεί μέσω ηλεκτρονικού ταχυδρομείου στη διεύθυνση που παρείχατε.

ΠΙΣΩ ΥΠΟΒΟΛΗ

Μην υποβάλετε ποτέ κωδικούς πρόσβασης μέσω των Φορμών Google.

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A2: List of stakeholders reached in Attica campaigns

ANNEX 2 List of stakeholders reached in Attica campaigns	
Type of group	**Name of group**
Hikers, walking groups, climbers	Walking group of Hymettus
	Physiological Movement of Vrilisos river
	Hellenic Alpine Club of Acharnes (EOS)
	Pezoporikos Omilos Athinon
Cyclists	PODILATIssES association
	"Filoi tou Podilatou Athinon" association
Local Authorities	Municipality of Piraeus
	Municipality of Moschato-Tavros
	Municipality of Nikaia
	Municipality of N. Philadelphia
	Municipality of Agia Varvara
	Municipality of Fyli
	Municipality of Kythira
	Municipality of Poros
	Municipality of Hydra
Birdwatchers	Hellenic Ornithological Society
Photographers	Wiki Loves Earth Greece
Firefighters	Hellenic Fire Service
	Forest Fire Protection Volunteers of Attica (E.DAS.A.)
Civil protection groups	Hellenic Rescue Team of Attica (HRTA)
	Emergency response team of the Olympic village
	Earthquake Planning and Protection Organisation OASP
	ASB Greece

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Ecological organisation	ELIX – conservation volunteers Greece
	Friends of the forest, Filodasiki Enosi Athinon
	Archipelagos Institute of Marine Conservation
	Organisation Earth
	Athens Environmental Foundation
Civil protection officers (authorities)	General Secretariat for Civil Protection
	The Directorate of Civil Protection
Central government/National and Regional authorities	Ministry of Environment and Energy
	Ministry of Education
	Special Secretariat for the Environment and Energy Inspectorate (SSEEI)
	General Directorate of Developmental Planning, Public Works and Infrastructure, Region of Attica
	General Directorate of Developmental Planning, Public Works and Infrastructure, Region of Attica
	Directorate of Technical Public Works, Region of Attica
	Environmental Impact Assessments/ General Directorate of Sustainable Development & Climate Change/ Region of Attica
	Directorate of tourism/ Region of Attica
	Directorate of Sport and Culture/ Region of Attica
	Information and Communication Technology Directorate/ Region of Attica
	Directorate of Administrative Services/ Region of Attica
	Education Directorate/ Region of Attica
	Directorate of Attica Region Technical Projects
	Directorate of the flood protection projects management/ Region of Attica
	Directorate of groves and parks/ Region of Attica
	Region of Attica, Department of Hydraulic and Marine Works
	National Observatory of Athens

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Research Institutes/ Academic bodies/Universities	School of Electrical and Computer Engineering - National Technical University of Athens
	Institute of Communication and Computer Systems
Education authorities and structures	Greek Ministry of Education and Religious Affairs
	Environmental Education Centres of Lavrio, Eleusina, Parko Tritsi, Drapetsonas, Argyroupolis.
	Second Chance Schools of Kallithea, Pallini, Korydalos and Athens
	First lyceum of Kaminia, Piraeus
	Elementary public school in Galatsi
	High School in Voula
	School of Hatzivei of Nea Filadelfeia
	Montessorians Schools of Varymbombi
	3rd Elementary public school of Nea Filadelfeia
	Hourdakis Elementary school of Palaio Faliro
	Malliaras schools of Alimos
	Avgouleas elementary school of Peristeri
NGOs	Greek Speleology Athletic Group (S.EL.A.S.)
	Environmental Group of Kessariani
	Greek Guiding Association (S.E.O.)
	Greek Special Search & Rescue Team
	Hellenic Society for the protection of Nature
	Friends of Goulandris Museum of Natural History
	Elliniki Etairia- Society for the Environment and Cultural Heritage
TV channels	SKAI Eco news
	ANT-1

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A3: Evaluation form

Campaign Experience Survey

Objective: to investigate the suitability of campaign elements, according to the experience of volunteers.

Date: _____

Campaign Experience

Q1.1 We just spent around 6 hours in the boat. How adequate was this amount of time for you?

- ❍ Way too much – 1 to 2 hours would be enough
- ❍ A bit too much – 3 to 4 hours would be better
- ❍ One less hour would be perfect!
- ❍ Perfect!
- ❍ One more hour would be perfect!
- ❍ A bit too short – 8 to 9 hours would be better
- ❍ Way too short – 9 to 10 hours would be enough

Q1.2 If it was not perfect, why not?

Please tick all that apply.

- ❑ I got bored
- ❑ The weather was not pleasant
- ❑ I got tired
- ❑ I wanted to capture more animals
- ❑ I wanted to enjoy more time in the trip
- ❑ Others: _____

Q1.3 What is the maximum amount of time that you are willing to stay in the boat?

- ❍ Up to 2 hours
- ❍ Up to 4 hours
- ❍ Up to 6 hours
- ❍ Up to 8 hours
- ❍ Up to 10 hours

Q1.4 Some animals were capture while the boat was moving. How easy was it to capture them?

- ❍ Too hard – the boat was moving too fast
- ❍ A bit hard – the boat could go a bit slower
- ❍ It was easy
- ❍ It was very easy

Q1.5 How do you feel about the amount of animals that appeared while the boat was moving?

- ❍ There were too few
- ❍ It was perfect!
- ❍ There were too many

Page **1** of **3**

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Q1.6 How do you feel about the amount of times the boat stopped to capture animals?

- ❍ We stopped too little times, I would prefer more often
- ❍ It was nice
- ❍ We stopped too many times, I would prefer less often

Q1.7 What did you like the most about your boat experience? Why?

Q1.8 What did you like the least about your boat experience? Why?

Q1.9 What would improve your boat experience?

Scent Explore app Experience

Q2.1 What did you like the most about the app? Why?

Q2.2. What did you like the least about the app? Why?

Q2.3. What would improve the app?

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About yourself

Q3.1 Please indicate which age category you belong to.

- ❍ Under 18
- ❍ 18 - 24
- ❍ 25 - 34
- ❍ 35 - 44
- ❍ 45 - 54
- ❍ 55 - 64
- ❍ 65 - 74
- ❍ 75 - 84
- ❍ 85 or older
- ❍ Prefer not to say

Q3.2 Please indicate your gender

- ❍ Male
- ❍ Female
- ❍ Other
- ❍ Prefer not to say

Q3.3 Your town / city, county, country

Q3.4 Your group/organization

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