

The citizen in Flemish citizen science:

Demographics, motives, and experiences

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Summary

In 2020, 195 Flemish citizen scientists completed a questionnaire that gauged demographic characteristics, their motivations, and experiences with citizen science. The results show, among other things, that citizen scientists in Flanders are on average older and more highly educated than the general population. At the same time, the projects subsidised by the appeals of the Department of Economy, Science and Innovation of the Flemish government also managed to appeal to a new group of citizens, who are younger and who only recently participated for the first time in a citizen science project. Contributing to scientific research is the biggest, but not the only motivator for participation. Citizen scientists often look back with satisfaction on their participation. These results provide guidelines for further policy to involve hard-to-reach target groups in future citizen science projects.

Citation: Duerinckx, A., Hens, C., Kerckhoffs, S., Van Laer, J., Verstraelen, K. (2021) The citizen in Flemish citizen science: Demography, motives, and experiences. *Scivil, Leuven, Belgium*.
DOI: 10.5281/zenodo.5825419

Key words: citizen science, Flemish citizen scientists

1. Introduction

Citizen science is scientific research conducted in whole or in part by non-scientists (citizens), often in collaboration with or under the guidance of professional scientists. The citizens who participate in a citizen science project are called citizen scientists. Depending on the project they contribute to, citizen scientists can perform a wide variety of tasks. For example, they can perform counts and collect data, annotate images and texts, even report and disseminate research results or help formulate research questions and research methods. Citizen science is therefore a broad term that covers many meanings.

Citizen science is on the rise in Flanders. More citizen science projects are being set up and more and more citizens are taking part. The best-known examples of citizen science in Flanders conduct research into biodiversity, mobility, and air quality, but there are also successful applications in other domains such as genealogy, history, archaeology, palaeontology, artistic research, literature research, health and well-being.

Although European studies have already been conducted into the demography of citizen scientists, both at the European level and in other countries [1], [2], [3], [4], we still have little insight into this in Flanders. To this end, Scivil, the Flemish knowledge centre for Citizen Science, conducted a survey in 2020 among citizen scientists to gain insight into personal characteristics, such as age and education, and their motivation to participate in a citizen science project. The

questionnaire was disseminated through many different channels: the Scivil website, social media and newsletter, the newsletter and website of the platform iedereenwetenschapper.be, and the newsletters and social media of many citizen science projects in Flanders.

2. Who are the Flemish Citizen scientists

Of the 311 citizen scientists who started the survey, 195 people completed the questionnaire in full. 198 citizen scientists completed the question about their gender. Of these, 59% were men and 41% were women. Half (52%) of the citizen scientists surveyed are aged between 56 and 75 and only 13.37% of the citizen scientists surveyed are younger than 36 years. 31% of the participants are in the middle bracket between the ages of 36 and 55. The majority of the citizen scientists surveyed therefore come from an older age group. A similar trend is reflected in the work situation of the citizen scientists surveyed, with the largest group (42%) being retired. 35% of the citizen scientists surveyed work full-time and 13% part-time. The professions of the citizen scientists who were surveyed are very diverse, from teachers and translators to nurses and IT professionals.

Age of citizen scientists

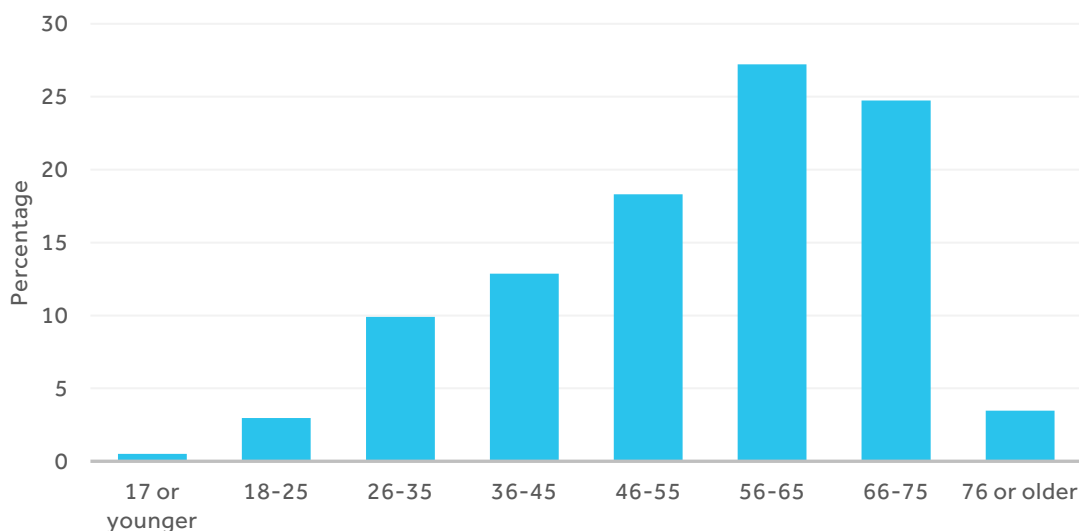


Figure 1. Age of citizen scientists.

With regard to the training of citizen scientists, the majority of the participants surveyed are highly educated. Four out of five participants obtained a higher education diploma, such as a master's degree (36%) or doctorate (11%) from university. A third of the participants obtained a diploma from a university of applied sciences (33%). Only 16% of the participants indicated that secondary education was their highest diploma and 3% indicated that they had no secondary education diploma. The latter group mainly includes people between 66 and 75 years of age. The citizen scientists who participated in our survey are remarkably higher educated than the average Flemish population, with only 42.7% having a higher education diploma, 39.6% a secondary education diploma as the highest diploma obtained, and 17.7% without a secondary education diploma¹.

¹ <https://www.statistiekvlaanderen.be/nl/bevolking-naar-onderwijsniveau-scholingsgraad>

Education citizen scientists

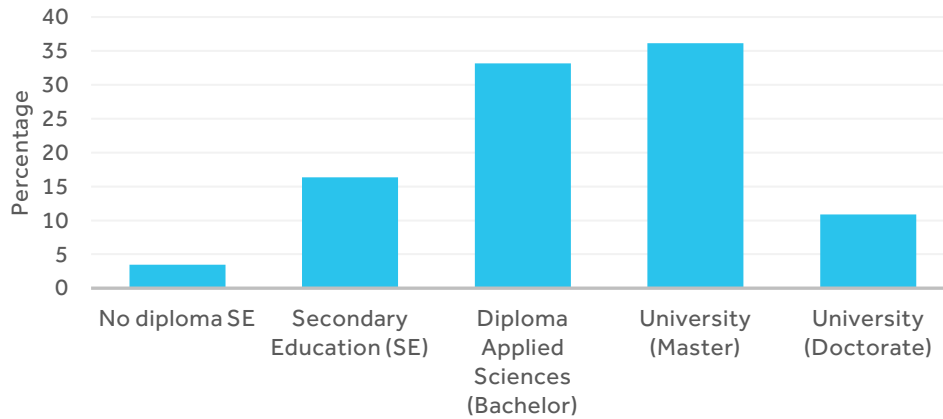


Figure 2. Level of education citizen scientists.

Education citizen scientists and average Flemish population

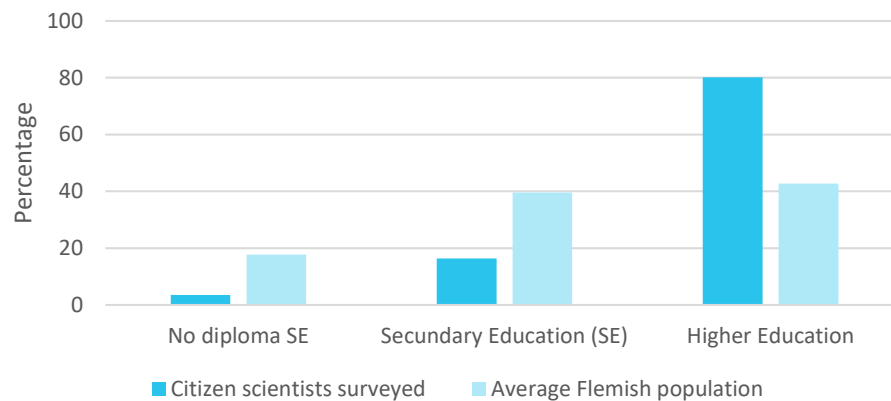


Figure 3. Level of education citizen scientists and Flemish population.

Although citizen science, as part of the Open Science movement, ideally reaches all target groups and can thus democratise scientific research, in Flanders it seems to mainly reach older, highly educated men. Earlier international research [5] already established that the participants in citizen science projects usually do not reflect a representative reflection of society. This can be detrimental to the diversity in collected data (possibly less representativeness) as well as to the underrepresented groups themselves, such as the low-skilled, who miss out on an opportunity to learn.

As initiator of a citizen science project, you can pay extra attention to involving these underrepresented target groups. For example, if you want to involve minority groups in your research, it is important to look for the right partners. Think of local organisations, such as community work, socio-cultural institutions or youth organisations. Making contact with these intermediaries can be a first step in removing barriers. In addition, if you always communicate in an accessible language, you will reach more citizens from different target groups. More tips on how to reach specific target groups can be found in our communications guide [6].

The trend in gender and age, with a majority of older men participating, also appears to exist in other countries, such as the United Kingdom [7]. Although the distribution in age and between men and women is also highly project and activity dependent. For example, the SpinCity² project, where 47% women and 53% men downloaded the SpiderSpotter app, shows a peak of citizen scientists in the category between 26 and 46 years old. In some activities, such as the #HomeSafari Facebook group of Botanic Garden Meise³, it is even the other way around and more women than men participate (65% women, 35% men), with participation also peaking in the age category 35 to 44 years. We conclude that the demographics of the participants are highly project dependent.

3. The Flemish citizen science projects



Figure 4. Word cloud citizen-science projects.

A great diversity of projects emerged when asked which citizen science projects the respondents had already participated in. Waarnemingen.be⁴ (Observations.be) was most often referred to by citizen scientists (15%), but also projects such as The Great Shell-counting day⁵ (9%), Curious Noses⁶ (8%), Bird and Butterfly Counts⁷ by Natuurpunt (7%) and Seawatch-B⁸ (7%) were frequently referred to by the citizen scientists surveyed. The most frequently indicated projects are therefore on the one hand large well-known projects in which many citizens participate and on the other hand projects, such as Seawatch-B, with a small number of highly motivated citizen scientists. In addition, it also matters whether the projects have actively communicated with their participants about this survey.

For the remainder of the questionnaire, the citizen scientists surveyed focused on one citizen science project to which they contributed the most. The most chosen citizen science projects were on the theme of nature (57%). Projects on history, air quality, weather and climate, mobility, health and communication are also mentioned.

² <https://home-safari.be/>

³ <https://www.spiderspotter.com/nl/>

⁴ <https://waarnemingen.be/>

⁵ <https://www.groteschelpenteldag.be/nl>

⁶ <https://curieuzeneuzen.be/>

⁷ <https://www.natuurpunt.be/het-grote-vogelweekend> en <https://www.natuurpunt.be/pagina/de-grote-vlindertelling>

⁸ <https://www.seawatch-b.be/>

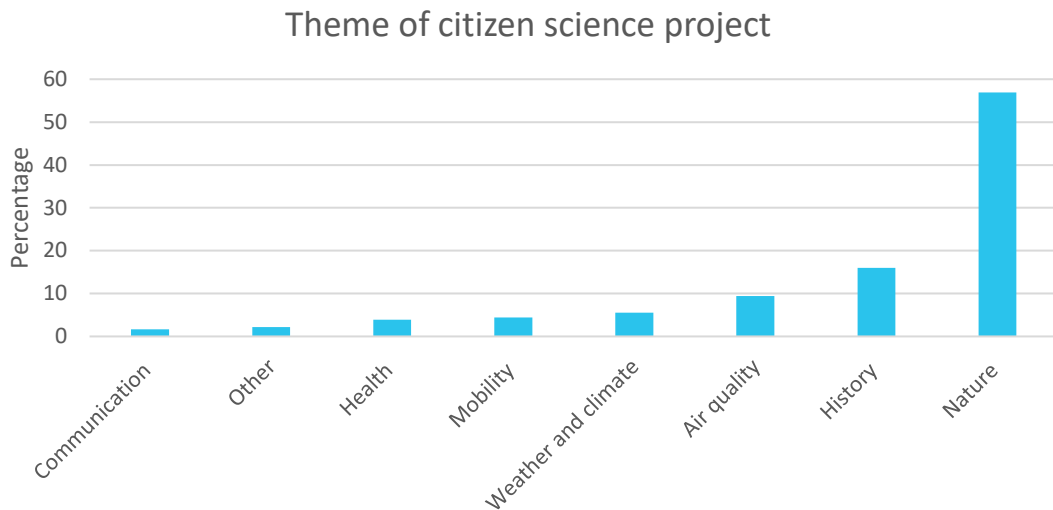


Figure 5. Themes chosen citizen science projects for further survey.

When we divide the chosen citizen science projects by gender of the citizen scientists surveyed, we see that the surveyed men relatively more often opt for a project with the theme of nature, weather and climate, whereas the surveyed women relatively more often opt for a project with themes such as communication, history or health.

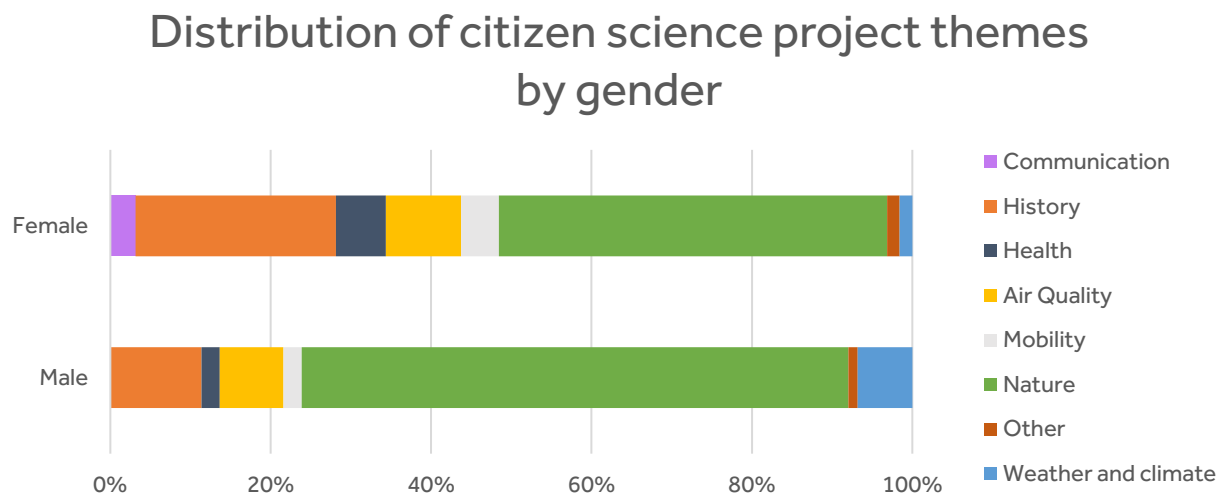


Figure 6. Distribution of themes by gender

In the survey, the respondents indicated where they lived on the basis of their post code. This was transformed into a classification in terms of metropolitan context, city centre, countryside, etc. No correlation was found between this classification and participation in certain projects on specific themes. In addition, the respondents were also classified according to the population density of their place of residence (low < 500/km² < medium < 1000/km² < high). The distribution of the surveyed citizen scientists over the three categories of population density is even.

Population Density

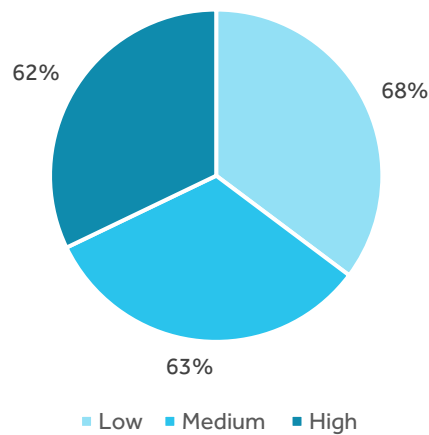


Figure 7. Population density

The surveyed citizen scientists from areas with a lower population density participated more often in nature projects than the surveyed citizen scientists from densely populated areas. In areas with a higher population density, on the other hand, more surveyed citizen scientists took part in projects on the theme of air quality and mobility.

Distribution of themes by population density

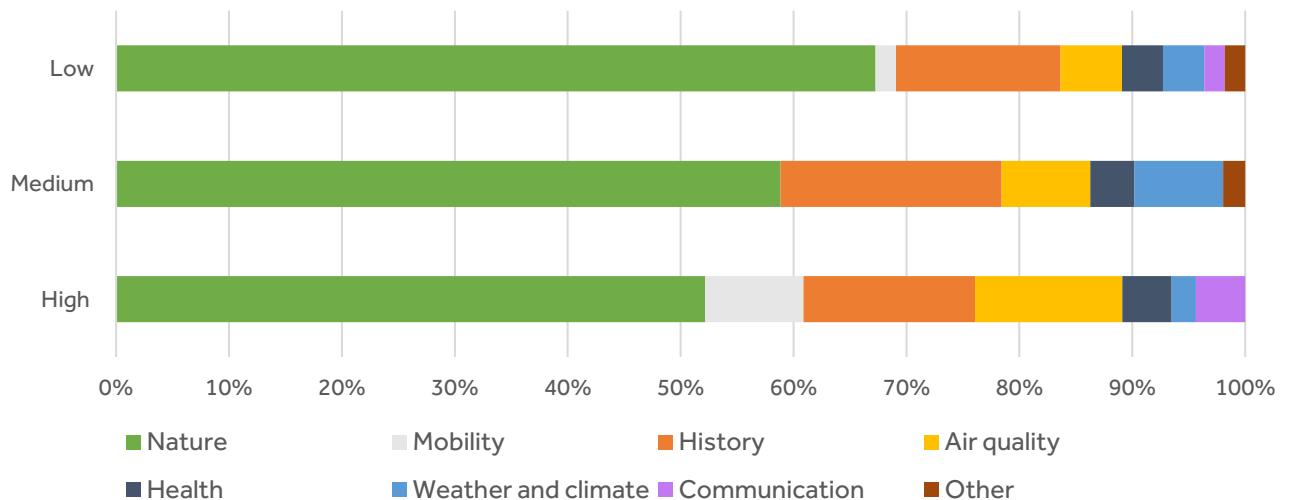


Figure 8. Distribution of themes by population density.

Most respondents got to know the citizen science projects via the internet (36%), e.g. via the website of the project itself (14%), via iedereenwetenschapper.be (everyonescientist.be) (6%) or via another website (6%). Social media also played a role (10%). In addition to the internet, word of mouth also seems to work. 18% became acquainted with the chosen citizen science project through an acquaintance. Respondents also got to know about the projects through newspapers or magazines (9%), radio and TV (6%) and work (4%).

In which way did you find out about the project?

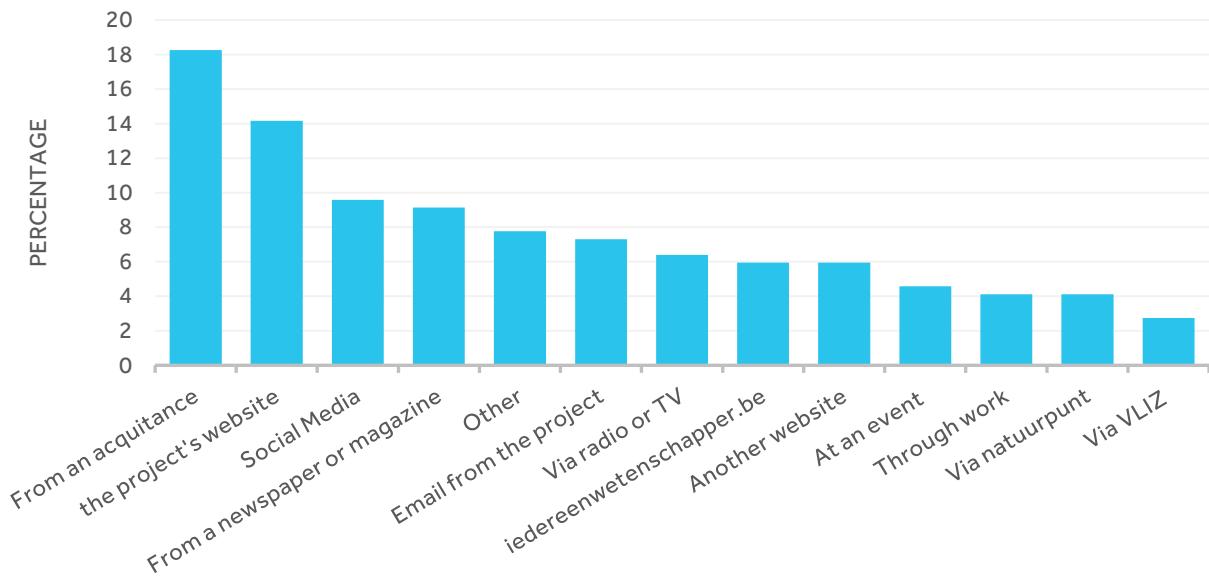


Figure 9. Information channels for finding out about citizen science projects.

The projects mentioned were initiated by citizen movements in only a few cases (3%). Mostly, this involved multidisciplinary organisations (30%), non-profit organisations (25%) and universities (21%) or other research institutions (21%). A study from Germany found similar results, with two thirds of citizen science projects initiated by research institutes, universities or colleges and one third by NGOs, groups or private individuals [8]. 31% of citizen scientists who completed the questionnaire mentioned a project subsidised by the Department of Economy, Science and Innovation through the 2018 and 2019 citizen science project calls⁹.

Initiating project organisations

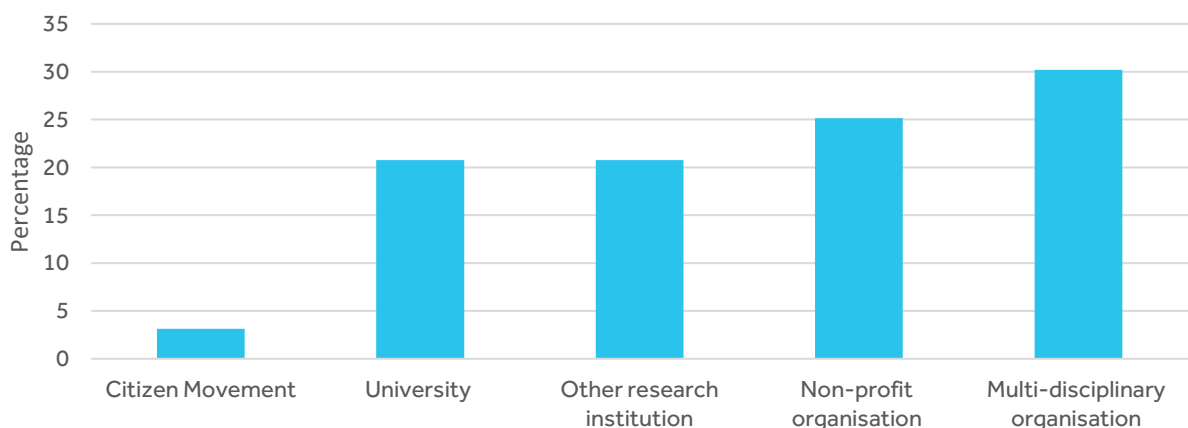


Figure 10. Initiators of citizen science projects.

The time the citizen scientists spent on the projects is very different. This is not abnormal, given the wide range of tasks that citizens can perform in such projects: performing counts and observations, building and installing sensors, annotating and transcribing data, even their analysis and dissemination. In most projects, citizens did something for the project once or a few times a

⁹ <https://www.ewi-vlaanderen.be/oproep-citizen-science>

week (34%), in other projects it was only once or a few times a month (20%) or even a year (23%). Only 9% of citizen scientists indicated that they do or have done something for the project on a daily basis. The duration of the activities that were carried out also varied greatly. From five minutes or less to more than three hours in some cases

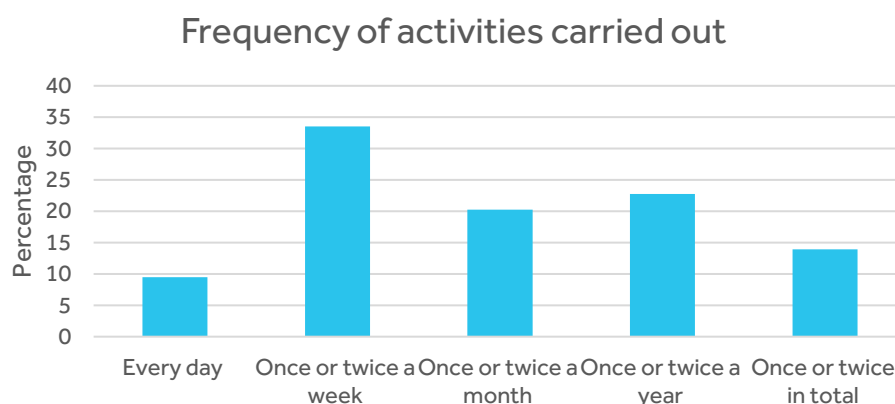


Figure 11. Frequency of activities in a citizen science project.

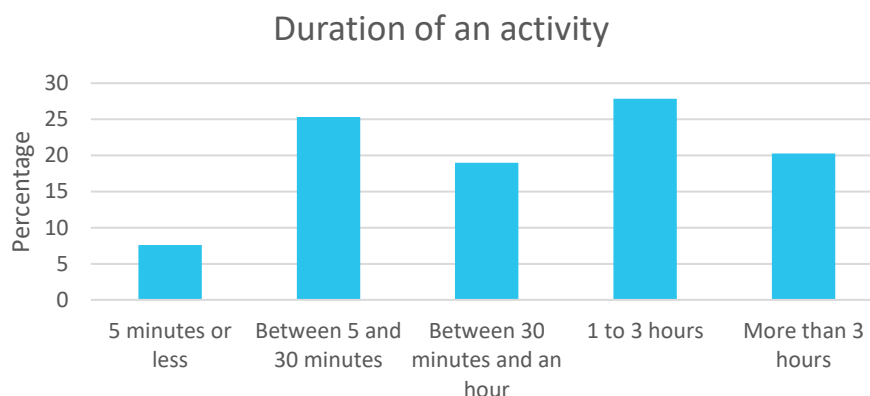


Figure 12. Duration of activities in a citizen science project.

4. Motives of citizen scientists

An important objective of the survey was to find out about the motives of citizen scientists. The main motives that emerged are to contribute to scientific research (63% completely agree), because it is fun (55% completely agree) and to learn (49% completely agree). Influencing the environment is also a motivator, but to a lesser extent (20% completely agree, 38% agree). Getting in touch with others was not a strong motivator for citizen scientists (6% completely agree) to participate in projects, and neither was receiving a reward. Other reasons that the citizen scientists themselves indicated as reasons for participating are, for example, pastime, out of curiosity or to educate others.

What motivated you to participate in the project?



Figure 13. Motivations for participation.

To influence my environment

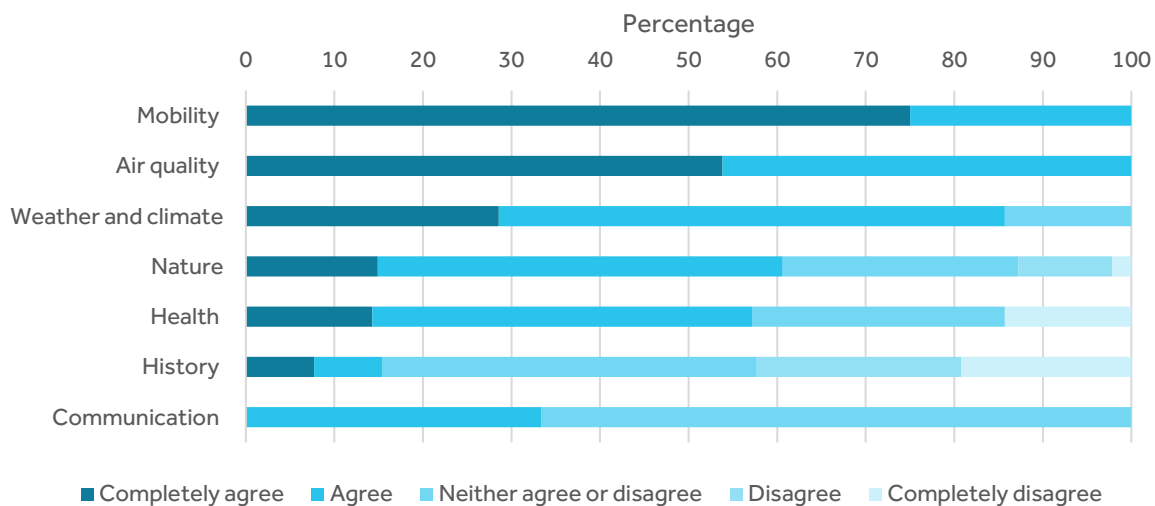


Figure 14. Motivation 'to influence my environment', divided by type of citizen science project.

Especially for the motivation 'to influence my environment', the answers differ greatly per theme. For example, themes such as mobility, air quality, and weather and climate score relatively high on this motivation, while it becomes less of a motivator within the themes of communication, history, health and nature. In terms of age, motivations appear to be about the same across all age groups.

International research [9] shows similar results. Thus, for example, "contributing to authentic research" emerges as an important motivator. Another important motivator from international research is the personal interest in a specific theme. In an open question, the surveyed Flemish citizen scientists were able to give additional reasons for participating. In those answers, this intrinsic motivation for a specific theme came back several times: "Love for the sea", "Interest in insects", "Interest in fauna and flora".

An example of a specific citizen science project where this kind of motivation was also strongly present is “Eye for Diabetes”. Eye for Diabetes interviewed eight citizen scientists from their top 25 contributors about their motivations for participating in the project. These people were mainly driven by intrinsic motivations such as an interest in science and health, or personal motives in which they were strongly linked to the topic of diabetes. Most of them also indicated that they had learned something by participating in the project.

Finally, the social aspect and a sense of community also emerge as a motivator in international research. However, this motivation appears to be less present among the Flemish citizen scientists surveyed.

5. Experience of the citizen scientists

Much attention was paid in the questionnaire to the citizen scientists' experience of their participation. They were asked to what extent their participation met their expectations and to what extent they found their participation fun, educational, challenging.... The participants gave a score between 1 and 5, whereby the higher the number, the more fun, more educational or more challenging the participants found their participation. Many results are in line with results on citizen scientists' motivations to participate in citizen science projects.

The most common expectation of citizen scientists was that they hoped to learn something, both about how a scientific study works and about the topic. In addition, the citizen scientists also expected to be able to make a useful contribution. When asked about the extent to which their participation in the citizen science project met their expectations, the citizen scientists answered positively. Only 5% answered 1 or 2 to this question. However, a large group of citizen scientists (42%) chose 3, and therefore felt that their expectations were only partially met. We did see that the extent to which the project met the respondents' expectations is positively related to how enjoyable or instructive the participation was found. The more the expectations of the citizen scientists were fulfilled, the more fun and instructive they found participating.

The majority of citizen scientists have a very positive experience after participating in a citizen science project. 70% of the participants gave the highest score on how much they liked their participation in the project. In line with this, 57% of citizen scientists also found their participation very instructive. Citizen scientists who liked their participation in a project usually found it instructive as well. The citizen scientists often found their participation moderately challenging. The majority chose 3 (30%) or 4 (29%) in the range of 1 to 5.

How did you experience your participation in the project?

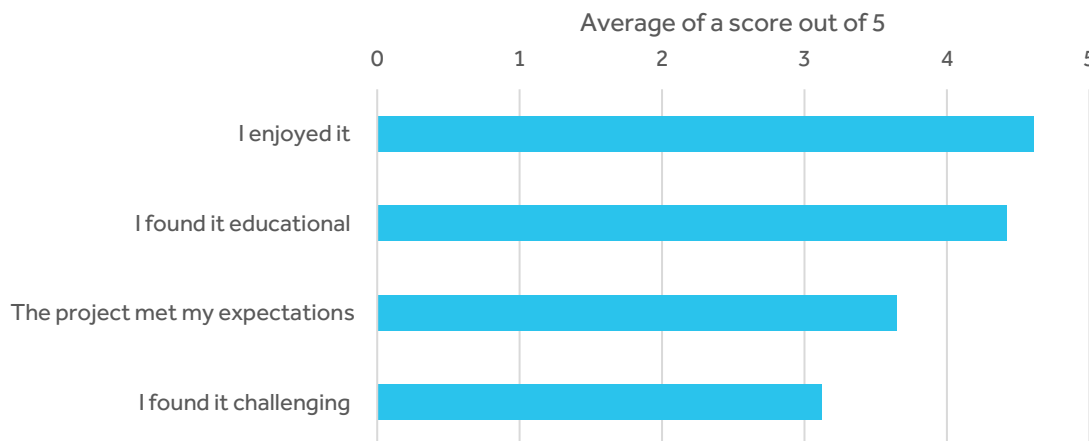


Figure 15. Experiences after participation.

Both the perceived appreciation of one's own contribution and the perceived impact of citizen scientists usually score (very) positively. Again, the participants gave a score from 1 to 5, with 1 meaning “completely disagree” and 5 “completely agree”. The vast majority (89%) of citizen scientists indicate that they feel valued for their own contribution to the citizen science project. At the same time, almost all citizen scientists (95%) also feel that their contribution is effectively advancing scientific research. The perceived impact on personal development is positively evaluated by three quarters of citizen scientists. They therefore see for themselves the added value of their participation. With regard to the perceived impact on the immediate environment, this is somewhat less, although half of the citizen scientists surveyed still feel that they have an effect on the local environment.

I feel that my participation in the project...

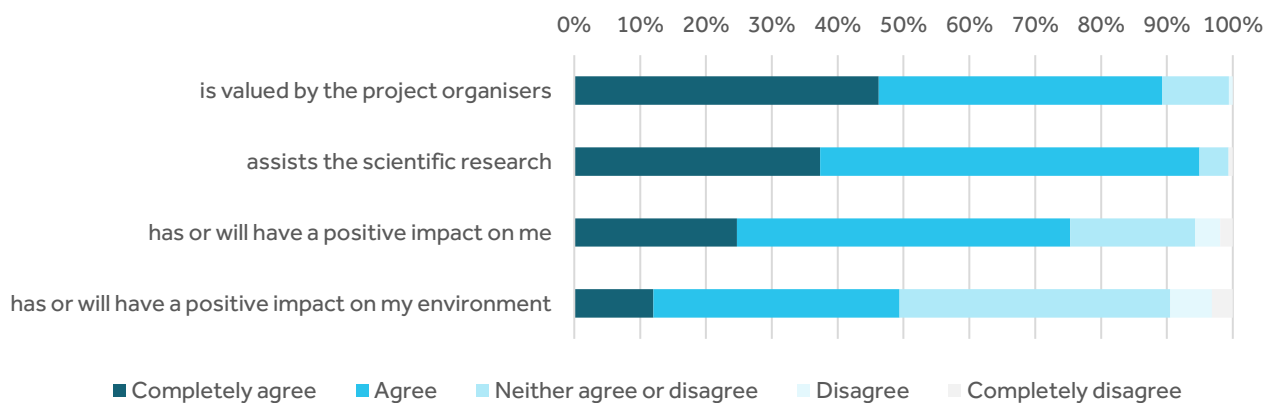


Figure 16. Perceived participation.

Finally, they were also asked to describe the participation in the citizen science project in three words. The three most frequently mentioned words were “educational”, “interesting” and “fun”. In addition, the following words complete the top 10: “interesting”, “challenging”, “instructive”, “nature”, “exciting”, “relaxing”, “surprising”.

When did you first take part in a citizen science project?

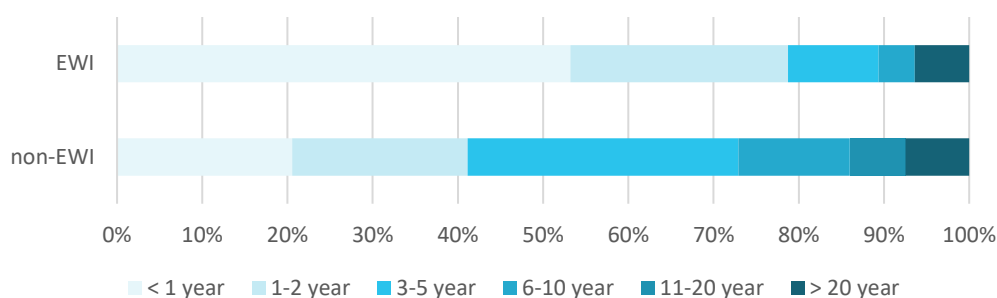
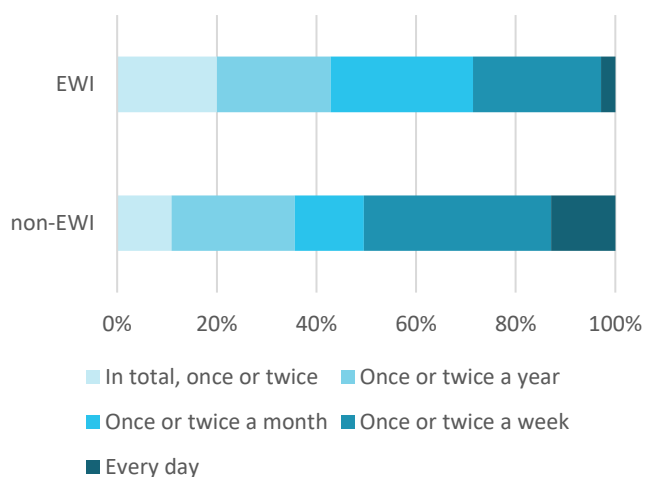


Figure 19. First participation by citizen scientists.

The frequency of the performed activity is generally lower among the surveyed citizen scientists of the EWI projects. For example, just over a quarter (28.5%) of the citizen scientists surveyed in EEMCS projects participated in the project once a week or more, compared to half (50.5%) for the surveyed citizens in other projects. The average duration of participation also differs. Less than 1 in 3 (29%) of the surveyed citizen scientists of the EWI projects indicated that the duration of participation in the project was 30 minutes or more at a time. In the other projects, this was the case for more than half (54.5%) of the citizen scientists surveyed.

How often did you carry out an activity?



How long was the participation on average?

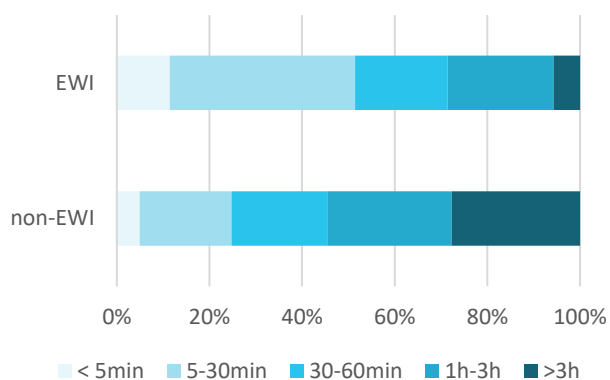


Figure 20. Frequency and duration of participations.

The motivations for participation (to contribute to scientific research, to connect with others, to learn, because it is fun, to influence the environment, because of the reward) are very similar for both categories.

For the citizen scientists questioned in this survey, the EWI projects therefore seem to reach a different, new group of citizen scientists. These are generally slightly younger and only recently (less than 2 years ago) took part in a citizen science project for the first time. This participation was less frequent and on average shorter in duration than that of the surveyed participants in other citizen science projects.

7. Conclusion

The results of this survey follow the general trend that citizen scientists are on average older and better educated than the average citizen in Flanders, although this appears to be highly project-dependent. It is therefore a challenge for project providers to think further about the target group and the possible involvement of underrepresented groups at the start of a citizen science project.

Regarding the themes of the citizen science projects, projects on nature are in the vast majority, followed by projects on history and air quality. The surveyed citizen scientists from areas with a lower population density took part more often in projects related to nature, whereas the surveyed citizen scientists from areas with a higher population density participated more in percentage

terms in projects related to air quality and mobility. Citizen scientists often got to know about the projects via the internet or through an acquaintance. Contributing to scientific research appears to be the biggest motivator for citizen scientists. But citizens also participate simply because it's fun and to learn. The motivator "to influence my environment" seems to be less important, but is especially important for citizen scientists who participate in projects on the theme of mobility.

Citizen scientists often get a positive experience from their participation. For example, they find their participation in a project both fun and educational, and in most cases it met their expectations. In addition, the majority of citizen scientists feel valued by the project organisers. All this makes for an overall positive experience.

Most of the projects mentioned by the citizen scientists surveyed were projects that were not subsidized by EWI. The citizen scientists who took part in projects that were subsidized by EWI were generally younger and only recently participated in a citizen science project for the first time. The EWI project calls thus seem to have succeeded in addressing a new group of citizens.

The results of this survey provide more insight into the demographics of Flemish citizen scientists, enabling both policymakers and project providers to deal more consciously with the citizen scientists who contribute to their project when devising or executing citizen science projects.

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With support from:



The Flemish Government