

CurieuzeNeuzen Vlaanderen:

biggest-ever citizen-science study into air quality

Unexplored territory

In May 2018, 20,000 Flemings measured the concentration of nitrogen dioxide (NO2) in their street. NO2 is a good parameter for air pollution. It has been linked to premature death and a whole series of health problems, including asthma, lung disease, heart attacks and lung cancer. The gas is emitted by industry, power stations and shipping, but the primary source in our towns and villages is cars, especially the diesel variety.

Computer models suggest that European limits on nitrogen dioxide levels are being exceeded in many locations in Flanders. Official measuring stations in Antwerp and Brussels have detected breaches like this for years. But no one knew exactly how things stood with air quality in Flanders. The large-scale citizen-science project was set up to fill in this blind spot. CurieuzeNeuzen Vlaanderen became the biggest-ever citizen-science study of air quality.

The editorial team at the newspaper *De Standaard* came up with the idea after publishing a report on air pollution. We were overwhelmed with responses, but felt that too few objective data were available. We therefore decided to collect them ourselves, through thousands of readers. This took us well outside our journalistic comfort zone, which meant we needed partners. We found them in the shape of Antwerp University and the Flemish Environment Agency (VMM), supported by the VITO research institute and HIVA (Leuven University’s Research Institute for Work and Society). A total of around 55 people were intensively involved. This unusual partnership between a newspaper, a university and the government to recruit citizens *en masse* as scientists was unexplored territory.

Cooperation was not always smooth. Certainly at the beginning, each partner had a reason to distrust the others. Do civil servants have enough political freedom to manoeuvre? Will journalists report the results with sufficient nuance? And won’t the scientists insist on the newspaper publishing footnotes? But it worked, because we were condemned to cooperate. And because we all had something to gain.

In *De Standaard*’s case, it was the prospect of securing hard data on which to base our reporting. The paper would also be able to link its name to a theme that tops Flemish people’s list of concerns.

Antwerp University saw the opportunity, as a smaller player, to put itself on the map. While the scientific coordinator Filip Meysman and his team would gain an unprecedented data set that would open up further research of international relevance.

There was a clear research question too: the density of the measurements meant the results could be compared with computer simulations by VITO’s new ‘ATMO Street Model’, which can forecast air quality down to street level. For the Flemish Environment Agency, this was an excellent opportunity to test the value of the model using 20,000 measurement points and to improve it so that more accurate forecasts will be possible in the future. CurieuzeNeuzen Vlaanderen was actually the biggest reality check ever.

In addition to the purely scientific goal – to collect data and insights – the partners kept an eye on the ‘soft’ side of the project: raising Flemish people’s awareness of air quality. Recruiting citizens on a large scale as scientists creates a sense of involvement and ownership. Citizens do the measuring, but they’re also part of the problem.

Logistical *tour de force*

Getting the overall project up and running took a logistical *tour de force*. There was no script for this. Implementation took just over a year – from September 2017 until October 2018. The recruitment of candidates got underway in March 2018, with a high-profile campaign using Flemish celebrities as [ambassadors](https://curieuzeneuzen.be/bekende-neuzen/). *De Standaard* engaged the advertising agency Bonka Circus and launched the biggest marketing campaign in the paper’s history. Adverts appeared on radio and television, in newspapers and magazines, in cinemas and on social media, on bus-shelters and the back of buses.

Precisely 52,626 families, schools, companies and organizations put themselves forward, of which 20,000 were selected by an algorithm. This took account of the optimum distribution and of interesting locations from the point of view of the research question.

The CurieuzeNeuzen team set up a website with information and a registration module. The measuring packs were prepared: each one had to include a V-shaped sign to which participants could attach two measuring tubes (passive samplers) and then mount on a first-floor window. An order for 40,000 samplers was placed with the Dutch lab Buro Blauw, 20,000 signs were designed, and 200,000 leaflets, 40,000 posters and 20,000 instruction manuals were printed. It all had to be extremely clear and simple: like assembling an IKEA cupboard.

The packs were put together at the end of April at a [sheltered workshop](https://drive.google.com/drive/folders/1My1D_bZY2jSOCTHye4DFiPhOPOnW563-), refrigerated, and distributed by Kariboo. Participants could collect their packs on Saturday 28 April at one of 600 Kariboo mail points. The V-shaped signs were a feature in the streetscape throughout the month of May: they adorned the fronts of houses, schools and businesses all over Flanders. Social media was flooded with photos of them. Participants hung posters in their windows and stuffed information leaflets into their neighbours’ mailboxes. The ‘CurieuzeNeuzen’ (‘nosy parkers’) showed a lot of commitment to ‘their’ special signs.

At the end of May, the packs were sent back to the lab, following which the scientists at Antwerp University, the Flemish Environment Agency and VITO spent the summer analysing the results. Meanwhile, back at *De Standaard*’s offices, work began on journalistic features about air quality.

The total cost of the operation was 880,000 euros, or 44 euros per measuring point. The participants themselves contributed 10 euros, with the rest funded by the three partners. Half of that amount went on the measuring pack, a quarter on the research, 15 percent on communication and 12 percent on distribution and ICT. The amount does not include the wages of the people involved with CurieuzeNeuzen.

Exceptional data set

People care about air quality. So much was obvious not only from the strong interest in taking part, but also the exceptionally high rate of return for the measuring results. 97.4 percent of the samplers (19,483) were returned correctly and with the right accompanying information – an extremely high level for a citizen-science project. 19,155 points (95.8 percent) delivered valid measurements that were plotted on an interactive map. 17,843 measuring points (89.2 percent) passed a more stringent quality control and could be included for further analysis.

The result is a unique and scientifically robust data set. The May values were calibrated against those of the Flemish Environment Agency’s official measuring stations and converted into indicative annual values. The Flanders-wide air-quality scan provides a clear insight for the first time into the dynamics of air quality at street level, which other countries and cities can also draw on.

The NO2 map of Flanders is coloured like a rainbow. Air quality differs sharply between and even within individual streets. Anyone who lives in a city has a higher chance of breathing dangerous concentrations of nitrogen dioxide, but European and health standards are being breached in even the smallest communities. Existing insights into higher concentrations in ‘street canyons’ were confirmed, but there were surprises too: the old industrial town of Aalst and the centre of Bruges, with its narrow streets, rated proportionately worse on the ‘street canyon index’ than the larger cities of Antwerp or Ghent. The most important new insight is that it is not only the volume of traffic and buildings that has a severe impact, but also stop-start driving at traffic lights and roundabouts. The effects of traffic circulation plans (e.g. Antwerp compared to Ghent) are also visible in the map.

Ground-breaking journalism

The idea for a national measuring campaign arose at the newspaper *De Standaard* in response to a need for objective data and facts. Implementing it meant going well beyond the normal bounds of journalism. Unlike traditional investigative or data reportage, the data we wanted to analyse did not exist yet and the newspaper was one of the driving forces behind their collection. To achieve this, the paper recruited thousands of citizens, many of them its own readers. A specific term for this kind of innovative journalism has not been coined yet, but ‘interactive data journalism’ might come closest.

This was also a particular form of ‘embedded journalism’. Being in together on the project’s birth and the intensive contact that followed between the paper and its partners at the university, the Flemish Government and the VITO, created a sense of mutual trust and broader understanding. The scientific bar was set high, but the project had to be communicated to the public in a clear and comprehensible way. The intensive collaboration process made it possible to reconcile the ‘hard’ goal of scientific data collection with the ‘soft’ ambition of raising the public’s awareness of a healthy living environment and demonstrating that a large-scale citizen-science project can help tackle major challenges in the area of mobility and spatial planning.

The announcement of the results on 29 September 2018 kept Flanders enthralled for days and triggered a stampede to the newspaper’s website. *De Standaard* pulled out all the stops for the project and made the substantial body of material available on all its channels free of charge. ‘The newspaper’ went 100% multimedia for the occasion. Conclusions, reportage and responses played out both in print and on the [website](http://www.standaard.be/curieuzeneuzen). Collaboration between the different editorial sub-teams (newspaper, project team, online, graphic design) was crucial.

Two large posters containing the dot maps were distributed with the newspaper: a general map of Flanders and a map of the relevant province, with the main cities highlighted.

The [interactive dot map](http://www.standaard.be/curieuzeneuzen/map/#8.5/51.07/4.04) with all the results drew most attention online. It was hosted exclusively on the DS website for a week, attracting 670,000 clicks in the first weekend alone.

Taken together, the CurieuzeNeuzen productions were viewed for a total of 1.5 million minutes that weekend – half as much again as all the site content combined on an average news day. Apart from the dot map, the other articles were likewise clicked over 474,000 times, a [long read](http://www.standaard.be/curieuzeneuzen/longread/) on our exposure to air pollution was viewed 77,500 times, two podcasts listened to over 21,000 times, and the videos with explainers and reportage watched almost 53,000 times. The newspaper achieved a historic online market share of 50 percent as a result.

Stories relating to CurieuzeNeuzen continued to attract very high reading figures in the week after too. DS zoomed in on aspects like the situation in schools and presented simulations on what Flanders would look like without diesel or if there had been no cheating over diesel emissions.

Major impact

CurieuzeNeuzen has become a household name in Flanders. An accompanying survey carried out by HIVA found that even by the time the measuring campaign began, over 75 percent of Flemings had already heard of it. The theme has been placed firmly on the map, and citizens’ understanding of the complex dynamics of air pollution has been sharpened. The question remains as to whether this will also lead to sustainable changes in behaviour. A follow-up survey will explore that.

The results have gone on to lead a life of their own. They have provided leverage to campaign groups and citizens. They are reflected in local government coalitions (local elections were held two weeks after the results were announced). Teachers have used them as material in the class – measuring air quality makes for a great science project. The partners behind the initiative are looking at whether funding can be secured to develop a teaching pack for schools.

The project has also attracted attention well beyond Belgium itself. The European Environment Agency praised its power to mobilize and is looking at how it can help roll out similar projects in various European cities. Media and investigative journalists from Canada to Egypt showed an interest in the project. CurieuzeNeuzen also featured in [Nature](https://www.nature.com/articles/d41586-018-07106-5) as the ultimate example of high-impact citizen science.

The CurieuzeNeuzen story isn’t over yet. The data continue to generate fresh insights. Ideas are growing for similar studies. It made the editorial team at *De Standaard* realize that a newspaper is at its best when it is engaged at the heart of the societal debate. That’s where it proves its relevance more than ever.