

# Monitor your city

**Brazilian secondary school students in the city of Curitiba are going to monitor the air quality in their city using smartphones. In the Dutch town of Ede schoolchildren looked for the hottest and coldest spots in their neighbourhood. Crowd sourcing makes people aware of the conditions in their cities.**

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A woman clutching a smartphone crouches beside a tree by the pond in De Dreijen Arboretum in Wageningen. It is 31.2 degrees Celsius, the app on the phone tells her. She walks over to a clump of trees. 'There is a bit of a breeze here, maybe it's a bit cooler.'

The woman is taking part in a workshop on Climate Phone Mapping run by research institute Alterra Wageningen UR. The participants have the use of a smartphone with an antenna where earplugs would normally be plugged in, which functions as a thermometer. The phone is equipped with a special app which stores the measured temperatures and sends them to an online database through a wireless connection. Workshop leader Matthijs Danes of Alterra is doing research on crowdsourcing of spatial data data collection by the general public. In May 2014 Danes got a class of 10- and 11-year-olds at the King David School in Ede to measure temperatures around their school. This enabled Danes to test the lesson materials he developed together

with teachers at the behest of Wageningen University's *wetenschapsknooppunt*, an organization for giving children some hands-on experience of science. 'It was fun to work with schoolchildren. They ran around the

neighbourhood and tried to take measurements for every brick and paving stone,' says Danes. The measurements showed that trees provide a more temperate climate, which means it is cooler on hot days and warmer

**'The students become more aware of the importance of clean air'**



on cold days. 'That is because vegetation has an insulating effect. We knew that, but this shows you can get the figures on it just as well from schoolchildren,' explains Danes. This Dutch project drew interest from the Brazilian city of Curitiba, which sets great store by sustainability. During a trade mission, Unilivre, a non-profit organization which develops teaching materials on urban sustainability, expressed interest in the project in Ede.

### MEASURING AIR QUALITY

In 2016, Alterra will measure the air quality in Curitiba with the help of about 40 students at two secondary schools. 'Carbon monoxide is a good indicator of the volume of traffic,' explains Danes. 'But there is no standard method for measuring carbon monoxide. We want to develop a prototype. We are still figuring out whether to link the meter physically through the audio socket or

the mini-USB port, or wirelessly with Bluetooth. There is something to be said for both solutions. One is cheaper, while the other is more user-friendly.'

Crowdsourcing is a growing trend, especially now that everyone is walking around with smartphones and tablets, and the data can be passed on wirelessly. 'In the traditional research world crowdsourcing was regarded with suspicion because it is often surrounded by uncertainties and you can be sent incorrect data.' But even these data are of value, Danes emphasizes. 'The temperatures may not be precise, but you can still see the relative differences between the hot and the cold spots. What is more, if you get a lot of data, you can filter the inaccurate data out.'

Of most interest to Danes is the way people go about taking the measurements. 'People often have a nose for the hottest and coolest spots in town. Sometimes you don't want average temperatures. If you want to protect the elderly from the effects of heat, the important thing is to know which particular spots they should avoid.'

### DO-IT-YOURSELF

Another aim of crowdsourcing is awareness raising. 'Take for example the children from Ede who had lessons from us. They are now aware of the big temperature differences that can be found in a small area as a result of different planning choices, such as paving or vegetation. They also know what steps residents can take to influence the temperature. Maybe later on they won't pave their gardens, but will opt for a nice tree instead,' explains Danes.

This objective plays a big role in the project in Curitiba too. Danes: 'The students become more aware of the importance of clean air and what they themselves can do to ensure it.' Curitiba also wants, with Alterra's help, to set up a system in which crowdsourcing will be a constant source of information about air quality in the city. 'It is very expensive for a city to set up and maintain a detailed monitoring network. So it is nice if the residents themselves collect the information.' ■

[www.wageningenur.nl/en/metropolitan-solutions](http://www.wageningenur.nl/en/metropolitan-solutions)



### INVESTMENT THEME METROPOLITAN SOLUTIONS

In 2050 there will be about 9 billion people living on the earth, with 70 percent of them in cities. Several different groups in Wageningen UR are doing research on urban issues. 'The life sciences provide solutions to urban problems relating to heat and drought in cities, flooding, water purification, air pollution, waste, infrastructure, green space and – not to be forgotten – the food supply,' says Carmen Aalbers of Alterra. From now on Wageningen UR will be pooling these research efforts under Metropolitan Solutions, one of the five investment themes in the new strategic plan. 'This makes Wageningen's contribution more visible to the outside world, so that more of the knowledge ends up in the big cities. Within the metropolitan areas, Wageningen UR is working on solutions with governments, businesses, civil society organizations and residents. These collaborations also throw up relevant research topics for Wageningen UR, says Aalbers.

An example can be seen in the Institute for Advanced Metropolitan Solutions (AMS) in Amsterdam, in which MIT in the US, the technical university TU Delft and Wageningen UR collaborate on urban issues. Other examples are projects such as the 'circular city', in which waste is used as a resource, and research on the relation between ADHD in children and green space in cities.

