



Case Study

Global Action Plan (GAP)

Client

Global Action Plan is an environmental charity whose aim is to work towards a greener and safer world for human health.

Overview

Global Action Plan (GAP) used EarthSense's MappAir® annual average dataset to investigate the number of children around the United Kingdom that attend schools that are situated in areas with nitrogen dioxide (NO₂) and fine particulate matter (PM_{2.5}) concentrations above the World Health Organisation's air quality limits.

The Challenge

Children are highly susceptible to the health impacts of air pollution exposure, which can affect the development of lung function, cause asthma, and impact them in their adult life. This is part due to them having higher breathing rates as well as small bodies that are closer to ground level sources, such as vehicle exhausts. When combined with attendance of schools situated near busy roads experiencing congestion during pick up and drop off times, this can further increase their exposure to unsafe air quality. To raise public awareness of air quality levels at schools, Global Action Plan wanted to investigate the number of nurseries, primary, secondary and sixth form schools across the UK located in areas with air quality concentrations above the World Health Organisation's recommended annual mean guidelines of 5µg/m³ for PM_{2.5} and 10µg/m³ for NO₂.

The Solution

GAP focussed their investigation on two ambient air pollutants, nitrogen dioxide (NO₂) and fine particulate matter (PM_{2.5}), both of which are known to cause damage to human health and can be found at school sites for reasons such as build-up of idling vehicles. To fully understand the extent of unsafe air quality at nurseries, primary, secondary and sixth form schools across the UK, GAP needed to obtain the average

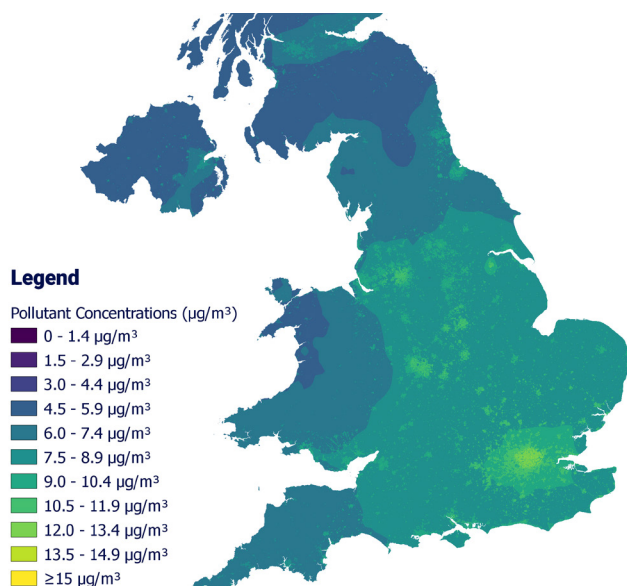


Figure 1: Mapped MappAir® annual average data for PM_{2.5}.

concentrations of NO₂ and PM_{2.5} for every site in the country, and selected EarthSense's MappAir® annual average dataset to deliver the required results.

Derived from its MappAir® air pollution model, EarthSense's annual average datasets take into account a number of parameters including Zephyr® point-source measurements, reference site data, national weather data, and traffic data to model the average concentrations for various air pollutant species. Available from 2014 to 2020 and at a resolution of 100m, these models provide information about average air pollution concentrations for the whole of the of the United Kingdom.

In this case, researchers at Global Action Plan needed air quality data that would indicate the average concentrations of NO₂ and PM_{2.5} for the whole of the UK. To do this, GAP collated postcodes for every school in England, Scotland, and Wales that were to be included as part of the study and converted these into longitude and latitude coordinates to give to EarthSense. Taking each of the coordinates, EarthSense's data scientists extracted data from the latest available MappAir® annual average dataset for January – December 2019 and entered each one into the API. This subsequently returned the average concentrations of NO₂ and PM_{2.5} in 2019 for each school site in the country.

EarthSense's data scientists presented the results to researchers at Global Action Plan, who were then able to compare the data against the World Health Organisation's recommended air quality guidelines for NO₂ and PM_{2.5}. Such information enabled the charity to identify the yearly average concentrations of NO₂ and PM_{2.5} at each of the schools and understand how



The fact that 27% of UK schools are above WHO air pollution limits is extremely alarming. Air pollution is not a fact of life. If we all do our bit, it can be solved with collaborative action and education.

Larissa Lockwood
Director of Clean Air, GAP

many children and young adults across the UK are exposed to air pollution whilst at school.

Outcomes

Using the MappAir® annual average dataset, Global Action Plan discovered that 7,852 nursery, primary, secondary and sixth form schools in England, Scotland, and Wales, which is around 27% of all schools, are situated in areas with air quality concentrations above the World Health Organisation's recommended guidelines. These numbers equate to around 3.4 million children that are learning in environments with unhealthy air quality. Global Action Plan's communications team used the data and compiled the information into an article on Clean Air Day 2021 around these findings. The article featured heavily in the UK press from outlets including the BBC, The Guardian and The Independent raising nationwide awareness and discussions.

Long Term Health Benefits

Using MappAir® data raised public awareness of the number of children at risk from pollution exposure. Such information could be used to prompt the likes of local councils and governing bodies to implement pollution monitoring projects to minimise concentrations of NO₂ and PM_{2.5} at schools.

Annual averaged data can also be used in future years to compare changes in air quality concentrations over time and evaluate



Figure 2: School grounds.

the success of various pollution mitigation strategies. Implementing pollution-lowering strategies backed by evidence, can help minimise the number of children affected by unsafe levels of air quality; potentially reducing the risks of asthma, diabetes, lung cancer, and also create a safer environment for healthier future generations.

Get in Touch

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