



# How can we improve air quality at our school and its surroundings?



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## Summary

Air quality refers to how clean or polluted the air is. Monitoring air pollution is essential for protecting both human health and the environment. Poor air quality can lead to serious health issues, including respiratory diseases, heart conditions, and lung cancer, especially for vulnerable populations. It also harms ecosystems, contributes to climate change, and reduces overall quality of life. By tracking air pollution levels, we can identify sources of contamination, implement effective regulations, and take action to improve air quality, ensuring a healthier and safer environment for everyone. The Air Quality Index (AQI) is used to measure air quality, with values of 100 or below generally considered satisfactory. When AQI exceeds 100, air quality is deemed unhealthy. Major sources of human-made air pollution include vehicle emissions, the burning of fuel oils and natural gas for heating, industrial by-products, coal-powered plants, and chemical production fumes. The impact on health varies based on factors such as age, location, and preexisting conditions.

So, how can we help improve air quality? The GLOBE Malta Air Quality Campaign aimed to educate students on the causes and effects of air pollution, encouraging them to reflect on its impact on their lives and explore possible solutions. Through data collection, analysis, and critical thinking, students developed insights and proposed actions to ensure cleaner, safer air for everyone. This is the second time our school has participated in this project. This time, we had the opportunity to analyse more aspects, including comparing our results with those from the first project as well as with data from newly participating schools.



## Research Questions

- What are the levels of nitrogen dioxide in front of the school?
- Are there any differences in nitrogen dioxide levels from those analysed some years ago?
- What can be done to improve the air quality around us?

## Research Methods

Gozo College, Ġuże Aquilina, Sannat Primary and Special Unit is situated in Sannat, a small village on the island of Gozo. The school aimed to reassess the air quality in its surroundings and chose to participate once again in the GLOBE Malta Air Quality Campaign, which took place between November and December 2024. A selected group of students from different year levels formed the GLOBE team and collaborated with their teachers through multiple meetings to plan and conduct the investigation.

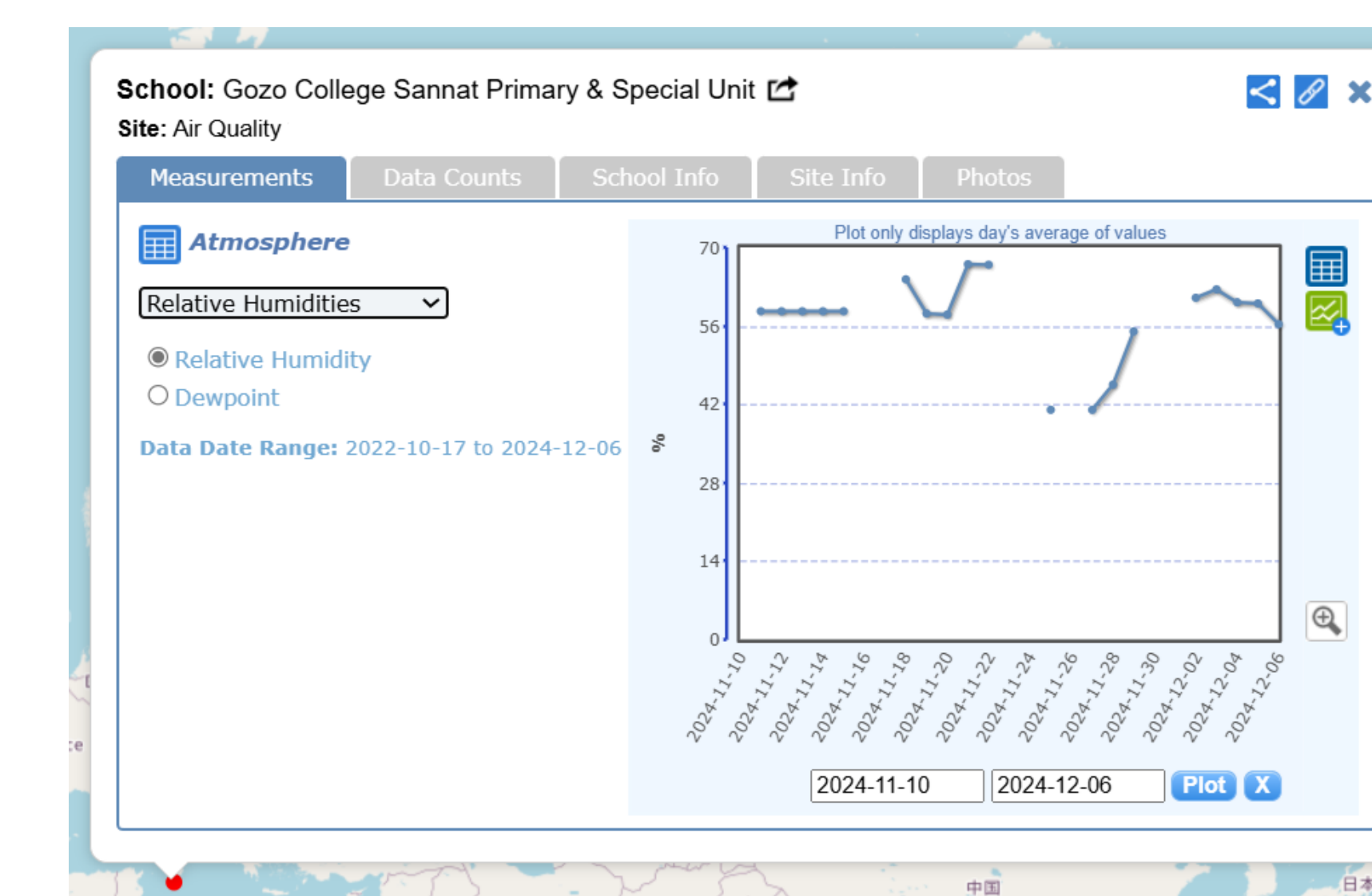
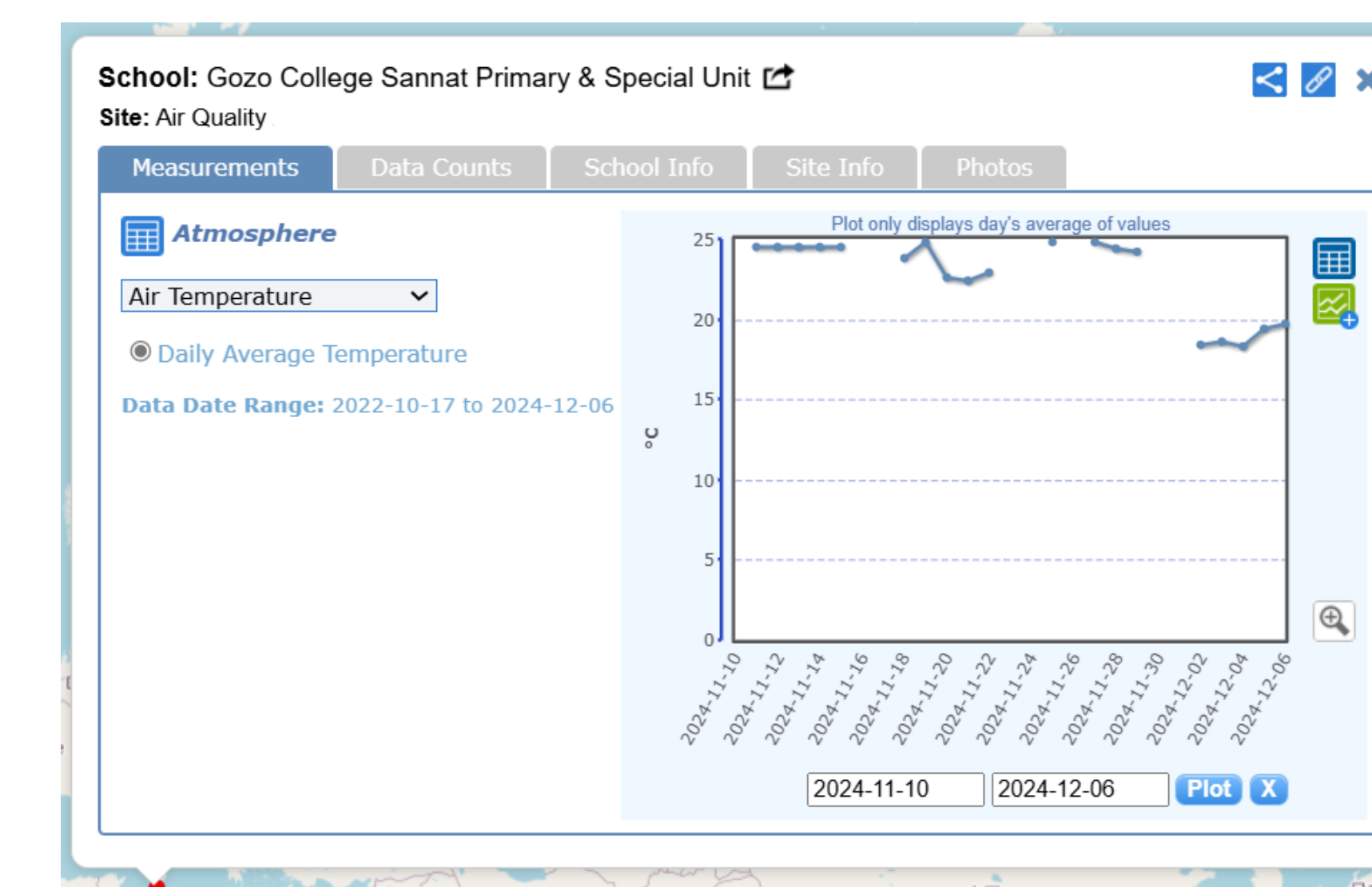
A diffusion tube was once again installed at our school, positioned near the main road leading to the main entrance of the locality to measure air quality in the most polluted area. It remained in place for four consecutive weeks before being sent to a specialised laboratory for analysis, along with tubes collected from other nearby schools in Gozo and Malta.

The students also conducted daily recordings of various modes of transport (Fig. 4) passing through the same area where the NO<sub>2</sub> tube was installed. Additionally, they measured air temperature, humidity, rainfall, and observed cloud types.

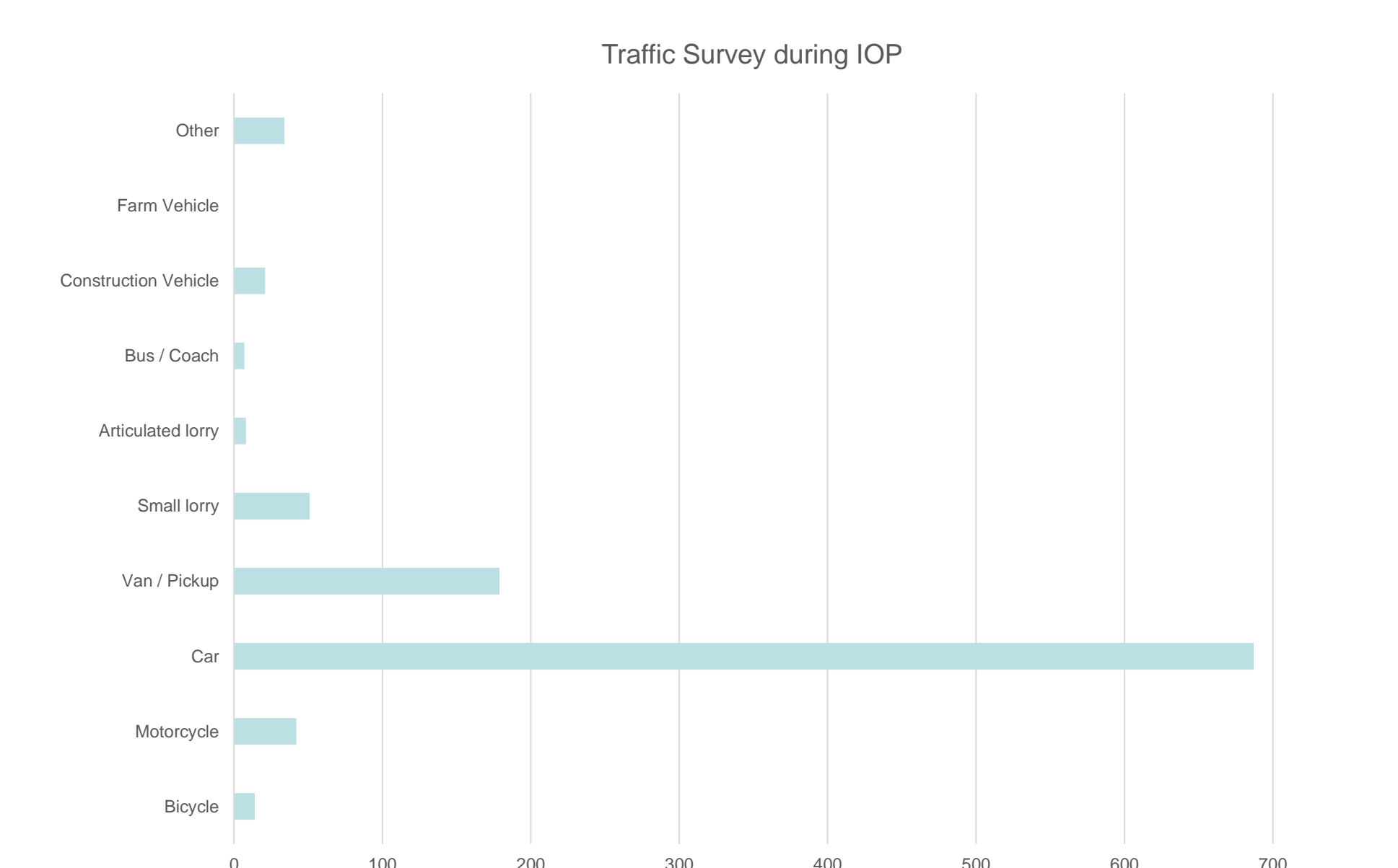


## Results

The screenshots below display data uploaded to the GLOBE website during the observation period in November and December 2024. Following the GLOBE Protocols guide, students recorded daily measurements of air temperature and humidity.



The data collected from the traffic survey was analysed and uploaded on excel. The chart below shows the results with the most popular vehicle observed being the private car.



## Conclusion

After receiving the results from Passam laboratories, Switzerland, we were able to compare NO<sub>2</sub> levels based on the location where each tube was installed. It was evident that the highest nitrogen dioxide levels were recorded in tubes placed along one of the busiest main roads in Victoria, Gozo—the island's capital and primary urban area. In contrast, tubes installed in smaller villages surrounded by the countryside, such as Sannat (where our school is located), St. Paul's Bay, and Rabat, Malta, showed the lowest NO<sub>2</sub> levels.

These results, clearly indicate that nitrogen dioxide (NO<sub>2</sub>) levels in Sannat have doubled over the past two years (In 2022 NO<sub>2</sub> was 3.79). This significant rise raises concerns about increasing air pollution in what was previously considered a low-pollution area.

The diffusion tube installed near the main road leading to the school entrance recorded NO<sub>2</sub> concentrations that were twice as high as those measured during the initial study two years ago. In contrast, previous data had shown that Sannat, being a rural village surrounded by the countryside, had some of the lowest NO<sub>2</sub> levels compared to more urbanised areas like Victoria, Gozo.

Possible contributing factors to this increase include a rise in traffic flow, changes in weather conditions affecting pollutant dispersion, and potential growth in local emissions from construction, heating, or industrial activities. Given the health risks associated with prolonged exposure to NO<sub>2</sub>, including respiratory issues and environmental degradation, this increase calls for further investigation and proactive measures to mitigate pollution.

Moving forward, continued monitoring and analysis are essential to determine the causes of this trend. Community awareness, policy adjustments, and sustainable urban planning should be considered to help maintain cleaner air in Sannat and prevent further deterioration of air quality.

## References

- GLOBE teacher guide <https://www.globe.gov/> (Accessed October 2024).  
GLOBE Science Data Visualization <https://vis.globe.gov/GLOBE/> (Accessed February 2025)