GreenAL

ANNUAL REPORT

AIR QUALITY AND NOISE POLLUTION

Co-PLAN INSTITUTE FOR HABITAT DEVELOPMENT

VOLONTARIATO INTERNAZIONALE PER LO SVILUPPO VIS ALBANIA

COSV COORDINAMENTO DELLE ORGANIZZAZIONI PER IL SERVIZIO VOLONTARIO

Sweden Sverige

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Disclaimer
The views and opinions expressed in this document are those of the authors and do not necessarily reflect the views of the donor.

About GreenAL

The project 'Support for Environmental Civil Society Organizations' (GreenAL) aims to empower Albanian environmental CSOs, and beyond, to actively and effectively participate in the EU accession negotiation process, with a primary focus on Chapter 27: Environment. This project is funded by the Swedish International Development Cooperation Agency (Sida) with funds from the Swedish Government. It is implemented by GreenAL Partners, Co-PLAN (the Institute for Habitat Development), in collaboration with VIS Albania and COSV (Cooperazione per lo Sviluppo).

Based on the **Green Lungs** concept, which Co-PLAN has implemented for seven years, GreenAL aims to continue and further deepen the approach of alternative environmental monitoring. Green Lungs is one of the civil society initiatives that serves as the sole source of information on alternative monitoring of air quality, noise levels, and ecosystem services, with a focus on urban greenery in the five main cities of Albania (Tirana, Durrës, Elbasan, Korçë, Shkodër).

Initially, the concept of alternative monitoring was financially supported by the EU Delegation to Albania for the period 2017-2021. It was later funded by the Swedish International Development Cooperation Agency (Sida) through the first phase of the GreenAL project from 2021 to 2023. Recognizing the growing interest in data on the monitoring of key air pollutants in cities across the country, this methodology will continue to be applied for the period 2024-2027 with financial support from Sida through the GreenAL project. A key feature of this third phase of monitoring will be the inclusion of the municipality of Fier, as one of the main urban centers in the Southern Region. Additionally, beyond air pollutants, this phase will also focus on monitoring and analyzing the impact of atmospheric conditions on environmental quality.

Alternative monitoring data can be considered complementary in assessing and interpreting pollution factors in urban areas. These data are essential for identifying pollution sources and evaluating their impact on the environment and public health. Moreover, they can be used to develop effective strategies and policies to improve air quality and reduce pollution.

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Why do we monitor?

Air quality in Albania is a pressing issue with direct impacts on public health and the environment, particularly in major cities like Tirana. Pollution levels are often high and linked to several key sources that further degrade air quality. In the previous alternative monitoring report, results from 400 monitoring stations in Tirana revealed alarming levels of key pollutants. NO_2 concentrations were found to be twice the EU limits, while CO_2 levels were five times higher. The most polluted areas included Astir, 21 Dhjetori, and major roads such as Rr. e Durrësit, Rr. e Kavajës, Rr. e Dibrës, as well as boulevards with high traffic congestion or active construction sites.

One of the main sources of pollution in urban areas is traffic. Vehicles, especially during peak hours, emit harmful gases such as nitrogen dioxide and particulate matter, which directly impact air quality and can cause health problems, including respiratory difficulties, allergies, and heart disease. In addition to traffic, economic and industrial activities also play a significant role, as businesses, construction sites, and manufacturing processes contribute to air pollution. The combination of these factors, particularly in densely populated cities with limited green spaces, worsens residents' quality of life and highlights the urgent need for immediate measures to reduce pollution.

Air pollutants include gases such as carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NOx), and volatile organic compounds (VOCs), as well as fine particulate matter like $PM_{2.5}$ (particles with a diameter of 2.5 micrometers or smaller) and PM_{10} (particles with a diameter of 10 micrometers or larger). These pollutants can originate from various sources, including industrial processes, vehicle emissions, agricultural activities, natural sources (such as wildfires and volcanic eruptions), and the burning of fuels in households. The composition of air pollution can vary depending on the geographical area, local pollution sources, and meteorological conditions.

Another form of pollution that should be monitored is acoustic pollution, which has a significant impact on individuals' health and community well-being. Prolonged exposure to acoustic pollution can lead to negative cardiovascular and metabolic effects, reduced cognitive performance in children, as well as serious issues such as stress and sleep disorders. It is estimated that acoustic pollution causes around 12,000 premature deaths and contributes to 48,000 new cases of ischemic heart disease each year in Europe. Furthermore, approximately 22 million people suffer from chronic noise-related issues, while 6.5 million people experience pronounced sleep disturbances.

Considering the complexity and interaction that air and acoustic pollutants may have with climate, urban typology, and other factors, it is essential to monitor the concentration of these pollutants. This monitoring can provide a more accurate understanding of their impacts and enable the planning of interventions to reduce these concentrations, thus helping to reduce public health vulnerability.

The main goal of air and acoustic pollution monitoring by GreenAL is to raise awareness among policymakers and the community about the effects of air and acoustic pollution on health and the environment, as well as to provide alternative monitoring of air quality and noise levels. This alternative

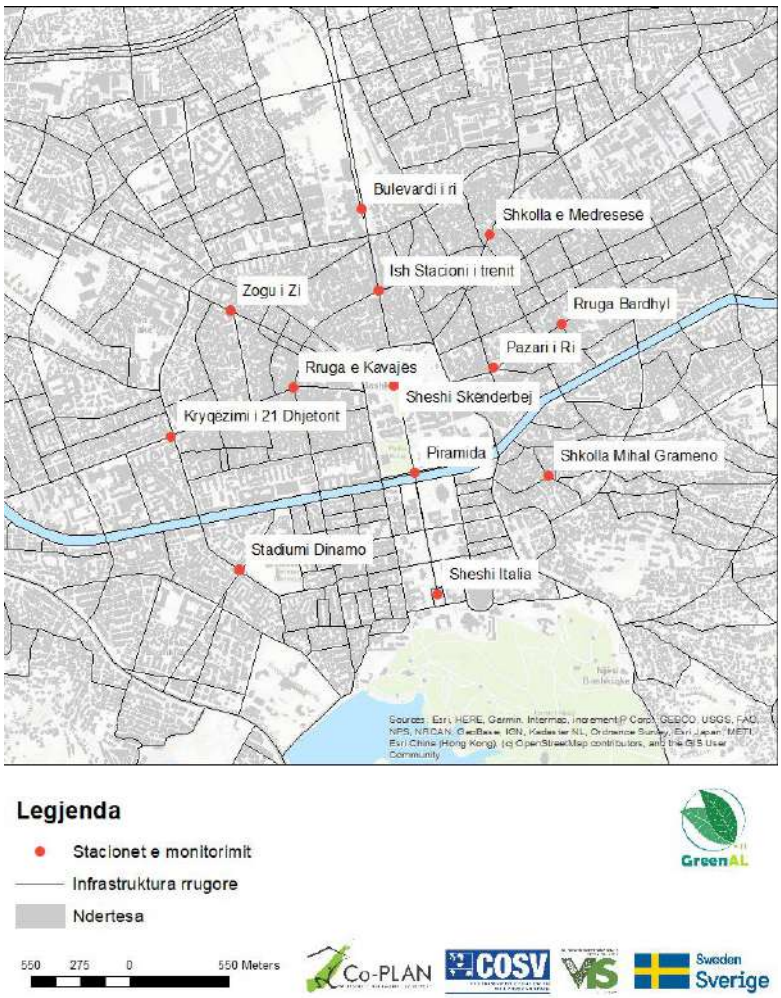
monitoring aims to support the development of effective policies and measures to reduce pollution and protect public health and the environment.

Alternative Monitoring Methodology

Throughout this phase, GreenAL will continue monitoring air quality and acoustic pollution by following the existing methodology, with an increased focus on expanding the network of stations to cover more urban areas and strategic points. The alternative air monitoring aims to cover the entire urban area of the selected cities. For the city of Tirana, 13 stations have been selected, which are located in the small ring of Tirana. This area will be expanded and further divided into monitoring sub-zones. Each monitoring sub-zone should contain a total of 10 monitoring points/stations, which are divided into two categories:

- Stations near pollution sources (roads, construction sites, etc.) on the perimeter of the area boundaries.
- Stations within the area (near schools, institutions, residences).

Figure 1 Monitored area



Source: Generated by the author.

The monitoring will be conducted continuously, with regular intervals for data collection and analysis on $PM_{2.5}$, PM_{10}, NO_2, CO_2, temperature, air humidity, and acoustic

pollution. The data generated from the monitoring will be integrated into the GreenLungs platform for this phase as well, with the difference being that for the period 2024-2027, the monitoring will be divided based on the seasons.

This is done to enable the assessment of the impact of seasonal factors on pollution levels, as temperature and atmospheric conditions directly affect the dispersion and concentration of pollutants. In winter, the air is more saturated and less mobile, causing the accumulation of pollutants, while in summer, hot conditions may accelerate the formation of atmospheric pollutants like ozone. By analyzing seasonal data, we can better understand how pollution levels change and how these changes can affect public health and the environment. This will allow for the comparison of pollution levels between different periods and the identification of trends, to improve air quality and reduce pollution.

For this monitoring period, data was collected from August to December, covering three different seasons: summer, autumn, and the beginning of winter. This timeframe allows for an assessment of air and acoustic pollution based on seasonal factors, such as changes in temperature, rainfall, population mobility, and construction activities.

- Rounds 1 and 2 correspond to the summer season, a period when urban traffic may be lower due to vacations, but high temperatures and solar radiation can influence the concentrations of pollutants like nitrogen dioxide (NO_2).

- Round 3 represents the transition from summer to autumn, a period when traffic and urban activities begin to increase as citizens return after the summer holidays.

- Rounds 4 and 5 were conducted during autumn, a season characterized by a gradual increase in traffic and economic activities, leading to higher pollution levels, especially in areas with heavy vehicle traffic and active construction sites.

- Round 6 reflects the transition from autumn to winter, when atmospheric conditions, including lower temperatures and increased use of heating devices, can affect the concentrations of air pollutants like PM_{10} and $PM_{2.5}$.

Devices Used for Monitoring

For monitoring the selected sites on the ground, the **Aeroqual S500** and **Testo 815** devices were used. These two devices are certified, ensuring accuracy and reliability during the measurement and monitoring of air pollution and noise, two key factors for assessing environmental quality in the studied areas.

The Aeroqual S500 is a portable device for air quality monitoring, designed for real-time pollutant concentration measurements. It is used in both indoor and outdoor environments to assess pollutants such as ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter (PM_{10} / $PM_{2.5}$), among others. The device is modular and includes interchangeable sensor heads that can be adapted for specific pollutants, offering flexibility and accuracy in measurements. Due to its portability and ease of use, it is ideal for research work and field monitoring. Air quality monitoring will help identify the main sources of pollution, analyze the impacts of air pollution on public health and the environment, and improve public and institutional awareness.

Testo 815 is a portable device designed for measuring noise levels, which has been used to monitor acoustic pollution in selected areas. The Testo 815 has a measurement range from 32 dB to 130 dB, making it suitable for measurements in various environments, from busy urban areas to quieter settings. The device complies with international noise measurement standards, such as IEC 61672-1. Additionally, Testo 815 offers calibration options and can be used with additional microphones for more sophisticated and accurate measurements. As a simple and easy-to-use device, it is ideal for quick and accurate measurements during field monitoring.

Pollutants and Environmental Parameters Monitored

$PM_{2.5}$ – Particulate matter with a diameter of up to 2.5 micrometers ($PM_{2.5}$) is generated by combustion processes (e.g., vehicle engines, industrial emissions), as well as by natural sources such as wildfires and dust storms. $PM_{2.5}$ particles are small enough to penetrate deeply into the respiratory system, reaching the lungs and entering the bloodstream. Long-term exposure to $PM_{2.5}$ is linked to respiratory and cardiovascular problems, including asthma, bronchitis, heart attacks, and premature death.

PM_{10} - Particulate matter with a diameter of up to 10 micrometers (PM_{10}) is generated by sources such as road dust, construction sites, and agricultural activities. PM_{10} particles are larger than $PM_{2.5}$ and are typically trapped in the upper respiratory pathways or the throat. While PM_{10} can cause respiratory issues, particularly in sensitive individuals, it generally has less severe health impacts compared to $PM_{2.5}$.

NO_2 - Nitrogen dioxide (NO_2) is a harmful gas primarily emitted from combustion processes, especially those involving fossil fuels like vehicles, power plants, and industrial facilities. Exposure to NO_2 can irritate the respiratory system, worsen asthma symptoms, and increase susceptibility to respiratory infections. Long-term exposure has been linked to respiratory and cardiovascular diseases, making it a significant public health concern. NO_2 also contributes to the formation of ground-level ozone and acid rain, further impacting air quality and ecosystems.

CO_2 – Carbon dioxide (CO_2) is a greenhouse gas primarily released from the combustion of fossil fuels and biomass. CO_2 is one of the main gases contributing to global warming, as it traps and retains

heat in the atmosphere. High levels and accumulation of CO_2 in the atmosphere are closely linked to climate change, including rising temperatures and weather pattern shifts. This gas also has direct impacts on ecosystems, making it a key factor in efforts to protect the environment and combat global warming.

Temperature and Humidity--Temperature and humidity are environmental parameters that influence air quality and atmospheric pollution. High temperatures can accelerate the formation of pollutants such as ozone, while low humidity often contributes to the increase of particulate matter (PM) pollution. Significant changes in temperature and humidity can affect human health, causing thermal stress and exacerbating existing diseases.

Meanwhile, below are the allowed air pollution limits in Albania compared to the EU, USA, and WHO.

Table 1 Concentrations at the allowed limit value according to the laws in Albania, EU27, USA, and WHO.

LIMIT CONCENTRATIONS OF AIR POLLUTANTS				
Pollutant	Standard			
	Albania	EU-27	U.S.A EPA	OBSH
PM 2.5 (µg/m3)	*20*	*10*	*9*	*5*
PM 10 (µg/m3)	*40*	*20*	*150*[1]	*15*
CO_2	*350*	*350*	*450*	*350*
NO_2 (µg/m3)	*60*	*40*	*53*	*10*

Source: MMA, referring to public data from the Ministry of Tourism and Environment, EU, EPA US, and WHO.

[1] Mandatory not to be exceeded more than once in three years.

CO_2 monitoring

During the monitoring conducted in the small ring of Tirana, and based on the CO_2 pollution standard (350 ppm), the analyzed data indicate significant exceedances at some stations, raising concerns about air quality and potential impacts on health and the environment. CO_2 (carbon dioxide) is a greenhouse gas that contributes to urban pollution and can affect air quality and human health at high concentrations.

Graph 1 Pollution from CO_2 during the monitored period

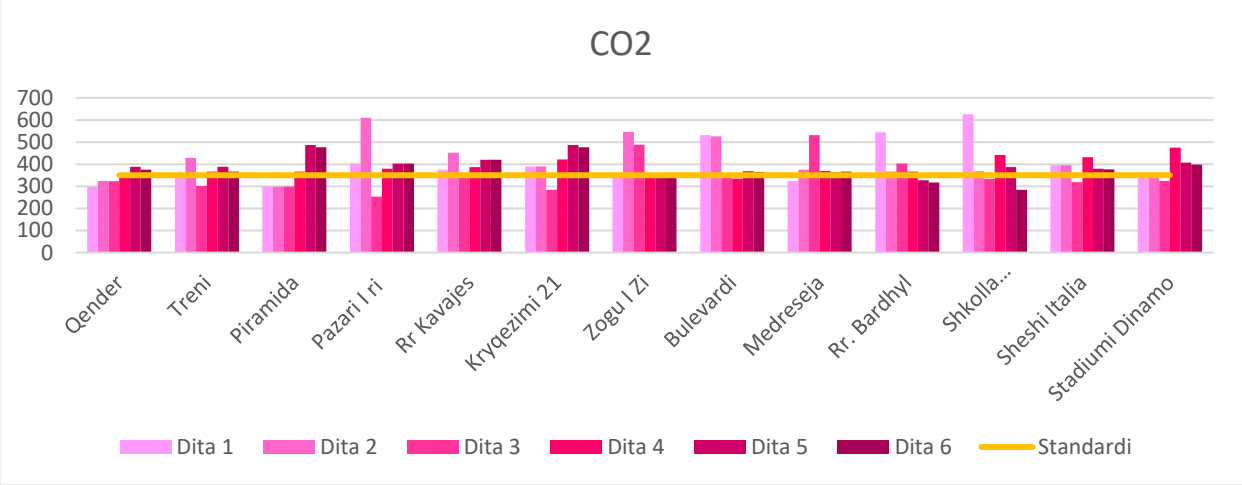
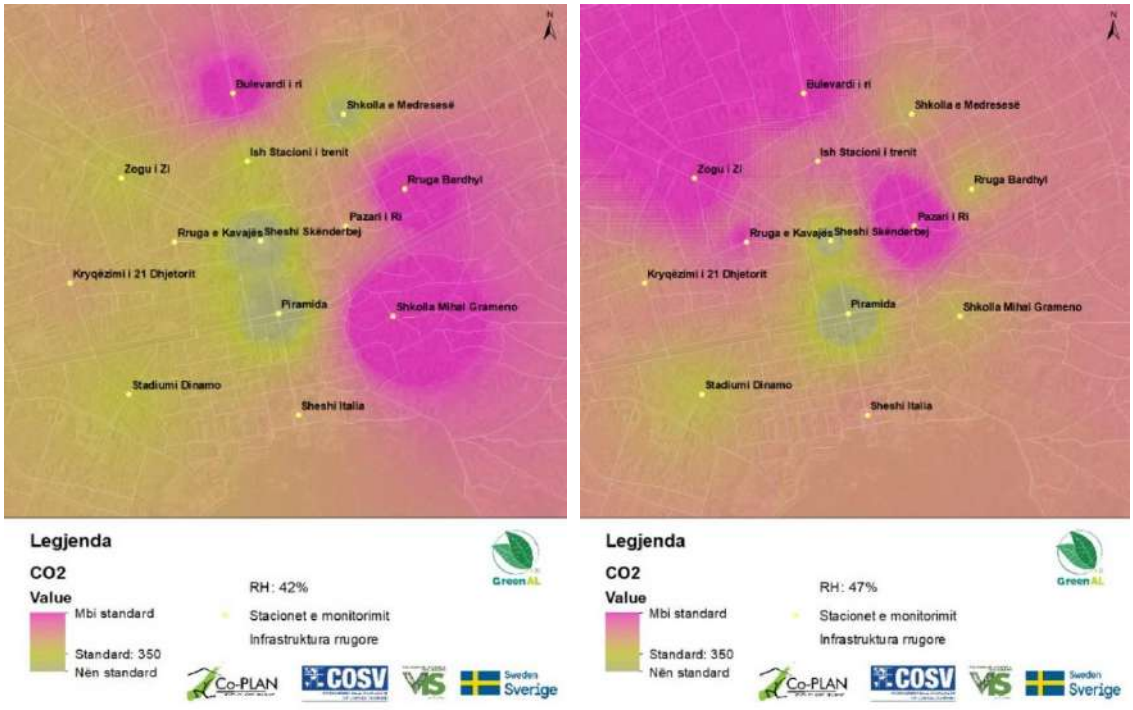


Figure 2 Distribution of CO_2 pollution in the first round (left) and the second round (right) of monitoring.

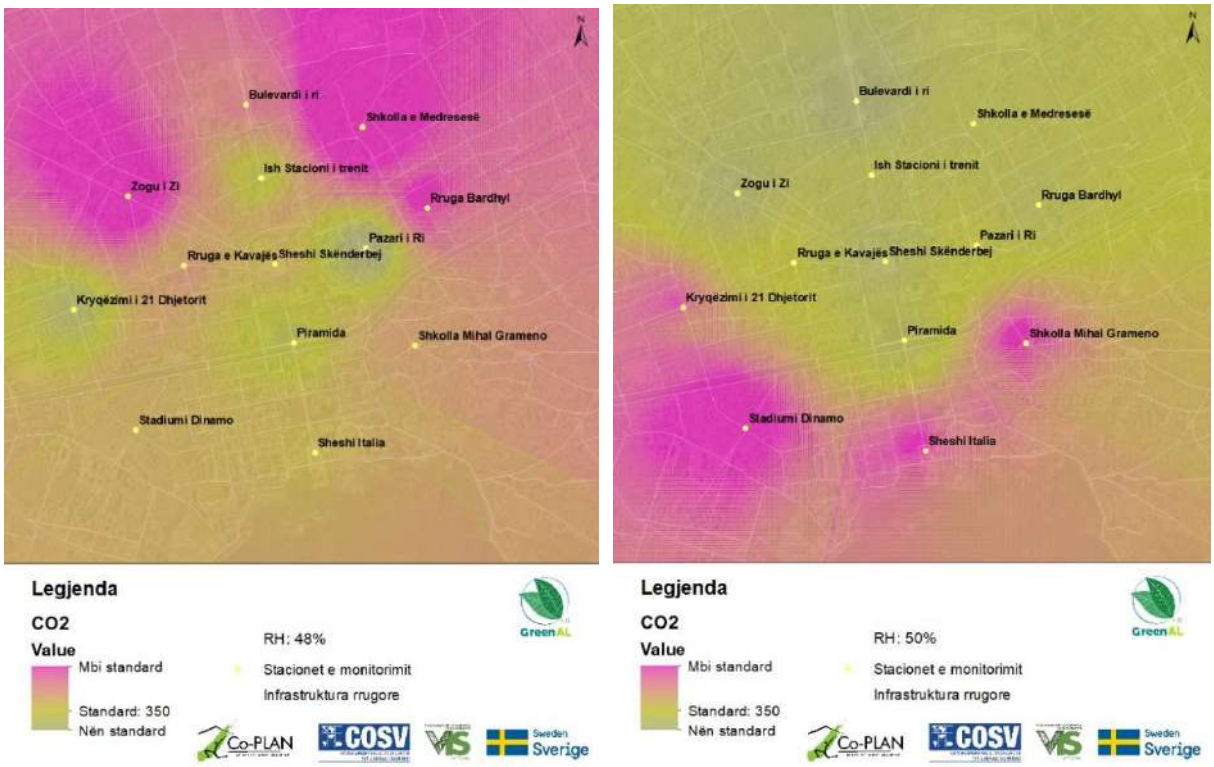


Source: Generated by the author.

In the first round of monitoring, the CO_2 pollution situation shows a concentration of pollution below the acceptable standard of 350ppm in most stations, suggesting relatively better air quality conditions. Stations like TR1 "Qendra" (297 ppm), TR3 "Piramida" (299ppm), and TR9 "Medreseja" (325ppm) report low pollution values, indicating a moderate impact from pollution sources. On the other hand, some stations exceed the standard, including TR8 "Bulevardi" with 532ppm and TR11 "Shkolla M. Grameno" with the highest value (626ppm). It should be noted that the monitoring took place in August when there was less vehicle movement and economic activity was more limited.

In the second round of monitoring, pollution levels significantly increased at several stations, indicating worse air quality conditions compared to Round 1. The most notable increases were observed at TR4 "Pazari i Ri" with a value of 610ppm and TR7 "Zogu i Zi" with 546ppm. On the other hand, some stations like TR3 "Piramida" and TR13 "Stadium Dinamo" reported stable levels below the 350ppm standard, with respective values of 299ppm and 35ppm. The average pollution value for Round 2 is higher than that of Round 1, indicating an overall deterioration in air quality. This difference could be the result of meteorological conditions affecting the dispersion of pollutants, as well as increased urban activities, such as more vehicles and greater population movement.

Figure 3 The distribution of CO_2 pollution in the third round (left) and the fourth round (right) of monitoring.



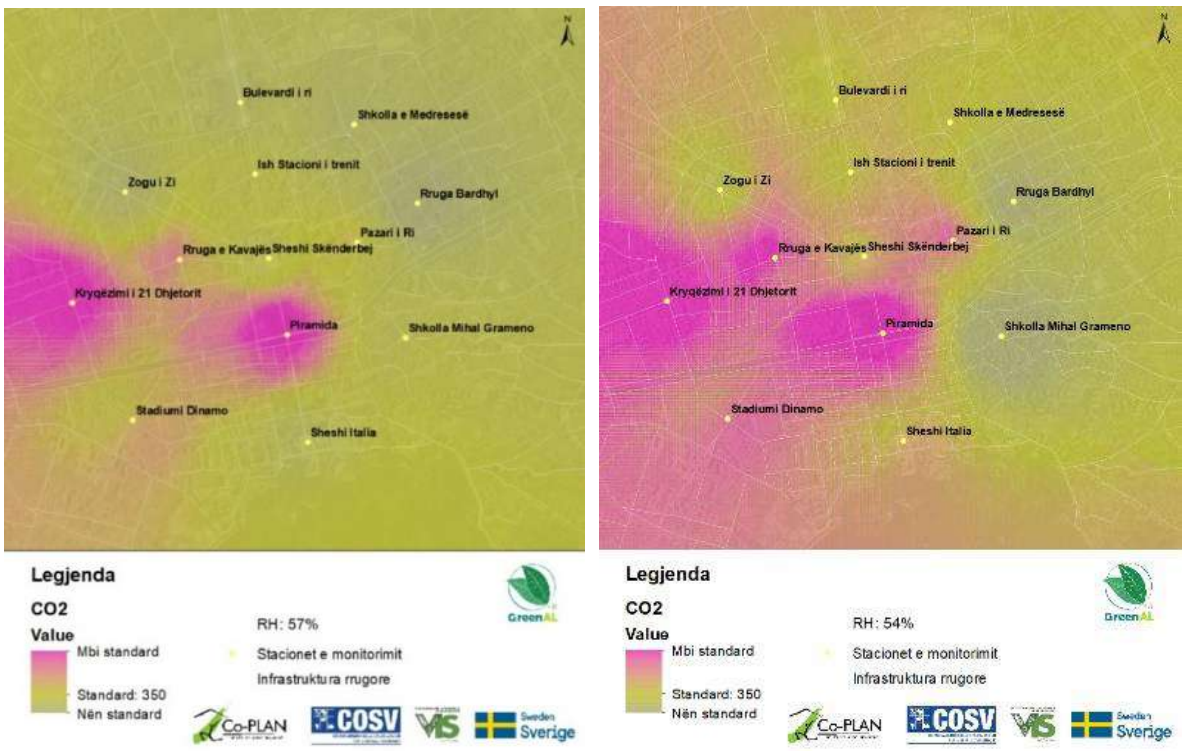
Source: Generated by the author.

In the third round of monitoring, the pollution levels show a distribution of pollution across stations. Stations like TR4 "Pazari i Ri" (254ppm) and TR6 "Kryqëzimi i 21 Dhjetorit" (284ppm) are below the

allowed standard of 350ppm, suggesting better air conditions in these areas. Meanwhile, some stations like TR9 "Medreseja" (532ppm) and TR7 "Zogu i Zi" (488ppm) significantly exceed the limit, indicating high pollution levels. The lowest value for Round 3 was recorded at TR4 (254ppm), showing a noticeable improvement compared to previous days. On the other hand, TR9 recorded the highest value (532ppm), reflecting considerable pollution in this area. The variations in pollution are linked to changes in daily activities and local factors such as **traffic and construction.**

In the fourth round of monitoring, pollution at several stations reached high levels and exceeded the standard of 350ppm. Stations like TR11 "Shkolla M. Grameno" (441ppm) and TR13 "Stadiumi Dinamo" (475ppm) reported high pollution, suggesting a deterioration in air quality compared to previous days. The highest value was recorded at TR13 (475ppm), while stations like TR4 "Pazari i Ri" (379ppm) and TR6 "Kryqëzimi i 21 Dhjetorit" (422ppm) remained close to the limit.

Figure 4 The distribution of CO_2 pollution in the fifth round (on the left) and the sixth round (on the right) of monitoring.



Source: Generated by the author.

Round 4 shows a noticeable deterioration in air quality at specific stations compared to other days, a phenomenon that may be linked to climatic conditions and precipitation distribution. Additionally, another important factor to consider is vegetation, as many plants dry out or lose their **leaves and do not carry out photosynthesis with the same intensity**. In the fifth round of monitoring, compared to previous monitoring rounds, we can say that there is relative stability at some stations and an increase in pollution at others. For example, TR6 "“Kryqëzimi i 21 Dhjetorit” " (487 ppm) and TR3 "Pyramid" (487ppm) report high values, indicating deterioration compared to previous days. Meanwhile, stations like TR8 "Boulevard" (368ppm) and TR5 "Kavaja Street" (420ppm) show lower values, close to the

allowed limit, but still above the pollution standard. Among the stations with the lowest pollution are TR1 "Center" (388ppm) and TR2 "Train" (388ppm), which are close to the standard and indicate a more **stable air quality situation**.

In the sixth round of monitoring, pollution continues to exceed the standard of 350ppm in many areas. TR6 "“Kryqëzimi i 21 Dhjetorit” " (476 ppm) and TR7 "Zogu i Zi" (357 ppm) report high levels, but somewhat lower compared to previous days. At other stations, such as TR1 "Center" (375ppm) and TR2 "Train" (366ppm), pollution remains close to the standard, showing an improvement compared to earlier monitoring rounds. Key contributing factors to the decline in air quality are the use of fossil fuels for heating, and atmospheric conditions (such as cold air) which can trap pollutants near the surface, worsening the situation.

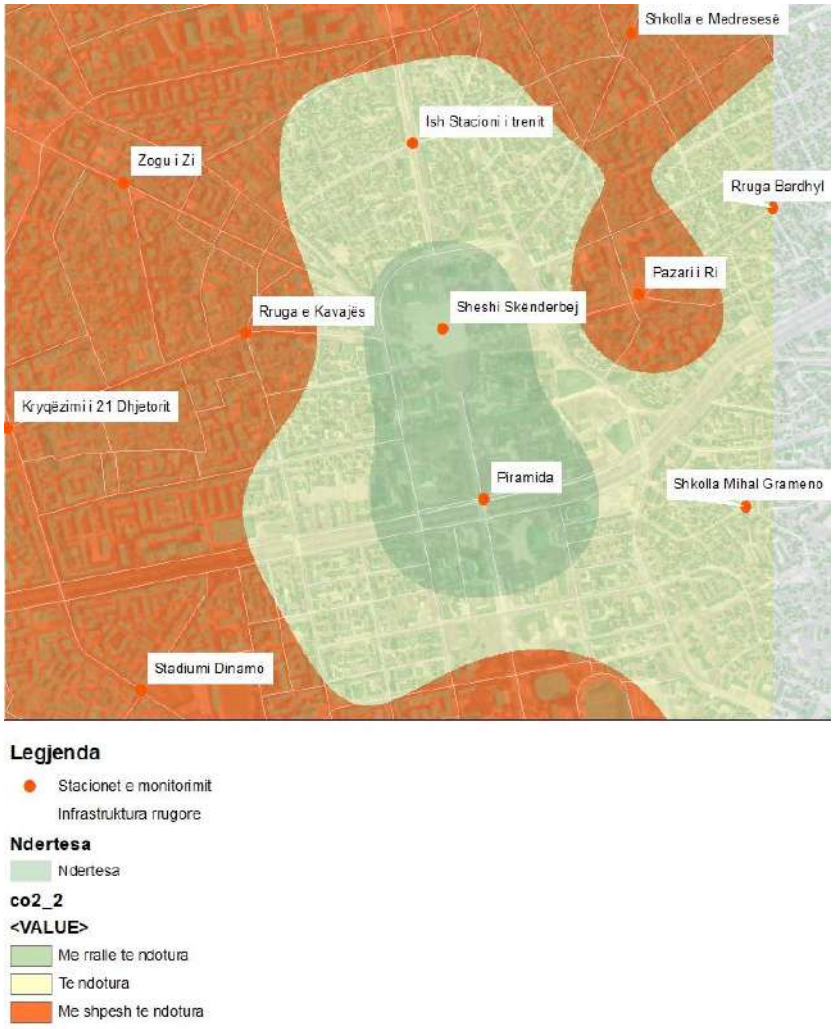
Summary Overview

In conclusion, during the monitoring period, CO_2 levels have shown significant variations between stations, reflecting the impact of urban and meteorological factors on its concentration in the air. Some stations recorded values below the acceptable limit of 350 ppm, indicating more favorable air quality conditions, while in other areas, concentrations were noticeably higher, signaling a significant deterioration.

These fluctuations can be attributed to several factors. **Heavy traffic,** especially during peak hours, has contributed to the increase in CO_2 levels due to the burning of fossil fuels by vehicles. Additionally, areas with **high construction** and industrial activity may have significantly increased its concentration through the use of machinery and combustion processes.

In addition to urban factors, meteorological conditions have played a key role. **During colder periods, the photosynthetic activity of vegetation decreases**, reducing the natural ability of the environment to absorb CO_2, which may have contributed to the increase in concentrations. Furthermore, the phenomenon of thermal inversion, which occurs more frequently in winter, may have trapped polluted air near the surface, limiting the dispersion of CO_2 and leading to higher pollution levels in some areas.

Figure 5 The stations with the highest CO_2 pollution levels during the monitoring period.



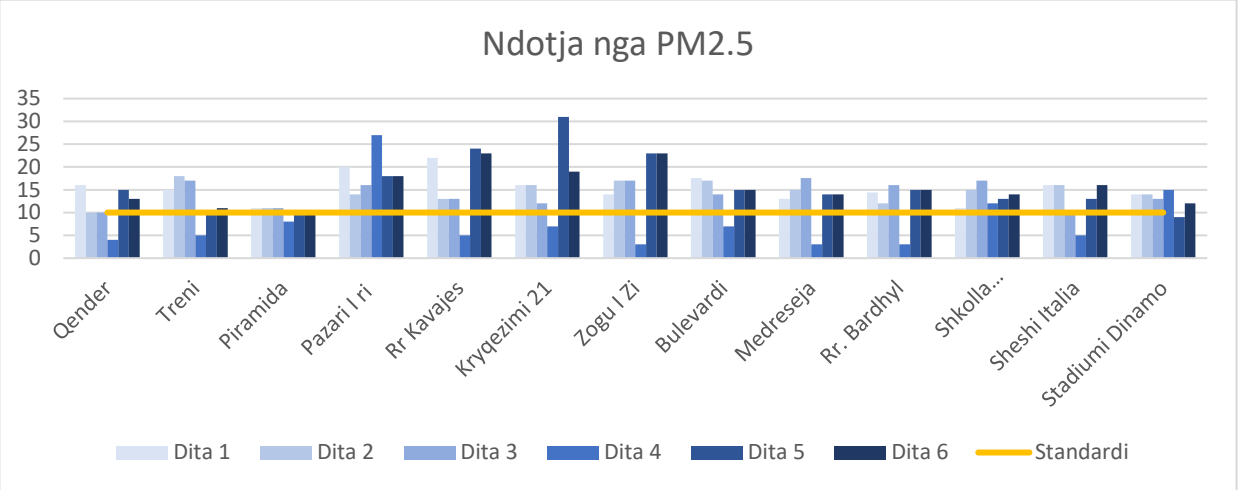
Source: Generated by the author.

However, in some areas, periods of CO_2 level reductions have also been observed, which may be linked to factors such as **reduced vehicle flow during certain hours**, the presence of wind, which helps disperse pollutants, or temporary traffic restriction measures in some areas. Despite these changes, the data indicates that CO_2 emissions remain an ongoing problem in the urban environment, highlighting the need for continuous monitoring and more structured measures to reduce it.

$PM_{2.5}$ and PM_{10} monitoring

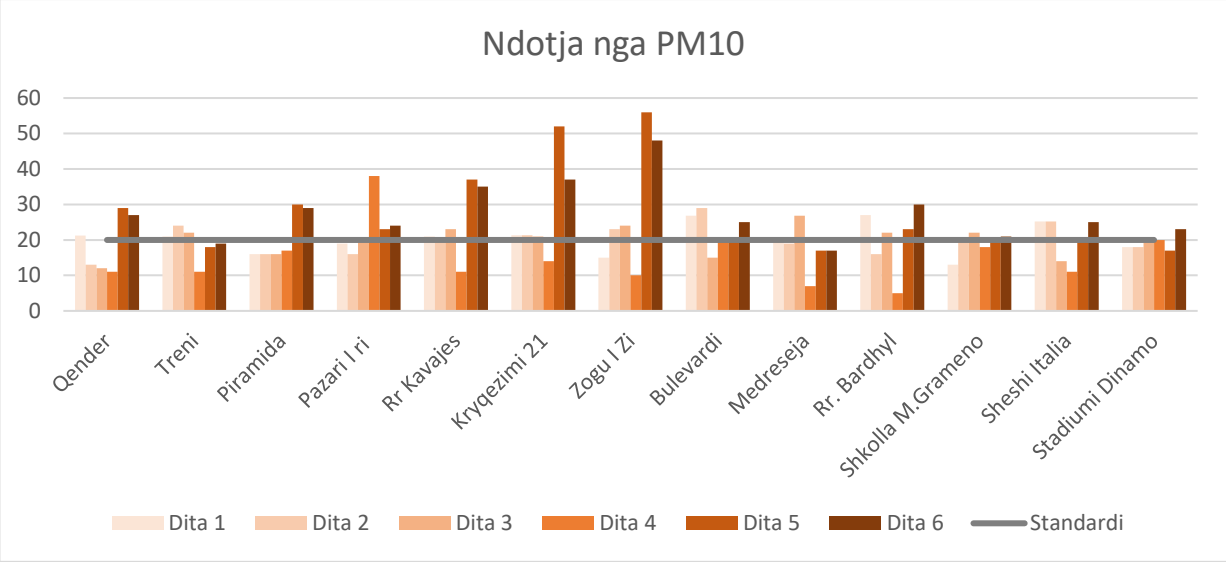
During the monitoring conducted at 13 monitoring stations, the data shows that in some of them, significant exceedances of pollution standards for $PM_{2.5}$ (10 µg/m³) and PM_{10} (20 µg/m³) were recorded. $PM_{2.5}$ and PM_{10} are fine particulate pollutants in the air. PM_{10} includes particles with a diameter up to 10 micrometers, while $PM_{2.5}$ are even smaller, with a diameter up to 2.5 micrometers. These particles come **from dust, fuel combustion, and industrial processes,** affecting air quality and human health.

Graph 2 Pollution from $PM_{2.5}$ during the monitored period.



Graph 3

Pollution from PM_{10} during the monitored period.

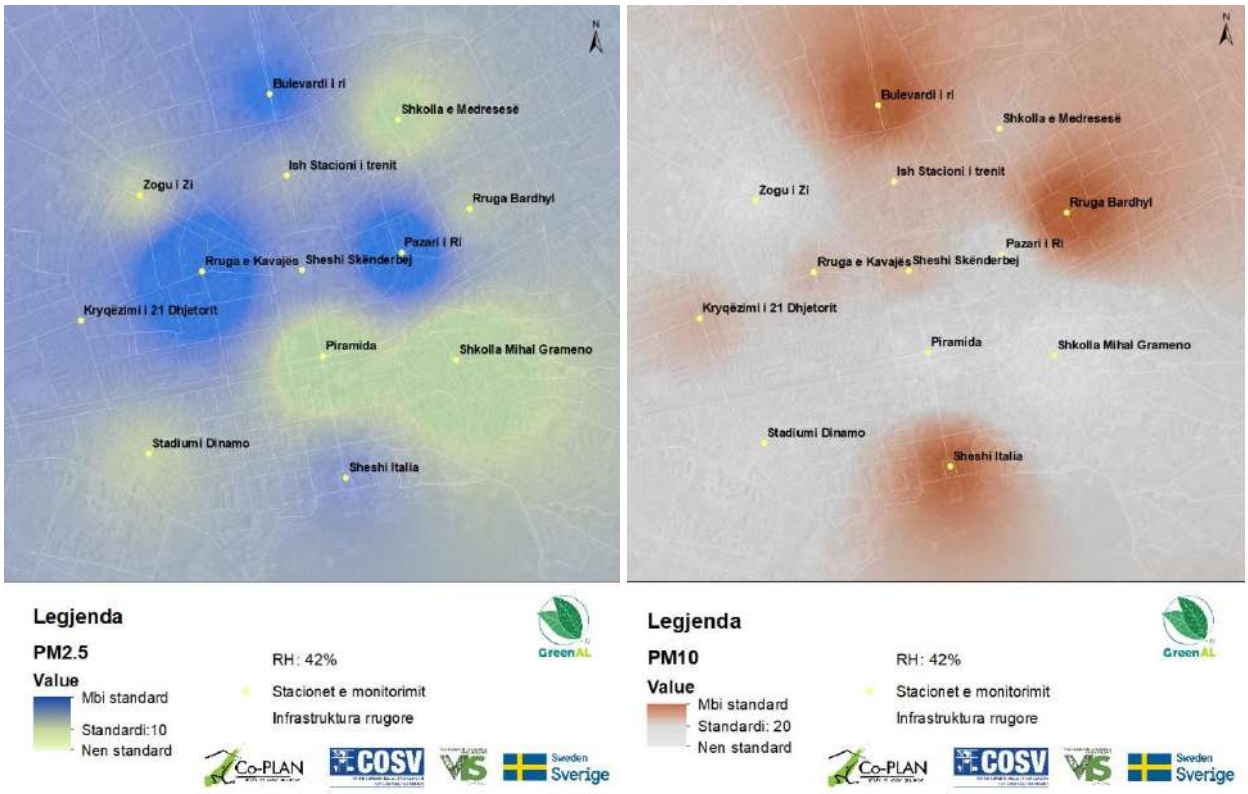


During the first round of monitoring, the levels of fine particulate pollution $PM_{2.5}$ and PM_{10} significantly exceeded the established standards, indicating a concerning air quality situation in most of the monitored areas. For $PM_{2.5}$, 12 out of 13 stations recorded values above the acceptable limit of 10 µg/m³, with the exception of the station at "Shkolla M. Grameno," which, although remaining below the

limit (11 µg/m³), was very close to it. The highest concentrations were recorded at "Kavaja Street" (22 µg/m³) and "Pazari i Ri" (20 µg/m³), **reflecting the significant impact of heavy traffic and intensive urban activities** in these areas.

In the case of PM_{10}, 11 out of 13 stations exceeded the limit of 20 µg/m³, confirming the high spread of dust particles in the air. Only "Shkolla M. Grameno" and "Dinamo Stadium" remained within the allowed limit, while the highest pollution was recorded at "Zogu I Boulevard" (26.8 µg/m³) and "Bardhyl Street" (27 µg/m³). These high concentrations can be attributed to the **heavy vehicle flow on the city's main arteries**, as well as the presence of construction and industrial activities that release harmful particles into the atmosphere.

Figure 6 The distribution of pollution from $PM_{2.5}$ (on the left) and PM_{10} (on the right) in the first round of monitoring.



Source: Generated by the author.

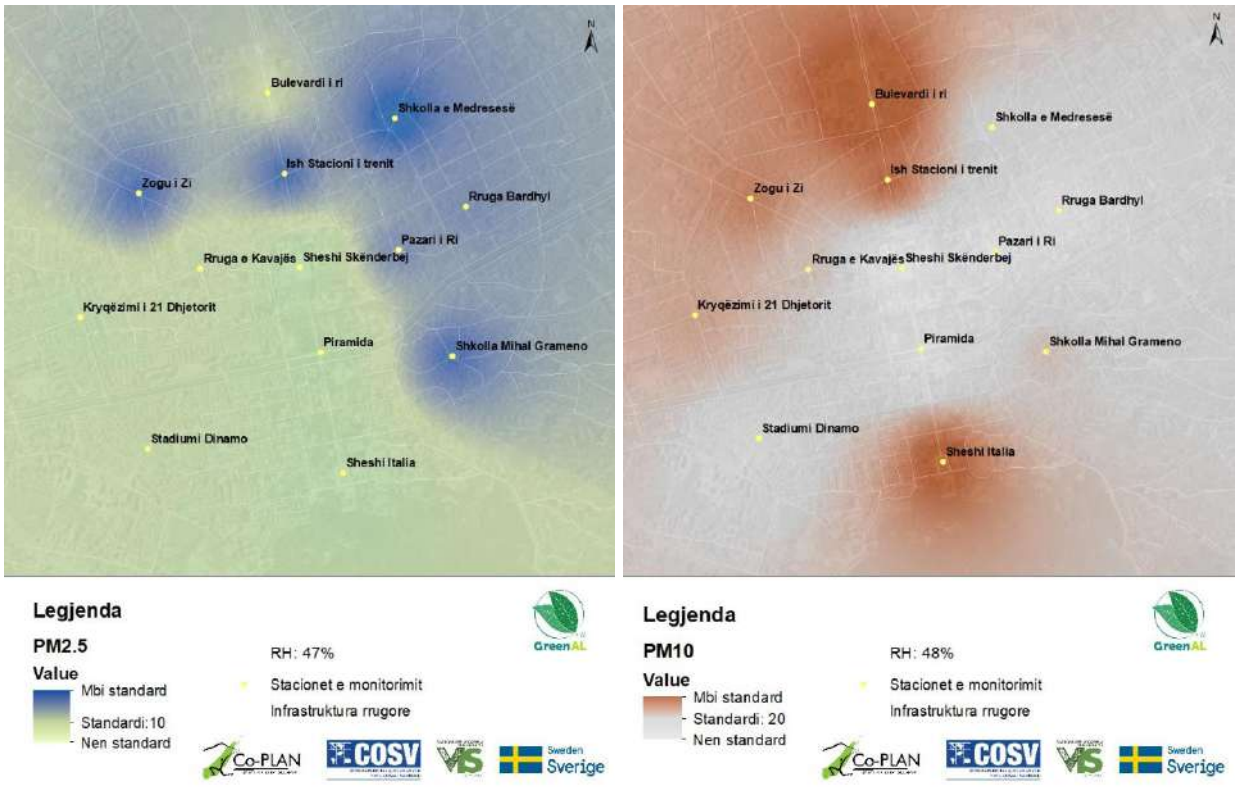
During the second round of monitoring, air pollution continued to be above the allowed standards in most of the monitored areas, although there was a slight reduction in the number of stations exceeding the standards compared to the first round.

For $PM_{2.5}$, 9 out of 13 stations exceeded the acceptable limit, while the stations "Pyramid," "Medrese," "Bardhyl Street," and "Dinamo Stadium" remained within the standard. The most problematic areas remain "Pazari i Ri" and "“Kryqëzimi i 21 Dhjetorit” ," where concentrations reached 16 µg/m³, indicating

that these areas **continue to be exposed to high pollution**, mainly due to intense traffic and high urban activities.

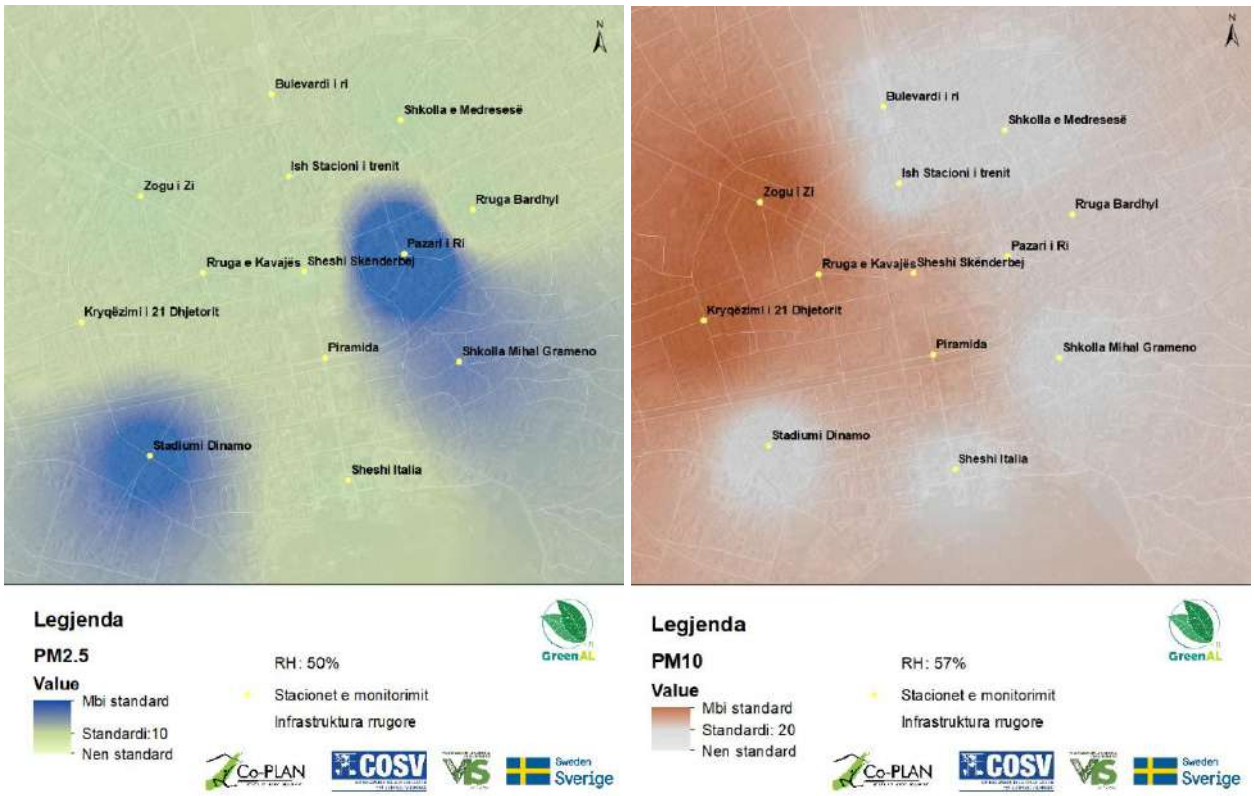
For PM_{10}, 10 out of 13 stations recorded values above the acceptable limit. Only "Bardhyl Street" and "Shkolla M. Grameno" remained below the standard, with 18 and 19 µg/m³, respectively. The highest concentrations were recorded at "Zogu i Zi" and "Pazari i Ri," which continue to be among the most polluted areas, reflecting the impact of **heavy traffic and emissions from construction** or economic activities.

Figure 7 The distribution of pollution from $PM_{2.5}$ (on the left) and PM_{10} (on the right) in the second round of monitoring.



Source: Generated by the author.

Figure 8 The distribution of pollution from $PM_{2.5}$ (on the left) and PM_{10} (on the right) in the third round of monitoring.



Source: Generated by the author.

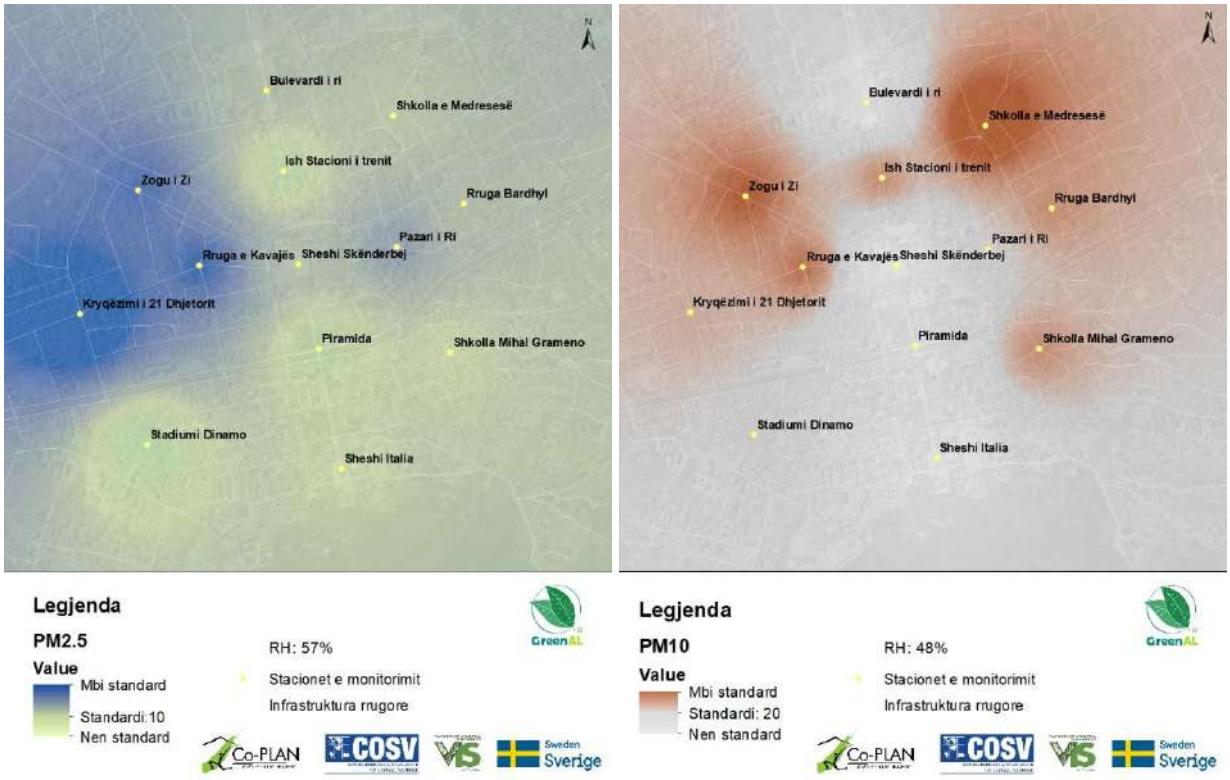
During the third round of monitoring, air pollution remained high, with most of the stations continuing to exceed the allowed limits.

For $PM_{2.5}$, **10 out of 13 stations** recorded concentrations above the acceptable standard. Meanwhile, the stations "Piramida," "Sheshi Italia," and "Stadiumi Dinamo" remained below the allowed limit, suggesting a lower impact from pollution sources in these areas. The highest pollution levels were recorded on "Rruga e Kavajës" and "Zogu i Zi," with a concentration of 17 µg/m³, which is mainly linked to intense traffic and urban activities.

For PM_{10}, the situation remains similar, with 10 out of 13 stations exceeding the acceptable limit. The highest pollution levels were recorded at "Zogu i Zi" (24 µg/m³) and "Pazari i Ri" (20 µg/m³), two areas known for their **high vehicle density and commercial activities**, which significantly contribute to fine particle pollution.

Although some stations have shown slight improvements compared to previous rounds, air pollution remains an ongoing issue in areas with heavy traffic and intensive urban development.

Figure 9 The distribution of pollution from $PM_{2.5}$ (on the left) and PM_{10} (on the right) in the fourth round of monitoring.



Source: Generated by the author.

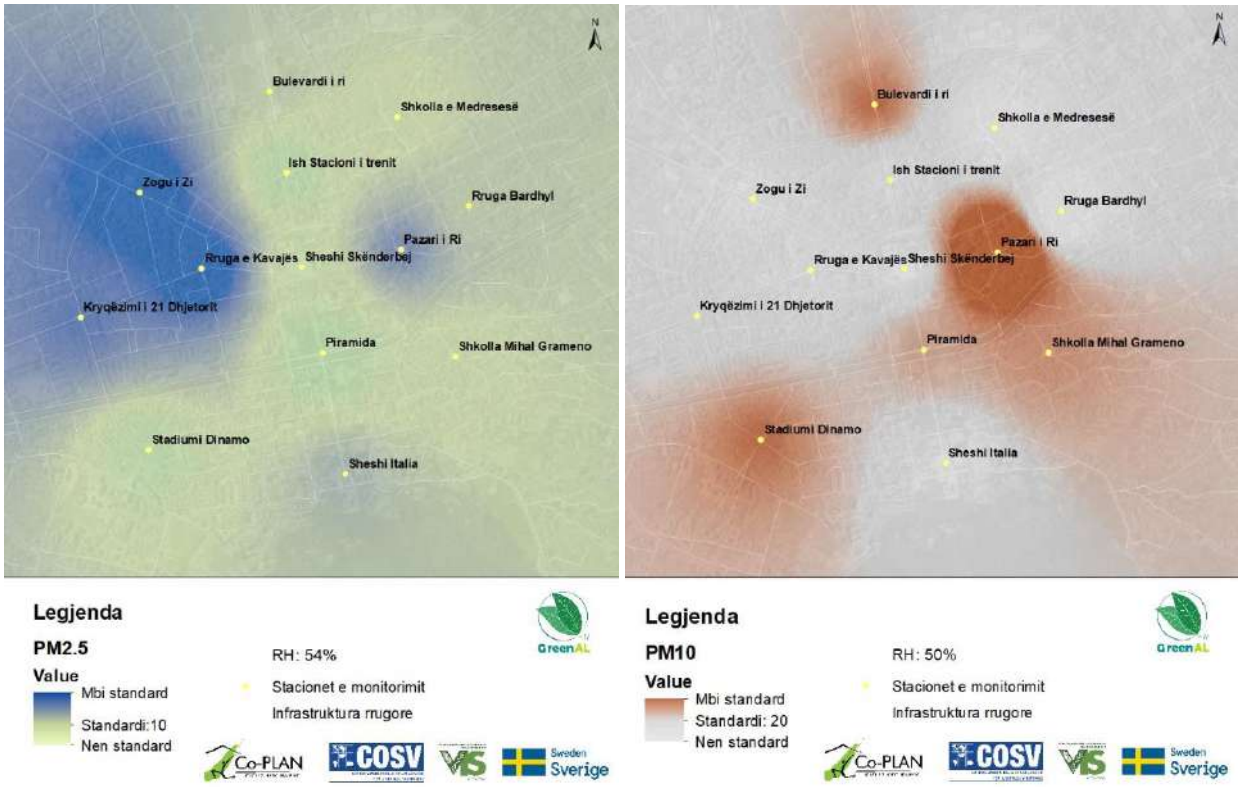
In the fourth round of monitoring, air pollution showed a **significant deterioration**, with high concentrations of fine particulate matter in most of the measurement stations.

For $PM_{2.5}$, 12 out of 13 stations exceeded the permissible standard, indicating widespread pollution throughout the urban area. Only the "Stadium Dinamo" station remained below the limit (9 µg/m³), suggesting a lower exposure to pollution sources. The highest levels were recorded at "Kryqëzimi i 21 Dhjetorit" (31 µg/m³) and "Zogu i Zi," two areas with heavy traffic and high vehicle movement, key factors contributing to the high concentrations of fine particles.

For PM_{10}, 11 out of 13 stations recorded concentrations above the acceptable limit. Only "Medreseja" and "Shkolla M. Grameno" remained below the standard, while the highest pollution was recorded at "Zogu i Zi" (56 µg/m³), a clear indicator of the **impact of construction, road dust, and intensive traffic in this area**.

This deterioration in pollution may be linked to seasonal factors, such as atmospheric stability that hinders the dispersion of pollutants, as well as increased urban activities, especially in areas with heavy traffic and high population density.

Figure 10 The distribution of pollution from $PM_{2.5}$ (left) and PM_{10} (right) in the fifth round of monitoring.

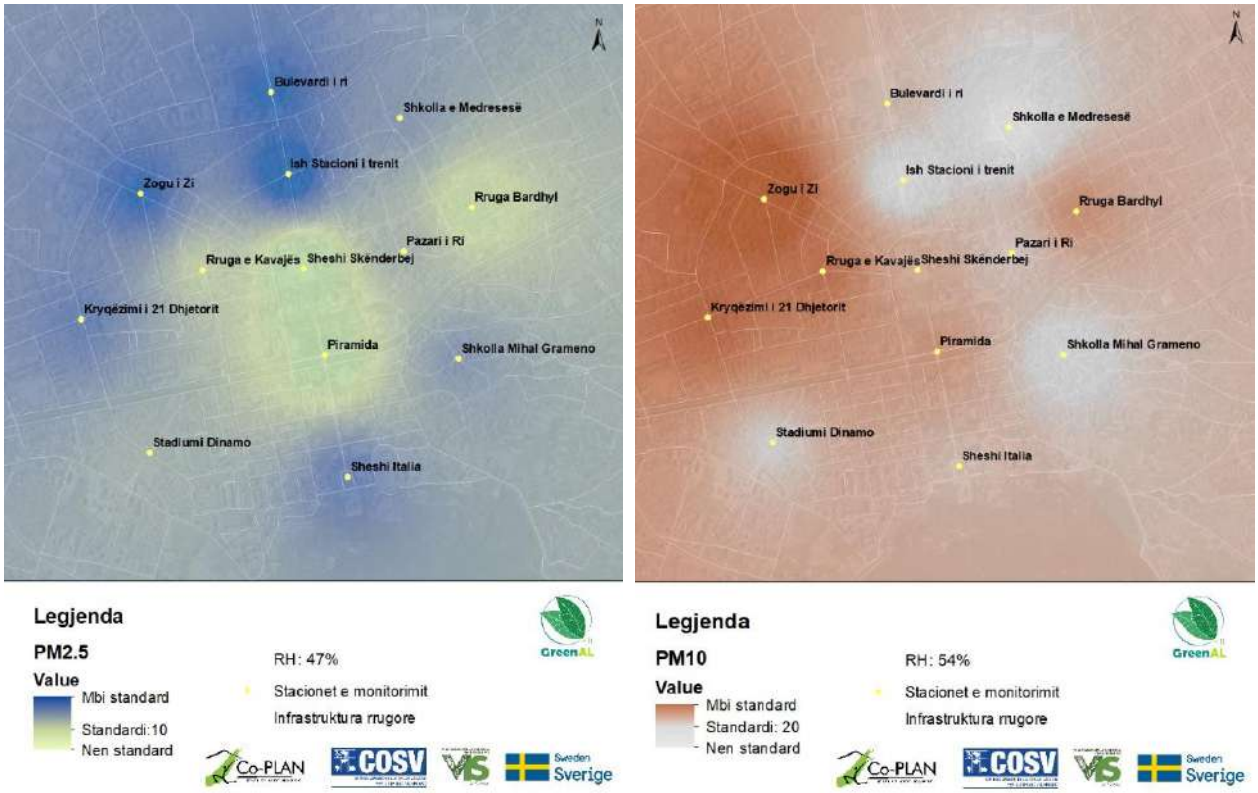


Source: Generated by the author.

In the fifth round, most of the stations exceeded the allowed standards for both $PM_{2.5}$ and PM_{10}, indicating widespread air pollution. For $PM_{2.5}$, only Piramida (10 µg/m³), Treni (10 µg/m³), and Stadiumi Dinamo (9 µg/m³) remained within the limit, while the highest levels were recorded at Kryqëzimi i 21 Dhjetorit (31 µg/m³), Rruga e Kavajës (24 µg/m³), and Zogu i Zi (23 µg/m³).

In the same round, for PM_{10} (standard: 20 µg/m³), most stations exceeded the limit, except for Treni (18 µg/m³) and Bulevardi (20 µg/m³), which are at the allowed threshold. The most problematic points are Kryqëzimi i 21 Dhjetorit (52 µg/m³) and Zogu i Zi (56 µg/m³), which indicate extreme pollution. Additionally, Rruga e Kavajës (37 µg/m³) and Pazari i Ri (23 µg/m³) show significant pollution levels. The results indicate high exposure to fine particulate pollutants in most of the monitored areas, especially at **major traffic nodes** and high-density urban zones.

Figure 11 The distribution of pollution from $PM_{2.5}$ (left) and PM_{10} (right) in the sixth round of monitoring.



Source: Generated by the author.

In the sixth round, most stations exceeded the allowable standards for both $PM_{2.5}$ and PM_{10}, indicating ongoing air pollution. For $PM_{2.5}$, only Piramida (10 µg/m³) remained within the limit, while the highest levels were recorded at the 21st of December Intersection (37 µg/m³), Zogu i Zi (48 µg/m³), and Rruga e Kavajës (35 µg/m³). Sheshi Italia (25 µg/m³), Rruga Bardhyl (30 µg/m³), and Pazari i Ri (24 µg/m³) also showed high pollution levels, signaling significant exposure to fine particulate pollutants.
For PM_{10}, air pollution remains problematic in most stations. The 21st of December Intersection (37 µg/m³) and Zogu i Zi (48 µg/m³) remain among the most polluted areas, while Rruga e Kavajës (35 µg/m³) and Pazari i Ri (24 µg/m³) maintain high pollution levels. Sheshi Italia (25 µg/m³) and Rruga Bardhyl (30 µg/m³) have also significantly exceeded the standard.

Summary Overview

The analysis of the measurement results shows that air pollution from fine particles is an ongoing issue at most monitoring stations, with concentrations frequently exceeding the allowable limit. **On average, 10–12 stations recorded high levels of $PM_{2.5}$,** particularly in areas with heavy traffic and dense urban activities such as "Rr. Kavajës," "Zogu i Zi," and "Pazari i Ri." Significant improvements were observed in Round 4, where only 7 stations exceeded the standard, possibly due to more favorable atmospheric conditions or a temporary reduction in urban activities. Additionally, **PM_{10} has shown regular exceedances at 10–11 stations**, with the highest pollution in "Zogu i Zi" and "“Kryqëzimi i 21 Dhjetorit” ," areas known for high traffic flow and intensive construction activities.

Figure 12 The stations with the highest pollution from $PM_{2.5}$ and PM_{10} during the monitoring period.

Source: Generated by the author.

The differences between rounds may have been influenced by various factors such as meteorological changes, construction activities, and urban traffic. **Lower temperatures and unstable atmospheric conditions have helped disperse pollutants, while higher temperatures and windless periods may have worsened pollution**. Additionally, construction activities have contributed to the increase in $PM_{2.5}$ and PM_{10} concentrations in certain areas, while temporary reductions in traffic on certain days may have led to slight improvements. To better understand these changes, it is important to analyze pollution in parallel with meteorological data and relevant urban activities.

NO_2 monitoring

During the measurements taken at 13 monitoring stations, the data show that pollution from NO_2 has often exceeded air quality standards (40 µg/m³). **High exceedances** were recorded in areas with the densest traffic and intensive urban activities, such as "Kryqezimi i 21 Dhjetorit," "Pazari i Ri," and "Zogu i Zi." Nitrogen dioxide (NO_2) is a major air pollutant, closely linked to **emissions from traffic and economic activities** in urban areas, negatively affecting human health and the environment.

Graph 4 Pollution from NO_2 during the monitored period

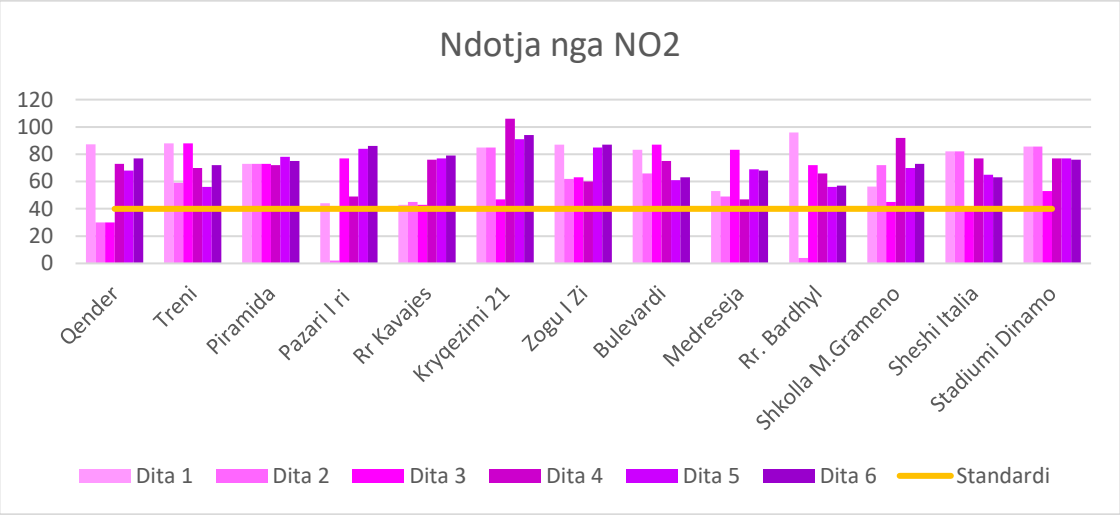
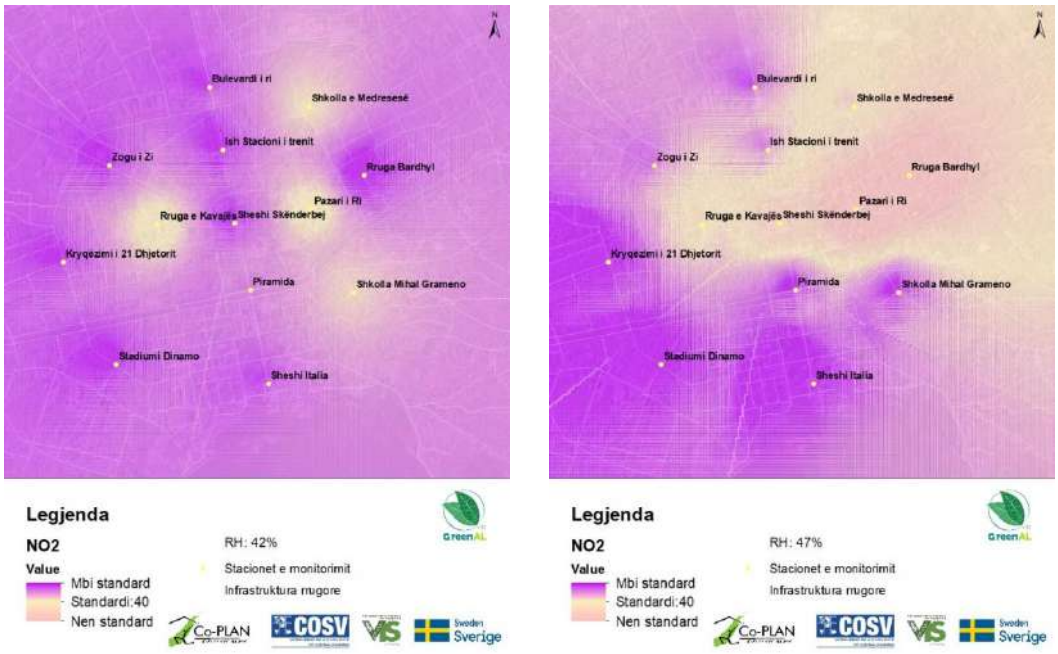


Figure 13 The distribution of pollution from NO_2 in the first round (left) and second round (right) of monitoring.

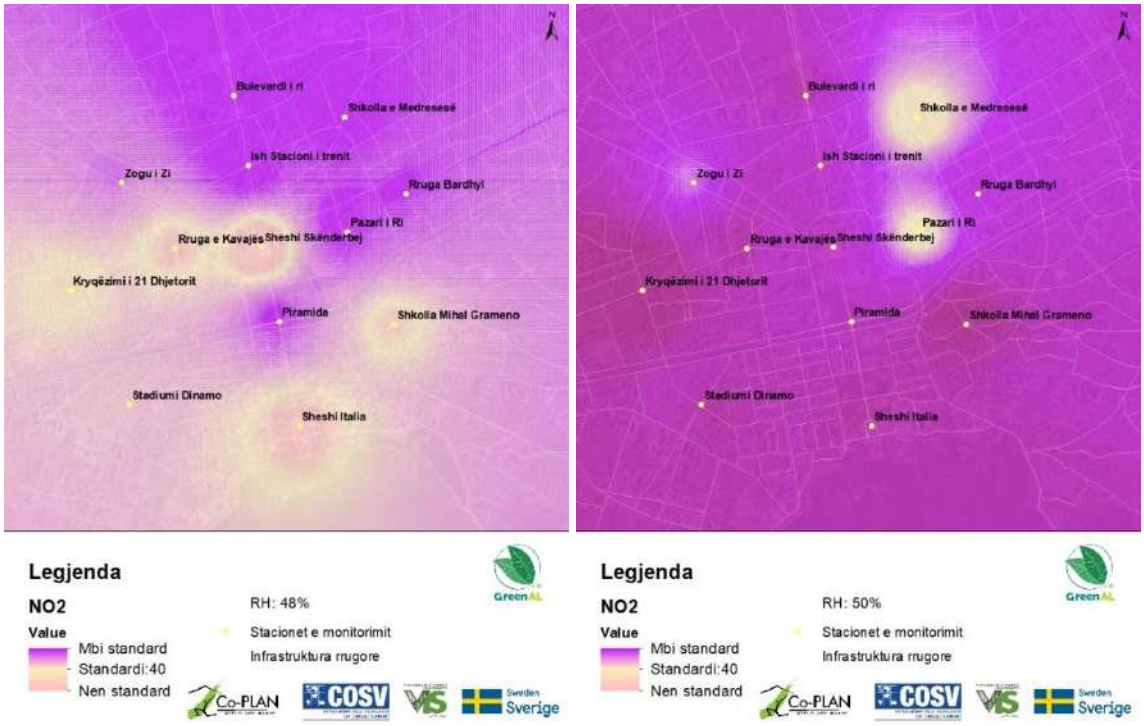


In the first round of monitoring, all stations recorded high levels of NO_2, indicating noticeable pollution in urban areas and near heavy traffic points. This result highlights the ongoing impact of traffic congestion

on urban air quality. The stations with the highest levels of pollution were on Rr. Bardhyl (96 µg/m³) and "Treni," where a value of 88 µg/m³ was recorded, making them some of the most polluted points due to **the high volume of vehicles**. This high value reflects the continuous pressure of heavy traffic and the pollution it causes in these areas. On the other hand, the lowest pollution was recorded on "Rr. e Kavajës," with a value of 43 µg/m³, which is still above the acceptable standard but noticeably lower than the other stations, indicating that this is a location with relatively lower pollution levels compared to areas with more intense traffic.

In the second round, out of the 13 stations monitored, 10 stations exceeded the 40 µg/m³ limit for NO_2, indicating high pollution levels. Only the "Pazari i Ri" and "Rr. Bardhyl" stations remained below this standard, showing cleaner air in these areas. The highest pollution levels were recorded at "Kryqëzimi i 21 Dhjetorit" (85 µg/m³) and "Treni" (59 µg/m³), two locations showing very high pollution due to dense traffic and intensive urban activities occurring in these areas. On the other hand, "Sheshi Skënderbej" and "Shkolla e Medresesë" recorded lower pollution levels, with values suggesting **cleaner and healthier air in these areas**, which may be less exposed to pollution from traffic and urban activities.

Figure 14 Distribution of pollution from NO_2 in the third round (left) and the fourth round (right) of monitoring.



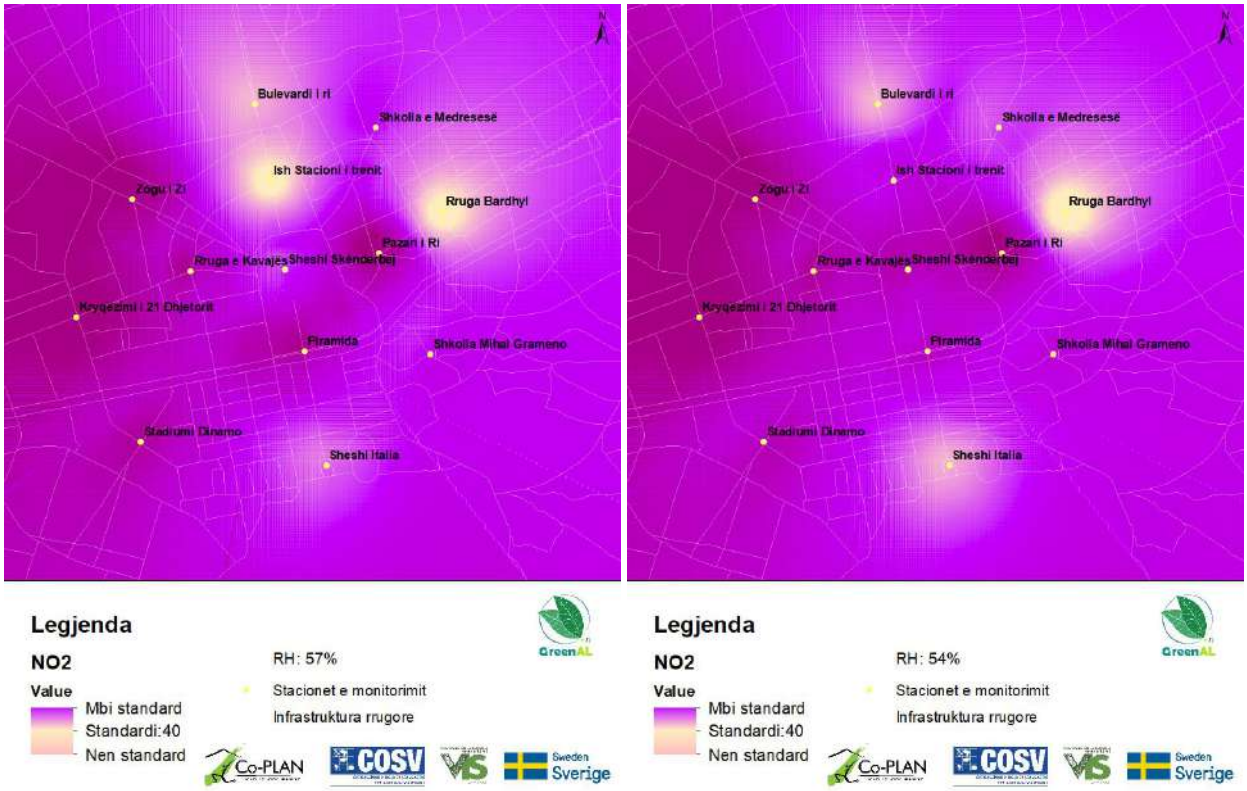
Source: Generated by the author.

During the third round of monitoring, of the 13 observed stations, 11 of them exceeded the 40 µg/m³ limit for NO_2, indicating high levels of pollution. Only "Sheshi Skënderbej" and "Sheshi Italia" remained below this threshold, indicating better air quality in these areas. The highest pollution levels were recorded at "Old Train Station" (88 µg/m³) and "Shkolla e Medresesë" (82 µg/m³), confirming these locations as some of **the most problematic due to heavy traffic**. Meanwhile, "Shkolla M. Grameno" and

"Sheshi Italia" showed lower pollution levels compared to previous days, suggesting that factors such as more open spaces and better air circulation may help reduce pollution.

In the fourth round of monitoring, pollution increased significantly, with 12 out of 13 stations recording NO_2 levels above the allowed limit of 40 µg/m³. The highest pollution was recorded at the **"Kryqëzimi i 21 Dhjetorit" (106 µg/m³), marking the highest value recorded so far.** High pollution levels were also recorded at "Shkolla M. Grameno" (92 µg/m³) and "Pazari i Ri" (49 µg/m³). The lowest pollution was recorded at "Medreseja" (47 µg/m³), but this value still remains above the allowed standard. This increase may have been influenced by factors such as heavy traffic, unfavorable atmospheric conditions, and urban activities.

Figure 15 Distribution of NO_2 pollution in the fifth round (left) and sixth round (right) of monitoring.



Source: Generated by the author.

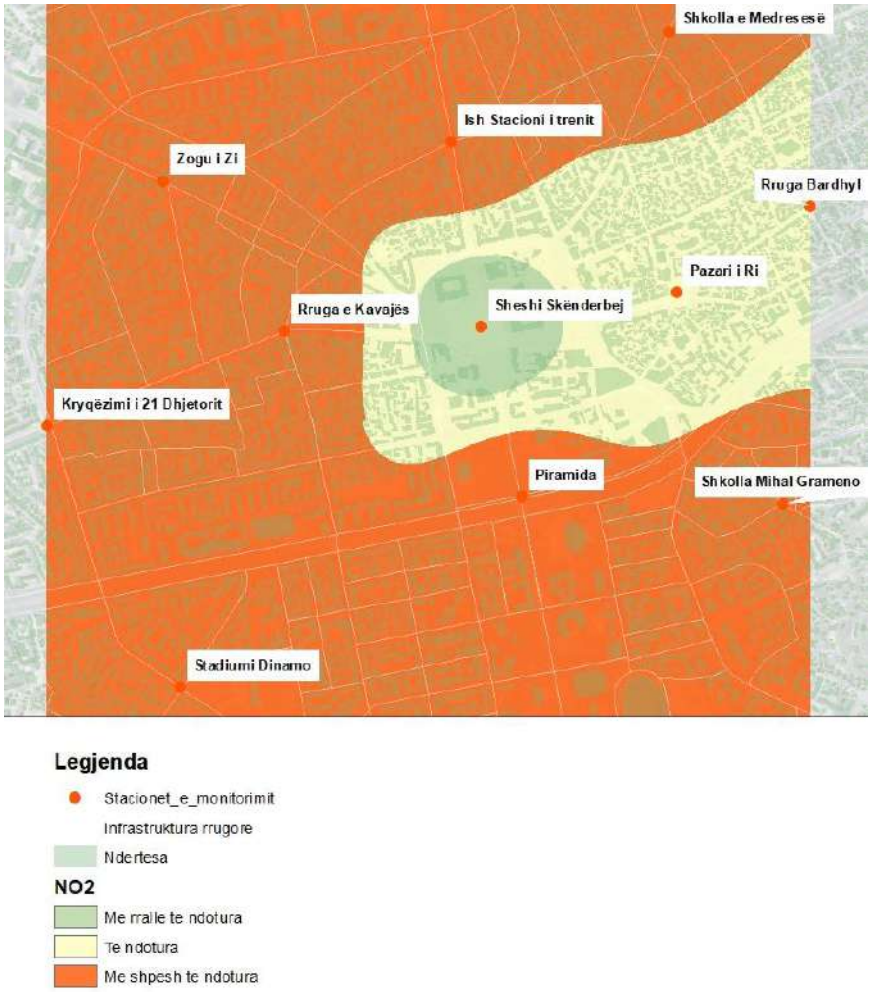
During the fifth round of monitoring, pollution remains high, with 12 out of 13 stations exceeding the permissible standard for NO_2, confirming that air quality continues to be a serious concern. The highest pollution levels were recorded at the "Kryqëzimi i 21 Dhjetorit" (91 µg/m³) and Zogu i Zi (85 µg/m³), both areas with heavy traffic that significantly contribute to the concentration of pollutants. The city center (68 µg/m³) and Pazari i Ri (84 µg/m³) continue to be problematic, indicating that pollution is not limited to major traffic points but extends to other urban areas as well. On the other hand, the lowest pollution levels were recorded at Bardhyl Street (56 µg/m³) and Italy Square (65 µg/m³), although these values remain above the allowed limit. The worsening of pollution may be linked **not only to heavy traffic**

but also to other factors, such as meteorological conditions and the use of **heating systems during the cold months**, which significantly increase the concentration of pollutants in the air.
In the sixth round of monitoring, the situation remains similar, with 12 out of 13 stations continuing to record NO_2 levels above the permissible standard of 40 µg/m³. The highest pollution levels were recorded at the "Kryqëzimi i 21 Dhjetorit" (97 µg/m³) and Pazari i Ri (89 µg/m³), confirming that these areas remain among the most polluted due to heavy traffic and dense urban activities. Similarly, the city center (79 µg/m³) and Zogu i Zi (85 µg/m³) continue to show high levels of pollution, reflecting the significant pressure from vehicle circulation and emissions from other urban sources. On the other hand, the lowest pollution level was recorded at Italy Square (60 µg/m³), although this value still exceeds the allowed limit. Compared to the fifth round, there is a noticeable increase in pollution in several areas, suggesting that factors such as heavy traffic and atmospheric conditions may have negatively impacted air quality during this period.

Summary Overview

During the six rounds of monitoring, air pollution has remained a continuous and concerning problem, with an average of **10–12 stations recording NO_2 levels above the permissible standard** of 40 µg/m³ every day. The data shows that pollution has been particularly high in areas with dense traffic and intensive urban activities, including the ""Kryqëzimi i 21 Dhjetorit" ," "Pazari i Ri," and "Zogu i Zi," which continue to record the highest pollution concentrations. In addition to traffic, these areas are characterized by dense construction and heavy vehicle circulation, factors that significantly impact air quality.
From the analysis of the data collected during these monitoring rounds, it has been observed that pollution fluctuated during certain periods, with moments of deterioration and slight improvement in some areas. In the early rounds, some stations recorded lower pollution levels or were within the standards, but starting from the fourth round, pollution increased significantly, with almost all stations exceeding the permitted limit. The most alarming levels were recorded at the "**"Kryqëzimi i 21 Dhjetorit"** ," which, in some cases, reached values **above 100 µg/m³,** consistently ranking as the most polluted area.
In addition to the impact of traffic, another factor that has contributed to the increase in pollution during these rounds is the cold season. During the **winter months, the use of heating systems significantly rises, and in many areas, especially those with old buildings or weak infrastructure, fuels such as wood and coal are used, which release significant pollutants into the atmosphere.** The combination of heavy traffic and pollution from heating has led to a noticeable deterioration in air quality during certain periods, particularly in the morning and evening hours when pollution peaks.
Another factor that has influenced changes in pollution levels is the weather and atmospheric conditions. On days with **wind or rainfall, pollution temporarily decreased**, as these conditions help disperse pollutants in the air. On the other hand, during dry days with limited air circulation, pollution concentrated at higher levels, negatively impacting air quality, especially in enclosed urban areas.

Figure 16 Stacionet me ndotjen më të lartë nga NO2 përgjatë periudhës së monitorimit



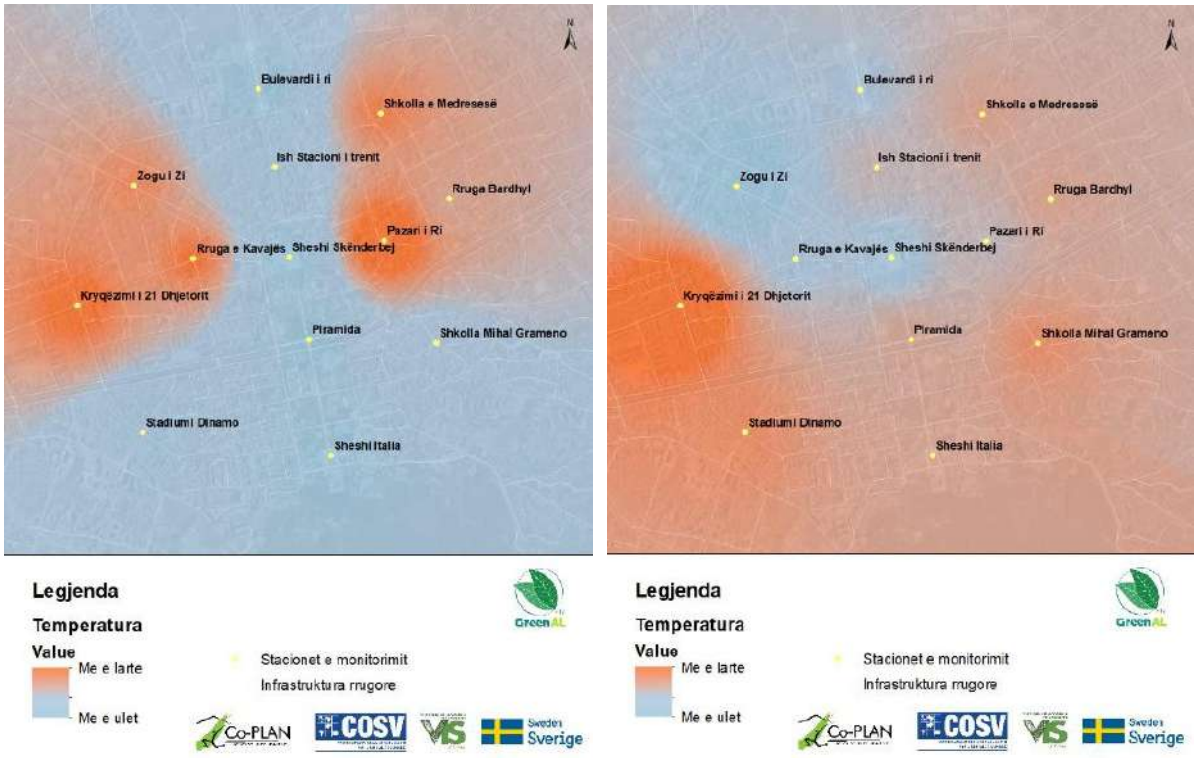
Source: Generated by the author.

Temperature and humidity

From the monitoring of temperatures and relative humidity during the August-September period, significant changes are observed, influenced by urban factors, climatic conditions, and daily activities in the monitored areas.

In the first round, the highest temperatures were recorded at the ""Kryqëzimi i 21 Dhjetorit" " (39.5°C) and "Zogu i Zi" (38°C), two areas with high building density and heavy traffic, where the **urban heat island effect** plays a major role. This effect is caused by asphalt and concrete surfaces, that absorb and retain heat during the day and release it at night, resulting in higher temperatures compared to greener areas. The humidity during this round was relatively low (42%), which favors the **rapid evaporation of water and makes the air drier**, contributing to the sensation of higher temperatures.

Figure 17 Air temperature monitoring during round 1 (left) and round 2 (right).



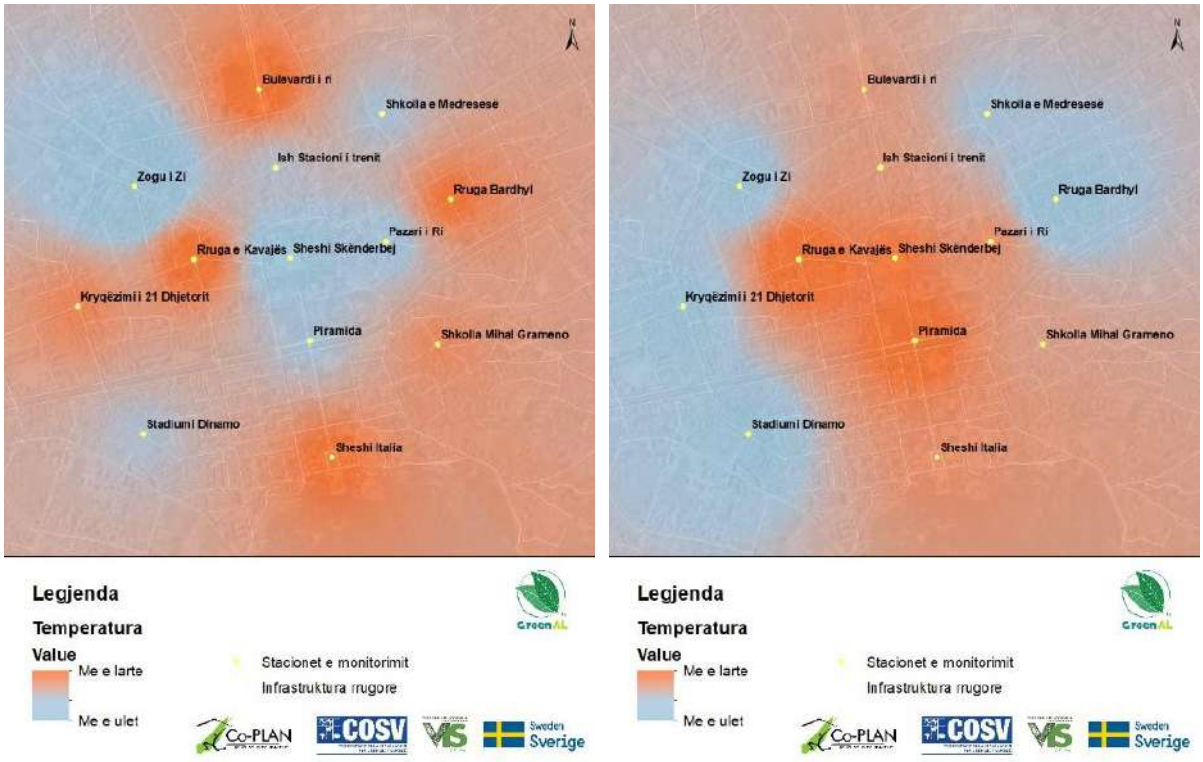
Source: Generated by the author.

In the second round, a decrease in temperatures is observed, particularly at "Zogu i Zi" (24.5°C), while the ""Kryqëzimi i 21 Dhjetorit" " remains at high values. On the other hand, stations such as "Piramida" and "Italy Square" show lower temperatures, possibly due to open spaces and better air circulation. Humidity during this round showed a slight increase (47%), which contributed to a decrease in temperature **due to the higher water vapor content in the air**, which can help distribute heat. These changes may also be linked to meteorological conditions, such as changes in air circulation cycles or

autumn rainfall, which help lower temperatures. Furthermore, the impact of **construction activities** and heavy traffic in certain areas may contribute to maintaining higher temperatures, affecting the variations recorded between different stations.

During the period from the end of September to November, a gradual decrease in temperatures is observed at most of the monitoring stations, as a result of seasonal changes and atmospheric factors. However, some areas, such as the "**“Kryqëzimi i 21 Dhjetorit” " and "Zogu i Zi,"** continue to record higher temperatures (35.4°C and 36.5°C), indicating the impact of urbanization. These areas are characterized by **high building density, few green spaces, and limited air circulation**, which affects the retention of heat even during cooler months. Additionally, construction materials such as concrete and asphalt absorb and retain heat during the day, releasing it slowly during the night, a phenomenon known as the "heat retention effect."

Figure 18 Air temperature monitoring during round 3 (left) and round 4 (right).



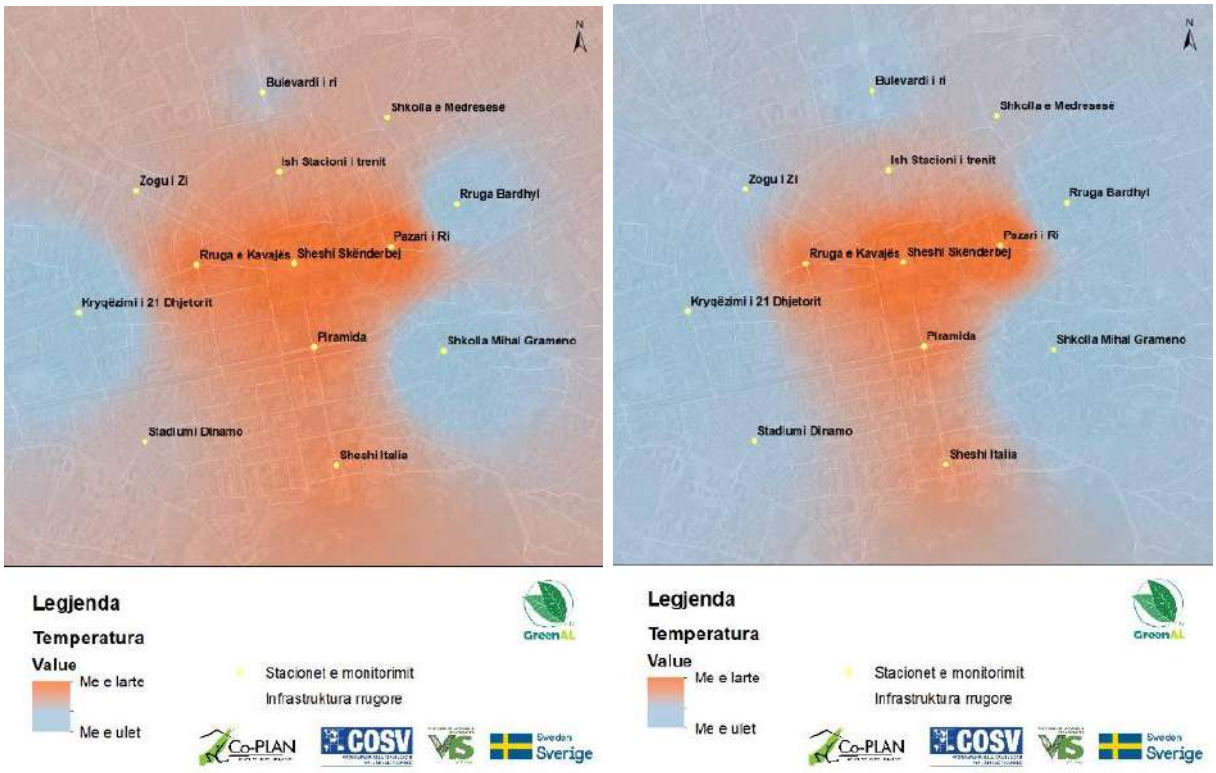
Source: Generated by the author.

During this period, the relative humidity in the air shows a slight increase, reaching 48% during the third round and 50% during the fourth round. This increase can affect the perception of temperature, as higher humidity reduces the evaporation effect, making the air feel warmer on dry days and cooler on days with high humidity. Additionally, during this time of year, weather changes, including weaker winds and calm atmospheric days, may limit the distribution of heat, affecting the temperature differences between

various areas of the city. These factors indicate that, despite the seasonal temperature drop, some densely urbanized areas continue to remain warmer compared to others.

During rounds 5 and 6, which encompass the late fall and early winter months, a noticeable drop in temperatures is observed at most monitoring stations. Stations such as "Stadiumi Dinamo" and "Shkolla M. Grameno" register lower values (16.7°C and 15.4°C), indicating a direct impact of weather conditions and a reduction in the urban heat island effect. At the same time, areas like "Piramida" and "Sheshi Italia" remain among the coolest, which may be linked to the **presence of open spaces, lower traffic levels, and better air circulation.**

Figure 19 Air temperature monitoring during round 5 (left) and 6 (right).



Source: Generated by the author.

Despite this general trend, some areas, such as "Kryqëzimi i 21 Dhjetorit," still **show a tendency to maintain slightly higher temperatures**. This phenomenon may be linked to factors such as urban density, **the presence of solid (concreted) surfaces that absorb and retain heat**, as well as the specific climatic conditions of the period, such as the absence of strong winds or calmer atmospheric days that limit heat distribution. Another significant change during this period is the increase in relative humidity, which reaches 57% in round 5 and 54% in round 6. This increase reflects the **impact of precipitation and the rise in evaporation from urban surfaces**, affecting the perceived temperature. Higher humidity during this period may contribute to a feeling of cooler air, as the higher water vapor content in the atmosphere may hinder the radiation of heat from urban surfaces at night.

Acoustic Pollution

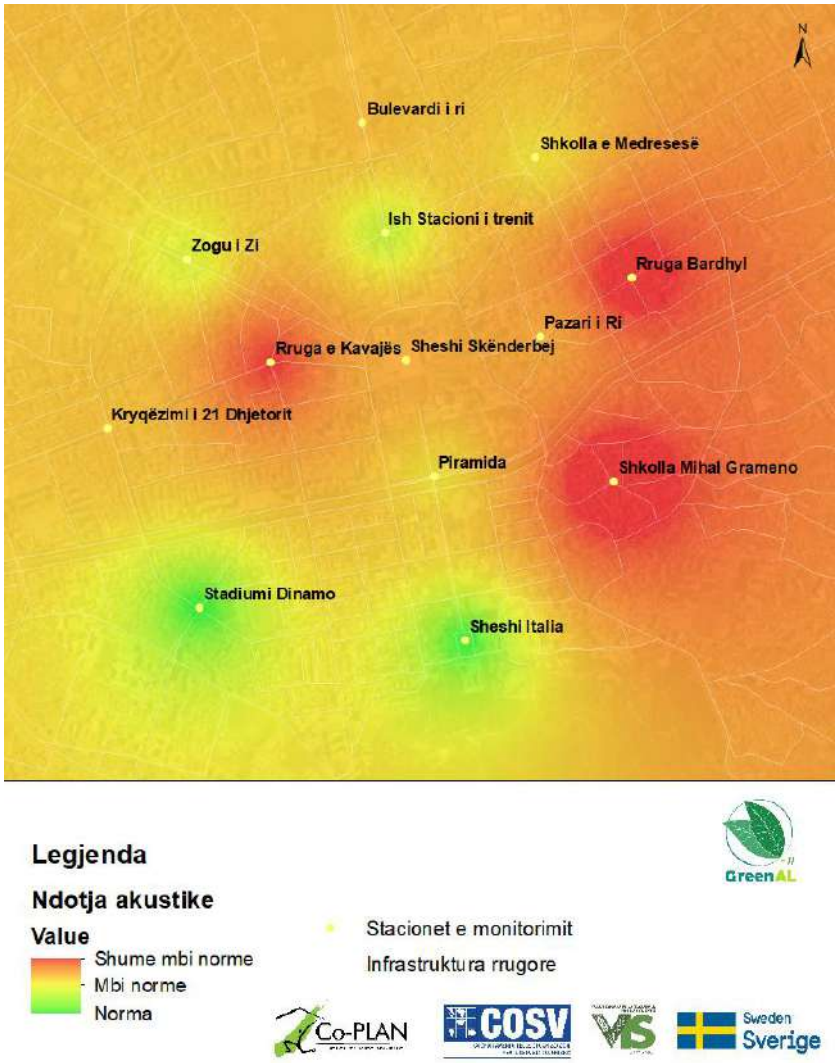
Acoustic pollution in Tirana is an increasingly prevalent problem due to rapid urban development and the growing intensity of traffic. This pollution has a direct impact on the health of citizens, **causing stress, fatigue, and hearing problems**. The city faces high noise levels, mainly from traffic, construction, and commercial activities, especially during peak hours. However, there are periods of the day and different areas that may be quieter, such as mornings or less frequented neighborhoods. This indicates that acoustic pollution is dynamic and dependent on the city's activities. To improve the quality of urban life and the health of citizens, **clear management measures are needed, such as reducing traffic in the most congested areas, creating green spaces**, and promoting awareness of the consequences of acoustic pollution.

In the first round, Sheshi Italia has the highest level of acoustic pollution, with 72.2 dB, indicating that this is one of the noisiest areas measured. Rr. Kavajes and Shkolla M. Grameno also have high noise levels, with 70 dB and 71.2 dB respectively, suggesting the presence of numerous activities and possibly indicating the intensity of traffic or other activities in these areas. Meanwhile, Zogu i Zi has a lower acoustic level of 61.4 dB, making this area quieter and less exposed to acoustic pollution. This round shows that some areas, especially those closer to the center and infrastructure, are more **affected by traffic and daily activities.**

In the second round, a noticeable decrease is observed in some areas such as Qendër (from 65.8 dB to 57 dB), which may indicate a quieter period, possibly due to reduced traffic or activity. Treni and Pazari i Ri continue to be among the noisiest areas, with levels reaching up to 66.8 dB and 67.5 dB, emphasizing the significant impact of traffic and the frequency of visitors. Zogu i Zi and Shkolla M. Grameno remain quieter with lower noise levels (56 dB and 61.4 dB), suggesting that these **are residential areas or places with less intensive activity.**

In the third round, Pazari i Ri and Kryqëzimi i 21 Dhjetorit are again some of the noisiest areas, with noise levels reaching up to 69 dB and 68 dB, indicating that these zones are congested and frequented by various types of users. In contrast, Zogu i Zi remains the quietest area with 56 dB, making it a good option for residential or relaxing activities. Medreseja and Stadiumi Dinamo show a slight increase in noise levels compared to previous rounds, reaching 68.75 dB and 65 dB, which may be linked **to sports activities or increased foot traffic** during the day.

Figure 20 Summary of acoustic pollution distribution during the monitoring period.



Source: Generated by the author.

In the fourth round, Sheshi Italia shows a decrease in noise levels compared to round 1, reaching 68.75 dB. This may be due to a reduction in activities or traffic in this area at that time of day. Meanwhile, Qendra shows a further decrease in noise levels (from 65.8 dB to 61.4 dB), indicating a quieter period. Kryqëzimi i 21 Dhjetorit and Medreseja remain among **the noisiest areas**, with high levels around 65.5 dB, which may reflect increased economic or transportation activity in these zones.

In the fifth round, Treni and Pazari i Ri are again among the noisiest areas with 66.3 dB and 68.25 dB, suggesting that these areas continue to be congested with daily activities, possibly high traffic or visitor intensity. Zogu i Zi remains among the quietest areas, with 56 dB, making it an attractive spot for those seeking tranquility. Stadiumi Dinamo shows a slight increase in noise levels (from 61.4 dB to 63.2 dB), which may be linked to sports or cultural activities in the area.

In the final round, Rr. Kavajes and Pazari i Ri remain among the noisiest areas, with 65.9 dB and 66.78 dB, emphasizing that these areas are constantly congested by traffic and daily activities. Zogu i Zi remains the quietest area, with a noise level of 58.1 dB, indicating that it is a preferred zone for residential and

relaxation purposes for those seeking peace. Sheshi Italia and Medreseja have high levels, around 68.75 dB and 65.56 dB, which may be linked to commercial and social activities taking place in these areas.

Summary Overview

The monitoring of acoustic pollution over the six rounds conducted shows a significant variation in noise levels across different areas of the city, reflecting the impact of factors such as traffic, economic activities, and the use of public spaces. The noisiest areas in most of the rounds include Pazari i Ri, Kryqëzimi i 21 Dhjetorit, Rruga e Kavajës, and Sheshi Italia, with levels reaching up to 72.2 dB, making these spaces critical points for acoustic pollution. Heavy traffic, proximity to major transport hubs, and high foot traffic in these areas for commercial and service purposes are the main factors contributing to these high noise levels.

In contrast, Zogu i Zi (Qemal Stafa School) has consistently recorded the lowest noise levels (around 56-58 dB), appearing as a quieter zone more suitable for residential purposes. The fact that this area maintains lower levels of acoustic pollution may be related to lower traffic density, one-way vehicle movement, and other factors.

Some areas, like the Center and Dinamo Stadium, have shown a decrease in acoustic pollution in the later rounds, suggesting the influence of changes in traffic intensity and daily activities. The reduction in noise in these areas may be the result of better traffic management, changes in activity schedules, or other factors such as weather and seasonality, which can affect the frequency of use of public spaces.

Overall, the monitoring indicates that acoustic pollution remains an ongoing concern in areas with high circulation and intensive economic activity, directly impacting the quality of life and well-being of residents. The high noise levels in these areas can have negative consequences on public health, including stress, sleep issues, and impacts on concentration and productivity.

Results

The alternative monitoring of air quality and acoustic pollution in Tirana has highlighted high concentrations of several major pollutants, which pose a serious concern for public health and the quality of the urban environment. The findings of this study provide an overview of the main issues related to air and acoustic pollution in the city, helping to address the necessary measures for improving environmental conditions.

Key Findings:

- **Carbon Dioxide (CO_2):** The results show that some monitoring stations have recorded CO_2 levels above acceptable limits. Areas with the highest concentrations include "Bulevardi," "Shkolla M. Grameno," and "Zogu i Zi," where dense urban activity and traffic significantly contribute to the accumulation of this pollutant. The high level of CO_2 is an indicator of pronounced pollution from human activities, such as the use of internal combustion engine vehicles and the lack of green spaces for its absorption and reduction.
- **Fine Particulate Matter $PM_{2.5}$ and PM_{10}:** In most monitoring stations, the concentrations of these particles have exceeded the limits set by international organizations such as the World Health Organization. The most affected areas include **major traffic arteries such as "Rruga e Kavajës" and "Zogu i Zi,"** where emissions from vehicles, construction, and the burning of materials are the main sources of pollution. The high presence of $PM_{2.5}$ and PM_{10} can cause respiratory issues, allergies, and other chronic diseases, especially in vulnerable groups such as children and the elderly.
- **Nitrogen Dioxide (NO_2):** High concentrations of NO_2 have been recorded **in areas with intense traffic**, such as "Kryqëzimi i 21 Dhjetorit" and "Pazari i Ri." This pollutant, closely associated with emissions from vehicles and industrial processes, can cause serious respiratory issues in exposed populations. Prolonged exposure to NO_2 is linked to increased cases of **asthma, bronchitis, and other pulmonary diseases**, making it crucial to implement measures to reduce emissions from transportation and industrial sources.
- **Temperature and Urban Heat Island Effect:** Monitoring has shown a noticeable rise in temperatures in certain urban areas, where the urban heat island effect is more pronounced. The areas with the highest temperatures are "Kryqëzimi i 21 Dhjetorit" and "Zogu i Zi," where asphalt and concrete surfaces retain heat for long periods, impacting thermal comfort and air quality. The urban heat island effect not only raises local temperatures but also **leads to higher energy consumption for cooling and air conditioning, further exacerbating the environmental impact.**
- **Noise Pollution:** Noise levels have been reported as problematic in areas with high traffic and intensive economic activity. The most affected areas include "Pazari i Ri," "Sheshi Italia," and "Rruga e Kavajës," where decibel levels often exceed the recommended limits for a healthy environment. **Prolonged exposure to noise pollution can have negative effects on residents' health**, leading to stress, chronic fatigue, difficulties in concentration, and sleep disturbances.

These results highlight the need for strategic interventions to reduce pollution and improve air quality and the urban environment in Tirana. Some more specific recommendations for the Municipality are listed below:

- The Municipality of Tirana should develop a Local Action Plan for Air Quality, addressing in a coherent manner the measures to be taken for reducing emissions from the transport sector, the construction sector (including the existing residential sector), and from industry.
- The Sustainable Urban Transport Management Plan for the Municipality of Tirana, drafted for the 2020-2025 period, foresees activities for monitoring traffic-related pollution. In its review for the next five year period, these monitoring activities should be made public, and clearer indicators should be set for the decarbonization of the sector, beyond investments in green buses.
- In general, there is a direct link between urban form, density and the accumulated pollution within neighborhoods. Promoting high-density development at the parcel level results in more pollution, not only from the construction process but also from the overburdened road usage capacity and lack of proper ventilation. As a result, over time, minimum thermal comfort and livability standards at the neighborhood level will be lost.
- The data suggests that a significant factor in the reduction of air quality is the emissions from heating and cooling devices used in households. Therefore, an integrated approach is needed to address the energy challenges of the housing sector by developing a program for residential renovation and stimulating energy efficiency improvements through financial support.
- Improving air quality and reducing acoustic pollution can be achieved by increasing active green spaces, planting native plants that absorb more pollutants, as well as promoting green facades or vertical greening. These interventions should be promoted at the city level, preceded by a detailed urban biodiversity strategy for Tirana.

Meanwhile, **civil society actors** need to network in an organized manner to work with communities, decision-makers, and the industrial sector in clearly identifying the negative effects of air and acoustic pollution on the quality of the environment, livability, and our cities. The community, supported by environmental organizations, can contribute directly to improving the situation of air and acoustic pollution:

- by reducing individual carbon footprints,
- by promoting and participating in urban "afforestation" and neighborhood gardening campaigns,
- by changing the way streets are used, prioritizing public transport, cycling, and walking,
- by investing in low-emission transportation means,
- by reducing personal energy consumption, as well as investing in alternative energy sources and improving the energy performance of homes,
- by lobbying for sustainable and healthy neighborhoods and communities that prioritize social cohesion over redevelopment,
- by lobbying, advocating, and actively participating in hearings organized within planning processes for healthier urban policies from an environmental perspective.

Civil Society Organizations, by supporting these community initiatives, can be at the forefront of real positive changes, on a small scale but with a greater impact on the urban environment.

Next steps

The main focus of **GreenAL** is expanding the pollution monitoring network in all its forms, aiming not only to collect accurate and comprehensive data on air quality and the urban environment but also to raise awareness and encourage active community participation. Beyond air quality monitoring, the network expansion will include measuring noise levels, assessing ecosystem services from urban greenery, and analyzing pollution in surface waters and soil. These alternative monitoring practices will help create a more complete picture of environmental impacts in cities and identify the most appropriate measures for improving environmental quality.
As part of this commitment, Co-PLAN, within the framework of the GreenAL project, will expand the monitoring network to six selected municipalities, monitoring a total of 800 points, distributed as follows:

- **Tirana – 300 points**
- **Shkodër – 100 points**
- **Elbasan – 100 points**
- **Korçë – 100 points**
- **Durrës – 100 points**
- **Fier – 100 points**

A key component of this initiative is the engagement of citizens and community representatives in all stages of monitoring, from the installation of **low-cost devices** to reporting and interaction through the **Green-Lungs Open-Source WEB & GIS platform**. This platform will serve as an open space for the publication and analysis of the generated data, ensuring transparency and full access for all interested stakeholders.
The upcoming report will delve deeper into these monitoring methods, focusing on enhancing the accuracy of data and improving the reporting process. This will enable a more comprehensive assessment of environmental impacts and the identification of necessary measures to improve environmental quality, making **GreenAL** a key player in this regard.

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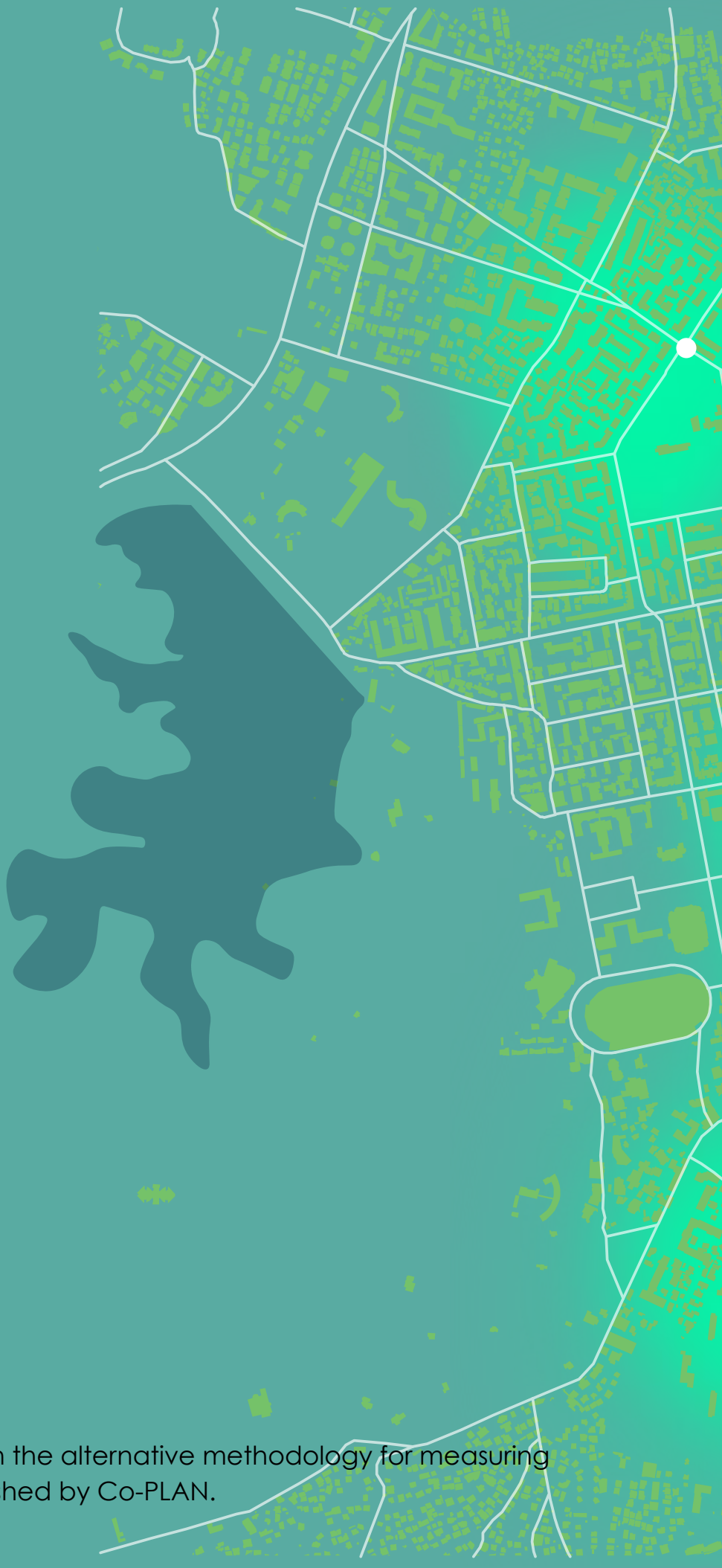

Disclaimer:
The collected data are based on the alternative methodology for measuring air quality and noise levels, published by Co-PLAN.