Air Pollution (PM10) in Athens

Impacts and Solutions for Healthy Live

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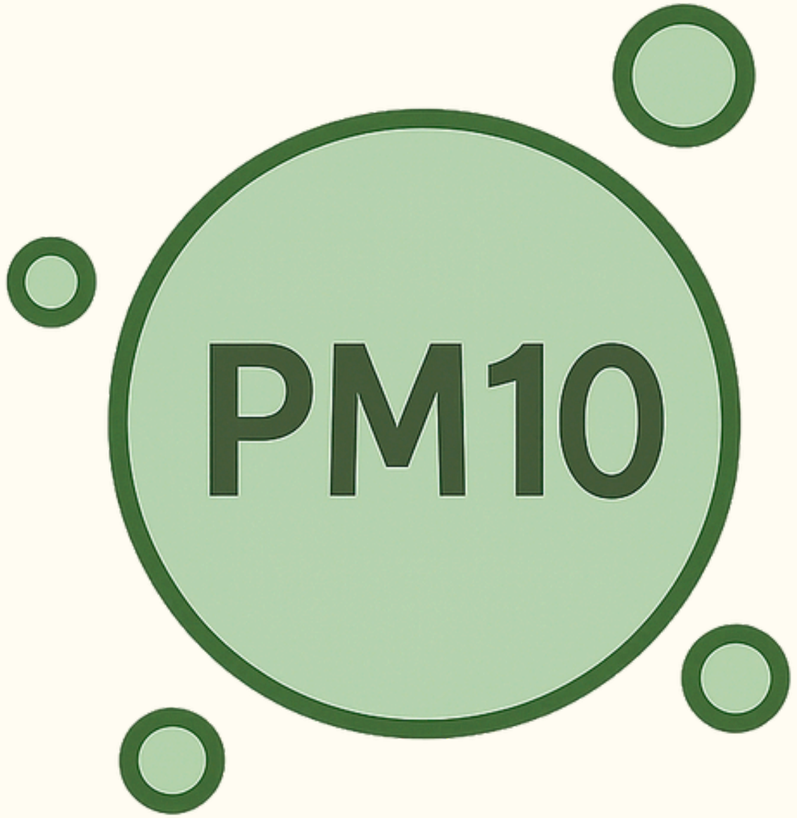
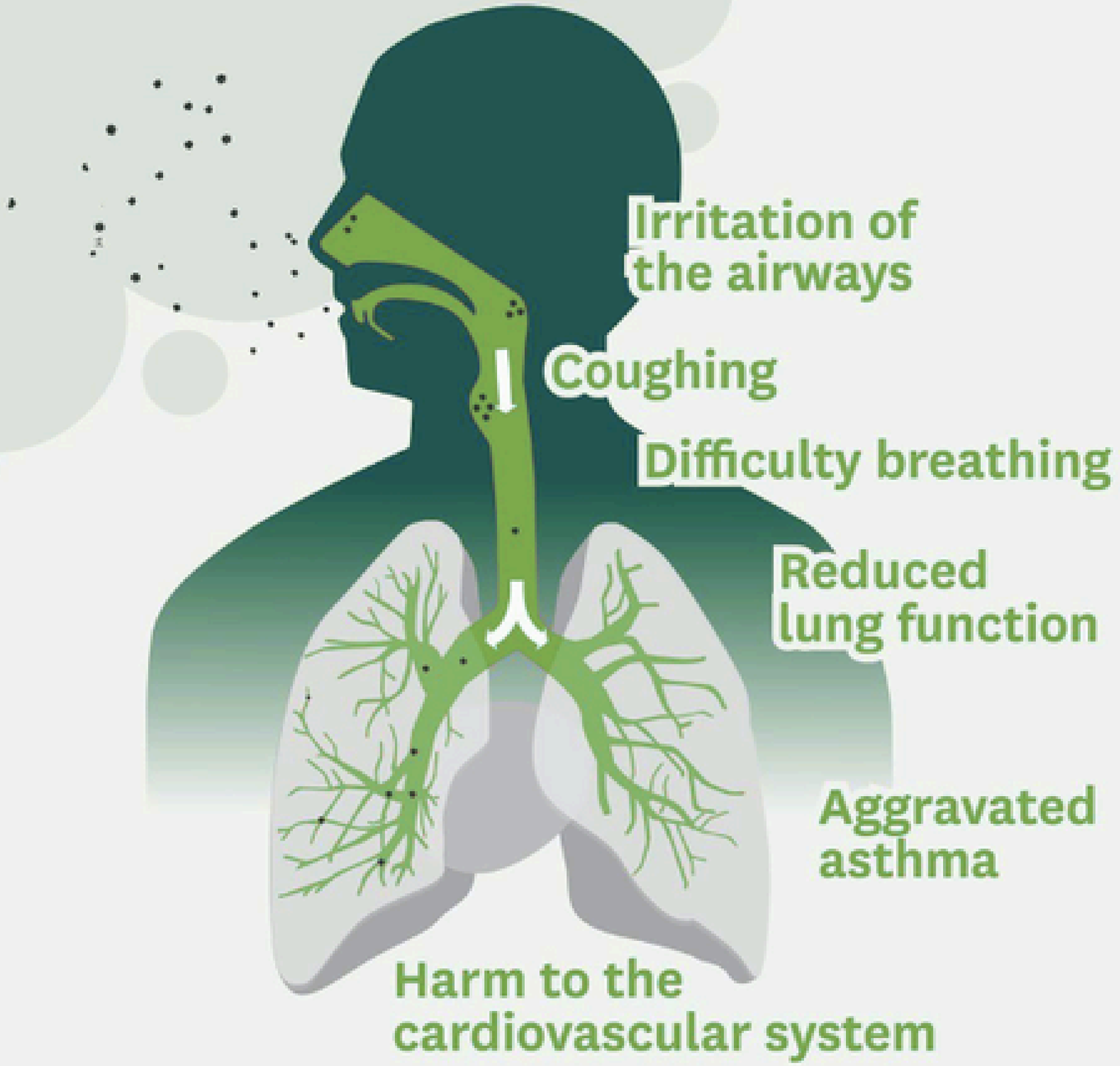
Agenda

- Introduction
- Problem Statment
- Objective
- Weather Condition Analysis
- Vegetation Analysis
- Seasons Analysis
- Human Activity Analysis
- Recommendation

What is PM10 ?



Breathing PM can cause serious health effects



Problem Statement

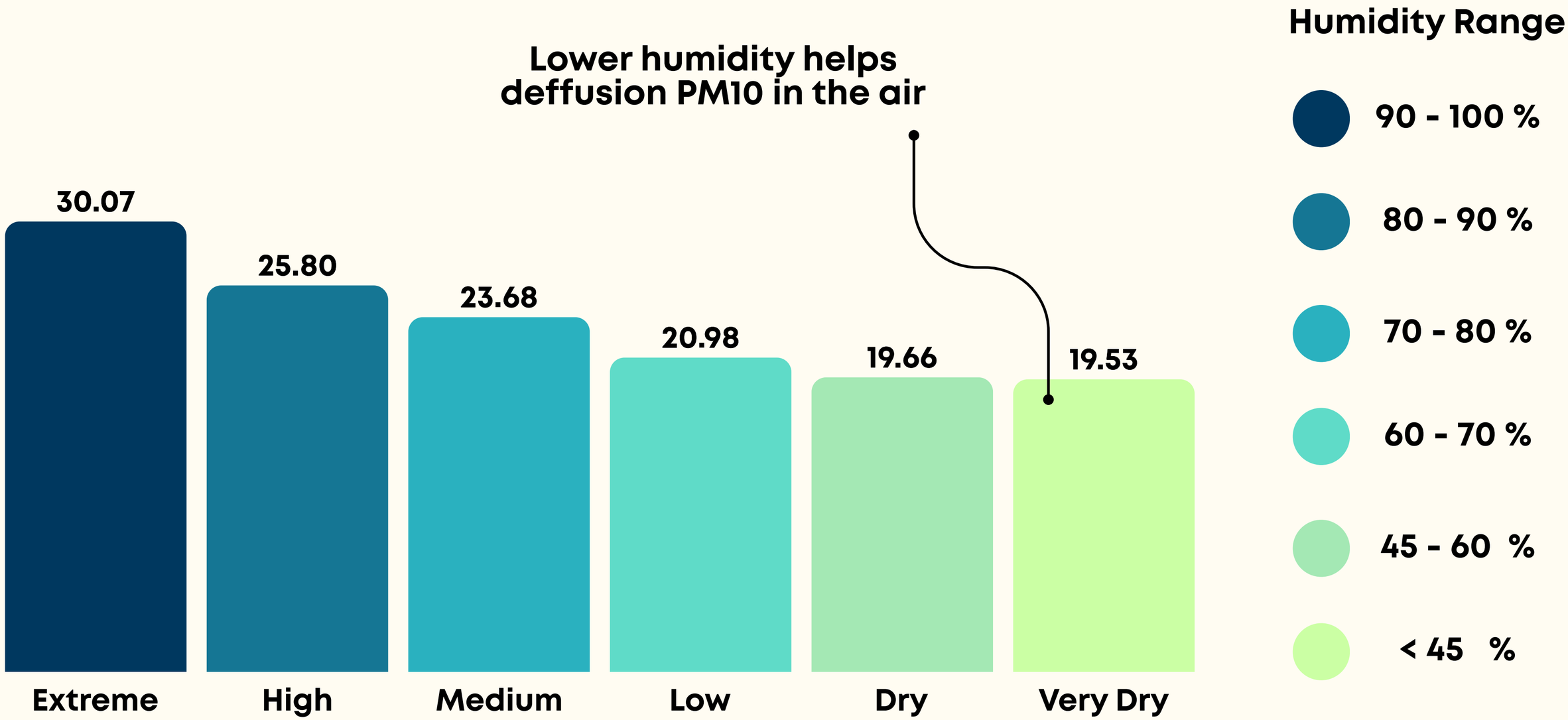
According to the World Health Organization (WHO) in **2021–2022 Athens** was one of the most polluted European cities, with an average **PM10 concentration** of **23.89** μg/m³. This level exceeds the World Health Organization's annual guideline of **15 μg/m³** by **59%,** posing significant risks to **public health, particularly respiratory** and **cardiovascular diseases.**

Objectives

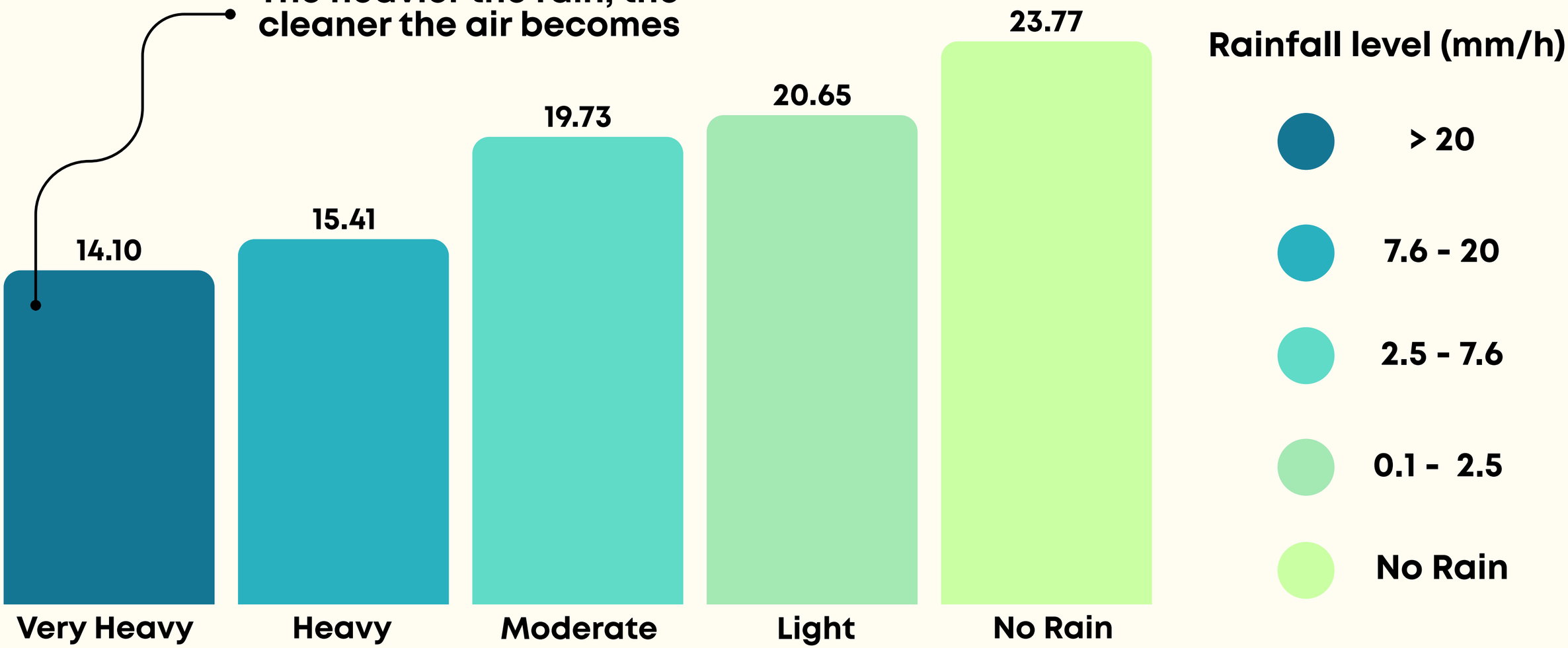
1. Investigate how weather conditions affect pollution levels.
2. Assess the role of vegetation in air quality differences.
3. Analyze temporal patterns (daily, monthly, seasonal) of pollution variation.
4. Evaluate human activities contributing to high PM10 .

Weather Condition Analysis

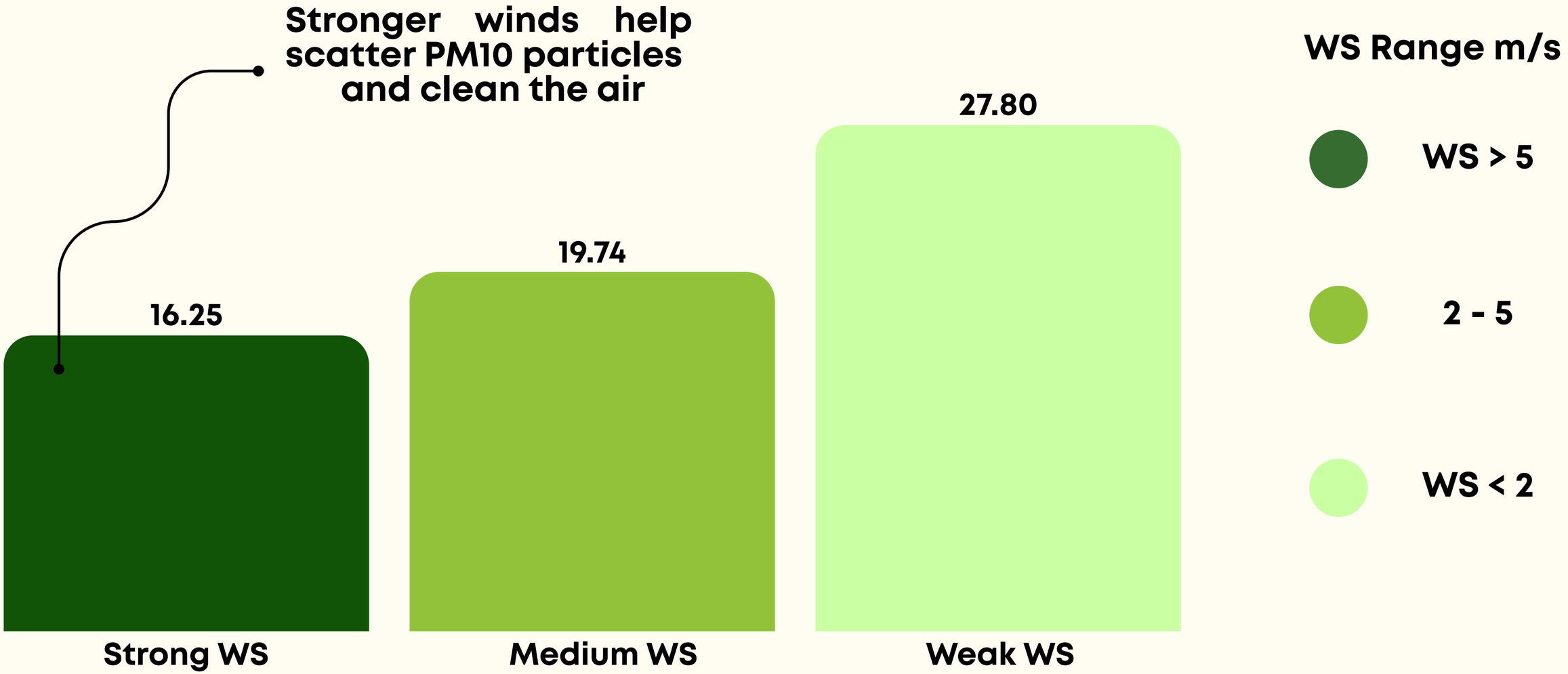
Average PM10 (µg/m^3) per Humidity Level



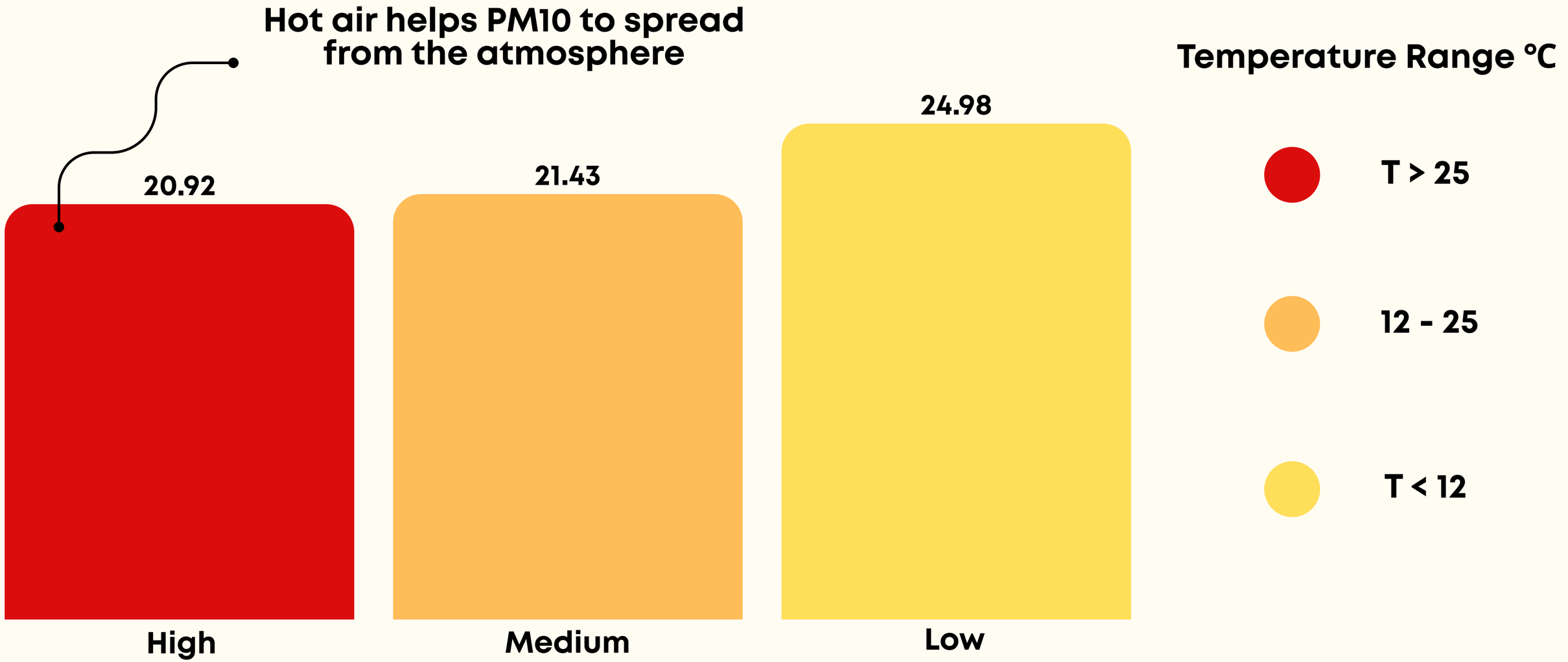
Average PM10 (µg/m^3) per Rainfall Level



Average PM10 (µg/m^3) per Wind Speed Level

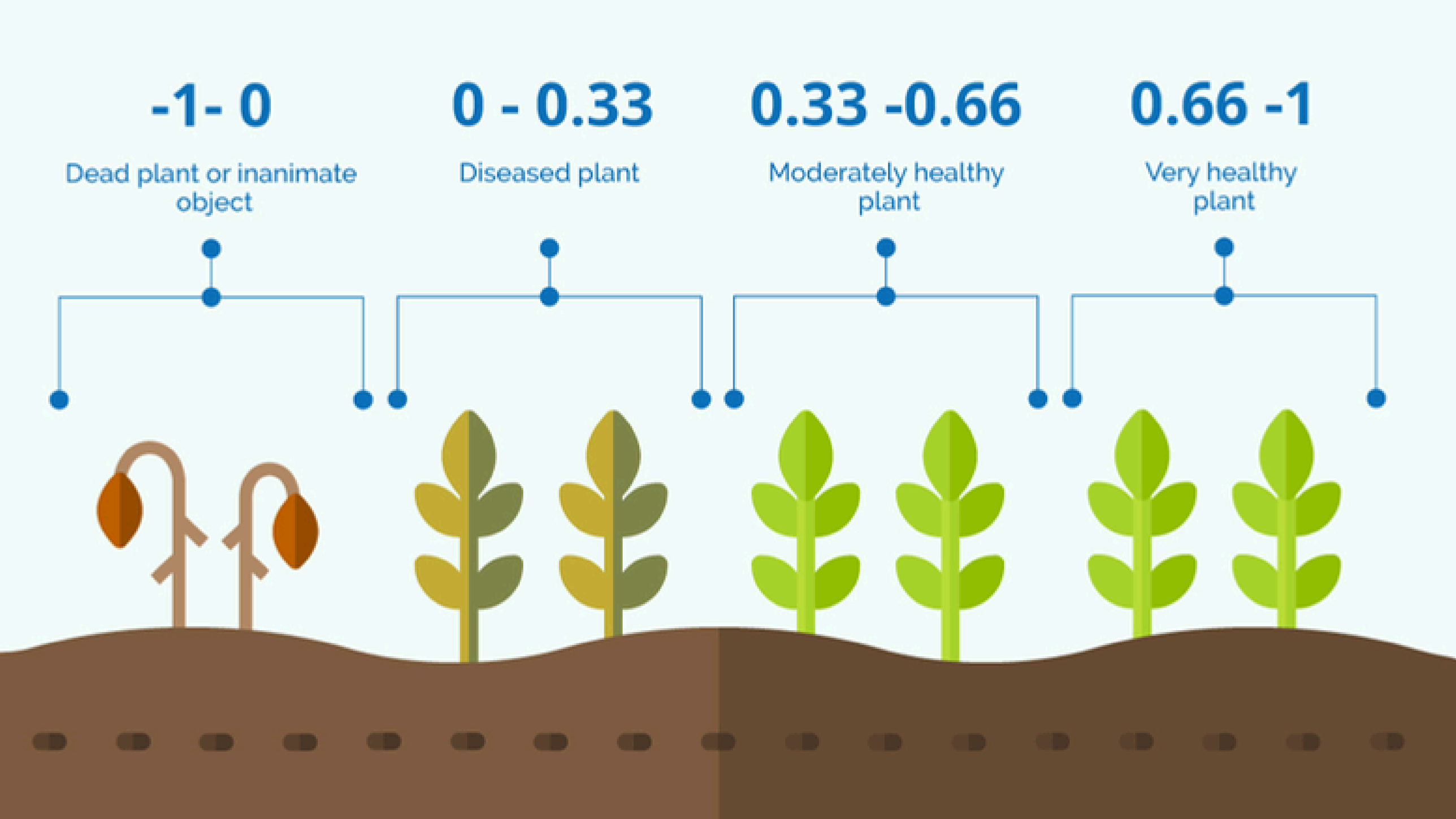


Average PM10 (µg/m^3) per Temperature Level

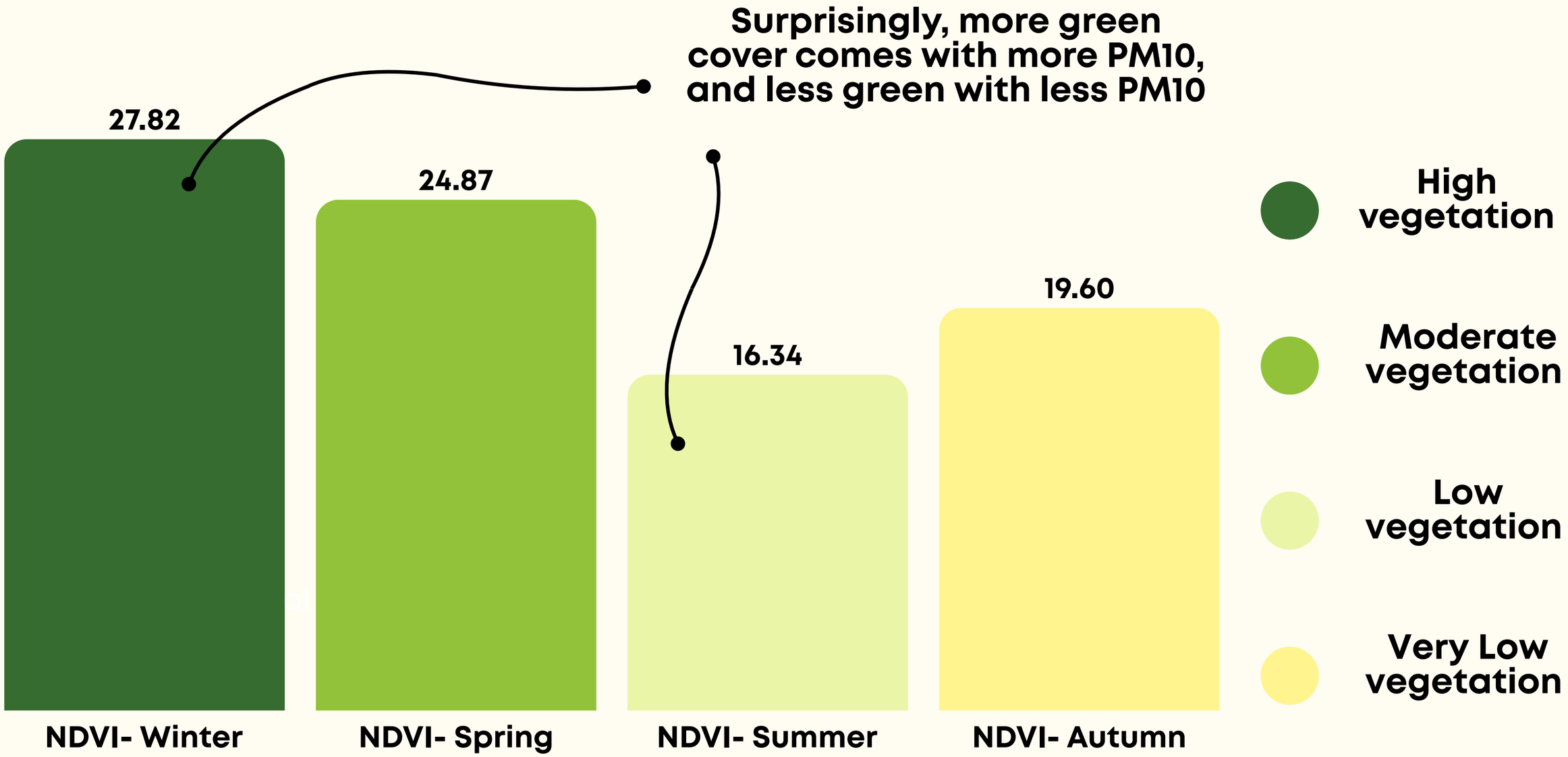


Vegetation Cover Analysis

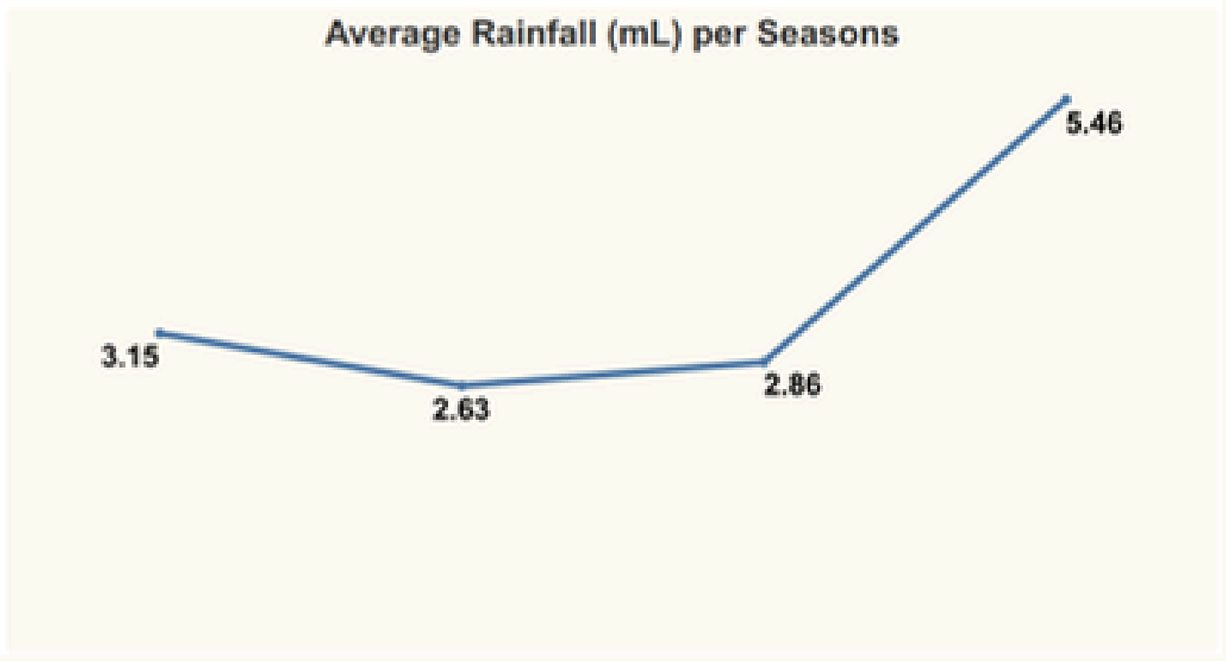
What is NDVI ?

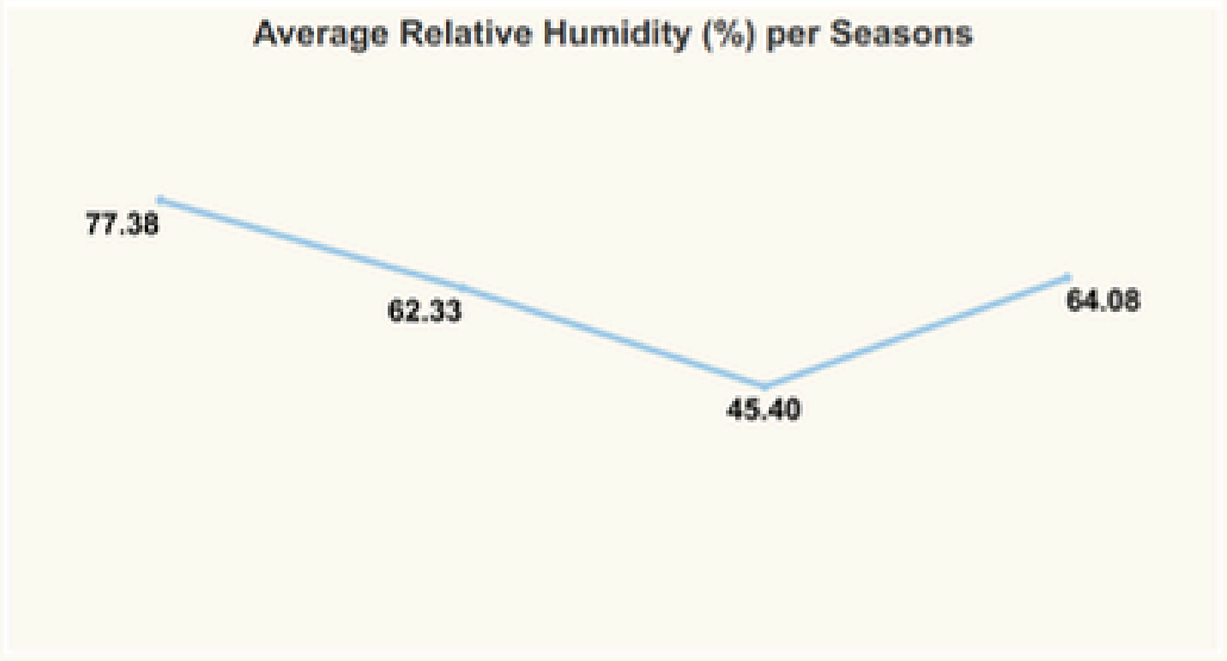

-1- 0
Dead plant or inanimate object
0 - 0.33
Diseased plant
0.33 -0.66
Moderately healthy plant
0.66 -1
Very healthy plant

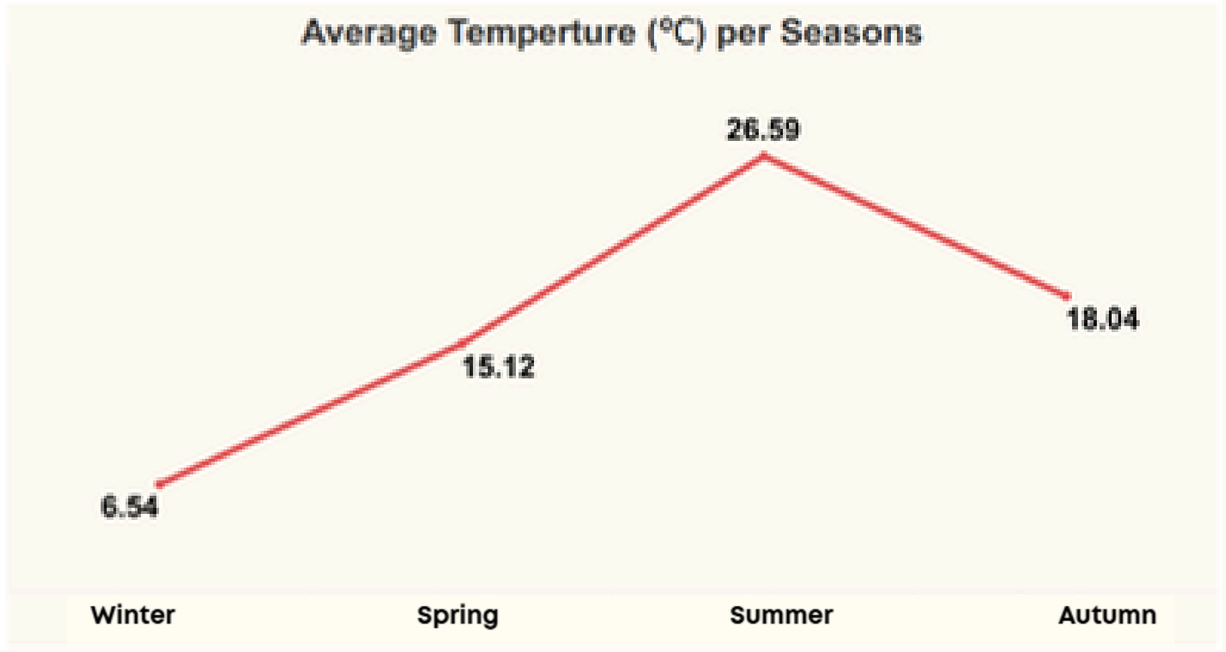
Average PM10 (µg/m^3) per Vegetation level

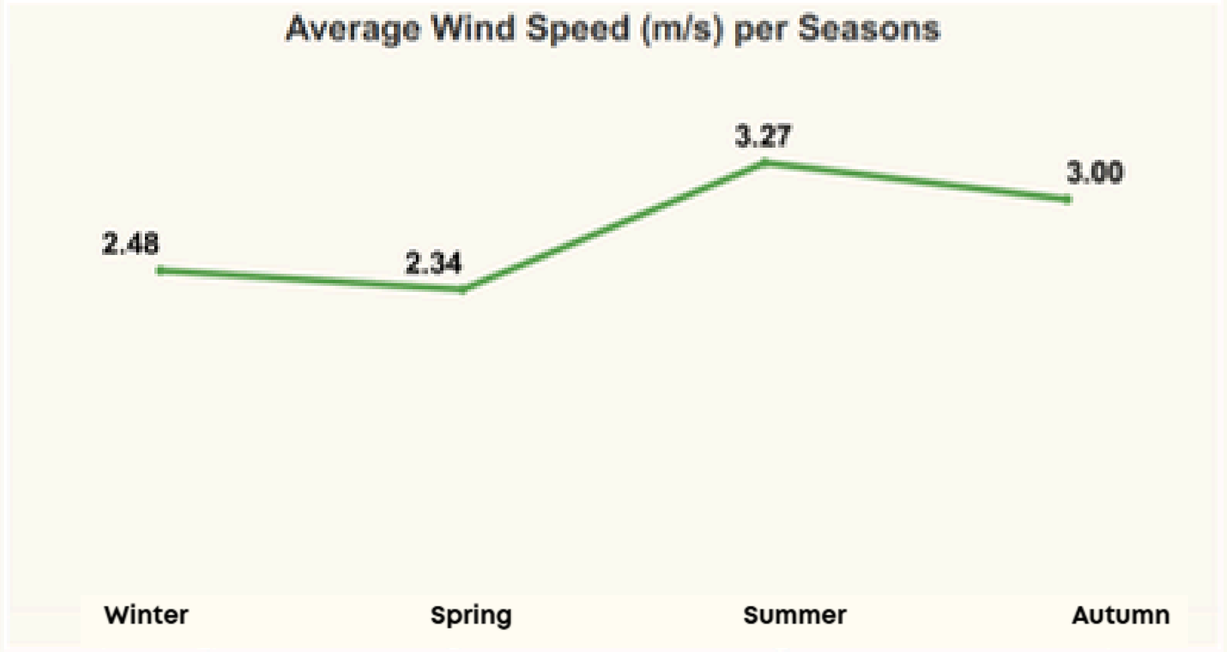


Seasons Analysis


Average Rainfall (mL) per Seasons
3.15
2.63
2.86
5.46


Average Relative Humidity (%) per Seasons
77.38
62.33
45.40
64.08


Average Temperture (°C) per Seasons
6.54
15.12
26.59
18.04
Winter
Spring
Summer
Autumn


Average Wind Speed (m/s) per Seasons
2.48
2.34
3.27
3.00
Winter
Spring
Summer
Autumn

Human Activity Analysis

HUMAN ACTIVITY

Traffic Emissions

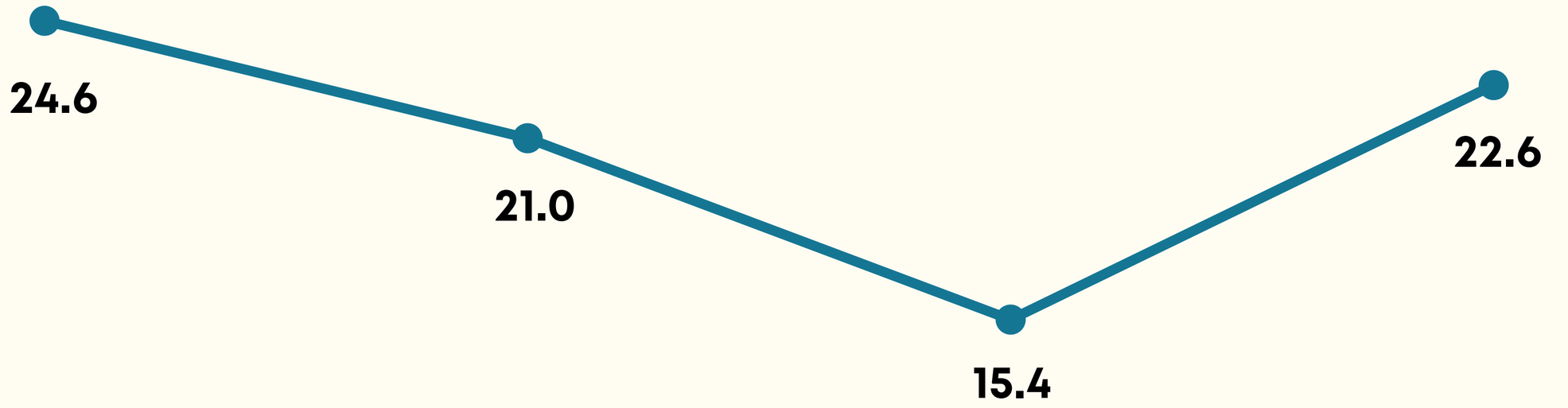
Industrial Emissions

Urban Pollution

How can we measure human activity ?

- **Traffic** – NO_2 mainly comes from cars, buses, and trucks.
- **Industry & Power** – Factories and power plants release NO_2.
- **Local Indicator** – It stays in the air for a short time, so it shows local human activity.
- **Easy to Measure** – Satellites and ground stations can track it clearly.

Average NO2 (µg/m^3) per Seasons



Winter Spring Summer Autumn

Recommendation

Increase taxes on factories and power plants whose emissions exceed the allowed limits

Promote the use of public transportation and set regulations on private vehicle ownership

Clean roads regularly from dust, and enforce dust control measures

limit outdoor activities during critical conditions, such as covering construction sites as practiced in China

THANK YOU