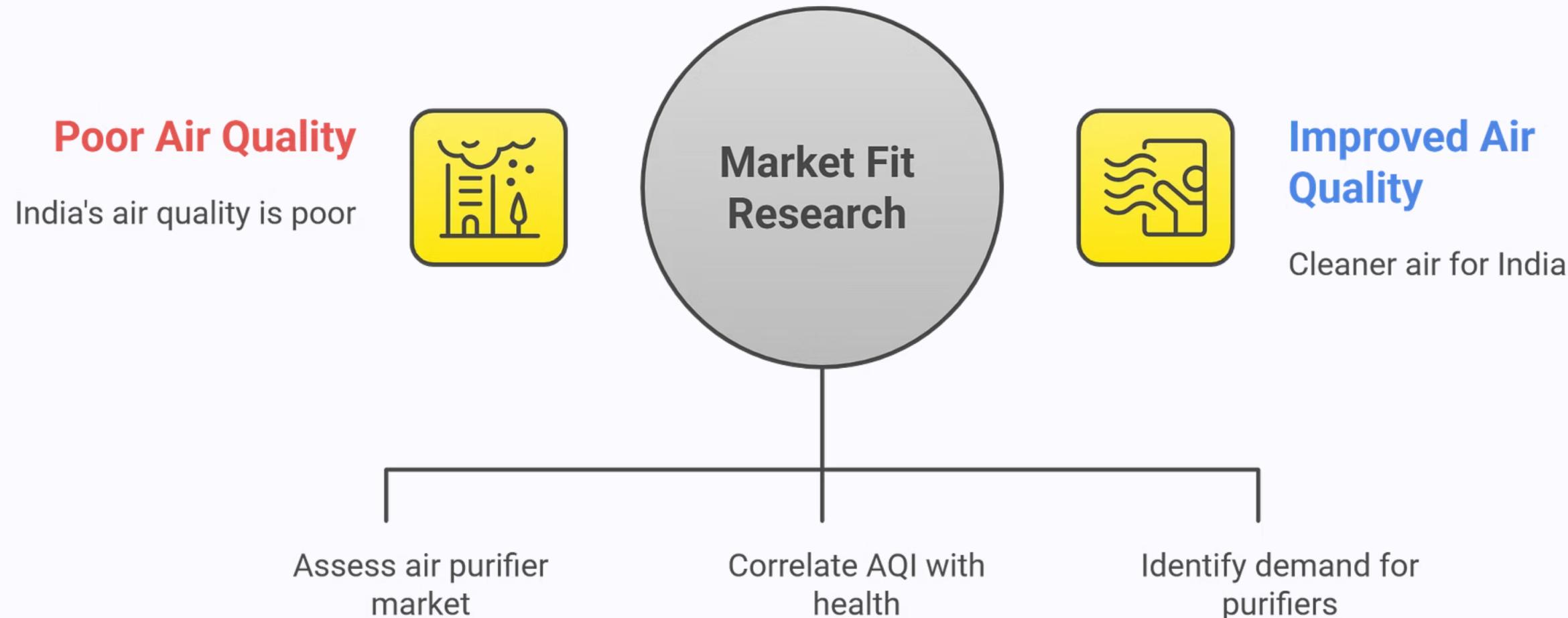


# AirPure Innovations: Market Fit Research using AQI Analytics





# Project Overview: Market Fit Research for AirPure Innovations

## 💡 Context:

India is facing a severe air quality crisis, with **14 cities ranked among the world's top 20 most polluted**. Despite growing awareness, the **air purifier market lacks data-driven direction**, and most products fail to address region-specific pollution challenges.

**AirPure Innovations**, an emerging startup, aims to develop a smart, affordable air purifier. However, before investing in product development and R&D, the company needs to answer four critical questions:

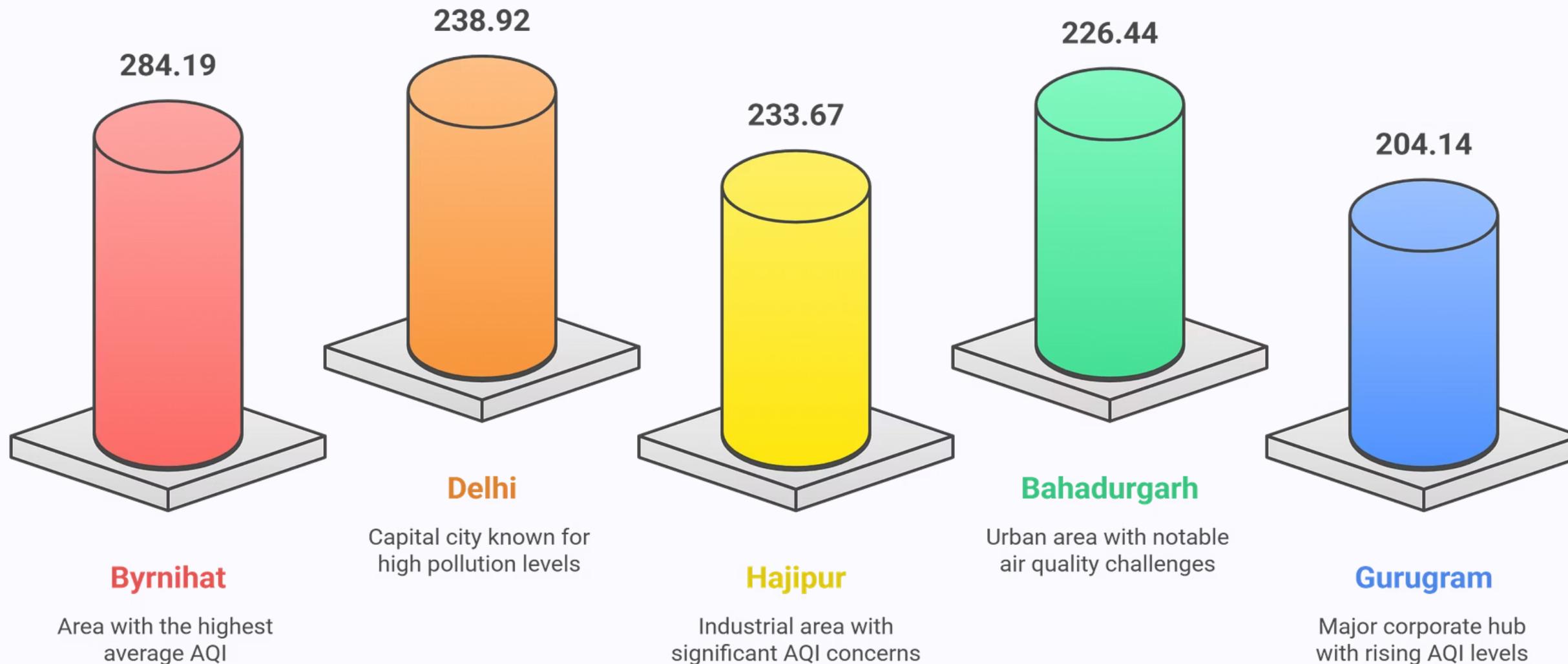
## 🧩 Core Challenge:

Despite rising public concern, **AirPure Innovations** lacks clarity on four critical fronts:

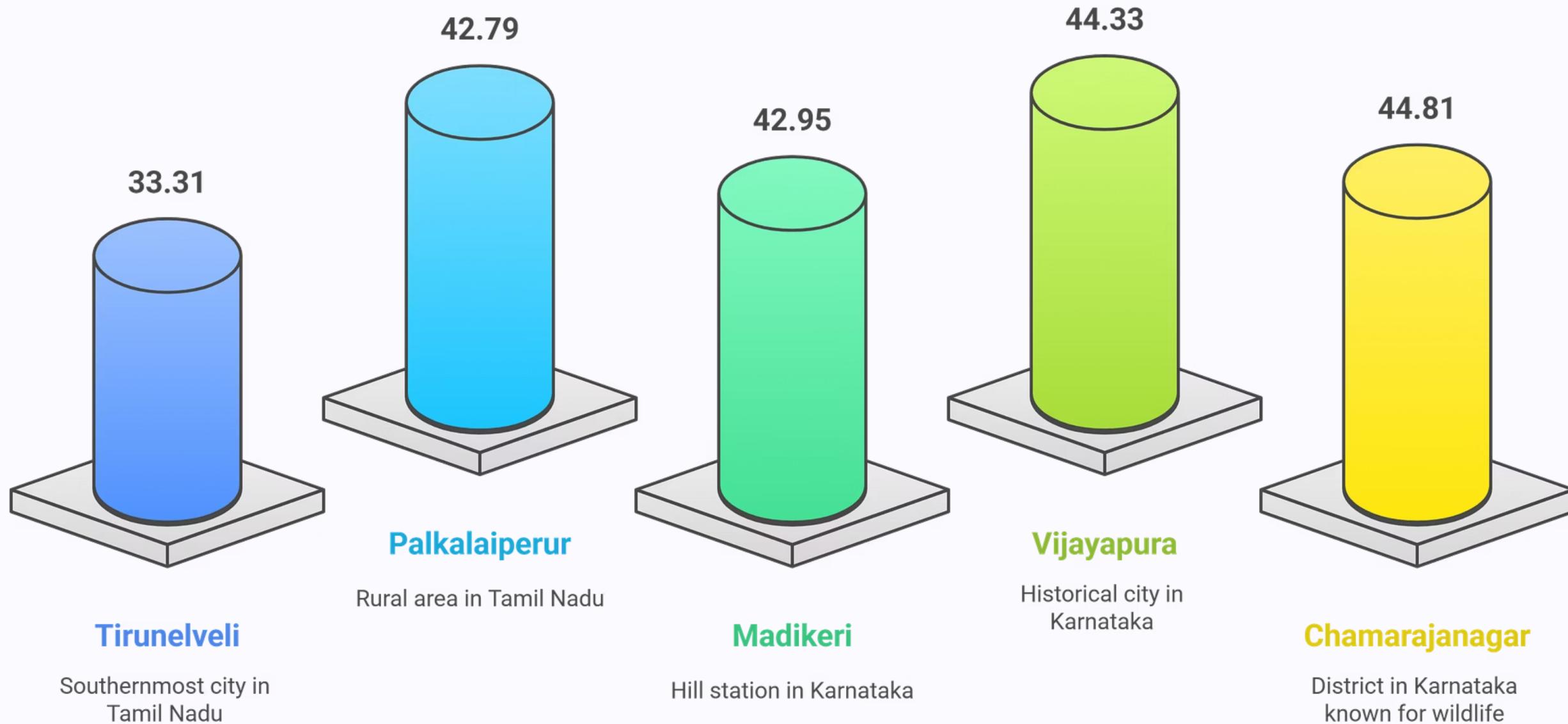
1.  **Which pollutants** pose the greatest health and commercial concern in different regions?
2.  **What** are the most essential features to include in the purifier?
3.  **Where** is the strongest, most underserved demand — and what's the market size?
4.  **How** can R&D be aligned with **localized pollution patterns**?

# Primary Analysis

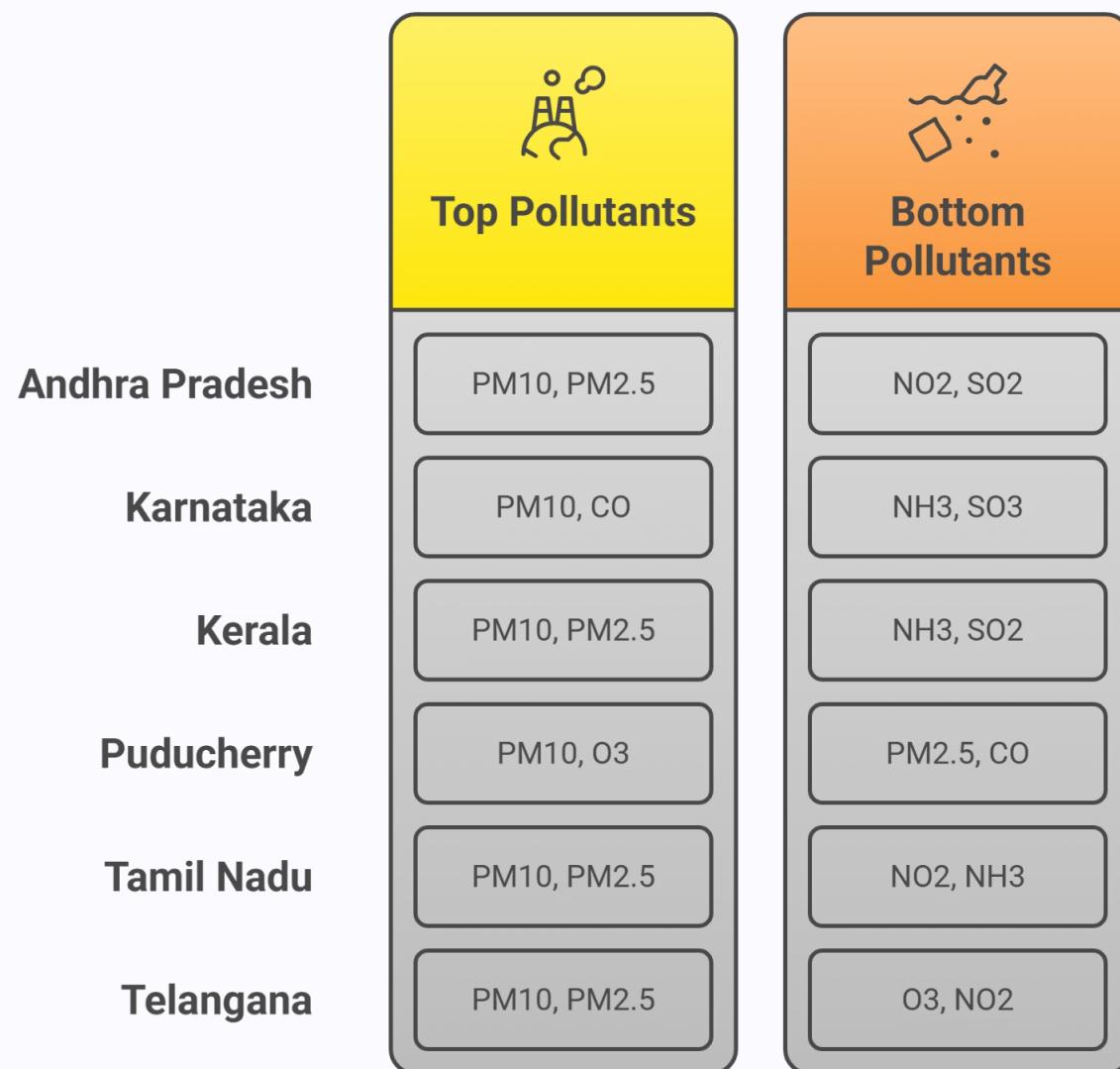
## Top 5 Areas with Highest Average AQI (Dec 2024 - May 2025)



## Areas with Lowest Average AQI (Dec 2024 - May 2025)



## Top/Bottom Pollutants by State (Southern India)



## What This Means for AirPure:

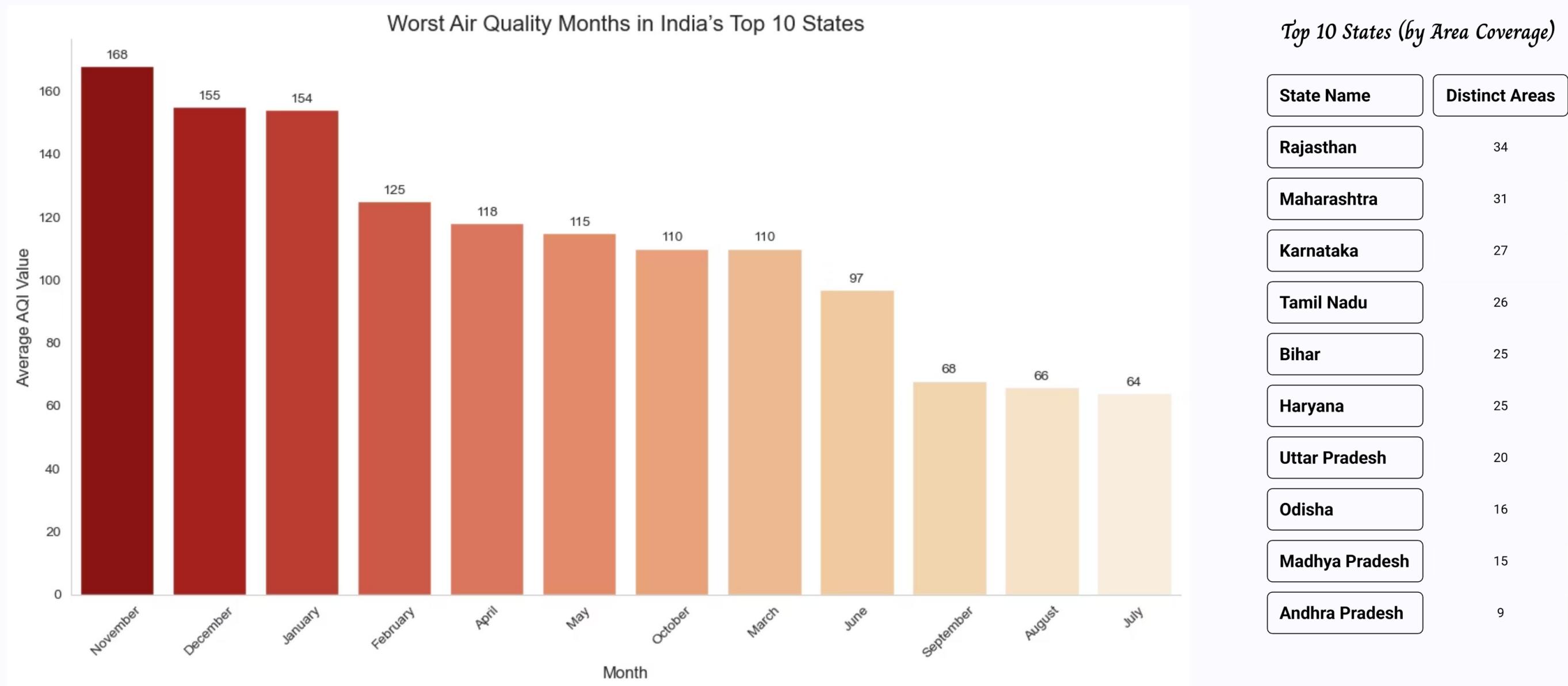
- Product design must **prioritize PM10 & PM2.5 filtration**, especially for South India.
- Consider **modular filters** for states with higher presence of **CO, NH<sub>3</sub>, or O<sub>3</sub>**.
- **Awareness campaigns** in states like Telangana or Tamil Nadu can focus on invisible pollutants (e.g., O<sub>3</sub>, NH<sub>3</sub>) that people might overlook.

## AQI Comparison: Weekdays vs. Weekends in Indian Metro Cities (Last 1 Year)

### 🎯 Strategic Implications for AirPure:

- Weekday vs weekend differences are marginal, but highlight user behavior patterns.
- Delhi and Chennai could benefit from smart purifiers that auto-adjust during weekday peaks.
- Marketing should highlight 24x7 filtration in cities with worse weekend AQI, like Ahmedabad and Mumbai.

City	Weekday AQI	Weekend AQI	AQI Change
 Delhi	208.78	198.92	Improved
 Ahmedabad	114.67	116.04	Worse
 Pune	101.94	100.85	Improved
 Kolkata	91.66	91.26	Slightly Improved
 Mumbai	90.95	92.65	Worse
 Hyderabad	77.94	79.01	Worse
 Bengaluru	71.89	72.38	Slightly Worse
 Chennai	71.31	68.44	Improved



# Insights from Monthly AQI Trends:

## 1. Seasonal Sales Strategy:

- The sharp AQI spike in **Nov-Jan** is a golden window for **product launches, ad campaigns, and purifier promotions**.
- You can align with **Diwali + winter demand** — "*Breathe Better This Festive Season.*"

## 2. Demand Forecasting Insight:

- The **30-40% drop in AQI** after winter means **consumer urgency declines** — pricing and features should adjust with seasonality (e.g., **EMIs or discounts post-February**).

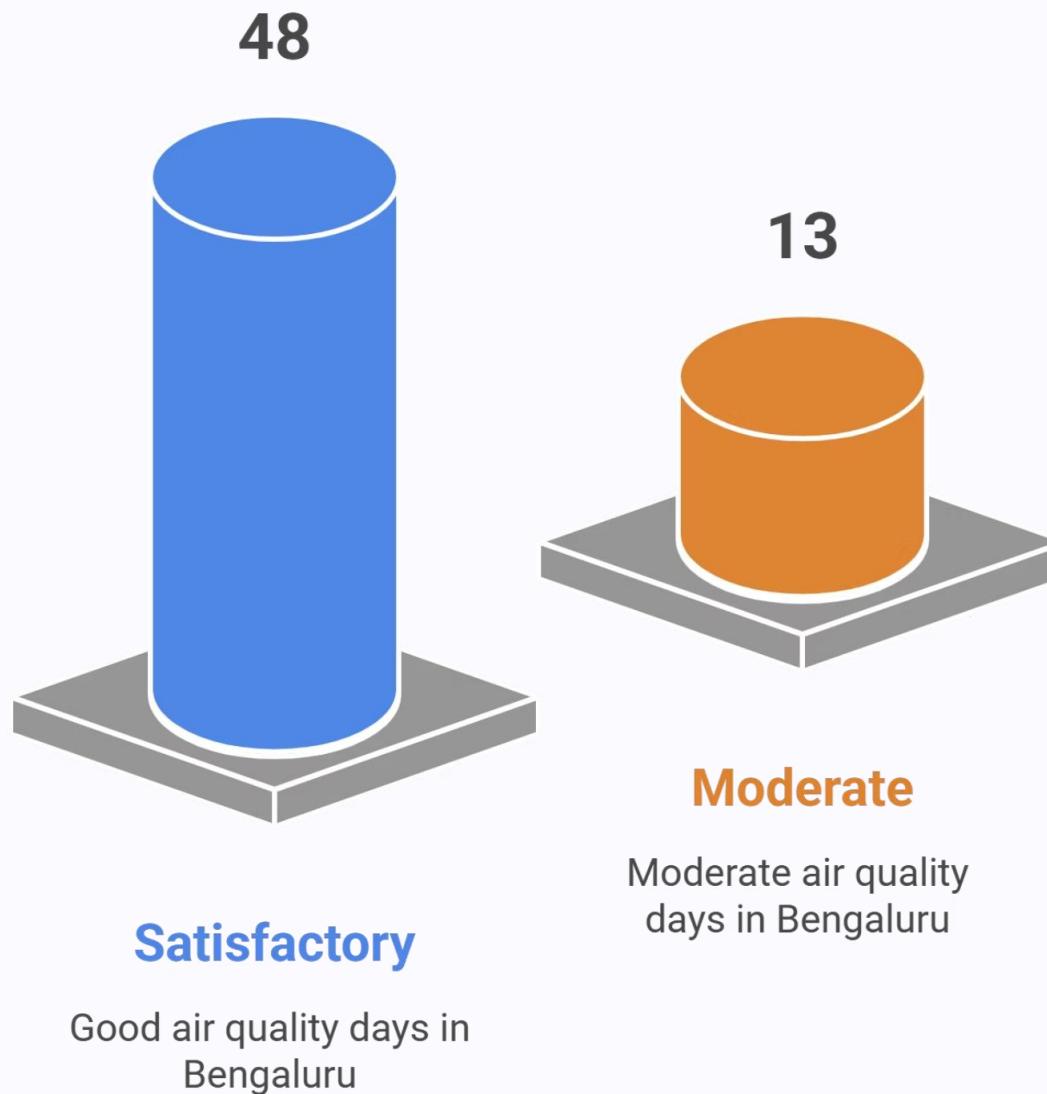
## 3. State-Wise Focus Planning:

- High-coverage states like **Rajasthan, Maharashtra, Karnataka** cover a wide urban/rural mix — ideal for **market segmentation testing** (budget vs premium models).

## 4. Product Design Implication:

- Winter AQI is dominated by **PM2.5 and PM10** — filtration systems must be built to **maximize capture of fine particulate matter** during peak months.

## Air Quality Days in Bengaluru (March-May 2025)

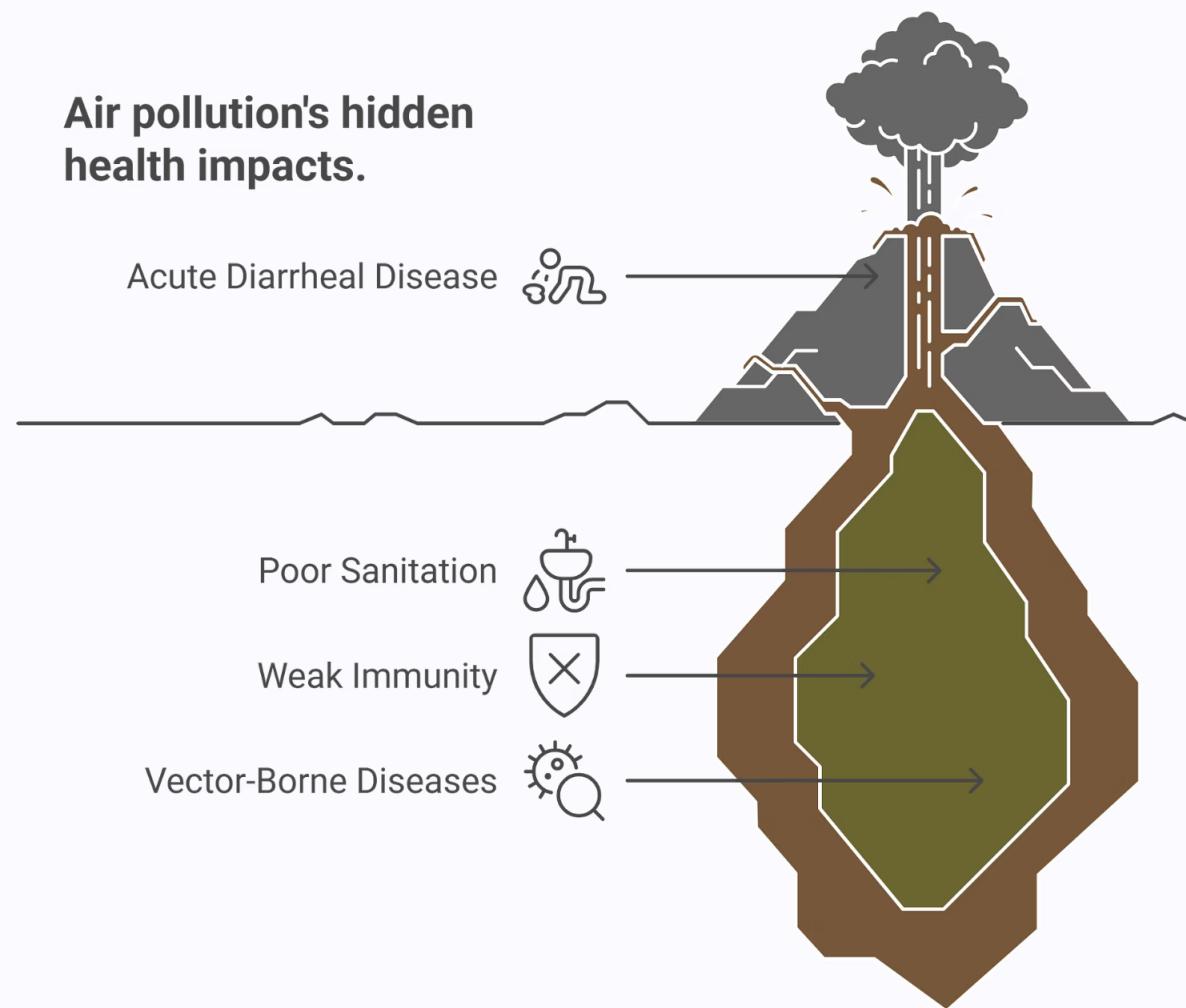


## Air Quality Insights: Bengaluru (Mar–May 2025)

- 1. ✓ Over 78% of the days (48 out of 61) were categorized as **Satisfactory**, indicating generally clean air during this period.
- 2. ⚠ Only 13 days ( $\approx 21\%$ ) fell under the **Moderate** category — showing slightly elevated pollutant levels but still within acceptable limits for the general population.
- 3. ✗ No days were recorded in the **Poor, Very Poor, or Severe** categories — a strong sign that air quality in Bengaluru remained well-controlled through late summer.
- 4. 📈 **Seasonal Trends:** March to May typically sees lower AQI due to better wind flow and less inversion — this pattern is consistent with the high number of satisfactory days.

## ψ. Top 2 Most Reported Diseases in each state

State	Top 2 Most Reported Diseases	Avg AQI
Delhi	Dengue, Measles	205.48
Jharkhand	Malaria, Acute Diarrheal Disease	165.09
Himachal Pradesh	Hepatitis A, Acute Diarrheal Disease	160.24
Bihar	Acute Diarrheal Disease, Dengue	156.84
Chandigarh	Cholera	141.45
Haryana	Cholera, Acute Diarrheal Disease	139.73
Rajasthan	Acute Diarrheal Disease, Dengue	127.56
Tripura	Acute Diarrheal Disease, Dengue	127.43
Uttar Pradesh	Acute Diarrheal Disease, Food Poisoning	125.33
Odisha	Acute Diarrheal Disease, Food Poisoning	125.12
Punjab	Acute Diarrheal Disease, Cholera	117.60



## 🔍 Insights from Disease–AQI Correlation:

1. 🔍 **Acute Diarrheal Disease dominates** across all high-AQI states, showing that **air pollution likely coexists with poor sanitation and weak immunity** — making citizens more vulnerable to illness.
2. 🦟 **Dengue, Malaria, and Hepatitis A** are common in highly polluted areas like **Delhi, Bihar, and Jharkhand**, suggesting a **double burden** of air and vector-borne diseases.
3. 🧠 **AirPure can position its purifier as a preventive health product**, not just a luxury — especially in Tier 1/2 cities where **AQI and illness trends are both high**.

## TOP Top 5 States by EV Adoption Rate (2022–2025)

State	Total Vehicles	EVs	EV Adoption Rate (%)	Avg AQI (2022–2025)
Tripura	178,931	22,631	12.65%	126.70
Delhi	2,086,374	245,938	11.79%	206.42
Chandigarh	154,562	17,888	11.57%	141.56
Assam	1,889,297	183,428	9.71%	114.12
Kerala	2,357,315	226,600	9.61%	68.07

## ▼ Bottom 5 States by EV Adoption Rate (2022–2025)

State	Total Vehicles	EVs	EV Adoption Rate (%)	Avg AQI (2022–2025)
Meghalaya	123,763	1,175	0.95%	62.73
Andaman & Nicobar Islands	24,795	165	0.67%	57.71
Arunachal Pradesh	99,736	195	0.20%	54.49
Nagaland	83,908	84	0.10%	80.46
Sikkim	34,154	29	0.08%	53.69

## Air Quality: More Than Just EV Adoption

### 💡 Insight:

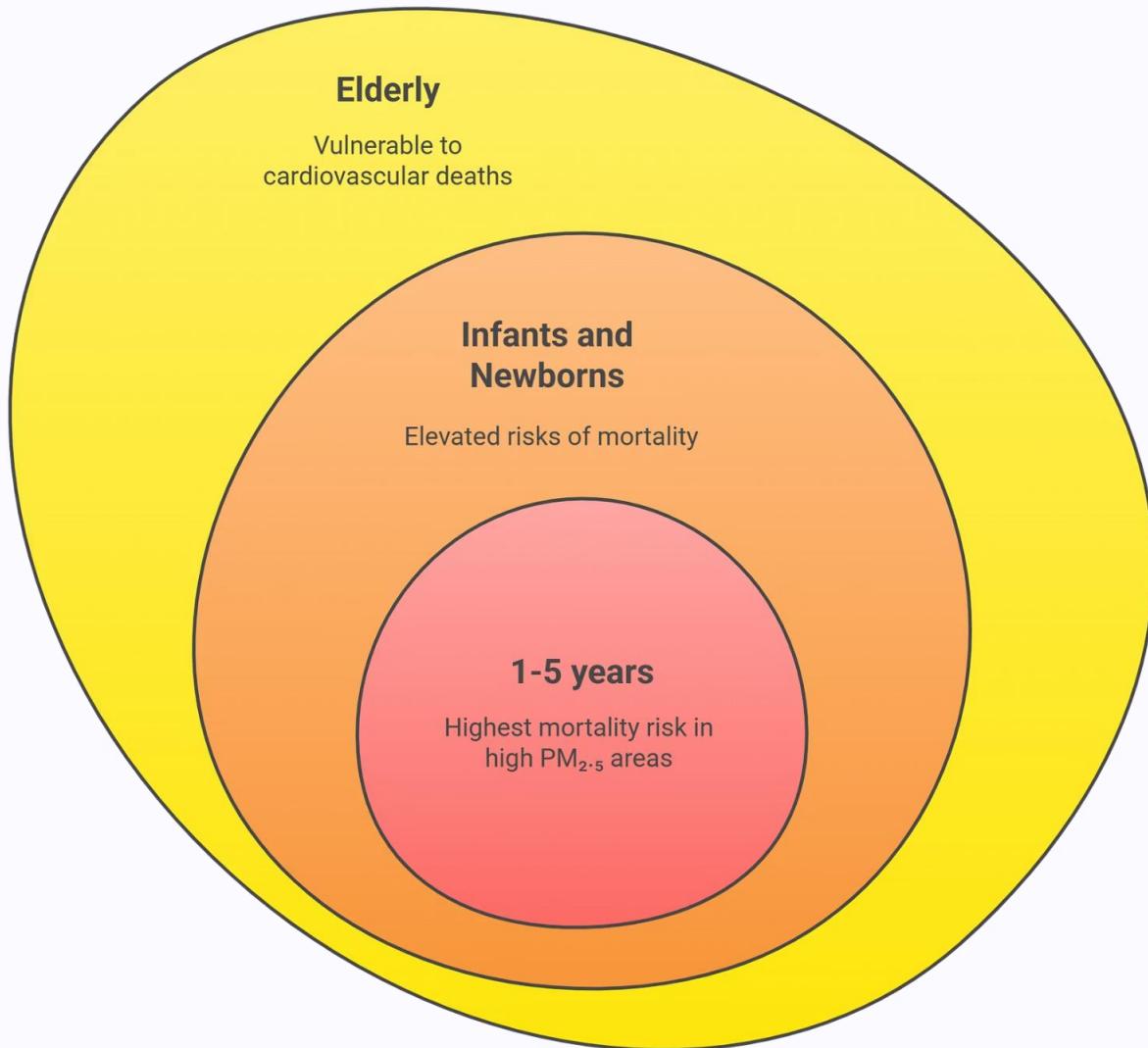
States with high EV adoption like Delhi and Tripura still suffer from poor air quality due to industrialization, urban congestion, and high population density.

On the other hand, low EV adoption states like Sikkim and Arunachal Pradesh show clean air, largely due to mountainous terrain and sparse development.

👉 Conclusion: EV adoption helps—but it cannot offset pollution alone. Geography, urban planning, and industrial policy matter too.



# Secondary Analysis



## Children (0-5 years)

Face significantly higher **relative risk** of death in areas with high PM<sub>2.5</sub>:

- 1-5 years: ~2.2× higher risk
- Infants (<1 year): ~2.0× risk
- Newborns: ~1.86× risk

Top health impacts: Asthma, pneumonia, and acute respiratory infections (ARI).

## Adults (60+ years)

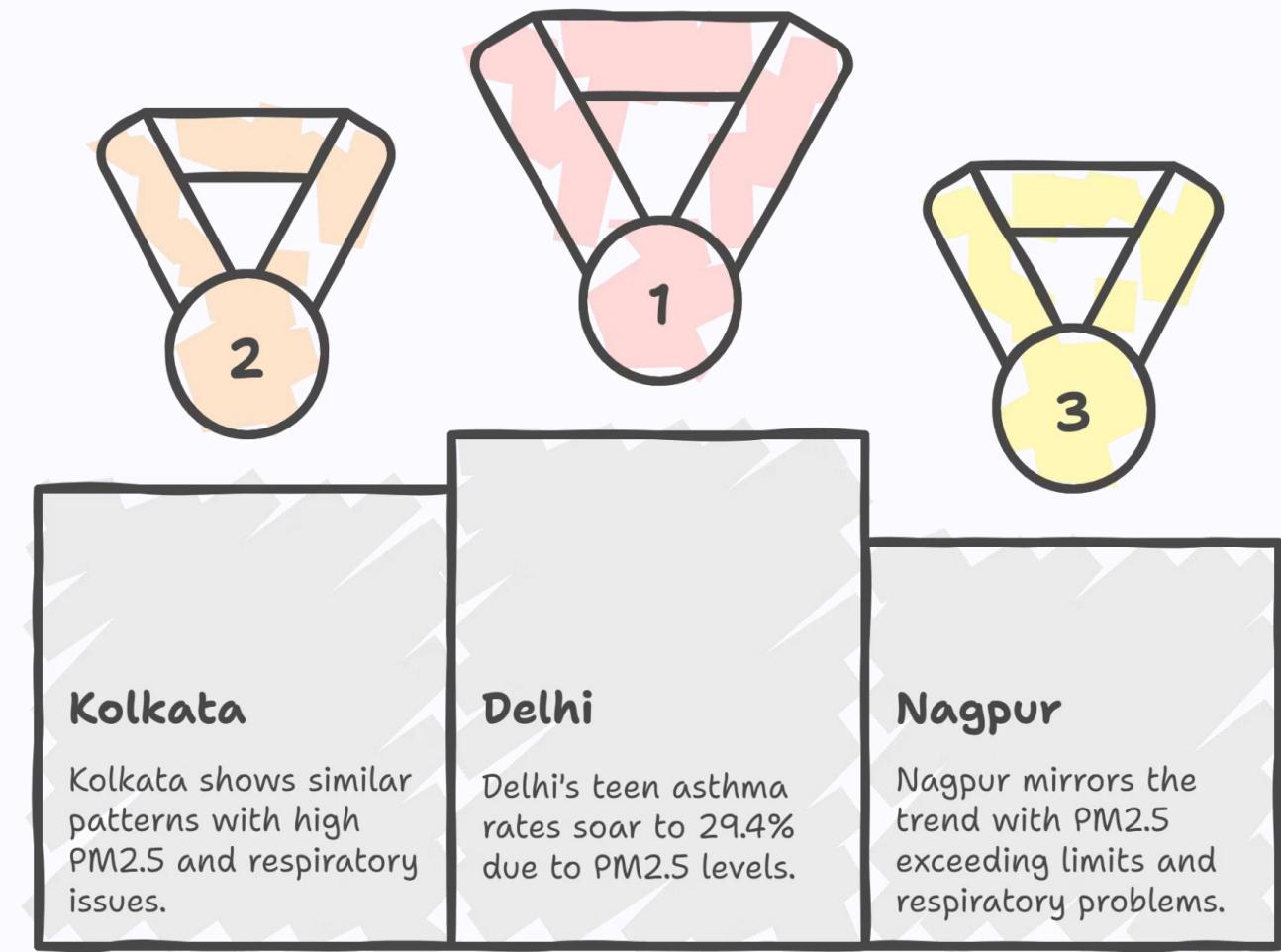
While general adults see smaller relative risks (~1.13×), older adults (60+) bear the highest **absolute mortality**.

Top health impacts: Heart attacks, strokes, and chronic obstructive pulmonary disease (COPD).

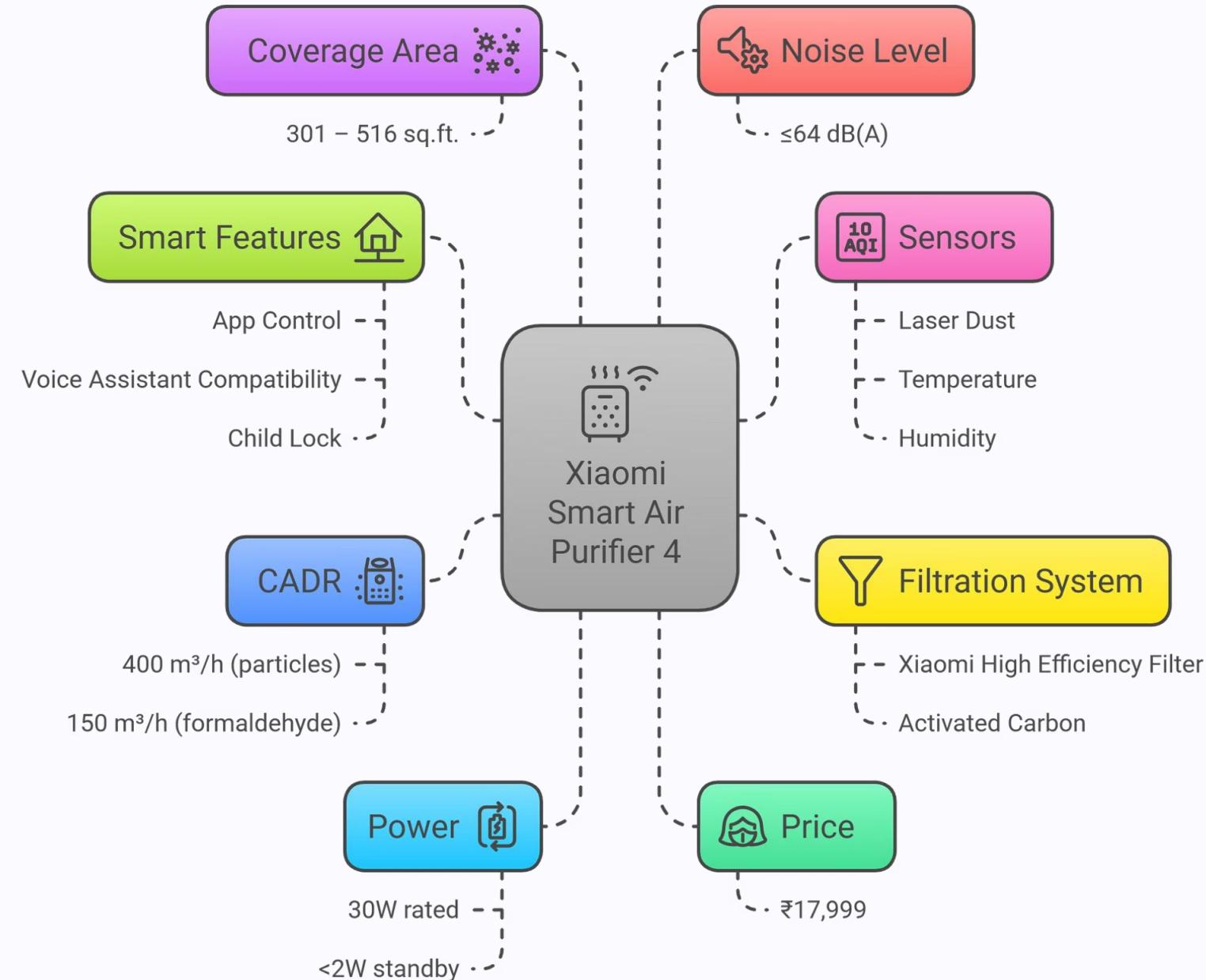
## City-Level Variation (How It Varies by City)

- **Delhi:** Worst-impacted city. A 2024 WHO-backed study found **>2.2 million children** with **lung impairment**. Among Delhi teens (13–17 years), asthma prevalence is nearly **30%**, almost *double* compared to cleaner cities.
- **Mumbai, Kolkata, Nagpur, Ranchi, Patna, Ahmedabad:** Also show very **high mortality rates in under-5s and elderly**, based on PM<sub>2.5</sub> exposure models.
- **Bangalore:** Rising asthma rates in children; a 10-unit AQI increase leads to ~1–1.4% rise in **pediatric asthma hospital admissions** (TOI & PubMed study).
- **Cleaner cities (e.g., Shillong, Port Blair):** Show much lower child mortality and respiratory illness rates – highlighting geography and pollution control as key protectors.

### Top Cities with Highest Teen Asthma Rates



## Xiaomi Smart Air Purifier 4 Features

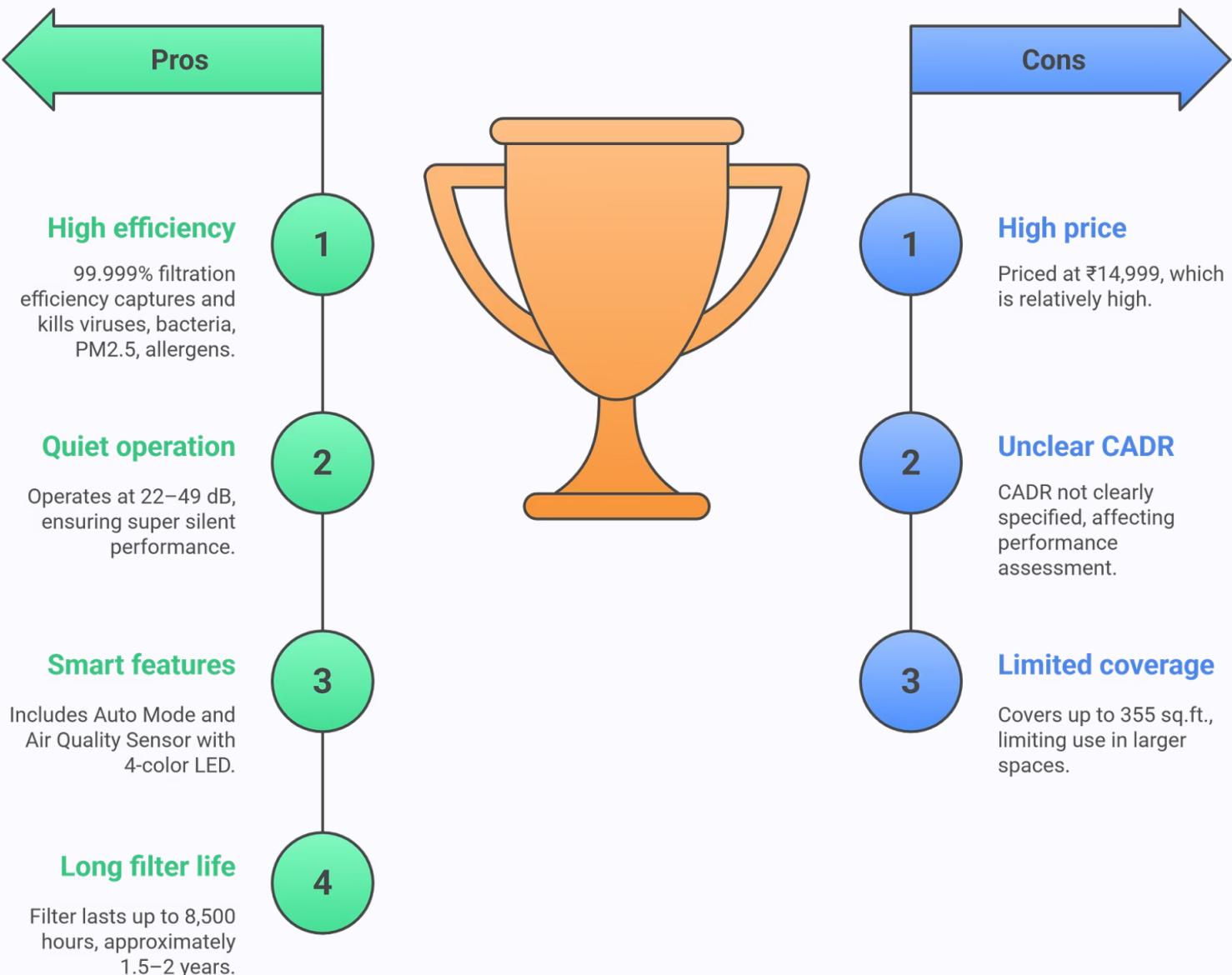


# Honeywell Air Purifier

<b>Price</b>	₹4,999 (MRP ₹9,999)
<b>Coverage Area</b>	Up to 235 sq.ft.
<b>Filtration System</b>	3-Stage: Pre-filter + H13 HEPA + Activated Carbon
<b>Filtration Efficiency</b>	99.99% (PM2.5, PM10, allergens, bacteria, viruses)
<b>CADR</b>	152 m <sup>3</sup> /h
<b>Noise Level</b>	29 dB (very quiet)
<b>Smart Features</b>	One-touch control, Filter Reset Indicator
<b>Sensors</b>	Not specified (assumed basic/manual detection)



# Coway Airmega 150

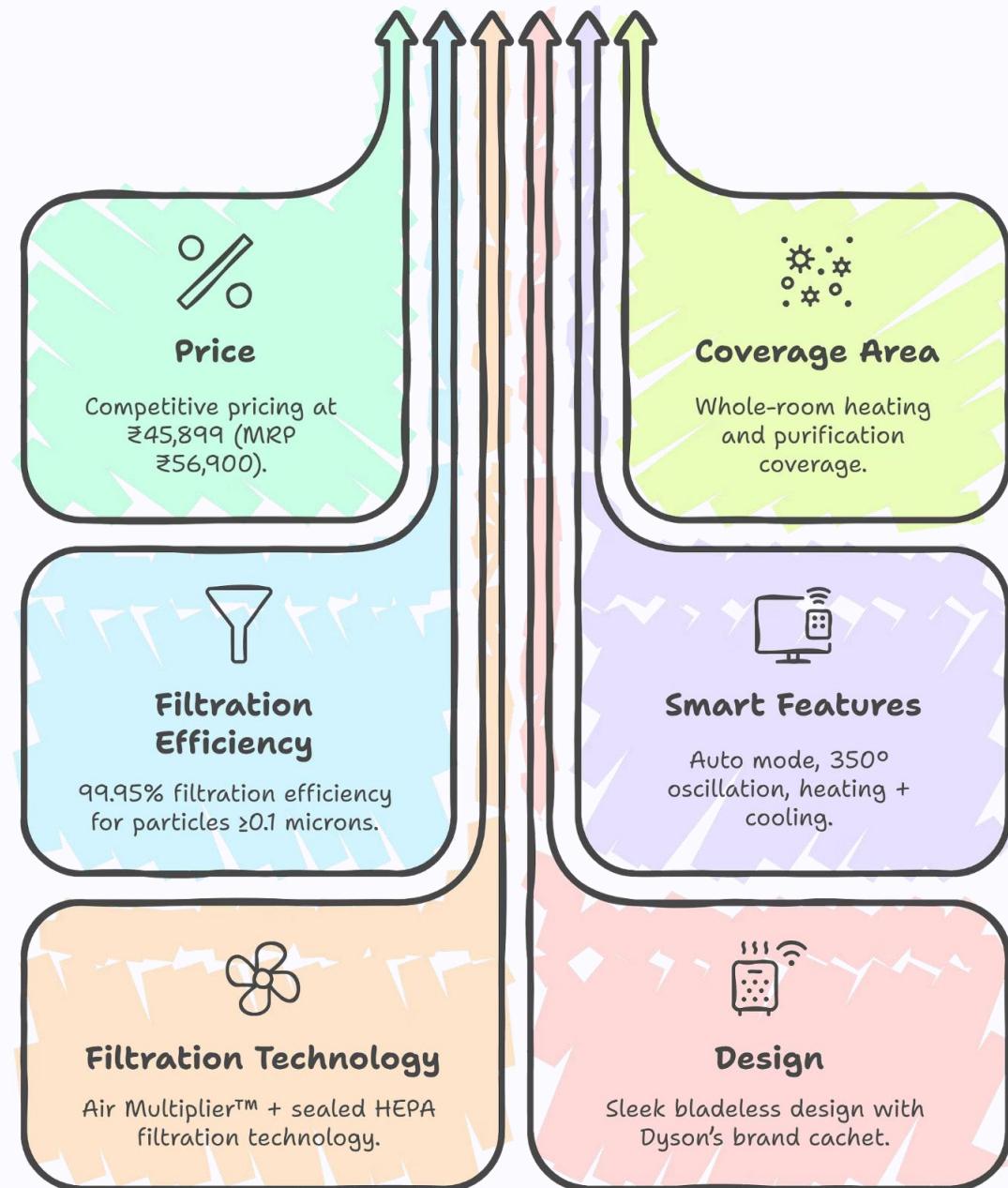


# Philips Air Purifier

Feature	Details
HOT PRICE	₹11,938 (MRP ₹14,995)
Coverage Area	Up to 380 sq.ft.
Filtration System	3-layer: Pre-filter + Carbon + NanoProtect HEPA
Filtration Efficiency	99.97% (captures particles as small as 0.003 microns)
CADR (Clean Air Delivery Rate)	300 m <sup>3</sup> /h
Noise Level	As low as 15 dB in Sleep Mode
Sensors	1000x/sec air quality scan



## Dyson Air Purifier Features



# City population and AQI 2024

Cities	Population 2024	Population (in Millions)	Average AQI 2024	AQI Category 2024
Delhi	33807400	33.81 M	208.93	Poor
Mumbai	21673100	21.67 M	91.28	Satisfactory
Kolkata	15570800	15.57 M	100.86	Moderate
Chennai	12053700	12.05 M	71.85	Satisfactory
Hyderabad	11068900	11.07 M	76.79	Satisfactory
Ahmedabad	8854440	08.85 M	114.45	Moderate
Surat	8330530	08.33 M	83.15	Satisfactory
Pune	7345850	07.35 M	96.58	Satisfactory
Jaipur	4308510	04.31 M	135.39	Moderate
Lucknow	4038210	04.04 M	125.78	Moderate
Thrissur	3605240	03.61 M	56.55	Satisfactory
Kochi	3507050	03.51 M	91.04	Satisfactory

# Key Insights: Population vs AQI (2024)

## 1. High population ≠ High AQI — not always.

- While Delhi (33.8M, AQI 208.9) has the worst AQI, other mega cities like **Mumbai (21.6M, AQI 91)** and **Chennai (12M, AQI 71.8)** maintain **Satisfactory** air quality.

## 2. Smaller cities can be highly polluted.

- Cities like **Muzaffarnagar (0.81M, AQI 178.8)** and **Dhanbad (1.41M, AQI 163.9)** show **very poor air**, proving that **industrial activity and governance** play a bigger role than population alone.

## 3. Geography matters.

- **Coastal cities** (e.g., Mumbai, Chennai, Kochi) show better air quality due to **natural ventilation** and sea breeze.
- **Landlocked and industrial cities** (e.g., Patna, Meerut, Asansol) struggle with stagnant air and dust accumulation.

## 4. Top polluted cities aren't always the largest.

- Cities like **Asansol, Bikaner, Muzaffarpur, Rohtak** — all below 2M population — have **AQI above 140**, often due to **unregulated emissions and low green cover**.

## 5. Conclusion:

- **Population is a contributing factor**, but **urban planning, industrial regulation, green policies, and geography** heavily influence a city's air quality.

# Indian Citizens's Awareness of what is AQI?

## 1. Awareness ≠ Understanding

- While many urban citizens know pollution is harmful, **only ~51%** know what the **AQI** is.
- Awareness of **PM2.5** — the deadliest pollutant — is just **35.8%** nationwide.
- The poor are most exposed, but only **10% in urban slums** have even heard of AQI.

## 2. 'AQI Illiteracy' is real

- People associate pollution with **short-term symptoms** (e.g. breathlessness), but **not with heart attacks, strokes, or cognitive decline** — which are actually deadlier.

## 3. Digital divide hurts effectiveness

- AQI is mostly shared via **apps/websites**, but those hit hardest by pollution often **lack internet access**.
- Govt focuses on data-sharing, not risk communication — **data ≠ awareness**.

## 4. Behavioral change is unequal

- Richer groups buy air purifiers & use apps. The poor wear cloth masks & feel powerless.
- Over **35% of Indians believe it's solely the government's job** to fix air pollution.

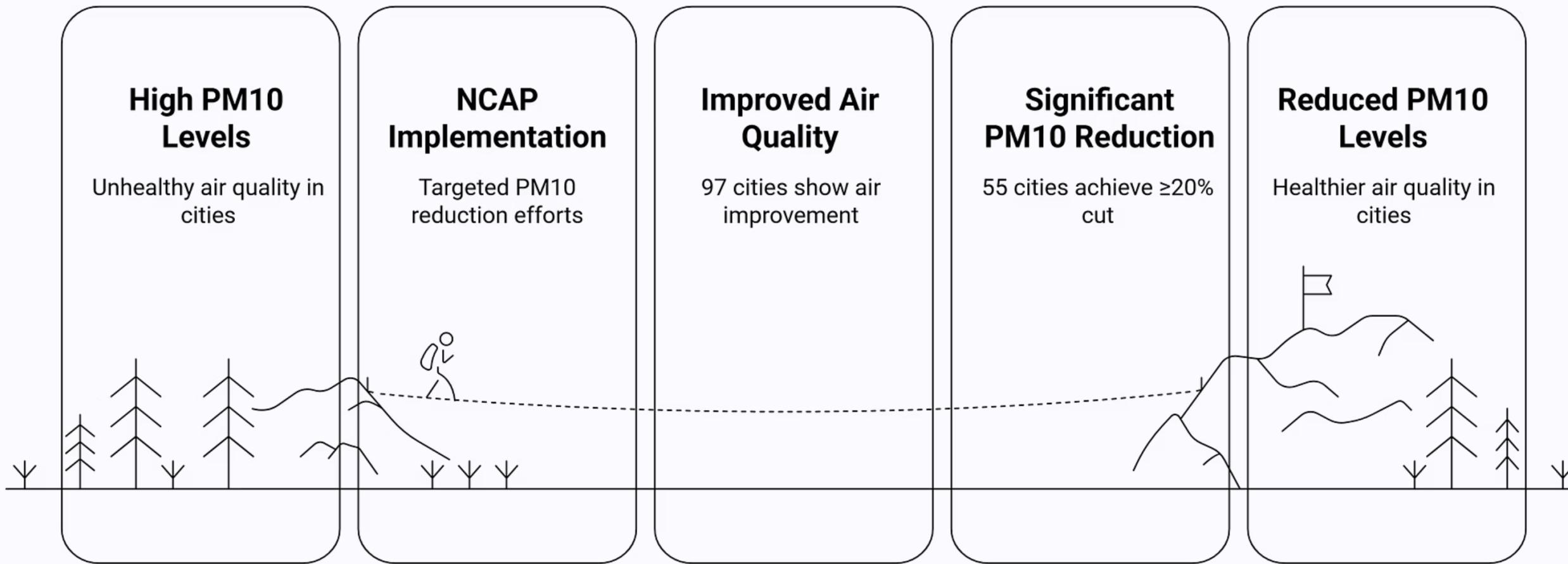
## 5. Communication failures

- **Color codes aren't standardized** across platforms (India vs. US scales).
- Campaigns are **urban-centric**, missing **rural India**, where **69% of pollution deaths** occur.
- **NCAP campaigns underperform** — funds unused, municipal workers unaware of policy.

## 6. The message is wrong

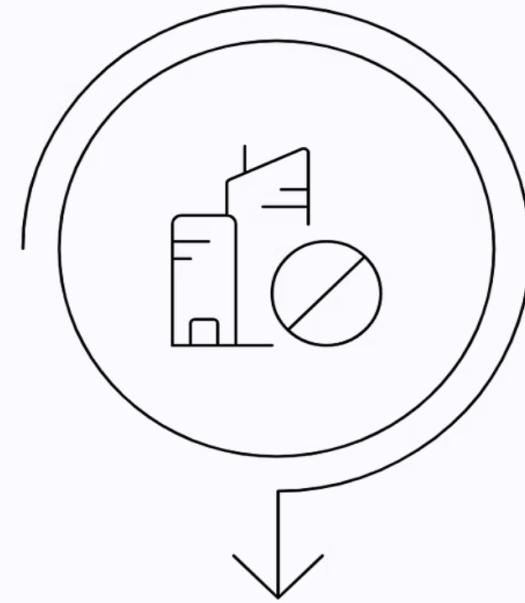
- Messaging focuses on "**what individuals should do**" (stay indoors, wear a mask).
- What's needed? A shift to "**what government and industry must fix**."

# Achieving Clean Air Targets



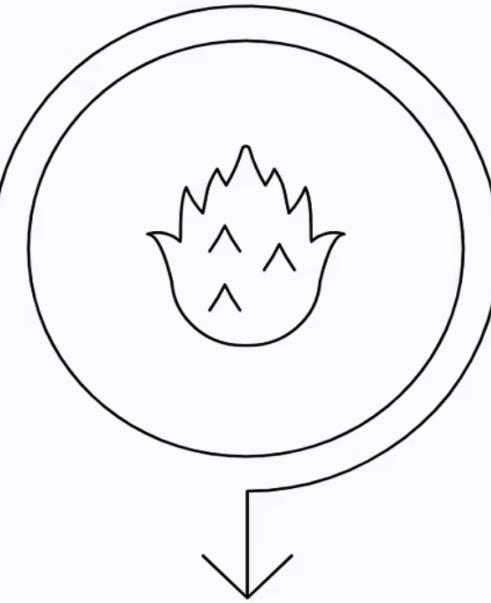
- The National Clean Air Programme (NCAP) targeted **40% PM10 reduction by 2025–26**.
- As of 2024:
  - ✓ **97 of 130 cities** saw improvement since 2017–18.
    - ✓ **55 cities** cut PM10 by  $\geq 20\%$ .
    - ✓ Delhi recorded its **best AQI (~204)** since 2018.

# Air Quality Improvement Initiatives



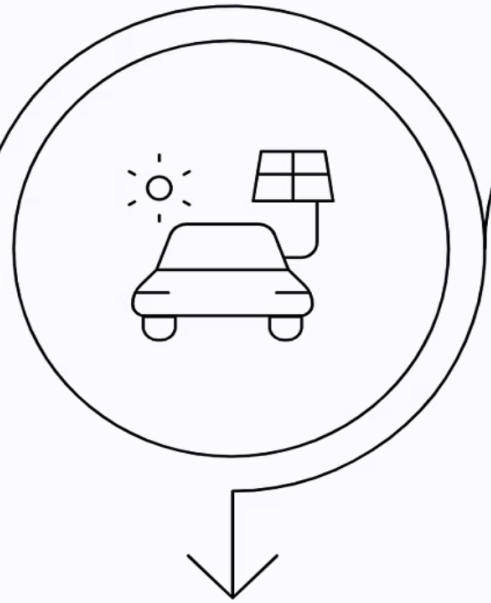
## Delhi-NCR Enforcement

Implementation of odd-even rules and firecracker bans led to PM10 reduction. Increased good air quality days.



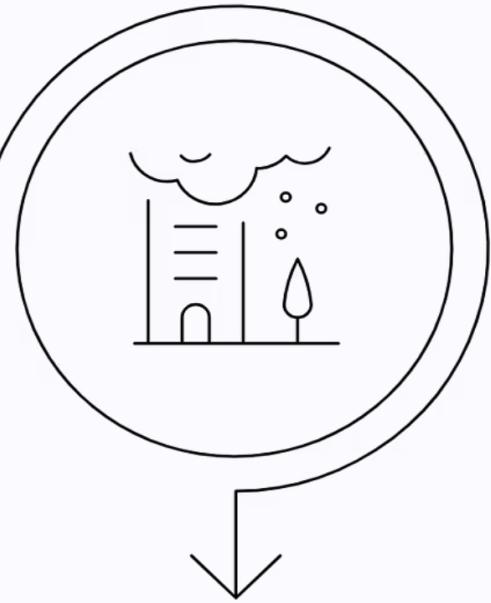
## Stubble Burning Controls

Reduction in Punjab fire incidents and PM2.5 levels post-Diwali. Improved air quality in key cities.



## Vehicle Emission Reduction

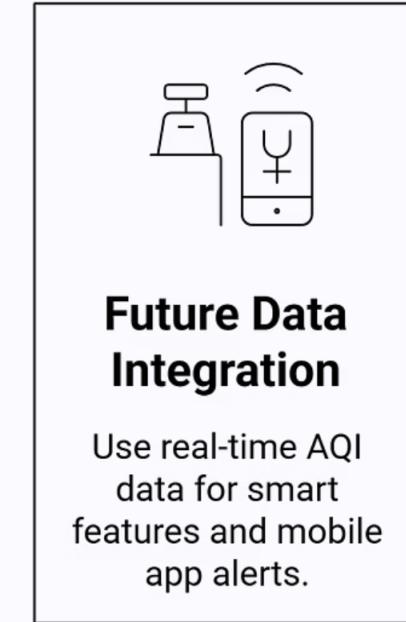
Implementation of Bharat Stage VI norms and EV subsidies. Reduced vehicle emissions and pollution.



## Graded Response Plans

Active GRAP implementation in over 130 cities. Proactive measures for air quality management.

# How to effectively launch air purifiers in high-risk cities?



**THANK  
YOU**

