PRODUCT MARKET FIT RESEARCH DASHBOARD
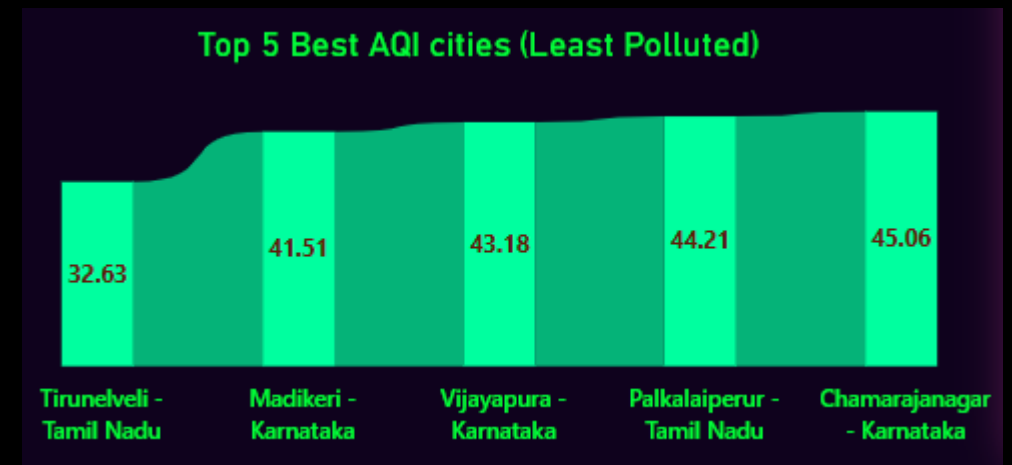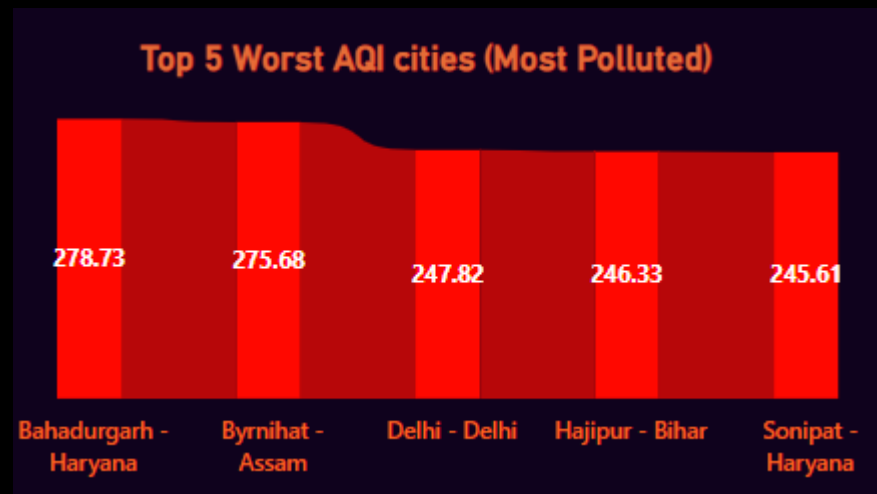
for Air Purifier Development Using AQI Analytics

- By Adeel Ahmad Siddiqui

TOP 5 HIGHEST AND LOWEST AQI CITIES OF INDIA

In last 6 MONTHS

Last 6 Months

Last 3 Months

Top 5 Worst AQI cities (Most Polluted)

278.73	275.68	247.82	246.33	245.61
Bahadurgarh - Haryana	Byrnihat - Assam	Delhi - Delhi	Hajipur - Bihar	Sonipat - Haryana

Top 5 Best AQI cities (Least Polluted)

32.63	41.51	43.18	44.21	45.06
Tirunelveli - Tamil Nadu	Madikeri - Karnataka	Vijayapura - Karnataka	Palkalaiperur - Tamil Nadu	Chamarajanagar - Karnataka

Bahadurgarh of Haryana stand the WORST AQI city in the last 6 Months having AVERAGE AQI 278 while Tirunelveli of Tamil Nadu remained the LEAST AQI city having AVERAGE AQI 32.

TOP 2 AND BOTTOM 2 PROMINENT POLLUTANTS FOR EACH STATE OF SOUTHERN INDIA.

(POST COVID)

state	Top 1	Top 2	Bottom 2	Bottom 1
Telangana	PM10	PM2.5	O3	NO2
Tamil Nadu	PM10	PM2.5	NO2	NH3
Puducherry	PM10	O3	PM2.5	CO
Kerala	PM10	PM2.5	NH3	SO2
Karnataka	PM10	CO	NH3	SO3
Andhra Pradesh	PM10	PM2.5	NO2	SO2

INDIA – Region
South

Top 2 and Bottom 2 Pollutants(state-wise)

PM10 AND PM2.5 REMAINED THE TOP MOST COMMON PROMINENT POLLUTANT IN SOUTH INDIA WHILE SO2,NH3,NO2 AND SO3 REMAINED LEAST OCCURING IN ALL THESE SOUTHERN STATES OF INDIA.

DOES AQI IMPROVE ON WEEKENDS VS WEEKDAYS IN INDIAN METRO CITIES?

(LAST 1 YEAR)

Last 6 Months

Last 1 Year

Last 3 Months
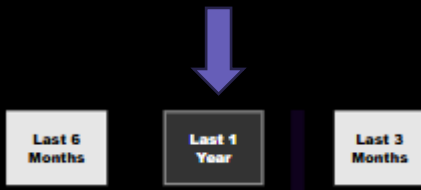
METRO CITIES - Weekend vs Weekdays AQI change			
city	WeekdayAQI	WeekendAQI	Change
Ahmedabad	108.96	111.26	2.30
Bengaluru	70.62	72.51	1.89
Kolkata	81.59	83.16	1.57
Hyderabad	78.94	78.78	-0.16
Mumbai	88.59	88.07	-0.52
Chennai	68.81	66.91	-1.90
Pune	103.06	100.30	-2.77
Indore	79.25	74.13	-5.13
Delhi	191.84	183.77	-8.06
Gurugram	176.01	163.75	-12.26

In Weekends…
AQI improved in cities -> Chennai, Pune, Delhi, Indore, Gurugram(highest with -12 down)
AQI remained constant in cities -> Hyderabad and Mumbai
AQI became worse in cities -> Ahmedabad, Bengaluru and Kolkata.

WHICH MONTHS CONSISTENTLY SHOW THE WORST AIR QUALITY ACROSS INDIAN STATES

Top 10 CITIES - STATES with worst Air Quality(Monthly View)

state-city	January	February	March	April	May	June	July	August	September	October	November	December	Total
Begusarai - Bihar	313	245	187	213	184	162	107	90	87	152	283	334	207
Bhiwadi - Rajasthan	212	187	158	206	210	166	101	88	121	194	285	212	179
Byrnihat - Assam	345	319	273	227	198	165	172	152	164	177	261	304	240
Darbhanga - Bihar	365			203	119	107	85	67	60	187	338	409	190
Delhi - Delhi	324	213	169	202	200	161	88	90	106	217	354	316	189
Dharuhera - Haryana	248	212	174	226	201	162	86	92	97	187	282	218	186
Greater Noida - Uttar Pradesh	265	197	156	213	220	185	98	108	134	221	306	279	200
Gurugram - Haryana	231	197	174	216	204	179	102	100	116	171	298	249	181
Siwan - Bihar	234	215	185	185	152	140	93	88	124	150	264	246	181
Sri Ganganagar - Rajasthan	224	202	199	211	228	195	177	131	138	161	273	219	198
Total	266	215	179	210	201	168	104	99	117	188	297	270	192

2022-2025

Monthly Variation of AQI

Last 1 Year

Monthly Variation of AQI

In last 1 Year, The Worst Air Quality Month remained November
While After the Covid, the worst Air Quality Month remained April
For All time conclusive, February to May and then November to January, remained the AQI peak months.

FOR THE CITY OF BENGALURU, HOW MANY DAYS FELL UNDER EACH AIR QUALITY CATEGORY (GOOD, MODERATE, POOR, ETC.)

(LAST 3 MONTHS)

76 DAYS FELL IN SATISFACTORY (WITH avg. AQI 83)
WHILE 15 DAYS FELL IN MODERATE (WITH avg. AQI 112) IN BENGALURU-KARNATAKA
 IN LAST 3 MONTHS.

TOP TWO MOST REPORTED DISEASE ILLNESSES IN EACH STATE , ALONG WITH THE CORRESPONDING AVERAGE AIR QUALITY INDEX (AQI) FOR THAT PERIOD.
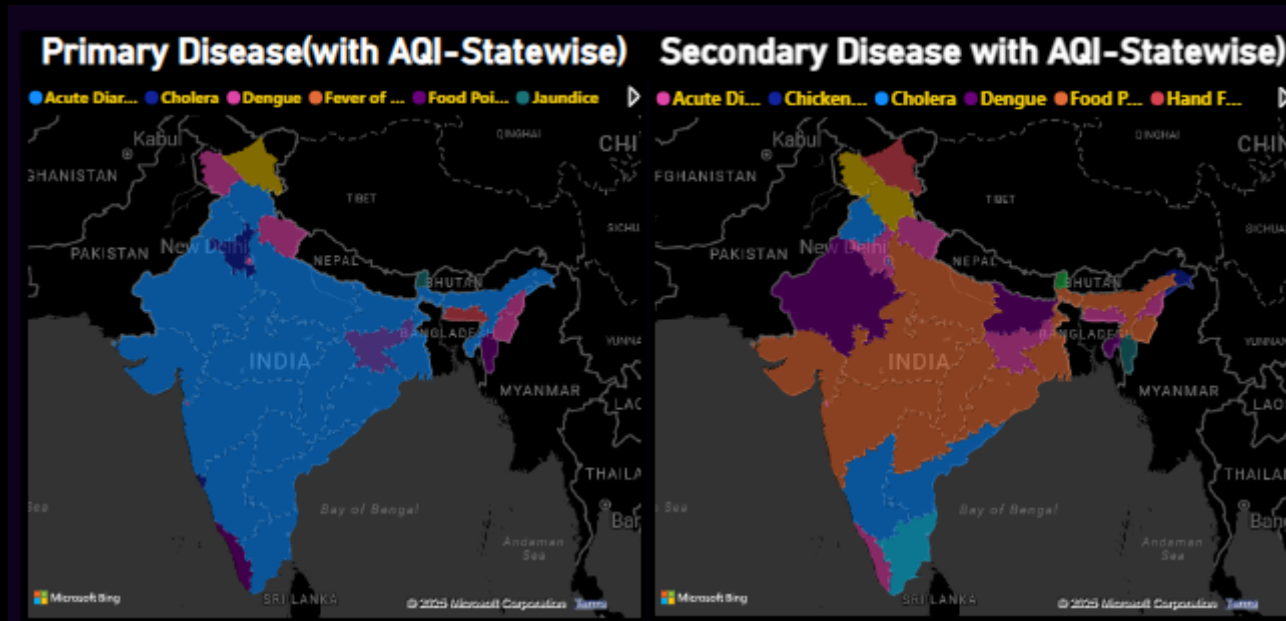
Post Covid   (PAST 3 YEARS)

AQI and disease in each state is available in dashboard via Tooltips in each Map

ACUTE DIARRHEAL DISEASE REMAINED PEAK PRIMARY DISEASE AFTER COVID, WHILE SECOND MOST PROMINENT ILLNESS REMAINED FOOD POISONING.
Average 3 Year Aqi remained between 68 to 182 from South to North India where these are the Prominent Diseases.
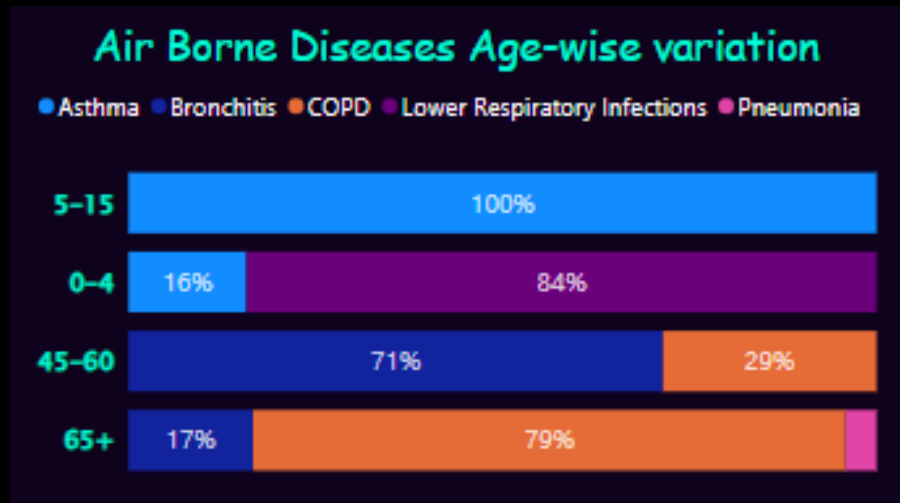
TOP 10 STATES WITH HIGH EV ADOPTION AND ANALYSE IF THEIR AVERAGE AQI IS SIGNIFICANTLY BETTER COMPARED TO STATES WITH LOWER EV ADOPTION
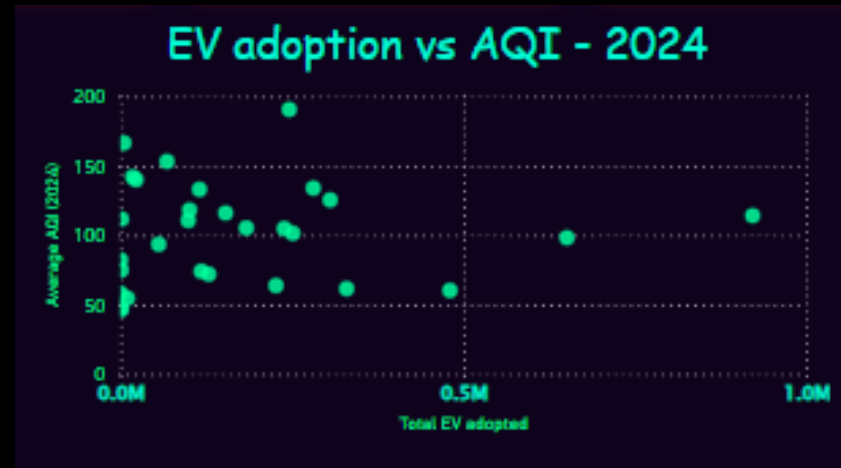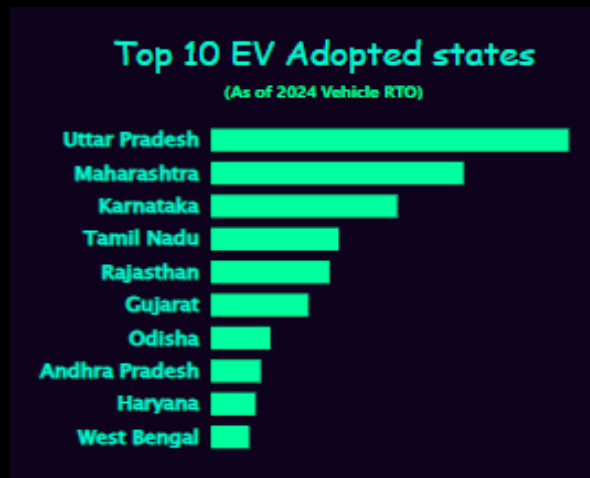
Uttar Pradesh having almost 9.3 Lakh EV registration in 2024 had an Average AQI of 121 while the other top 3 states had low AQI, ranging from 68 to 103. Rajasthan being 5th state with 3 Lakh EV adoption had average AQI of 128 (high). While Gujrat, Odisha, Haryana had low EV adoption and had aqi ranging 110 to 142(Haryana being highest AQI and Lowest EV adoption among top 10 states). Andhra Pradesh is 8th in rank in EV adoption but had 77 AQI. West Bengal with 1 Lakh EV adoption in 2024 had an AQI 109 (moderate).

TOP WHICH AGE GROUP IS MOST AFFECTED BY AIR POLLUTION-RELATED HEALTH OUTCOMES — AND HOW DOES THIS VARY BY CITY?

(PAST 3 YEARS)

Air Borne Diseases Age-wise variation

● Asthma ● Bronchitis ● COPD ● Lower Respiratory Infections ● Pneumonia

Age		
5-15	100%	
0-4	16%	84%
45-60	71%	29%
65+	17%	79%

General Disease Count Per Age Group, extracted from several state air borne disease reports as well as age groups.

States that have High AQI had most Air Borne Diseases as compared to the states with below AQI

Asthama Remained the primary Air Borne Disease Among 5 to 15 Years Age Group.
Children between 0 to 4, Often suffered from Lower Respiratory infections
The Adults after 45, reported to be suffering from Bronchitis or COPD
While after 60 years onwards a typical disease often found was COPD i.e. in aged People.

MAJOR COMPETITORS IN THE INDIAN AIR PURIFIER MARKET, AND WHAT ARE THEIR KEY DIFFERENTIATORS

Existing Brands and their Top Differentiators

| Brand	Top Differentiator Feature	Flagship Model (Example)
Blueair	HEPASilent™ dual filtration, whisper-quiet	Blue Pure 211+
Coway	Long-life filters, Smart mode	Coway Professional 150
Daikin	Plasma ionizer + Deodorization	MC55XVM6
Dyson	Advanced sensors, Formaldehyde filter, sleek design	Dyson Purifier Cool Formaldehyde
Eureka Forbes	Certified by ASL & Asthma Foundation	Dr. Aeroguard SCPR 600
Honeywell	Real-time AQI indicator, activated carbon filter	Air Touch i8
Kent	HEPA + Carbon filter, UV	Kent Aura
LG	360-degree purification	PuriCare AS95GDWT0
Lloyd	HEPA + Ionizer	Lloyd Aura
Mi (Xiaomi)	Smart App control, OLED display, value for money	Mi Air Purifier 4
Panasonic	Econavi tech, Nanoe purification	F-PXJ30A
Philips	AeraSense tech, NanoProtect HEPA	Philips AC2887/20
Realme	Budget smart purifier	Realme TechLife Purifier
Samsung	Virus Doctor technology	AX40K3020WU
Sharp	Plasmacluster ion tech	FP-F40E-W

Feature Category	Examples
Pricing Tier	Budget (₹7k–12k), Mid (₹12k–25k), Premium (₹25k+)
Certifications	ECARF, AHAM, Asthma Council certifications
Filtration Tech	HEPA H13, Activated Carbon, Plasmacluster, Formaldehyde filters
Sensor Types	PM2.5, VOC, CO2, Odor, Temp-Humidity sensors
Design	Portable, wall-mount, tower type
Coverage Area	Small rooms (200 sq.ft) to large halls (700+ sq.ft)
Smart Features	Wi-Fi/Bluetooth control, App alerts, Real-time AQI display

There are almost 15 existing brands in the Air Purifier Market as the Size of Air Purifier Market is 777.75 CR. Top Brands Include Blueair, Coway, Dyson, Eurkea Forbes, Honeywell and kent.
The key Differentiators remained the Hepa + ionizer, Hepa + Carbon Filter, UV , 360 Degree Purification, Certification from Asthama Councel(for brand value), Budget friendly, New Innovative Technologies.

WHAT IS THE RELATIONSHIP BETWEEN A CITY'S POPULATION SIZE AND ITS AVERAGE AQI — DO LARGER CITIES ALWAYS SUFFER FROM WORSE AIR QUALITY?
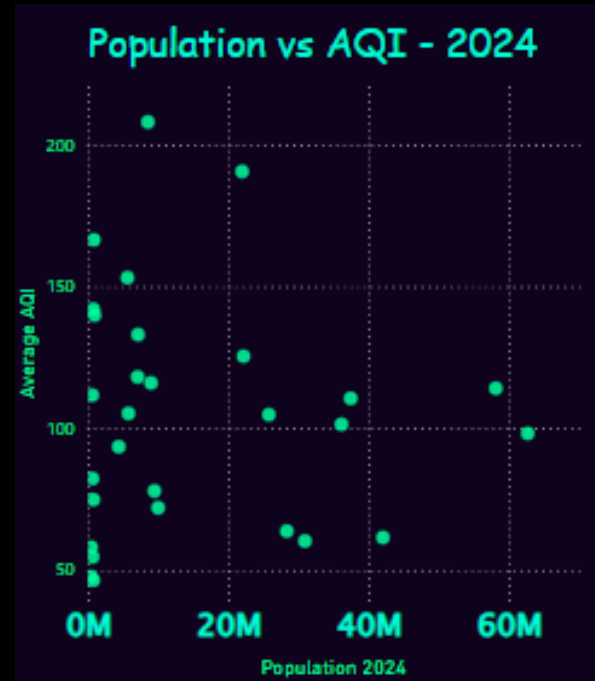
The states with cities collectively below 20M Population had AQI range between 50 to 170 .
While the states above 20M to 60M typically showed an AQI ranging between 50 to 120 .
Conclusion-> Population is not a cause for AQI spikes.

Based on surveys, studies, and observational data from 2021 to 2024.

1. Current State of Awareness

Population Segment	AQI Term Awareness	Health Implication Understanding	Notes
Urban Residents (Delhi, Mumbai, Bengaluru)	Moderate to High	Low to Moderate	Know AQI spikes, but unclear on what to do
Tier 2 & 3 City Residents	Low	Very Low	Often confuse AQI with weather
Rural Population	Very Low	Negligible	AQI virtually unknown unless exposed via TV/social media

2. Key Survey & Study Findings

Source / Study	Key Findings
TERI & CSE Urban AQ Study (2021)	Only 26% correctly identified AQI color codes and actions
CSIR–NEERI Pilot (Nagpur, 2022)	Over 50% of participants had never heard of AQI before workshop
Airveda & LocalCircles Survey (2023)	Only 1 in 3 took protective action during severe AQI
Google Trends (India, 2021–24)	AQI searches spike during winter in Delhi NCR, remain low elsewhere
SAFAR App Feedback (2022)	Most users open AQI app but don't link readings to symptoms or take action

3. Common Gaps in Understanding

Gap Type	Examples
Scale Misinterpretation	People don't know what "Poor" or "Very Poor" means in terms of health risk
Lack of Protective Action	Very few people wear N95 masks or avoid going out based on AQI

Gap Type	Examples
Vulnerable Groups Unaware	Pregnant women, elderly, and children at higher risk often not informed
Confusion With Weather	AQI often confused with humidity or temperature

4. Awareness Drivers (Limited Reach)

Channel	Role in AQI Awareness	Limitation
Mobile Apps (SAFAR, AQI India, Airveda)	Real-time updates, color-coded AQI	Weak health context or action suggestions
News Media	Short-term visibility during smog events	Lacks continuity and education
Schools & NGOs	Some pilot programs (esp. Delhi)	Not yet scaled nationwide
Government Campaigns	Limited outreach on AQI health literacy	Often seasonal, not year-round

WHICH POLLUTION CONTROL POLICIES INTRODUCED BY THE INDIAN GOVERNMENT IN THE PAST 5 YEARS HAVE HAD THE MOST MEASURABLE IMPACT ON IMPROVING AIR QUALITY — AND HOW HAVE THESE IMPACTS VARIED ACROSS REGIONS OR CITIES?

Policy	Year	Target Impact	Funds Released / Utilized	Current Status
NCAP	2019	Reduce PM by 20–30% (40% by 2026)	₹9,650 Cr released; ~64% utilized	Mixed success
BS-VI Norms	2020	Sharply lower vehicle emissions	₹70,000 Cr industrial investment	Technically successful; enforcement gaps
CAQM (Delhi NCR)	2020	Unified enforcement in NCR	Funded via NCAP allocations	Partially effective
GRAP (Revised 2023)	2017 / 2023	Emergency AQI response	Operational (no major funds)	Temporarily effective
FAME II (EV Subsidies)	2019	Boost EV adoption for cleaner air	Significant subsidies; infrastructure grants	In-progress, limited immediate impact

Cities like Mumbai (44%), Kolkata (37%), Prayagraj (AQI score 100; PM_{10} down ~20–55%) show solid success. Others like Delhi saw only ~15% reduction and utilized ~22–33% of funds, while Visakhapatnam saw a ~33% increase in PM_{10} and low fund use (₹39.6 Cr of ₹129.4 Cr allocated);

Enforcement capacity enabled emergency actions (e.g., GRAP), vehicle bans, dust control—but Delhi remains among most polluted cities, with only ~15% PM_{10} reduction since 2017 and low fund utilization (~22% of ₹38.2 Cr allocated

EV penetration is rising—Delhi, Maharashtra, Karnataka lead. Strategic foundation laid; impact yet to scale—requires wider EV uptake & charging infrastructure.

Monthly Variation of AQI

1 2 3 4 5 6 7 8 9 10 11 12

MARKET PRIORITIZATION and STRATEGIC ACTION

City	Strategic_Focus
Faridabad	Value-priced entry units, EMI financing, CSR/government tie-ins
Ghaziabad	Value-priced entry units, EMI financing, CSR/government tie-ins
Jaipur	Value-priced entry units, EMI financing, CSR/government tie-ins
Patna	Value-priced entry units, EMI financing, CSR/government tie-ins
Delhi	Launch premium models, local partnerships, rapid buildup
Gurugram	Launch premium models, local partnerships, rapid buildup
Noida	Launch premium models, local partnerships, rapid buildup

Prioritization Quadrant

Multiple selections

- ☑ I - High Income/High ...
  - ■ Tier1/2
  - ☐ Tier3
- ☑ II - Low Income/High ...
  - ■ Tier1/2
  - ☐ Tier3
- ☐ III - High Income/Low ...

High Income/High AQI
Low Income/Low AQI
High Income/Low AQI
Low Income/Low AQI

Cities Like Faridabad, Ghaziabad, Jaipur, Patna, Delhi, Gurugram and Noida are the Tier1/2 cities having High/Low Incomes but High AQI. The AQI in these cities always remained high. So these cities are best to start the launch. As we see the Monthly AQI variation, The AQI generally remained peak among all months in 2024 data.

Location / Study	PM$_{2.5}$ Increase	Associated Outcome
India (NFHS-5 sample)	+10 µg/m³	~23% higher odds of ARI (asthma-like symptoms)
Inner-city Delhi (observed)	Severe AQI spikes	ER visits for asthma/respiratory issues doubled
General Indian hospitals	Higher PM levels	~20–25% rise in admission rates

Delhi-specific (Hospital & Air Pollution Studies)
- Dramatic PM$_{2.5}$ surges during **post-Diwali, winter, and stubble-burning** seasons.
- Reports of **emergency room visits doubling** among children with respiratory issues during severe pollution.
- Other Indian hospital-based research in metropolitan areas noted **20–25% increases in hospital visits** for respiratory disease during high pollution day

India-wide (NFHS-5 & PM$_{2.5}$ Exposure)
•A national study combining 2019–2021 NFHS-5 survey data (~223,000 children) found:
- Every **10 µg/m³ increase in PM$_{2.5}$** was associated with a **23% higher odds** of acute respiratory infections (ARI) in children under five.
- These respiratory infections include **asthma-like symptoms** (e.g., coughing, difficulty breathing)
- Children in the **highest exposure quartile** (> 78 µg/m³) had over **4× greater risk** compared to those in the lowest exposure group
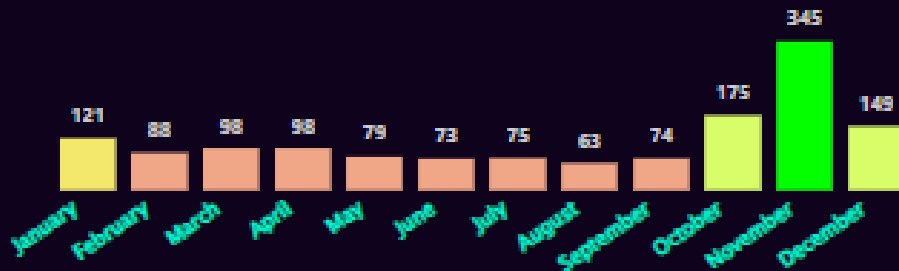
Citations & Study sources:
•**NFHS-5 & PM$_{2.5}$ exposure study (national, including Delhi)**   (BIOMED CENTRAL)
•**Delhi air quality/surge reports** noting doubled hospital utilization during pollution episodes   (SPRINGERLINK)
•**General hospitalization increases** during poor air quality episodes in India (~20-25%)   (FRONTIERSIN.ORG)
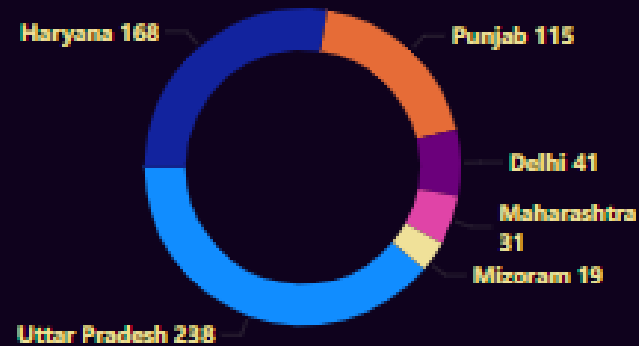
BEHAVIOR SHIFTS: DO POLLUTION EMERGENCIES INCREASE PURIFIER SEARCHES/PURCHASES?
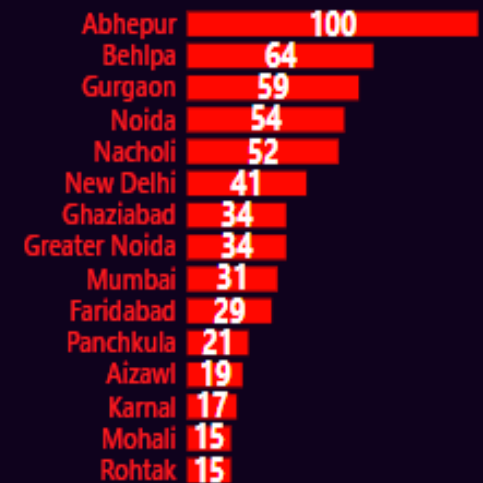
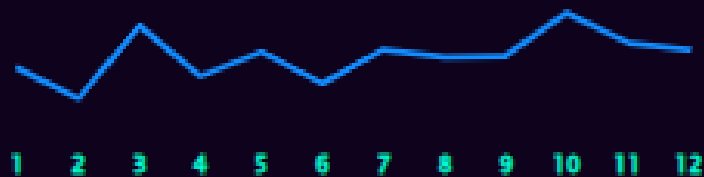**Air Purifier Searches(Google trends June-23 – June 25)**

Real Seasonal Demand

Month	Value
January	121
February	88
March	98
April	98
May	79
June	73
July	75
August	63
September	74
October	175
November	345
December	149

Interested States(Search Count)

- Haryana 168
- Punjab 115
- Delhi 41
- Maharashtra 31
- Mizoram 19
- Uttar Pradesh 238

Cities that Searched Air Purifier

City	Value
Abhepur	100
Behlpa	64
Gurgaon	59
Noida	54
Nacholi	52
New Delhi	41
Ghaziabad	34
Greater Noida	34
Mumbai	31
Faridabad	29
Panchkula	21
Aizawl	19
Karnal	17
Mohali	15
Rohtak	15

Monthly Variation of AQI 2024

1 2 3 4 5 6 7 8 9 10 11 12

Verdict: YES! The Pollution spikes lead to Air Purifier Searches among the Affected Cities.
Delhi NCR and Haryana area remained highly participant among Air Purifier Searches.
But the search amount always remained low as the awareness is very low in India about AQI index and Pollution Effects.

Feature Gap Matrix(existing market)

Feature	Feature Gap	Widely Offered
Activated Carbon / VOC		✓
CADR (Verified)		✓
Energy Efficiency	✓	
Filter Replacement Indicator		✓
HEPA Filtration (H13+)		✓
Hybrid Features (Fan/Heater)		✓
Long Filter Life	✓	
Low Noise / Night Mode		✓
Ozone Safe (No Ionizer)	✓	
Real-time PM Monitoring	✓	
Smart App / Voice Control	✓	
Smart Sensors & Auto Mode		✓
UV/Virus Sterilization	✓	

Existing Market Lacks..
Energy Efficiency, Long Fillter Life, Ozone Safe(No Ionizer), Real-time PM monitoring, Smart App/Voice Control and UV/Virus Sterilization.

These are the possible lack features but typically existing market have almost all the main features including low Noise/Night mode. Yet after spending on R&D, our company can still launch its product better then the existing by making new possible changes that existing market lacks.
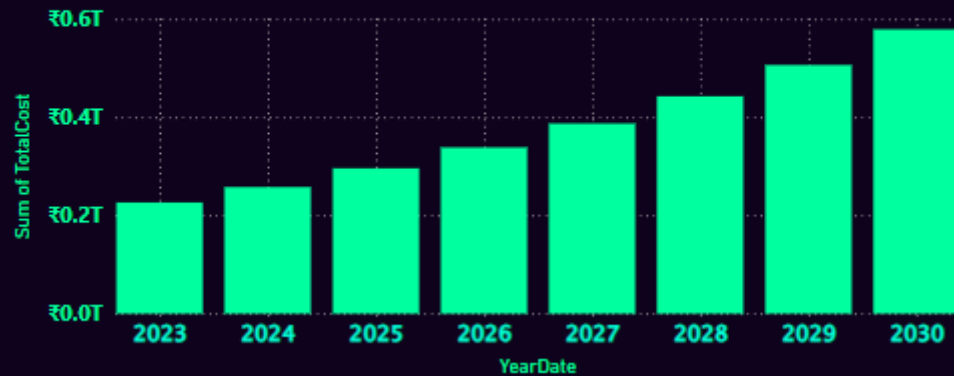
HEALTH COST PROJECTIONS

Annual Health Cost Impact (INDIA)

₹258bn

Asthama Health Cost Projection (in Trillion(₹))

South India Study(2023):- avg annual cost 21,000₹ per person| Prevelance: 30% of 2.5% Indian Population

Assuming the 30% Of 2.5% of Indian Population Which is 0.75% of Indian Population, and an average Annual cost of 21,000 rupees per person, spent on Asthma (as per the 2023 study of South India),
There is 258 Billion or 26 thousand-Crore Rupees being spent on Asthma, which tends to increase (as calculated for 2024).
This is an assumed calculation as generally 30% population that is Asthma Positive, shows interest in curing it but 70% Population remain neglected.
It is reported that 2.5% of the total Indian Population is Asthma Positive.

MARKET SIZE OF AIR PURIFIER

Market Projection (In CRORES)

CAGR->16.% , Market Size in 2024 -> 777.75 CR
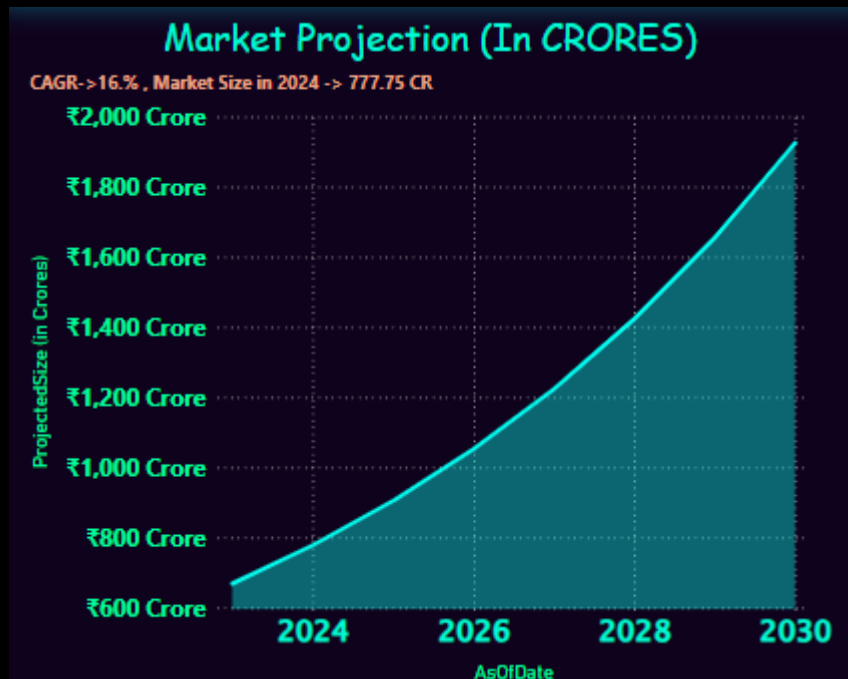
Air Purifier Market Size was reported as 777.75 cores in 2024 with a CAGR of 16% leading to 1200 crore market in 2028 (projected).

This means that there is a chance to take to enter in the market.