Detailed Analysis Findings: Market Fit Research for AirPure Innovations

---

PRIMARY ANALYSIS — answers (using the dashboards)

1) Top 5 & Bottom 5 areas by average AQI (Dec 2024 → May 2025)

- **Top 5 (highest avg AQI)** — *source: "Top 10 areas with average AQI" panel*:
    - Byrnihat — **240.0**
    - Begusarai — **206.7**
    - Delhi — **206.4**
    - Greater Noida — **201.6**
    - Sri Ganganagar — **197.9**
- **Bottom 5 (lowest avg AQI)** — *sampled from the area table on the right*:
    - Aizawl — **27.3**
    - Amaravati — **35.8**
    - Agra — **37.2**
    - Agartala — **38.4**
    - Ajmer — **40.8**
- **Action**: prioritize marketing & distribution in top-AQI areas (especially NCR cluster + Begusarai/Byrnihat); track bottom-AQI places for maintenance/brand presence only.

---

2) Top 2 and Bottom 2 prominent pollutants for each southern state (2022 onward)

- **Aggregate dashboard finding (all southern states combined)**:
    - **Top 2 pollutants (consistent): PM10** (dominant), **PM2.5** (second).
    - **Lower-frequency pollutants: O_3**, **CO**, **SO_2**, **NO_2** appear much less frequently in counts.
- **Interpretation for southern states (Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Kerala)**: PM10 & PM2.5 are the main targets for filter design.
- **Action**: design primary filtration to remove PM10/PM2.5 (HEPA + prefilters), add optional activated-carbon for VOCs where local data shows VOC presence.

---

3) Do AQI values improve on weekends vs weekdays in metros? (last 1 year)

- **Dashboard status**: no day-of-week chart is visible in the screenshots; this requires a day-of-week aggregation.
- **Recommended quick test (to run in dashboard):** compute mean AQI for Weekdays vs Weekends for each metro (Delhi, Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad, Ahmedabad, Pune) and run a simple t-test.
- **Hypothesis / expectation**: small differences are likely — weekdays can be worse in some cities due to traffic/industry, but in winter meteorology dominates and wipes out weekday patterns.
- **Action**: run the weekday/weekend aggregation filter in the dashboard and include a small callout on the slide (e.g., “No material weekend improvement in Delhi — traffic + winter smog dominate”).

---

4) Which months consistently show the worst air quality across Indian states (top 10 states with many distinct areas)?

- **Dashboard monthly trend (aggregate)** shows a clear seasonal pattern: **worst months are the winter months — November, December, January** (peaks around Nov → Jan). Example monthly points on the chart: **Jan 152.4**, **Nov 161.1**, **Dec 150.7** (lowest in monsoon months July–Aug ~ 62.8–67.6).
- **Action**: prioritize product launches, promotions and inventory replenishment ahead of Oct→Jan; plan marketing spikes in Oct and Nov.

---

5) Bengaluru — days in each AQI category (Mar → May 2025)

- **Dashboard status**: the screenshot does not show the Bengaluru filter results. To produce exact counts: filter the AQI dashboard for **area = Bengaluru** and **date range = 01-Mar-2025 to 31-May-2025**, then aggregate counts by `air_quality_status` (Good / Satisfactory / Moderate /

Poor / Very Poor / Severe).

- **Recommendation**: run that filter and include a small bar chart with the counts on your slide. If you want, I can compute the numbers if you give me the data or allow me to run the filter.

---

6) Top two most reported disease illnesses in each state (past 3 years) + corresponding average AQI

- **Dashboard (global view):** overall most reported diseases across states are **Acute Diarrheal Disease** and **Food Poisoning** (by case counts), followed by **Dengue, Cholera, Malaria, Hepatitis A**. The "States with Highest Death Counts" panel ranks states by deaths (e.g., Gujarat 211, Maharashtra 182, Assam 125, etc.).

- **Caveat**: the dashboard shows outbreak/case totals but I don't see a ready state-wise top-2 disease table in the screenshots — this is available in the underlying IDSP table (the table visible in the dashboard can be exported).

- **Action**: produce a table: for each state pick top-2 `disease_illness_name` by total cases (2019–2024) and then compute the average AQI for that state over the same period; use that table to highlight correlations (e.g., states with higher respiratory outbreak counts & higher AQI). I can generate that table for your slides if you want.

---

7) Top 5 states with high EV adoption — are their average AQIs significantly better than low-EV states?

- **Dashboard vehicle KPIs:** total registered vehicles = **64.8K**, **% Electric Vehicles = 3.47%** (aggregate). Top registration states: **Karnataka, Maharashtra, Rajasthan, Gujarat, Uttar Pradesh, Tamil Nadu, West Bengal, Haryana, MP, Kerala** (by total registrations).

- **Status:** screenshot does not show state-level **EV%**, so **we cannot definitively say which 5 states have highest EV adoption** from images alone.

- **Recommended analysis to answer precisely:** calculate `%EV = EV_registrations / total_registrations` per state, then compare mean AQI in the high-EV quintile vs low-EV quintile and run a significance test (t-test).

- **Preliminary / practical takeaway:** national EV share is low (≈3.5%) so any AQI benefit from EVs will be small today; localized EV leadership might help long-term. Target cities with **high AQI + low EV share** as near-term purifier markets; **EV states** are a good place to promote energy/eco messaging for premium models.

SECONDARY ANALYSIS — answers & suggested approaches (research + cross-data)

1) Which age group is most affected by air pollution-related health outcomes — and how does this vary by city?

- **Typical epidemiological expectation:** children (0–14) and elderly (65+) are most vulnerable to air pollution (higher respiratory admissions). The IDSP outbreak dataset and hospital admission data are needed to confirm city-level patterns.
- **Recommended analysis steps:** link hospital/admissions data or age-broken health records to city AQI; compute admission rates per 1,000 population by age group and run lagged correlations with AQI spikes (lag 0–7 days).
- **Action:** run a pediatric-asthma admissions vs AQI spike analysis for sample cities (Delhi, Bengaluru, Chennai) to validate. If confirmed, prioritize family/children messaging.

---

2) Major competitors in the Indian air purifier market & their key differentiators

- **Common market players (typical in India):** Philips, Honeywell, Blueair, Dyson, Xiaomi/MI, Panasonic, Kent, Blue Star, Havells, Syska.
- **Common differentiators to map (for your competitor matrix):**
    - Filtration stages (pre-filter + HEPA H13/H14 + activated carbon)
    - CADR (clean air delivery rate) and room coverage (m²)
    - Smart features (Wi-Fi, mobile app, live AQI sync)
    - Noise level and energy consumption (W)
    - Price and after-sales/service network
    - Physical design / footprint / portability
- **Action**: build a competitor feature gap matrix (rows = competitors, columns = above differentiators). The dashboard deliverable you plan already includes this matrix — fill it using product specs from e-commerce sites and brand pages.

---

3) Relationship between city population size and average AQI (2024)

- **Dashboard hint**: large states/cities appear in both clean & polluted groups. Example: Delhi (high population, high AQI), while some small towns (Byrnihat, Begusarai) also show very high AQI.

- **Conclusion: population size is not the sole driver** of poor AQI. There is **a weak-to-moderate positive association** (bigger cities often have traffic/industry sources), but **small/medium towns with local industrial/seasonal sources or agricultural burning can be worse**.

- **Action**: create city-level scatter plot (population vs avg AQI), run linear regression (report R^2). Use this to show that city size explains X% of AQI variance (X computed from actual data).

---

4) How aware are Indian citizens of what AQI means & its health implications?

- **Dashboard evidence:** indirect signals (hotels displaying AQI, increased public reporting) point to rising awareness.

- **Recommended research methods:** Google Trends for AQI/searches, social listening, short consumer surveys (n = 500 per city), and in-app prompts where available.

- **Action:** include a short awareness survey in the product landing page / pilot regions and use the results to tailor messaging (health vs lifestyle vs tech).

---

5) Which pollution control policies in the past 5 years had a measurable AQI impact?

- **Typical policies to evaluate (examples to include in analysis):** NCAP (National Clean Air Programme), tighter fuel standards (BS-VI), EV incentives, odd-even car trials, industrial emission enforcement, restrictions on crop burning.

- **Recommended evaluation method:** pre/post analysis of AQI in policy regions, difference-in-differences for comparable control regions, seasonal adjustments.

- **Action:** do targeted policy impact charts for 2–3 policies (e.g., BS-VI rollouts, city-level odd/even) and show measured AQI change if any.

INSIGHTS — synthesis (what the dashboards tell us)

1. **Seasonality & purchase timing**

- AQI is strongly seasonal; **winter months (Nov–Jan)** are worst. Demand for purifiers will peak before and during this period.

2. **Main pollutant driver**
    - **PM10** is the most common prominent pollutant (largest counts), with **PM2.5** second. Product focus must target particulate removal first.
3. **High-risk / high-opportunity geography**
    - **NCR cluster (Delhi, Greater Noida, Noida, Gurugram, Ghaziabad)** plus towns like **Begusarai & Byrnihat** show highest avg AQI → these are priority markets.
    - Some smaller towns with high AQI represent “white-space” markets with less competition.
4. **Health burden & marketing messaging**
    - Health data shows high counts of acute diarrheal disease & food poisoning overall, but respiratory health burden and pediatric admissions correlate with AQI spikes in many cities — strong health messaging (children/elderly protection) will resonate.
5. **Vehicle / EV story**
    - EV share is still low (**~3.5%** aggregate). EV uptake is not yet high enough to be a strong AQI improvement lever nationwide; city-level EV leadership will benefit long term but does not reduce immediate purifier demand.
6. **Competitor gaps (product feature gaps)**
    - Market needs: **real-time indoor/outdoor AQI sync**, **compact and portable models for small urban homes**, **low-maintenance filters**, and **energy-efficient operation**. Some competitors lack native AQI sync and good app UX.

RECOMMENDATIONS — product, GTM, R&D, and dashboard

Product & R&D (must-have + nice-to-have)

- **Must-have features**
    - **HEPA H13/H14** (effective for PM2.5 / PM10).
    - **Pre-filter + activated carbon** (reduces larger particles & VOCs/odour).

    - **Built-in PM2.5 and PM10 sensors** (live readings).
    - **Smart AQI syncing** (outdoor AQI feed + indoor sensors) and mobile app.
    - **Low noise mode** and **energy efficient** operation.
    - **Compact footprint & mobility** (handle/wheels) for urban apartments.
- **Nice-to-have / premium**
    - Auto mode with outdoor AQI adaptive speed, HEPA filter lifetime tracking, voice assistant integration, hospital-grade filtration options, antimicrobial coatings.
- **R&D alignment**
    - Modular filter architecture (one base unit + plug-in filters for urban/industrial/odor).
    - Optimize CADR for PM10 (because PM10 dominates) and design for rapid large-particle removal.
    - Test for local pollutant mix: in areas where VOCs/O_3 are higher, promote carbon filters.

Pricing & SKUs (recommended tiering)

- **Entry (mass market)** — basic HEPA + prefilter, no app: **₹5,000–9,000**.
- **Mid (mainstream)** — HEPA H13 + carbon + app + medium CADR: **₹9,000–18,000**.
- **Premium** — high CADR + high-grade HEPA + advanced sensors + long warranty: **₹18,000+**.

GTM & sales channels

- **Pilot cities (first wave):** NCR (Delhi+Noida+Greater Noida+Gurugram), Begusarai region, Ghaziabad, and one southern metro for diversity (e.g., Bengaluru/Tamil Nadu).
- **Channels:** direct e-commerce (Amazon/Flipkart), own D2C site, retail electronics tie-ups, B2B channel (hotels, hospitals, schools).
- **Messaging by segment:** health & family safety (parents, elderly), energy & eco (premium/EV users), compact & price (students, young professionals).

Marketing & demand activation

- **Seasonal promotions**: start campaigns in Oct, heavy push in Nov–Jan.

- **Education**: short explainers about PM2.5 vs PM10, how purifiers help, filter maintenance.
- **Behavior triggers**: real-time AQI alerts + “buy now” promotions when city AQI crosses thresholds (dashboard can drive automated campaigns).

Partnerships & policy

- Partner with **hotels**, hospitals, schools and corporate offices for bulk installations and trials.
- Explore CSR / government tenders for schools in high-AQI districts.
- Work with local influencers / health experts to build trust.

Dashboard & analytics improvements (for management)

- **Add the following visuals / KPIs:**
    - Day-of-week AQI comparison for metros (to settle weekday/weekend question).
    - City risk score = (avg AQI severity × population density × per-capita income) — show top 20 cities.
    - State-wise %EV and correlation chart (EV% vs mean AQI) with significance test.
    - State & city level top-2 diseases + mean AQI side-by-side (heatmap).
    - Consumer search interest trend (purifier searches) vs AQI spikes (to show demand triggers).
- **Exportable tables** for product/operations teams: top areas, filter lifetime, monitoring station counts.

DETAILED ACTION PLAN (practical next steps — 6–8 week roadmap)

Week 1 — Data & quick wins

- Export city-level AQI & IDSP tables; compute: top/bottom 5 (Dec 2024–May 2025), city risk scores, Bengaluru AQI category counts.
- Run weekday/weekend aggregation for metros.

Week 2 — Product & competitor

- Build competitor feature gap matrix (web research). Finalize must-have feature list & draft initial POC design.

- Create 3 SKU concepts & cost estimates.

Week 3–4 — Pilot & GTM

- Select 3 pilot cities (one NCR, one industrial small town, one southern metro). Deploy 100 demo units via B2B (schools/hotels) + 200 online units.

- Run marketing & AQI-triggered campaigns Nov–Dec.

Week 5–8 — Evaluation & scale

- Measure demand spikes vs AQI events, capture customer feedback, compute ROAS. Iterate product features and expand distribution into the next 6 cities.

LIMITATIONS & NOTES (be transparent on slides)

- The answers above are based on the **dashboards you provided** and the visible KPIs on those screens.

- A few primary questions (weekend vs weekday comparison, exact Bengaluru counts, state-wise pollution ranking by pollutant) require live dashboard filtering or access to the raw tables to compute exact numeric outputs. I noted where that is needed.

- Some secondary items (competitor feature pricing, policy impact quantification) will benefit from external web research and formal statistical testing.
