# Survey instrument for Cross Cities Comparison of Air Quality Valuation (Delhi)

## Introduction

Dear Participant,

You have been randomly selected to participate in an important study on Delhi's air quality. This study is conducted by researchers from universities in China, Singapore, and United States.

This short survey (about **20 minutes**) is designed to find out about your attitudes and concerns towards air quality in Delhi.

The findings from this survey will be used to help inform policies related to air pollution issues in Asia, and there are no right or wrong response to any of the questions. You can be assured that your responses are anonymous and the data will not be traceable to you.

If you have any questions, or if you want the study's final report, please contact Professor Jie-Sheng Tan-Soo from National University of Singapore (jiesheng.tan@nus.edu.sg).

Thank you for your time and input in this research.

## a. Screening questions

1. Was Delhi your primary residence for the year 2018 (at least 10 months)?
   1) Yes
   2) No

2. Please provide the street address in Delhi where you lived for most of 2018 (Note: We just need you to provide the name of your street or general location and not your unit address).
   _____

3. Are you at least 21 years old?
   1) Yes
   2) No

**b. <u>Sociodemographic questions</u>**

1. What is your gender?
    1. Male
    2. Female

2. How old are you?
    _____ Years

3. What is your marital status?
    1. Married
    2. Single
    3. Widow
    4. Divorced/Separated

4. What is the highest level of schooling you have attained?
    1. No schooling
    2. Primary school
    3. Secondary school
    4. Higher secondary school
    5. Vocational school
    6. Bachelor's degree
    7. Master's degree and above
    8. Doctoral degree

5. Which statement best describes your current employment?
    1. Salaried employee
    2. Head of own business
    3. Not working but looking
    4. Not working -- retired
    5. Work from home (telecommute or run business from home)
    6. Student
    7. Housewife

6. If you are employed, which of these description(s) best fit the nature of your work? (Choose all that applies)
    1. Mainly indoor
    2. Mainly outdoor
    3. My work requires physical labor most of the time
    4. My work is mostly non-physical labor

7. Please indicate the range of your monthly income (Rs)
    1. I have no income
    2. Less than 5,000
    3. 5,000 to 12,000
    4. 12,000 to 17,000
    5. 17,000 to 22,000
    6. 22,000 to 27,000
    7. 27,000 to 32,000
    8. 32,000 to 37,000
    9. 37,000 to 42,000
    10. 42,000 to 47,000
    11. 47,000 to 52,000
    12. 52,000 to 57,000
    13. More than 57,000

8. Please indicate the range of your household monthly income (Rs)
    1. Less than 5,000
    2. 5,000 to 12,000
    3. 12,000 to 17,000
    4. 17,000 to 22,000
    5. 22,000 to 27,000
    6. 27,000 to 32,000
    7. 32,000 to 37,000
    8. 37,000 to 42,000
    9. 42,000 to 47,000
    10. 47,000 to 52,000
    11. 52,000 to 57,000
    12. 57,000 to 62,000
    13. 62,000 to 67,000
    14. 67,000 to 72,000
    15. More than 72,000

9. How many people live in your household, including you? ____

10. How many 12 years old and below live in your household? ____

11. Including you, how many 60 years old and above live in your household? ____

12. What is your relationship to the head of household?
    1. I am the head of household
    2. Co-head of household
    3. Spouse
    4. Grandparents/parents/parents-in-laws
    5. Sibling

6. Child
7. Other family relationship
8. Friend
9. There is no head of household

**c. <u>Awareness and attitude towards air pollution</u>**

13. Thinking back over the past year, how satisfied are you with air quality in your community in Delhi?
    1) Very satisfied
    2) Satisfied
    3) Neutral
    4) Unsatisfied
    5) Very unsatisfied

14. Air quality was _____ in my community for 2018
    1) Bad throughout the year
    2) Bad only sometimes, but not during specific seasons
    3) Bad only during specific seasons (specify month(s): _____)
    4) Bad only rarely
    5) Mostly good
    6) I don't know

15. Do you think the air quality in your community in Delhi is better or worse than that in most other parts of Delhi?
    1) My community has much better air quality
    2) My community has better air quality
    3) There is no difference
    4) My location has worse air quality
    5) My location has much worst air quality
    6) It depends; sometimes it is better, but other times worse
    7) I do not know

16. Compared to 2017, do you feel overall air quality in Delhi improved in 2018?
    1) Improved significantly
    2) Some improvement
    3) Remained the same
    4) Some deterioration
    5) Worsened significantly

17. What do you think will be true about air quality in Delhi five years from now?
    1) Will improve significantly
    2) Will have some improvement
    3) Will remain the same
    4) Will have some deterioration
    5) Will worsen significantly

6) Don't know/ No way of forecasting

18. What do think are the ***main*** sources of air pollution in your community? (**Choose all that apply**)
    1) Industrial polluters from your city
    2) Industrial polluters from neighboring provinces
    3) Passenger vehicles (e.g. cars, motorcycles)
    4) Commercial vehicles (e.g. buses, trucks)
    5) Construction sites
    6) Neighbors or people living near you burning crops, fuel, or garbage
    7) I don't know
    8) Others, please specify: _____

19. Who do you think should be responsible to improve air quality? (**Choose all that apply**)
    1) MCD (city) government
    2) Delhi state government
    3) Central government
    4) Government of neighboring states
    5) Government of neighboring countries
    6) Citizens and civil society
    7) Others, please specify _____

20. If given sufficient resources, do you trust the city government to improve air quality in Delhi?
    1) Definitely yes
    2) Probably yes
    3) Probably no
    4) Definitely no
    5) Don't know

21. What types of health issues do you think air pollution in Delhi causes or exacerbates? **(Choose all that apply)**
    1) Premature death
    2) Asthma/Shortness of breath
    3) Cold/flu/fever/runny nose
    4) Sinus problems
    5) Lung cancer
    6) Heart issues
    7) High blood pressure/ Stroke
    8) Headaches/migraines
    9) Eyes redness/swollen/tearing
    10) Skin rashes/problems
    11) Mood swings, depressions
    12) Minimal or no health issues
    13) Don't know
    14) Others, please specify: _____

22. On any given month, which of these fuels do you use regularly (at least twice weekly) inside your residence? (e.g. for cooking purposes) (**Choose all that apply**)
    1) Wood
    2) Charcoal
    3) Coal
    4) Kerosene
    5) LPG/Butane/Propane/Natural gas/ Biogas
    6) Electricity/Solar
    7) I use none of these fuels

23. Are there any smokers among your household members who live with you **in Delhi**?
    1) Yes, there are _____ number of smokers among my household members
    2) No {Skip to question 27}

24. Does anybody smoke tobacco ***inside of your house in Delhi***?
    1) Yes
    2) No {Skip to question 27}

25. How many cigarettes/cigars are smoked ***inside of your house*** per day?
    1) More than one small pack per day (there are 10 cigarette sticks in a small-sized pack)
    2) One small pack per day
    3) At most a few sticks of cigarettes/cigars per day
    4) At most one stick of cigarette/cigar per day

26. How do you feel about being exposed to cigarette smoke?
    1) I am very bothered by it
    2) I am somewhat bothered by it
    3) I am barely bothered by it
    4) I am not bothered by it
    5) I don't know

27. Do you know there is scientific information about air pollution level?
    1. Yes
    2. No (skip to question 30)

28. On average, how often do you consult information on local air quality?
    1) At least daily
    2) At least once a week
    3) At least monthly
    4) Very infrequent/never

29. What are your sources of information for air quality measurement? (**Choose all that apply**)
    1) Mobile phone
    2) Radio, TV
    3) Newspaper
    4) Public display boards
    5) Computers/laptops
    6) Friends/co-workers/family members
    7) Others, please specify
    8) I do not receive information on local air quality

The three photos below are examples of **green spaces** that are found in Delhi. The greenery in these areas consists of grass and shrubs and/or trees. Residents often gather at these places for exercising, brisk walks, picnics, and many other activities.

Source: sodelhi.com

Source: happytrips.com

Based on this definition of green spaces, please answer the following questions:

30. Is your home located within walking distance to green spaces (such as parks and recreational areas)?
    1) Yes
    2) No

31. How often do you visit green spaces for leisure and recreational purposes, including physical activity?
    1) At least daily
    2) At least once a week
    3) At least monthly
    4) Very infrequent/never

Among the four options listed below, where would you rather be under different air quality conditions for leisure and recreational purposes? Please indicate your most preferred and least preferred choices.

32.

On a day with **perfect** air quality and **comfortable** climate, where would you prefer to be for leisure and recreational purposes?

1. In my home, without air purifiers in operation (see handout if you do not know what is an air purifier)
2. In my home, with air purifiers in operation (note that an air purifier usually cost around Rs8,000 to Rs30,000)
3. Outside of my home, but mostly indoors, e.g., shopping malls, restaurants, cinemas etc…
4. Outside of my home, at green spaces

A) Most preferred: _____; B) Least preferred: _____

On a day with **moderate** air quality (think of this as a typical day in Delhi) and **comfortable** climate, where would you prefer to be for leisure and recreational purposes?

1. In my home, without air purifiers in operation (see handout if you do not know what is an air purifier)
2. In my home, with air purifiers in operation (note that an air purifier usually cost around Rs8,000 to Rs30,000)
3. Outside of my home, but mostly indoors, e.g., shopping malls, restaurants, cinemas etc…
4. Outside of my home, at green spaces

C) Most preferred: _____; D) Least preferred: _____

On a day with **bad** air quality (can think of this as the worst air pollution you have experienced in Delhi) and **comfortable** climate, where would you prefer to be for leisure and recreational purposes?

1. In my home, without air purifiers in operation (see handout if you do not know what is an air purifier)
2. In my home, with air purifiers in operation (note that an air purifier usually cost around Rs8,000 to Rs30,000)
3. Outside of my home, but mostly indoors, e.g., shopping malls, restaurants, cinemas etc…
4. Outside of my home, at green spaces

E) Most preferred: _____; F) Least preferred: _____

## d. Contingent valuation

Delhi's air pollution is around **3.33 times worst** than the national air quality standards set by the **Ministry of Environment**. Hence, air quality in Delhi **does not meet** the national standards.

Here are photos of the India Gate in Delhi on two days with differing levels of air pollution. The photo on the left was taken on a day with average air pollution, while the photo on the right was taken during Diwali 2016 when air quality was very bad.

India Gate on a day with average air pollution
Image source: reviewadda.com

India Gate during Diwali 2016

**Information on health impacts of air pollution**

The current level of air pollution in Delhi is known to pose significant public health risks.

Delhi's air pollution is around **3.33 times worst** than the national air quality standards set by the **Ministry of Environment**. Hence, air quality in Delhi **does not meet** the national standards.

According to scientists, when compared to the **national standards** set by the Ministry, these are the following known mortality risks at Delhi's current levels of air pollution:

a. About 67% more likely to die from respiratory illnesses
b. About 33% more likely to die from lung cancer
c. About 16% more likely to die from heart diseases
d. About 25% more likely to die from stroke

Apart from these mortality risks, risks of sickness from various physical ailments also increase because of air pollution (such as asthma and bronchitis). There is also new evidence showing that exposure to air pollution is associated with increased risks of mental illness, including depression, dementia, and Alzheimer's diseases.

33. Delhi's air pollution is around **3.33 times worst** than the national air quality standards set by the **Ministry of Environment**. Hence, air quality in Delhi **does not meet** the national standards. Beginning from 2019, I want you to imagine that Delhi could begin a series of stricter controls and measures to improve air quality, such as limiting factories emissions, stricter emissions standards for new vehicles, limiting crop burnings, increasing tree planting. Other than these examples, other measures could be implemented.

    Now, I want you to imagine that the program **will be successful**, and these measures would reduce Delhi's annual pollution from its current level to meet **national air quality standards**.

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Now, I want you to imagine that the program **will be successful**, and these measures would reduce Delhi's annual pollution from its current level to meet **national air quality standards**.

These controls and measures would require a mandatory fee to be paid by **all** Delhi residents. Hence, all Delhi residents are required to vote whether they are in favor of implementing these measures.

Here, we want you to indicate whether you would vote "Yes" or "No" for this program if the mandatory fee is as stated in the question.

Before responding, please consider that if you contribute money towards this air quality improvement program, you are not going to be able to spend money on other things. In other surveys, we have seen that people sometimes give very high amounts because they have not carefully considered the other things they could buy with the money. Others give very small amounts because they do not think about all benefits.

There is no right or wrong answer, and it is important to us that you answer the following question as carefully and accurately as possible.
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There is no right or wrong answer, and it is important to us that you answer the following question as carefully and accurately as possible.

How would you vote for this air quality improvement program if all residents are each required to pay Rs XXX ***annually***?

1. I vote Yes
2. I vote No

Options for XXX (in rupees)

5000, 25000, 35000, 50000, 80000
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34. {If "*I vote Yes*" in question 33} What were the reason(s) that made you vote in favor for the program? (**Choose all that apply**)
    1. Improving air quality will improve everyday health for me and for people that I care about
    2. I fear the mortality risk from high air pollution
    3. I don't like the smell of air pollution
    4. Improving air quality would allow me and my family to participate in more outdoor activities
    5. It costs too much to operate air purifiers and buy masks whenever air pollution is bad
    6. It is too mentally stressful to have to check outdoor air quality status before I leave home everyday
    7. I am concerned that if we do not control this problem now, it will be even more difficult to improve air quality in future
    8. Others, please specify: _____

    {If "*I vote No*" in question 33} What were the reason(s) that made you unwilling to vote in favor of the program? (**Choose all that apply**)
    1. I do not have enough money to pay this fee
    2. Air pollution is not a problem for me and my family
    3. Air quality improvement should not be paid for by Delhi residents as this problem is caused by neighboring provinces/factories
    4. Delhi residents are already paying enough taxes
    5. I do not believe it is possible to improve air quality in Delhi
    6. I do not trust the government to use the money wisely
    7. Others, please specify: _____

## e. Averting behaviors

35. You may have undertaken some of the following activities or behavior changes during period of poor air quality in Delhi in the year 2018.

    For each of these activities, please indicate the option that is applicable.

    a. Did you purchase face masks?
        1.No
        2.Yes, Rs ____ spent in purchasing face masks in 2018.

    b. Did you purchase air purifiers for home?
        1.No
        2.Yes, we bought ___ air purifiers in 2018 and spent Rs ____

    c. Did you purchase air conditioners to improve air quality for home?
        1.No
        2.Yes, we bought ___ air conditioners in 2018 and spent Rs ____

    d. Did you spend any money on your household to treat common air pollution-related illnesses such as asthma, allergic reactions?
        1.No
        2.Yes, we spend Rs_____ in 2018.

    e. Did you leave temporarily leave Delhi with your household escape air pollution in 2018?
        1.No
        2.Yes, we left Delhi ___ times in 2018 and spent a total of Rs____ on transportation, food, lodging, and etc…

## f. Time tradeoff

36. I want you to imagine another scenario now. Suppose that the two situations shown below could occur. **Both situations would be in Delhi.**

    In the first situation, you would live longer by good fortune. However, Delhi would have constant high levels of air pollution (think of this as the worst air quality you have encountered in Delhi).

    In the second situation, you would not live as long, but Delhi would have perfect air quality.

    Note that it will be a quick and painless death in both situations.

    Choose which of these two options you prefer.

| | Option 1 | Option 2 |
|---|---|---|
| Lifespan: | 75 years | 60 years (you could die from accidents) |
| Air pollution: | Bad air | Perfect/clean air |

    I choose _____.
    1. Option 1 {Go to Question 37}
    2. Option 2 {Go to Question 38}
    3. I am unable to choose

37. {If Option 1} Now consider this new set of options

| | Option 1 | Option 2 |
|---|---|---|
| Lifespan: | 75 years | 65 years (you could die from accidents) |
| Air pollution: | Bad air | Perfect/clean air |

    I choose _____.
    1. Option 1
    2. Option 2
    3. I am unable to choose

38. {If Option 2} Now consider this new set of options

| | Option 1 | Option 2 |
|---|---|---|
| Lifespan: | 75 years | 55 years (you could die from accidents) |
| Air pollution: | Bad air | Perfect/clean air |

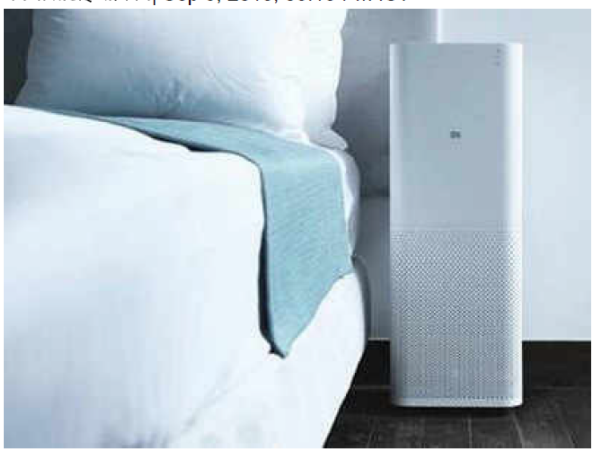
I choose _____.

1. Option 1
2. Option 2
3. I am unable to choose

नवभारत टाइम्स

# कैसे चुनें सही एयर प्योरीफायर, इन बातों का रखें ध्यान

नवभारतटाइम्स.कॉम| Sep 5, 2018, 03.18 PM IST



घर में जरूर लगवाएं एयर प्योरिफायर

इस बात में कोई संदेह नहीं कि शहरों की हवा हद से ज्यादा प्रदूषित हो गई है। दुनिया के 20 सबसे ज्यादा प्रदूषित शहरों में से 13 भारत के हैं। ऐसे में अगर आपको लगता है कि वायु प्रदूषण सिर्फ घर के बाहर है और घर के अंदर आप सेफ हैं तो ऐसा बिलकुल नहीं है। घर के अंदर की हवा भी कभी-कभी बहुत ज्यादा प्रदूषित और हानिकारक हो जाती है। लिहाजा घर के अंदर की हवा को प्रदूषण मुक्त करने के लिए आपको एयर प्योरिफायर का इस्तेमाल करना चाहिए।

कैसे चुनें सही प्योरिफायर?

- प्योरिफायर ऐसी जगह सबसे ज्यादा असर दिखाते हैं जहां खिड़की दरवाजे बंद रहते हैं ताकि उन्हें लगातार धूल-मिट्टी फिल्टर न करना पड़े।
- फिल्टर करने की क्षमता कमरे के साइज से मैच करनी चाहिए। हमेशा वही मॉडल खरीदें जो आपके रूम साइज से ज्यादा एरिया की हवा साफ करने के लिए डिजाइन किया गया हो।
- प्योरिफायर में बिल्ट-इन ह्यूमिडीफायर होना भी जरूरी है।
- एयर प्यूरिफायर में कौन सा फिल्टर इस्तेमाल किया गया है, इस बारे में भी रिसर्च करें। फिल्टर पोलन, डस्ट, स्मोक, गंध और अन्य प्रदूषण फैलाने वाले कणों को फिल्टर करने की क्षमता रखता हो।
- प्योरिफायर लगाने की बेस्ट जगह आपका बेडरूम है और अगर आपको फर्क नजर आए तो बाकी जगह भी लगवा सकते हैं।
- कमरे के साइज के हिसाब से प्योरिफायर आपके कमरे की हवा को 15 से 30 मिनट में प्योर कर देगा और इसके बाद भी अपना काम करता रहेगा।
- एयर प्यूरिफायर खरीदते वक्त उसे प्राथमिकता दें, जिसमें ऐक्टिवेटेड कार्बन लेयर हो।

ऐसे करें प्योरिफायर की सफाई

एयर प्योरिफायर हवा को फिल्टर करता है। हम कई चीजों के लिए फिल्टर यूज करते हैं। हम जो पानी पीते हैं उसमें भी कई फिल्टर्स होते हैं। एयर प्योरिफायर के फिल्टर बहुत आसानी से चोक हो जाते हैं। इनको कुछ हद तक वैक्यूम क्लीनर से साफ किया जा सकता है। प्योरिफायर को एक महीने यूज करने के बाद आप देख सकते हैं कि जो कुछ उस फिल्टर में जमा हुआ है वो आपके फेफड़ों में हो सकता था। जिन लोगों को अस्थमा या एलर्जी है ये उनके लिए प्योरिफायर काफी फायदेमंद होता है।