

## **The Economic Impact of Sustainable Development Initiatives in Urban Areas: Noida's Open Drain Problem**

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### **ABSTRACT**

*This paper explores the rapid growth of Noida and its widespread issue of open drains. The primary objective is to assess how the presence of these drains affects the quality of life among affected communities. This is done through data collected from the administration of a multiple-choice questionnaire among the residents of Noida. There is a significant gap between urban waste management and the quality of life of the inhabitants, which this study aims to highlight. By conducting a survey among those residing and working near open drains in Noida, the paper evaluates and analyzes the impact on individuals and communities across several axes. These include health, lifestyle, expenditure, and property values. This research intends to provide a comprehensive understanding of the socio-economic consequences of open drains, highlighting the urgent need for improved urban waste management solutions to enhance the quality of life in rapidly growing urban areas like Noida.*

**Keywords:** Noida, Open drains, Quality of life, Survey, Urban infrastructure

### **I. INTRODUCTION**

The story of Noida, an urban city outside of Delhi, is one of population growth and rapid urbanization. This aspiring metropolis, whose population is projected to reach a million by 2041, is at a turning point (National Capital Region Planning Board, 2021). Despite having witnessed rapid growth in recent decades, the creation of infrastructure and public services has simply not kept pace. The critical issue of waste disposal in open drains lies at the center of this conflict.

At present, most of Noida's open drains are blocked by garbage and lack proper fencing, signage, and safeguards. Reports even suggest that fumes emitted by these drains are so toxic that they even corrode pipes in refrigerators, televisions, and air-conditioners (Sengupta, 2022).

Poor waste management impacts not only the environment but also the health of Noida's residents. Especially since open drains give rise to a host of diseases like cholera, malaria, polio, dengue—and even a 2007 typhoid outbreak in West Bengal, the cause for which was directly linked to open sewage drains (Bhunja et al., 2009). Moreover, the brunt of these outbreaks is often borne by low-income groups and those living close to open drains.

However, despite these dangerous health risks, Dayal et al. point out a curious oversight, wherein “even India's most comprehensive household surveys do not systematically collect data on drain availability and quality,” and that the Rural Economic and Demographic Survey as well as the National Family Health Survey 2019–2020, only contained two questions on sewers (2022, p. 2252).

It is this very gap between urban waste management and the quality of life among inhabitants that this paper attempts to address. By surveying people who reside and work near open drains in Noida, this paper will assess and analyze how their presence impacts individuals and communities, as well as their health, lifestyle, expenditure, and property value, among others.

## **II. BACKGROUND**

To understand the impact of open drains on the quality of life in Noida, a questionnaire-based survey was conducted between October 2023 and December 2023. It included multiple-choice questions on symptoms, lifestyles, incurred expenses, and property value, among others. A pilot study was also held to confirm the clarity and effectiveness of the questions, and the feedback received was used to modify the questionnaire.

Prospective participants were identified and recruited in person as well as by email. In total, 100 responses were collected. However, 8 responses were incomplete and hence excluded from the final study. Of the remaining 92 participants, 20 reside near open drains, 62 work near open drains, and 10 reside as well as work near open drains (see table 1).

It is worth noting that 96.7% of participants residing near open drains live within a distance of 2 kilometers from one, while 97.2% work in an office less than 2 kilometers from an open drain (see table 2 and 3). In fact, almost 80% of them work as close as 500 meters from the sewer canals. Moreover, 56.70% of participants living near open drains are long-term residents, meaning they have lived in the same residence affected by open sewers for over 6 years.

Diverse socioeconomic backgrounds are also represented in the survey. Responses were obtained from participants belonging to several different occupations, including students, daily wagers, business owners, service professionals, and retirees. Keeping this in mind, the definition of a workplace was also broadened to include not only commercial complexes, but also rickshaws

and autos, as drivers, due to the nature of their occupation, are often at close distances to the canals.

**Table 1. Demographic details of study participants, n = total number of participants**

Characteristics	n = 92	n%
<u>Age Group</u>		
15 to 25	13	14.1%
26 to 35	45	48.9%
36 to 45	22	23.9%
46 to 55	9	9.8%
Above 55	3	3.3%
<u>Occupation</u>		
Student	7	7.6%
Daily wagers	24	26.1%
Business	25	27.2%
Service	30	32.6%
Retired or not working	6	6.5%
<u>Proximity to sewer drainage system</u>		
Through residence	20	21.7%
Through workplace	62	67.4%
Through both	10	10.9%

**Table 2. Demographic details of study participants who work close to open drains, n = total number of participants**

Characteristics	n = 72	n%
<u>Employment duration</u>		
Less than 2 years	28	38.9%
2 to 4 years	23	31.9%

4 to 6 years	9	12.5%
More than 6 years	12	16.7%
<u>Distance from sewage canal</u>		
Within 500 meters	57	79.2%
500 meters to 1 km	8	11.1%
1 km to 2 km	5	6.9%
More than 2 km	2	2.8%
<u>Type of Office</u>		
Commercial complex	10	13.9%
Open stalls	22	30.6%
Retail center	10	13.9%
Housing society	11	15.3%
Rickshaw or auto	13	18.0%
Other	6	8.3%

**Table 3. Demographic details of study participants who reside near open drains, n = total number of participants**

Characteristics	n = 30	n%
<u>Duration of stay at home</u>		
Less than 2 years	4	13.30%
2 to 4 years	6	20%
4 to 6 years	3	10%
More than 6 years	17	56.70%
<u>Distance from sewage canal</u>		
Within 500 meters	15	50%
500 meters to 1 km	9	30%
1 km to 2 km	5	16.7%

More than 2 km	1	3.3%
<u>Type of Housing</u>		
Multi-level building or Corporate housing society	7	23.3%
Chawl system	8	26.7%
Individual standalone house	10	33.3%
Other	5	16.7%

### III. DISCUSSION

Odors from open drains, as Lewkowska et al. (2016) note, are not merely an ecological concern, but also a social one, that negatively impact a community's quality of life. The severity of this issue in Noida can be discerned from the survey, with 97.8% of study participants reporting unpleasant odors from open sewage (see table 4). For over 64% of participants, these odors were noticeable all the time or at least once a day.

**Table 4. Participants’ responses to the questions in the survey regarding the impact of open drainage channels on their lives, n = total number of participants**

Questions	n = 92	n%
1. Have you ever noticed any unpleasant odors coming from the sewage canal?		
A. Yes	90	97.8%
B. No	2	2.2%
2. If yes to previous question, how often do you sense bad odors from sewer canals?		
A. All the time	25	27.2%
B. Very frequently (almost daily)	34	37%
C. Occasionally (once in a week)	21	22.8%
D. Rarely (once in a month)	5	5.4%
E. Handful of instances or never	7	7.6%

3. If yes then what was/were the health issues that you faced?		
A. Respiratory problems (coughing, wheezing, shortness of breath)	15	16.3%
B. Gastrointestinal issues (nausea, vomiting, diarrhea)	9	9.8%
C. Skin irritation (rashes, itching, dryness)	2	2.2%
D. Headaches or dizziness	3	3.2%
E. Eye irritation (redness, itching, watering)	8	8.7%
F. None	55	59.8%
4. How frequently do you experience these symptoms or health issues?		
A. Weekly	6	6.5%
B. Monthly	14	15.2%
C. Rarely	25	27.2%
D. Never	47	51.1%
5. Have you ever visited a doctor for the treatment of the above symptoms?		
A. Yes	23	25%
B. No	69	75%
6. What was the amount of money that you paid for the treatment of diseases caused by toxic gasses? (in Rupees)		
A. Not applicable	66	71.7%
B. Below 1000	19	20.7%
C. 1000 to 10,000	6	6.5%
D. 10,000 to 50,000	1	1.1%
7. Have the local government bodies in your area taken any action on this issue?		
A. Yes	13	14.1%
B. No	61	66.3%
C. Unsure	18	19.6%
8. Would you like to implement /buy a system to alert you about the toxic		

levels of these gasses?		
A. Yes	14	15.2%
B. Yes, if cost-effective	18	19.6%
C. No	60	65.2%

This proximity spells serious health consequences and is evidenced in the responses again, as nearly 40% of participants self-reported health issues linked to exposure (see table 4). The most common were respiratory problems (16.3%), which include symptoms like coughing, wheezing, and shortness of breath. For 21.7% of participants, these symptoms recurred weekly or monthly, while 28.3% paid for some form of treatment.

Despite the burden open drains place on communities, more than half the participants (66.3%) reported that their local government bodies had not taken any action, and a sizable minority (19.6%) said they were unsure.

**Table 5. Participants’ responses to the questions in the survey regarding the impact of open drainage channels on work lives, n = total number of participants**

Questions	n = 72	n%
1. Are you aware about the potential health hazards of these toxic gasses?		
A. Yes	52	72.2%
B. No	20	27.8%
2. How often have you had to skip work because of the above symptoms?		
A. Once in fifteen days	2	2.8%
B. Once in a month	8	11.1%
C. Once in a year	4	5.5%
D. Never	58	80.6%
3. If yes, then has your workplace taken proper safety precautions?		
A. No	22	30.6%
B. Yes	43	59.7%
C. Unsure	7	9.7%

It was also observed that a significant majority (72.2%) of working professionals who participated in the survey were aware of the potential health hazards posed by toxic gasses emanating from open drainage channels, indicating a general level of awareness among the population (see table 5). Though a majority of respondents (80.6%) reported never having to skip work due to symptoms related to exposure, a notable subset did report occasional absences once a month (11.1%) and once in fifteen days (2.8%).

A majority (59.7%) indicated that their workplace has taken proper safety precautions. However, when asked to list these precautions, a handful of responses ranged from mosquito repellents to pest control sprays and mask distribution, which are not comprehensive enough to eliminate the problem. Coupled with the fact that a significant proportion (30.6%) reported their workplace has not implemented safety measures at all and a small percentage (9.7%) being unsure, Noida’s employees likely face several unaddressed health risks.

**Table 6. Participants’ responses to the questions in the survey regarding the impact of open drainage channels on homes and residences, n = total number of participants**

Questions	n = 30	n%
1. Have you had to pay for any additional expenses in your household, due to the effects of toxic sewer gasses? A. 1 expense selected B. 2 expenses selected C. 3 expenses selected D. Other	4 3 3 20	13.3% 10% 10% 66.7%
2. Have you experienced any financial losses like decreased property value as a result of the toxic sewer gasses? A. Yes B. No	6 24	20% 80%
3. Are people living in your society aware about the effects of sewer gas? A. Yes B. No	8 13	26.7% 43.3%



C. Unsure	9	30%
4. If yes, then has your society/workplace taken proper safety precautions?		
A. Yes	3	10%
B. No	27	90%

After surveying participants living close to open drains, a majority of respondents (66.7%) reported not incurring any additional household expenses (see table 6). However, a notable minority (33.3%) did report additional expenses ranging from appliance repairs to the installment of double-sealed windows and purchase of air purifiers. A small but significant portion (20%) of respondents also reported experiencing financial losses due to decreased property values. This is not uncommon, as Sengupta (2022) also reported the difficulties Noida’s residents faced when selling a flat near a drain. One of them, Manish Ahluwalia, even offers a first-hand account:

*“Those who live on the other side of the society get better rates for their property than those who live adjoining the drain. The difference is almost Rs 5 lakh. I want to leave this area and sell off my property, but there are no suitors. It’s like you are trapped here.”*

These conditions appear bleaker as a majority (90%) reported their society has not taken proper safety precautions. In fact, only 26.7% of respondents believed that their neighbors are even aware of these effects, indicating room for better public awareness and education.

While the survey elucidates numerous ways open drains impact Noida’s quality of life, it also highlights a glaring lack of state intervention. Such intervention is necessary since implementing waste management solutions at a large scale cannot be undertaken by communities or private organizations. To sustain Noida as a metropolis, the city must combat the open drain problem sooner than later—not merely to improve sanitation but to enrich the people, economies, and ecologies that depend on it.

#### **IV. CONCLUSION**

The issue of open drains takes on a new tone of urgency, as a recent study that involved studying sewage samples from two Noida drains found an alarmingly high level of multi-drug resistant strains (Kundu et al., 2022).

Many plans have also been drawn up to begin covering Noida’s drains. However, some have flagged concerns regarding the approach, as covering drains is merely a temporary solution likely to erode water quality and lead to more toxic gas formation. In the same vein, efforts like

constructing walls around the drains or carrying out regular fumigation are also not permanent or sustainable solutions. What Noida needs, ultimately, is a multi-pronged approach that addresses waste treatment and management as a whole.

In the meantime, protocols can be defined and standardized across residences and workplaces close to open sewers. But it is only through a collective effort by policy-makers, government officials, city authorities, and other relevant stakeholders that Noida can successfully bridge the gap between its people and infrastructure.

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