Dissertation Training

at

International Institute of Health Management and Research
New Delhi

Assessment and Observational Study of Waste Disposal in a Semi-Urban Area of Goyla Dairy (Delhi NCR)

by

Akhil Saraswat
PG/23/010

Under the guidance of
Dr. Punit Yadav

PGDM (Hospital and Health Management)
2023-25

International Institute of Health Management Research
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ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my mentor, Dr. Punit Yadav, Assistant Professor, IIHMR Delhi, for his exceptional guidance, constant encouragement, and unwavering support throughout the course of my dissertation. His insights, constructive feedback, and academic mentorship have been instrumental in shaping the direction and quality of this research.

This study was undertaken independently under his supervision, and I feel privileged to have had the opportunity to learn from his vast experience in the field of public health and health management. His timely reviews, detailed observations, and ability to simplify complex concepts greatly helped me in refining the study and deepening my understanding of the subject.

I also extend my thanks to the faculty members and administrative staff at IIHMR Delhi for providing a conducive academic environment and necessary resources for the successful completion of this work. Their support, directly and indirectly, contributed to my overall learning experience during the course of this program.

Akhil Saraswat

PG/23/010

CERTIFICATE OF APPROVAL

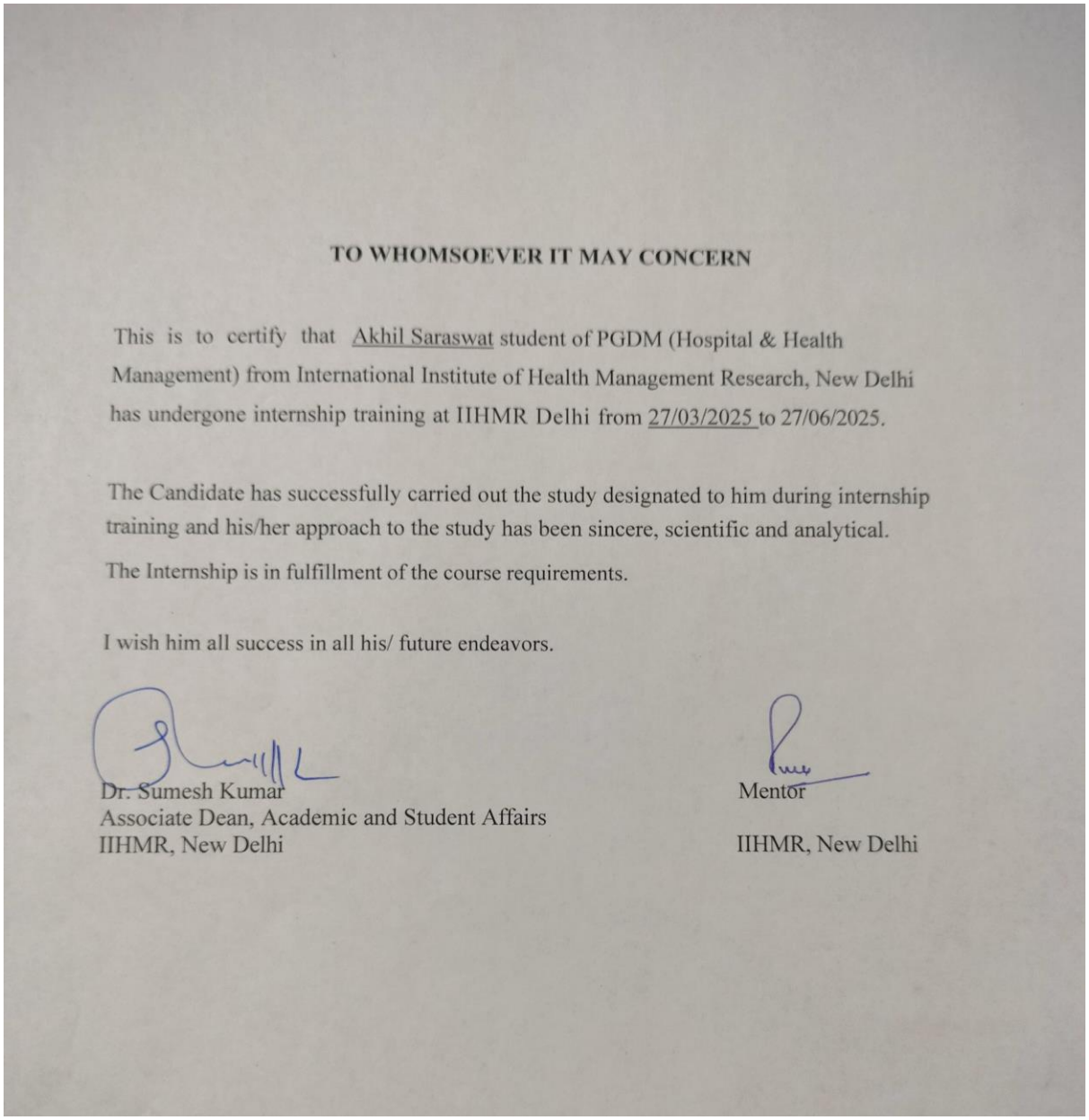
Certificate of Approval

The following dissertation titled **Assessment and Observational Study of Waste Disposal in a Semi-Urban Area of NCR** at **IIHMR Delhi** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
Dr. Shiv	
Dr. Sumant Swain	

TO WHOMSOEVER IT MAY CONCERN



TO WHOMSOEVER IT MAY CONCERN

This is to certify that Akhil Saraswat student of PGDM (Hospital & Health Management) from International Institute of Health Management Research, New Delhi has undergone internship training at IIHMR Delhi from 27/03/2025 to 27/06/2025.

The Candidate has successfully carried out the study designated to him during internship training and his/her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his/ future endeavors.

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Mentor
IIHMR, New Delhi

CERTIFICATE BY SCHOLAR

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **Assessment and Observational Study of Waste Disposal in a Semi-Urban Area of Delhi NCR** and submitted by AKHIL SARASWAT Enrollment No. PG/23/010 under the supervision of Dr. Punit Yadav for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from 2023 to 2025 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Akhil

Signature

AKHIL SARASWAT

FEEDBACK FORM

Annexure F

FEEDBACK FORM

Name of the Student: AKHIL SARASWAT

Name of the Organisation in Which Dissertation Has Been Completed: IIHMR DELHI

Area of Dissertation: GOYALA DAIRY

Attendance: PRESENT

Objectives achieved: Objectives Achieved.

Deliverables: An innovative study to assess waste mgt practices through GIS

Strengths: Using GIS

Suggestions for Improvement: More comprehensive Data base on secondary interfaces

Suggestions for Institute (course curriculum, industry interaction, placement, alumni):

Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)

Date:
Place:

CERTIFICATE FROM DISSERTATION ADVISORY COMMITTEE

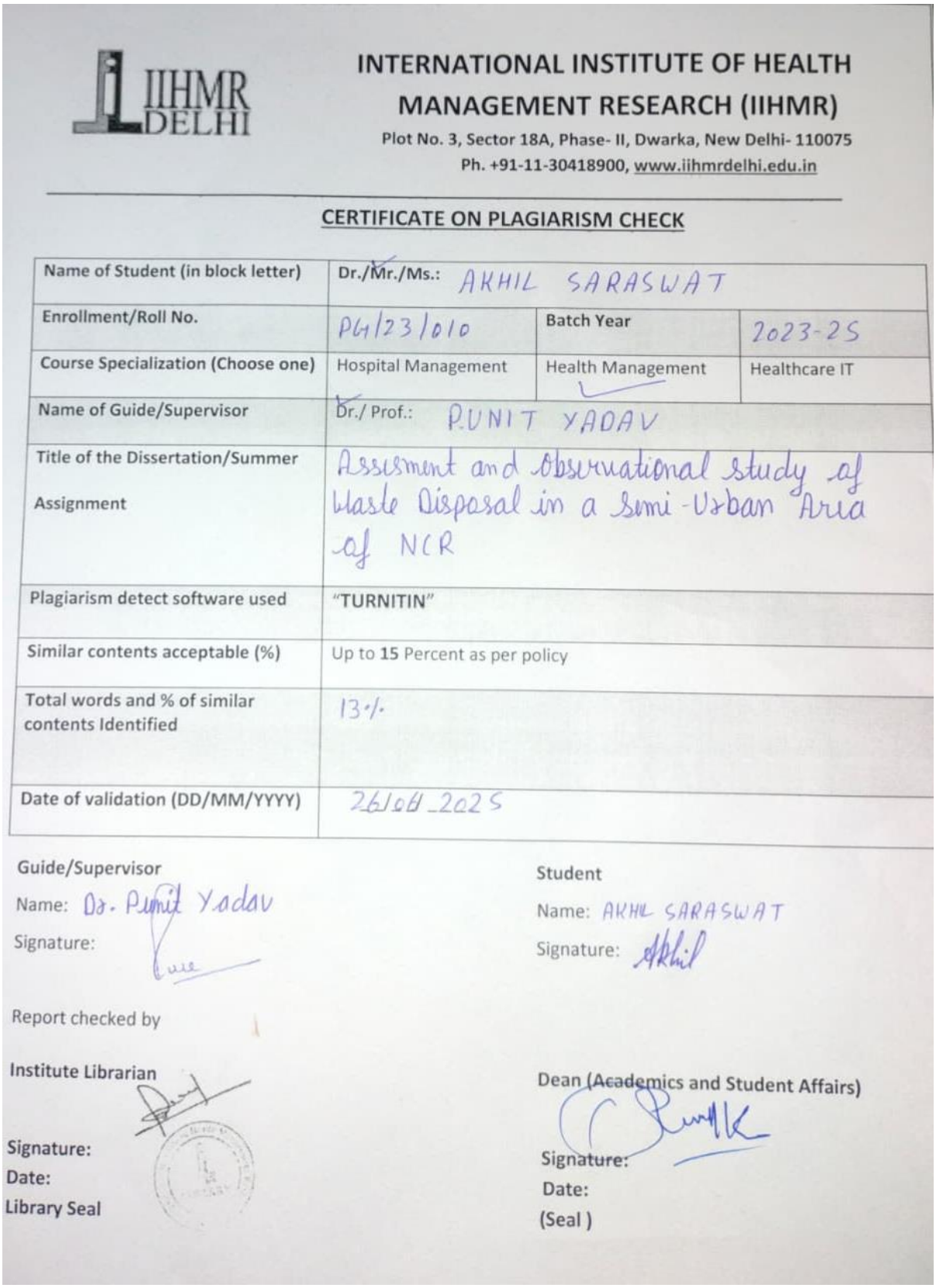
Certificate from Dissertation Advisory Committee

This is to certify that **Mr. AKHIL SARASWAT,** a graduate student of the **PGDM (Hospital & Health Management)** has worked under our guidance and supervision. He is submitting this dissertation titled "**Assessment and Observational Study of Waste Disposal in a Semi-Urban Area of Delhi NCR** in partial fulfillment of the requirements for the award of the **PGDM (Hospital & Health Management).**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Institute Mentor Name: Dr. Punit Yadav
Designation: Professor
Organization: IIHMR DELHI

CERTIFICATE ON PLAGIARISM CHECK



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CERTIFICATE ON PLAGIARISM CHECK

Name of Student (in block letter)	Dr./Mr./Ms.: AKHIL SARASWAT		
Enrollment/Roll No.	PGI/23/010	Batch Year	2023-25
Course Specialization (Choose one)	Hospital Management	Health Management ✓	Healthcare IT
Name of Guide/Supervisor	Dr./ Prof.: PUNIT YADAV		
Title of the Dissertation/Summer Assignment	Assesment and Observational study of Waste Disposal in a Semi-Urban Area of NCR		
Plagiarism detect software used	"TURNITIN"		
Similar contents acceptable (%)	Up to **15** Percent as per policy		
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Signature: Akhil

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LIST OF ABBREVIATIONS

SBM-U – Swachh Bharat Mission – Urban

AMRUT – Atal Mission for Rejuvenation and Urban Transformation

SDG – Sustainable Development Goal

MLD – Million Litres per Day

CPCB – Central Pollution Control Board

STP – Sewage Treatment Plant

FSTP – Faecal Sludge Treatment Plant

OTS – Onsite Treatment System

FSSM – Faecal Sludge and Septage Management

IEC – Information, Education & Communication

CSZ – Core Sanitation Zone

GPS – Global Positioning System

GIS – Geographic Information System

TABLE OF CONTENTS

Abstract

This study explores the current state of liquid waste disposal practices in Goyla Dairy, a semi-urban area in Delhi NCR. Despite various government initiatives like the Swachh Bharat Mission–Urban (SBM-U) and AMRUT, the area continues to face challenges related to the safe disposal and treatment of grey and black water. Using a cross-sectional observational design, the research involved field visits to 59 purposively selected sites, where photographic evidence and location-based data were collected to assess sanitation infrastructure and practices.

The findings reveal a high level of non-compliance with national sanitation guidelines. Most wastewater is discharged untreated into open drains, with limited presence or functionality of septic tanks and sewage treatment plants. Septic systems, where present, are rarely desludged, and overflow is common. Additionally, the absence of decentralized treatment solutions contributes to environmental and health hazards.

The study highlights significant gaps in waste management infrastructure, service delivery, and community awareness. It emphasizes the need for regular desludging, infrastructure upgrades, and active community involvement. The results aim to support informed policy-making and localized interventions to achieve the objectives of SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities).

Assessment and Observational Study of Waste Disposal in a Semi-Urban Area of NCR

Name of Student: Akhil Saraswat

Roll No: PG\23\010

Name of the Faculty Mentor: Dr. Punit Yadav

Introduction:

Water plays a vital role in our daily lives. We rely on it for drinking, cooking, bathing, cleaning, and various other tasks. Once used, this water turns into wastewater or used water. This wastewater can be categorized as grey water, which comes from kitchens, bathrooms, and wash basins, and black water, which comes from toilets and urinals. If this used water is not collected and treated properly, it can cause serious health problems and pollute our surroundings.

In many areas of India, especially in semi-urban places like Goyla Dairy in New Delhi, there is no proper system to manage this liquid waste. People often throw used water into open drains, streets, or nearby empty lands. Some houses have septic tanks or soak pits, but they are not cleaned regularly. Sometimes the waste water from toilets, kitchens, and bathrooms all mix together and flow in open drains. This leads to dirty surroundings, bad smells, mosquito breeding, and diseases like diarrhea, typhoid, and skin infections.

The Government of India has launched various programs such as the Swachh Bharat Mission– Urban (SBM-U) and AMRUT to improve cleanliness, drainage, and sewage systems in cities and towns. These programs support building of toilets, septic tanks, treatment plants, and proper drainage lines. However, in areas like Goyla Dairy, there is still a gap between government plans and what is actually happening on the ground.

This study was conducted to understand the current situation of liquid waste disposal in Goyla Dairy. The purpose was to observe how used water is being handled in households and public areas. A total of 59 places were visited and photos were taken. Each site was observed to see whether the waste water is going into proper drains, septic tanks, or is simply thrown outside. The goal is to find out the problems in the system and suggest improvements.

The study also aligns with the objectives of the Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities), which focus on ensuring access to clean, safe water and promoting healthy, livable environments for everyone.

Aim of the Study:

The aim of this study is to understand how liquid waste (used water) is being disposed of in a semi-urban area called Goyla Dairy in New Delhi. It focuses on how people manage waste water from kitchens, bathrooms, and toilets, and whether the waste is being collected and treated in the right way or not.

Objectives of the Study:

1. To observe how households and communities in Goyla Dairy are currently disposing of liquid waste (grey water and black water).
2. To identify whether proper systems like drains are available and working or not.
3. To check if the current methods of waste water disposal follow the standards and guidelines given by the government (like under Swachh Bharat Mission).
4. To document the problems seen during field visits and collect visual evidence (photos) of drains and wastewater sources.

Review Of Literature:

Efficient management of liquid waste is critical to safeguarding public health and preserving environmental quality. Across India, numerous research studies, policy documents, and government missions have drawn attention to the pressing issues surrounding wastewater disposal, especially in urban, semi-urban, and peri-urban regions where infrastructure is often inadequate.

According to the Central Pollution Control Board (CPCB) report from 2019, India generates an estimated 72,368 million litres per day (MLD) of sewage. However, only about 28% of this wastewater is treated through formal treatment plants. The remaining untreated sewage is typically discharged into natural water bodies, drains, or open land, resulting in serious environmental degradation, contamination of water sources, and increased risk of disease outbreaks.

This challenge is particularly pronounced in semi-urban and peri-urban areas, where structured sewerage systems are either non-existent or function poorly. In such regions, communities predominantly depend on on-site sanitation systems like septic tanks and soak pits. However, these systems are often poorly maintained, with desludging either neglected or delayed. The lack of regular maintenance leads to system overflows, leakage

into groundwater, and the creation of breeding grounds for mosquitoes and other disease vectors, thus endangering the health of local populations.

To address these challenges, the Government of India launched the Swachh Bharat Mission – Urban (SBM-U) in 2014. This initiative goes beyond merely building toilets; it also focuses on the comprehensive management of faecal sludge and wastewater. SBM-U encourages the adoption of decentralized wastewater treatment technologies, such as small-scale treatment plants, bio-digesters, and community-based treatment systems. It also promotes regular desludging of septic systems and scientific handling of wastewater, particularly in smaller cities and towns where conventional centralized systems are financially or technically unviable.

Overall, these efforts aim to reduce environmental pollution, prevent waterborne diseases, and move towards achieving sustainable sanitation solutions, in alignment with the broader goals of environmental protection and improved urban living conditions.

Another major initiative, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), launched in 2015, focuses on improving urban infrastructure, including water supply, sewerage, and wastewater treatment plants (STPs). However, many reports show that the implementation of such schemes in semi-urban pockets is inconsistent due to limited technical capacity, financial constraints, and lack of monitoring.

Studies also show that community involvement and awareness play a key role in improving liquid waste management. In places where residents are informed and engaged, there is better upkeep of local drains, timely desludging of septic tanks, and more demand for improved services.

Despite the existence of national frameworks, semi-urban areas like Goyla Dairy often fall through the cracks due to their transitional nature — neither fully urban nor rural. This study builds upon existing literature by providing ground-level observations of liquid waste management practices in Goyla Dairy and highlighting the practical gaps in infrastructure, behavior, and service delivery.

Methodology

Study Design:

The study used a cross-sectional observational design, meaning it assessed the present state of liquid waste disposal by examining various locations at one specific point in time. This method allowed for the collection of real-time data on sewage disposal, drainage infrastructure, and on-site sanitation practices, without making any changes or interventions in the natural setting.

Study Area:

The study was conducted in Goyla Dairy, a semi-urban locality located in the South-West District of New Delhi. Goyla Dairy was selected as it represents a typical semi-urban setting where rapid population growth and inadequate infrastructure contribute to poor waste management practices. The area includes both planned and unplanned settlements, where people depend on a mix of on-site systems like septic tanks and open drains for liquid waste disposal.

Inclusion Criteria

- Sites that displayed liquid waste disposal systems such as open or closed drains.
- Household and community sources of grey water (from kitchens and bathrooms) and black water (from toilets).
- Locations showing on-site sanitation systems like septic tanks and soak pits.
- Observations matching Swachh Bharat Mission–Urban (SBM-U) guidelines.
- Points where grey and black water were observed to mix or overflow.
- Sites with evidence of faecal sludge discharge or stagnant wastewater.
- Locations suitable for geotagged photo documentation of liquid waste practices.

Exclusion Criteria

- Sites related to solid waste disposal, such as household garbage, plastic waste, or compost bins.
- Private household interiors including bathrooms, kitchens, or internal plumbing.

- Locations dealing with industrial waste, biomedical waste, or commercial discharge.
- Any area showing only stormwater runoff without contamination from used water.
- Areas where no liquid waste source or flow was visibly present.
- Public spaces without relevant sanitation or drainage structures.

Study Period:

The research was conducted over a period of three months during the summer of 2025:

- Preliminary Site Visits: 15 April – 30 April
- Data Collection: 1 May – 25 May
- Data Analysis: 26 May – 10 June

Sample Size:

A total of 59 observation sites were selected and studied to assess various types of liquid waste sources and disposal methods used in the area.

Sampling Method:

The study used a purposive sampling method. A total of 59 observation sites were selected within Goyla Dairy based on their visibility and relevance to the study of liquid waste disposal. The selection focused on areas with varied sanitation infrastructure—such as open drains, septic tanks, soak pits, and household wastewater outlets.

To ensure geographic diversity and spatial accuracy, geotagging was used. Photographs of each site were captured using a GPS-enabled smartphone, allowing precise location identification.

Data Collection Methods:

Photographic Documentation: A total of 59 photographs were taken using a GPS-enabled mobile phone to capture real-time images of liquid waste management practices. These photos were geotagged to show the exact locations.

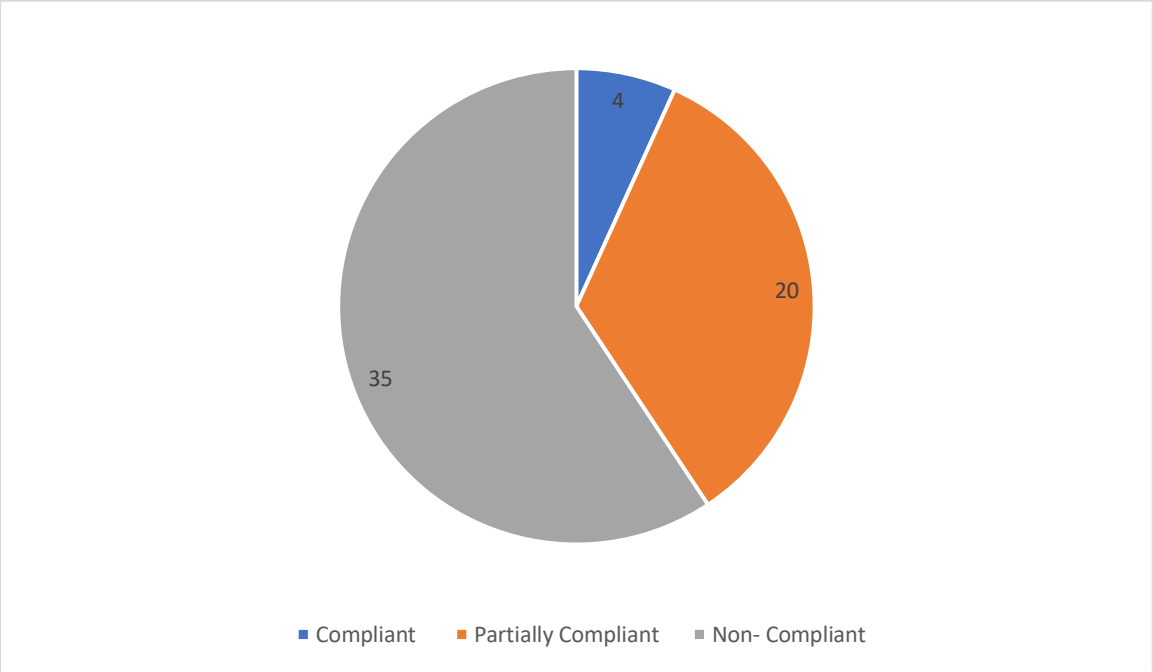
S.NO.	Components	Description	Compliance	Remarks
1.	**Sewage (Used water)**	Used water consists of two main components: • **Grey water**, which comes from sources like kitchens, bathrooms, and wash basins. • **Black water**, which originates from toilets and urinals. At times, these may also get combined with other municipal flows, including surface runoff and stormwater.	Partially Compliant	Grey and black water observed, but often mixed with stormwater.
2.	**Generation of Domestic Used water**	Domestic Used Water Generation: The Government of India, along with various States and Union Territories, aims to supply 135 litres of safe drinking water per person per day through different schemes and missions. Out of this, it is estimated that around 80% (approximately 108 litres per person per day) becomes used water after consumption.	Not Applicable	Estimation based on population norms; not physically measured.
3.	**Management of used Water**	Used water management involves the processes of collecting, transporting, treating, and safely disposing of all the mentioned types of waste water.	Non-Compliant	No proper system for collection and treatment in many observed areas.
4.	**Collection**	Grey water from kitchens, bathrooms, and wash basins, along with black water from toilets, should be collected and directed either into a nearby sewer system (off-site sanitation) or into on-site sanitation systems such as septic tanks connected to soak pits.	Partially Compliant	Wastewater collection done in some areas, but often poorly maintained.

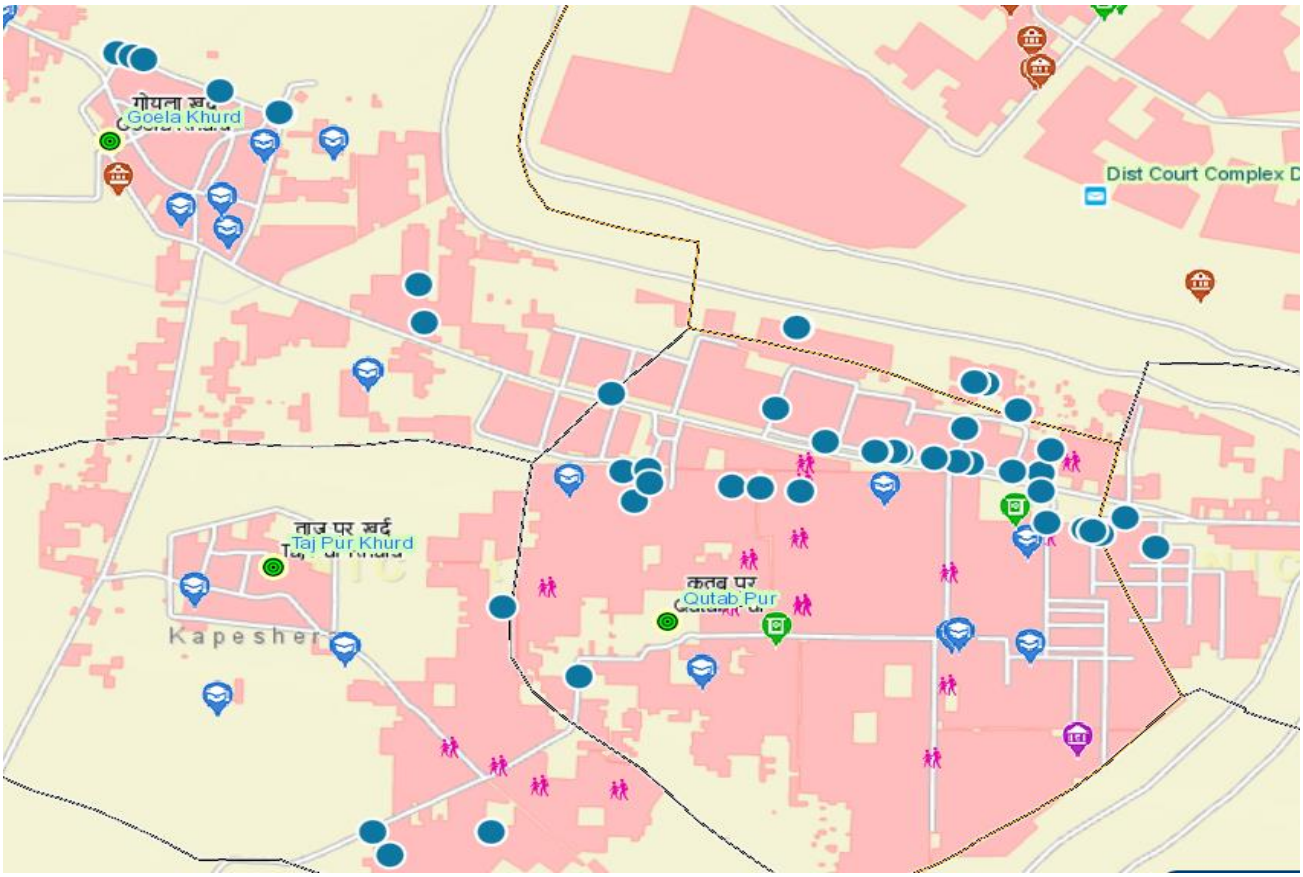
5.	**Conveyance**			
5.1.	**Off- site system**	The off-site system includes the transportation of sewage through pipelines and its treatment at a Sewage Treatment Plant (STP).	Partially Compliant	Existing in few central areas only; periphery depends on on-site system.
5.1.1	**Interception and Diversion drains**	This system involves intercepting and collecting sewage from municipal drains in areas without a sewer network and redirecting it to a Sewage Treatment Plant (STP) for proper treatment.	Not Compliant	No separate diversion mechanism seen; wastewater flows into drains.
5.1.2	**Sewer Network**	A sewer network is made up of underground pipelines, usually laid along roads, designed to collect sewage from homes and other buildings. The central part of a city, typically with a high population density, is known as the Core Sanitation Zone (CSZ) and is generally suitable and feasible for installing a sewer system. In contrast, the outer areas of a city, known as fringe areas, usually have lower population density. These regions often rely on on-site sanitation systems, as constructing a sewer network there is usually not practical or cost-effective.	Partially Compliant	Network seen in core areas but lacking in fringes and slum zones.
5.2.	**On-site System**	An Onsite Treatment System (OTS) is a sewage disposal setup that is privately owned and managed, not operated by the municipal authorities. It treats used water at the source and typically produces partially treated wastewater. Additionally, there are also packaged onsite sewage treatment units available in the market for such purposes.	Partially Compliant	Septic tanks seen but not regularly desludged; soak pits often overflow.

5.2.1	**Septage (from septic tanks with soak-pits)**	In on-site systems, faecal sludge and black water are collected in septic tanks and soak pits located within the property. These tanks are periodically emptied using specialized collection vehicles, which then transport the waste to designated treatment facilities.	Non-Compliant	No regular desludging practice or faecal sludge treatment facility.
6.	**Treatment**	Sewage is treated at a Sewage Treatment Plant (STP), while faecal sludge can be handled either at the STP itself, at a combined STP-cum-Faecal Sludge Treatment Plant (FSTP), or at a separate FSTP. These treatment facilities can be set up as either centralized or decentralized systems.	Non-Compliant	STP either not working or absent; decentralised treatment not used.
6.1.	**STP**	Sewage Treatment Plants (STPs) are facilities designed to treat used water generated from domestic, commercial, and institutional sources.	Non-Compliant	STP was found non-functional or neglected in field observations.

Total Sample Size – 59

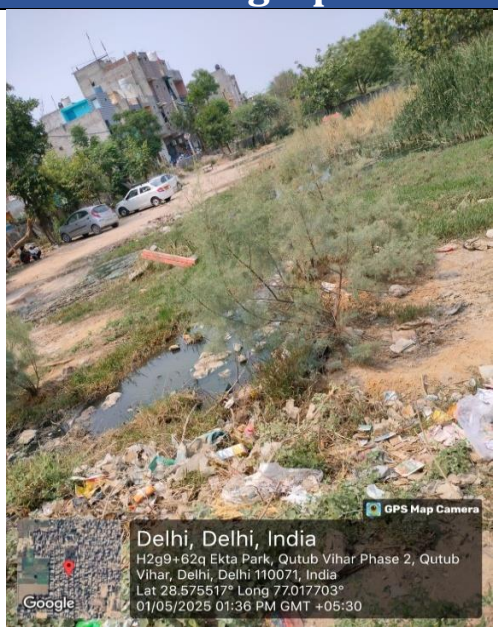
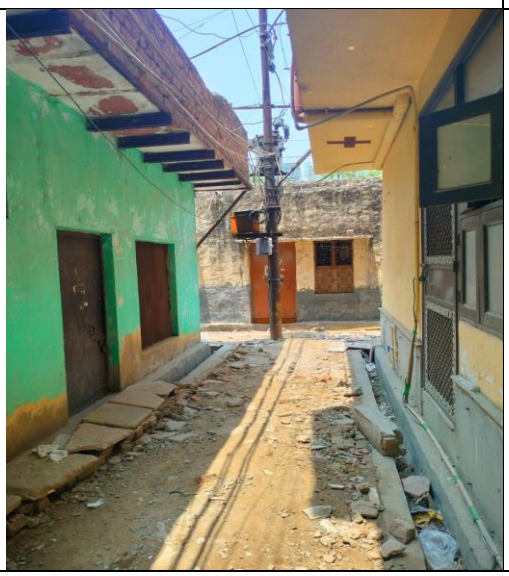
Compliant	**4**
Partially Compliant	**20**
Non-Compliant	**35**



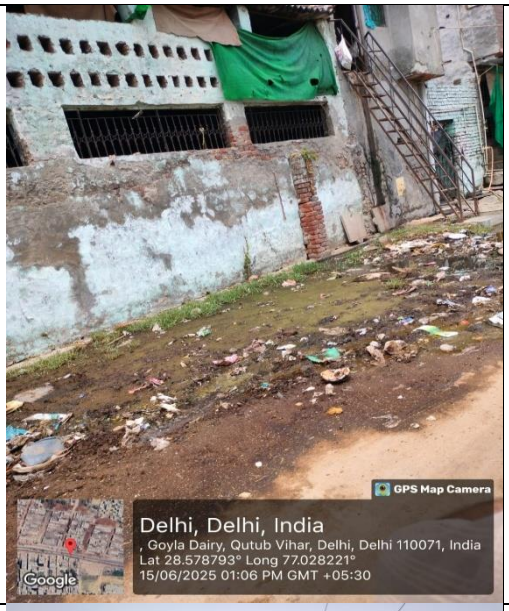
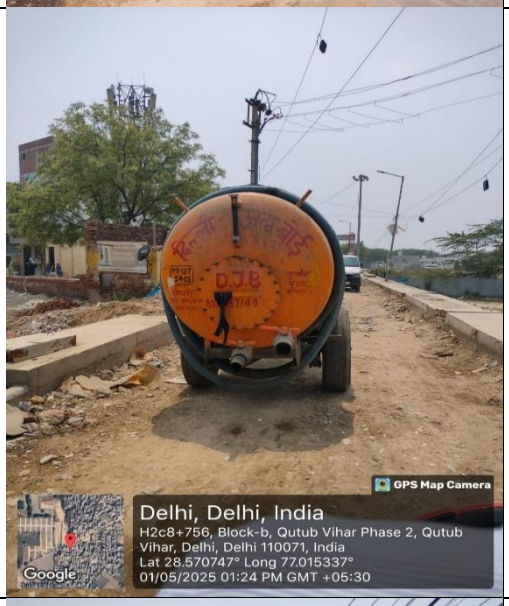


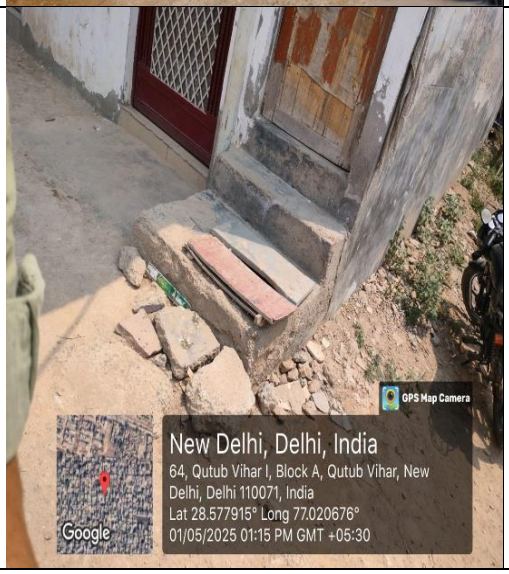
- **I have marked all the location in rectangular boxes from where I have clicked all the images in my whole Project.**

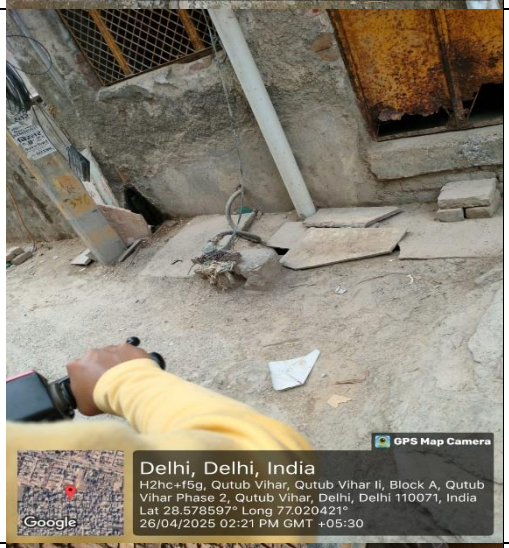
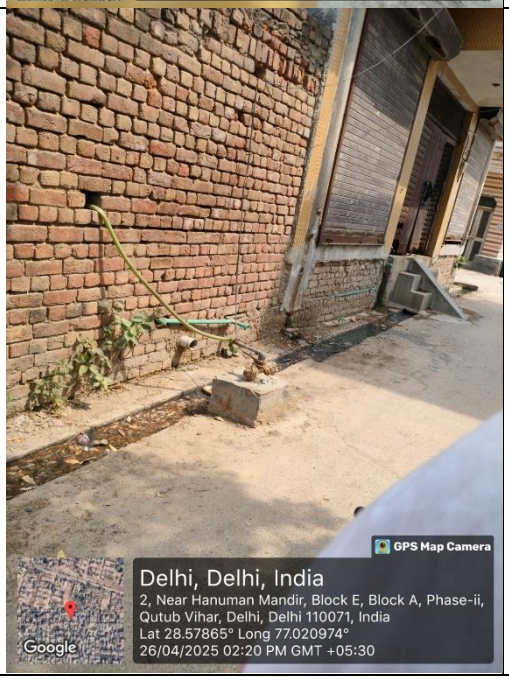
Evidence Table

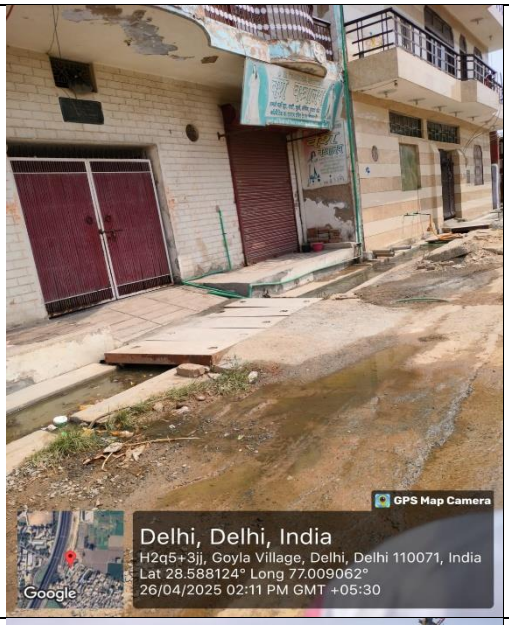
S.NO.	Photograph	Remarks
1.		Open drain source
2.		Open drain source

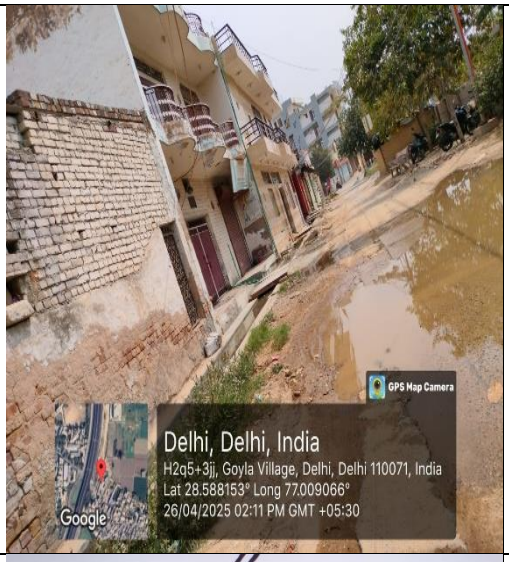
3.		open drain source
4.		Open drain source
5.		Open Drain Sources

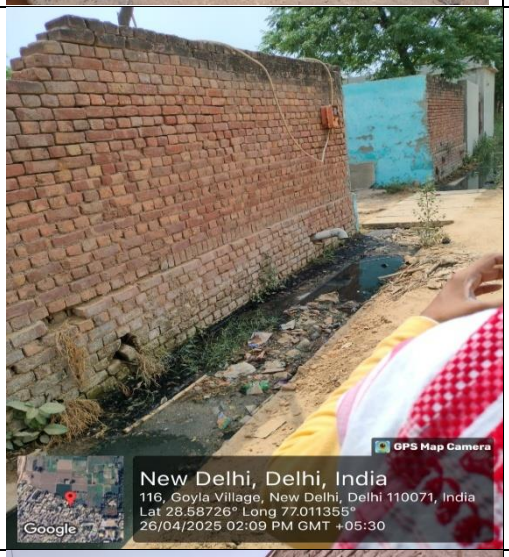
6.		Overflowed open drain sources
7.		Closed Drain Sources
8.		Open drain source

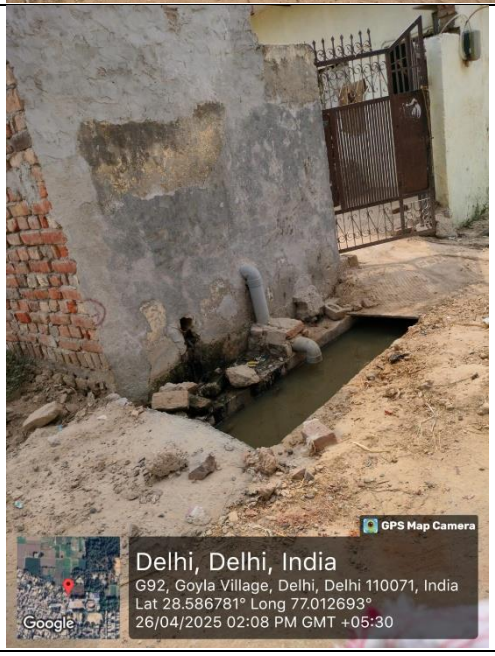
9.		Semi-Closed Drain Sources
10.		Open Drain Sources
11.		Closed Drain Sources

12.		Closed Drain Sources
13.		Closed Drain Sources
14.		Open drain source

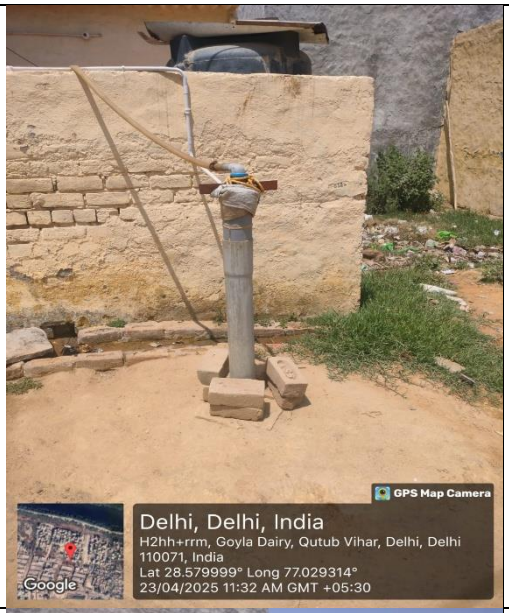
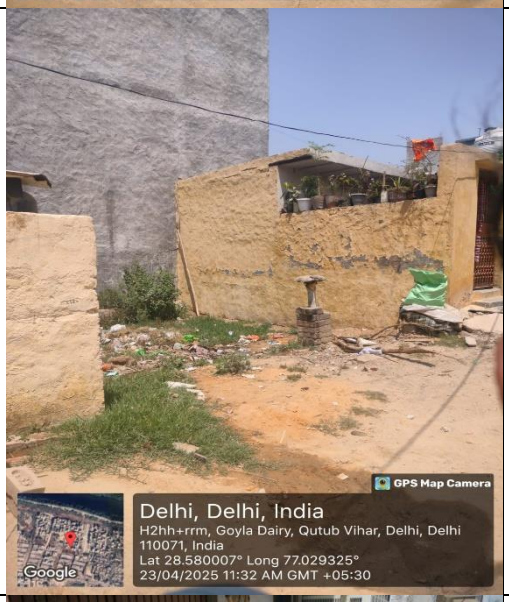
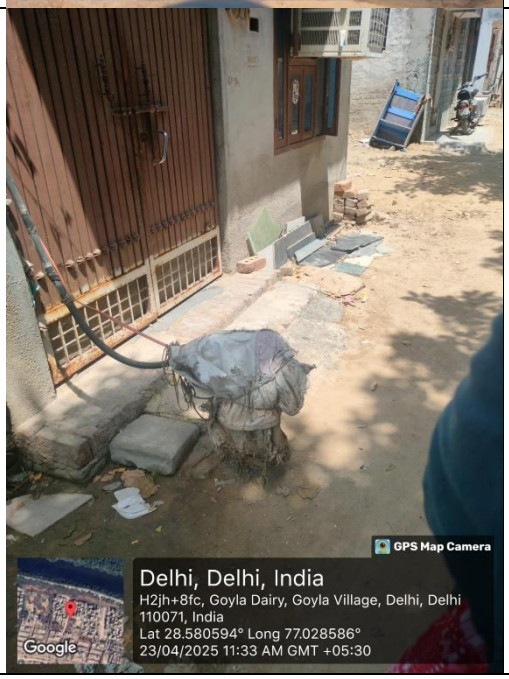
15.		Open drain source
16.		Open drain source
17.		Open drain source

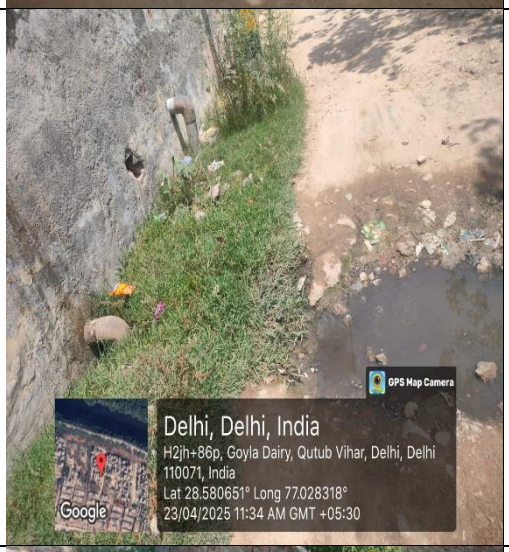
18.		Overflowed Open drain source
19.		Sewer line discharging onto roadside area.
20.		Soak pit with visible sludge deposits.

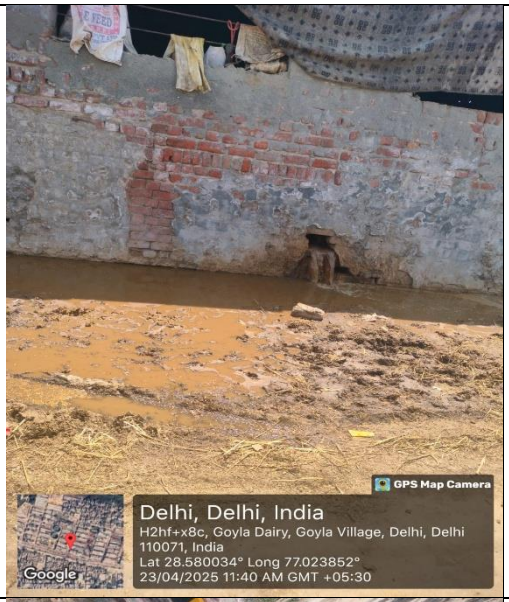
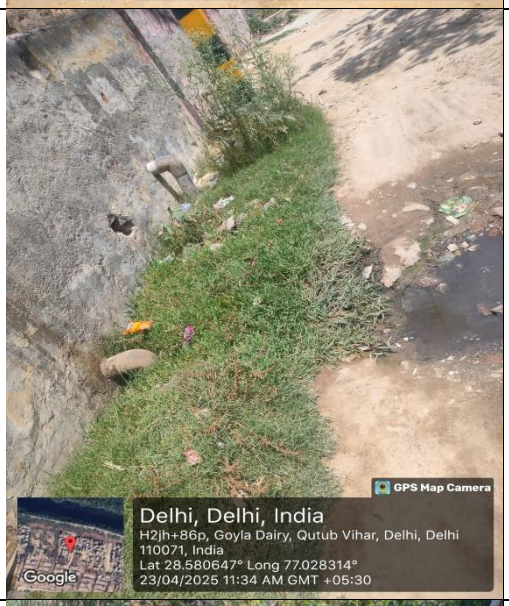
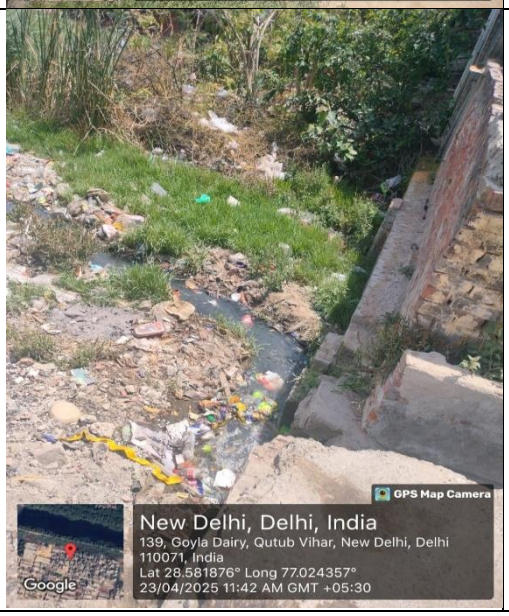
21.		Closed Drain Sources
22.		Open drain source
23.		Open drain source

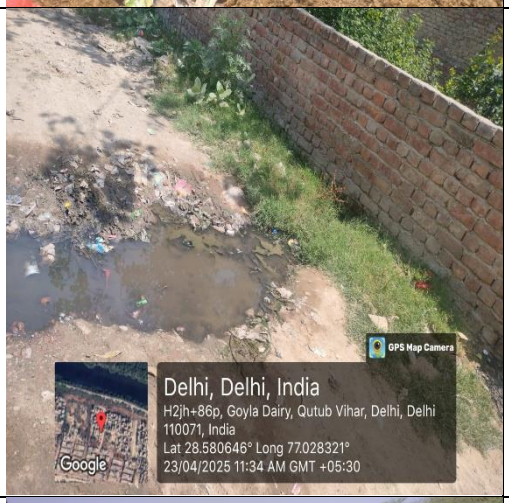
24.		Open drain source
25.		Semi- Open drain source
26.		Open drain source

27.		Open drain source
28.		Open drain source
29.		Closed Drain Sources

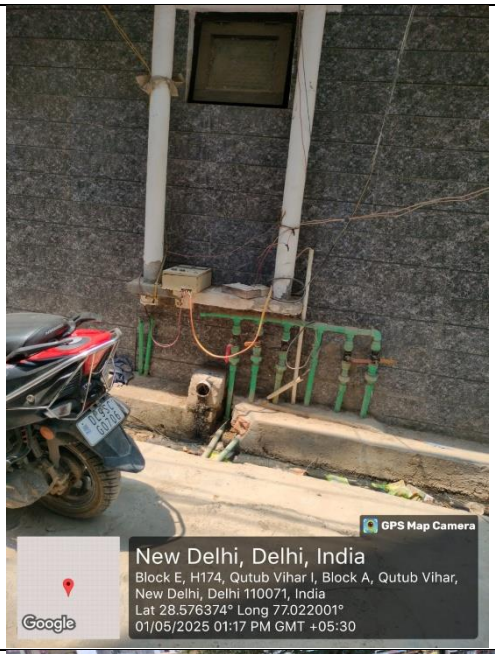
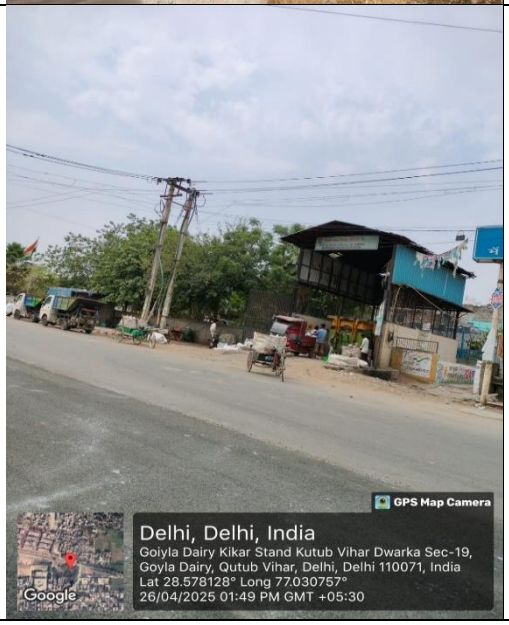
30.		Location signboard for sewage treatment plant.
31.		Sewer line exposed above ground.
32.		Water ponding near borewell area.

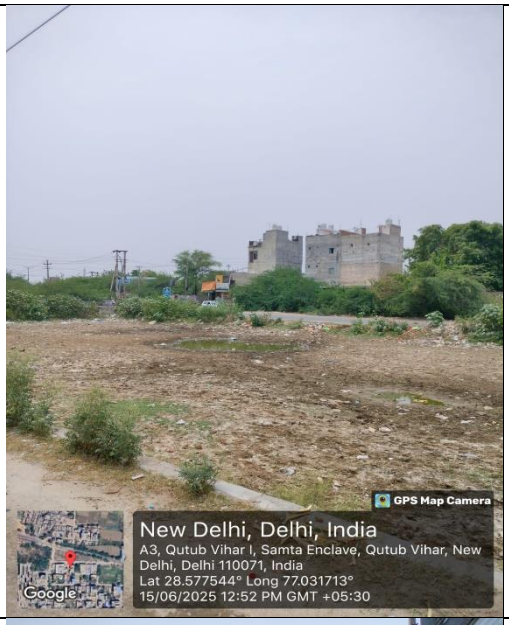
33.		Closed Drain Sources
34.		Open drain source
35.		Open drain source

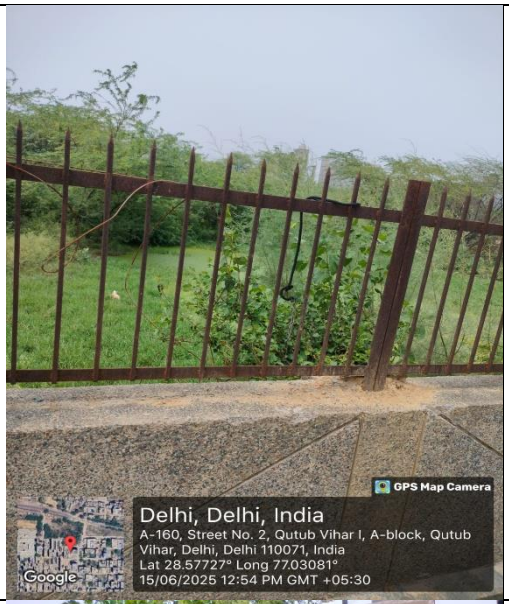
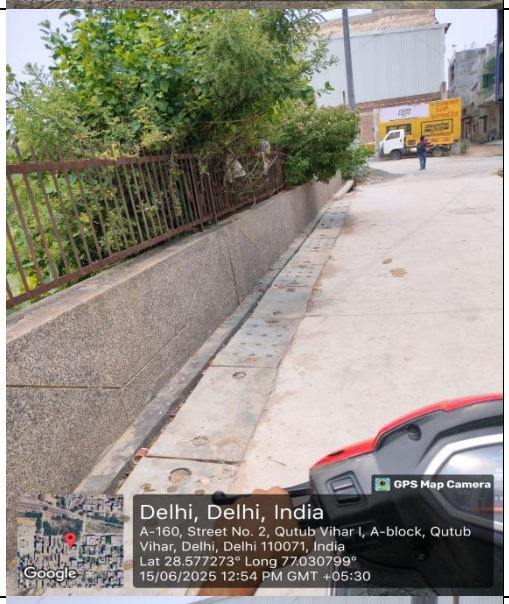
36.		Open drain source
37.		Open drain source
38.		Open drain source

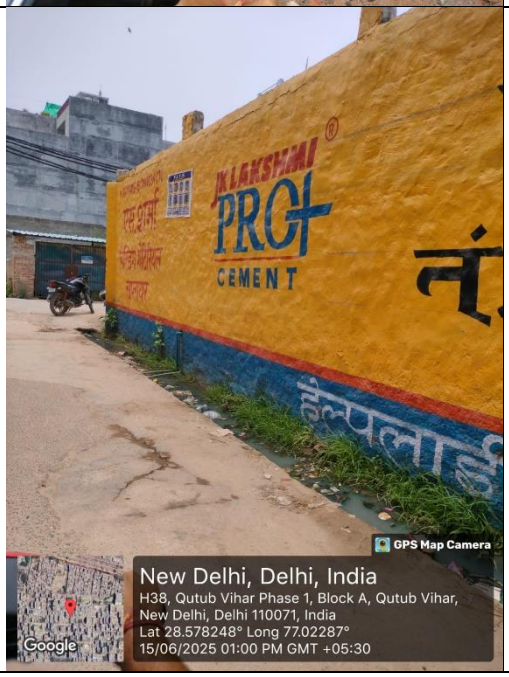
39.		Open drain source
40.		Open drain source
41.		Open drain source

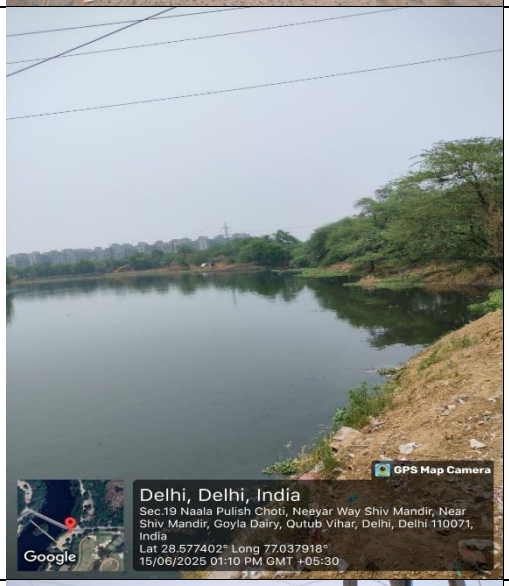
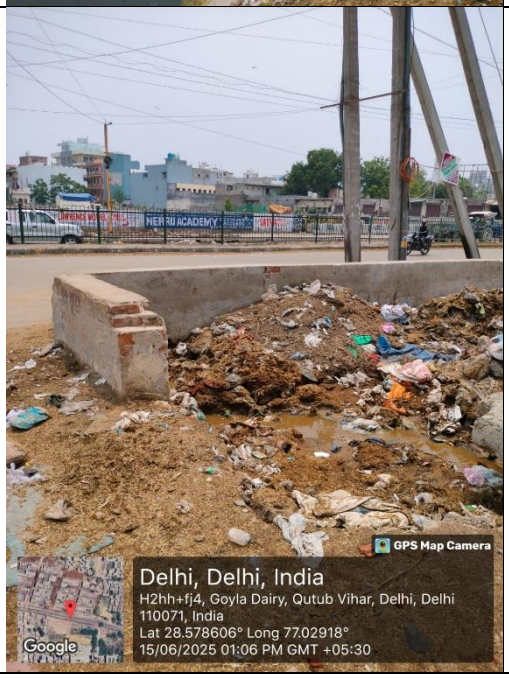
42.		Closed Drain Sources
43.		Closed Drain Sources
44.		Closed Drain Sources

45.		Open Drain Sources
46.		Open drain source
47.		Closed Drain Sources

48.		Unlined channel carrying domestic wastewater.
49.		Overflowed Open drain source
50.		Closed Drain Sources

51.		Open drain Sources (A large amount of water where a lot of water collects)
52.		Closed Drain Sources
53.		Open drain source

54.		Open drain source
55.		Overflowed Open drain source
56.		Open drain source

57.		Open drain source
58.		Open Drain Sources (A large amount of water where a lot of water collects)
59.		Open drain source

Observations:

This research study was conducted using an observational cross-sectional design, in which the existing liquid waste management practices were assessed through direct field observations at 59 purposively selected sites in Goyla Dairy, New Delhi. Observations were systematically documented using a pre-designed checklist that was aligned with the guidelines of the Swachh Bharat Mission – Urban (SBM-U).

Each observation focused on the following key parameters:

- Type of wastewater: Whether the site contained grey water (from kitchens and bathrooms), black water (from toilets), or a combination of both.
- Drainage infrastructure: Open drains (uncovered) or closed drains (piped or covered channels).
- Sanitation systems: Use of septic tanks, soak pits, or direct discharge without any containment.
- Condition of drains: Presence of blockages, overflow, stagnation, or broken infrastructure.
- Treatment facilities: Presence or absence of sewage treatment plant (STP) or any decentralized treatment system.
- Hygiene and environmental indicators: Foul smell, visible waste, mosquito breeding, and flooding of waste water.

Each site was documented using GPS-enabled, geotagged photographs. A total of 59 valid photos were collected as visual evidence, each tagged with remarks explaining what was observed.

The observations revealed significant variation across the study area:

- A large number of households discharged liquid waste directly into open drains, leading to unhygienic conditions.
- Septic tanks and soak pits were found in some locations, but desludging practices were either absent or irregular.
- Many drains showed signs of stagnant wastewater, overflow, and waste accumulation.
- No active sewage treatment plant (STP) was observed functioning within the study area.
- In several areas, grey water and black water were mixed and discharged untreated into the environment.

These field observations reflect major gaps in liquid waste management infrastructure and practices in Goyla Dairy. The results support the need for urgent interventions, such as promoting on-site treatment systems, regular desludging, and improved community awareness.

Discussions:

This observational study aimed to assess the existing liquid waste disposal practices in Goyla Dairy, a semi-urban locality of South-West Delhi. Based on field visits to 60 purposively selected sites and photographic documentation of 59 locations, the study revealed significant challenges in the management of grey and black water, as well as a general lack of alignment with national sanitation guidelines.

The most prominent observation was the widespread use of open drains as the primary method for wastewater conveyance. Grey water from bathrooms and kitchens, and in many cases, black water from toilets, was found to be discharged directly into open drains without any form of treatment. This is contrary to the objectives of the Swachh Bharat Mission – Urban (SBM-U) and creates a high-risk environment for vector-borne and waterborne diseases.

The study also found that there were no centralized or decentralized treatment facilities like Sewage Treatment Plants (STPs) or Faecal Sludge Treatment Plants (FSTPs) in place. Most households relied on on-site sanitation systems such as septic tanks and soak pits. However, these were not desludged regularly, and in some cases, signs of overflow or leakage were observed, leading to surface-level contamination. According to national guidelines, desludging should be carried out every 3 to 5 years, but in Goyla Dairy, there was no structured desludging system or schedule in operation.

A significant portion of the study area showed mixing of grey water and black water at the household or neighborhood level. This mixing not only worsens the quality of wastewater but also makes it unsuitable for any potential reuse or eco-treatment solutions like soak pits or natural filtration systems.

The absence of faecal sludge and septage management (FSSM) infrastructure further reflects a policy-practice gap. Although SBM-U Phase II emphasizes the promotion of decentralized and safe sanitation systems, their on-ground implementation in Goyla Dairy was not evident. The lack of a sewerage network, combined with unplanned urban expansion, has resulted in unscientific and unsafe disposal of used water.

Environmental hygiene conditions were also found to be poor in several locations. Stagnant wastewater, blocked drains, and direct toilet outlet discharges were observed, especially around schools, marketplaces, and community toilet complexes. These findings highlight the public health risks associated with unmanaged liquid waste.

The study also demonstrated the value of using geotagged photographs to support data collection. Visual evidence not only validated the observations but also helped map high-risk areas. This tool can be useful for future monitoring and planning by municipal authorities or community-based organizations.

Overall, the discussion of findings highlights that while basic sanitation infrastructure may be present in parts, the operation, maintenance, and treatment aspects of liquid waste disposal are largely absent. The study confirms that the existing system in Goyla Dairy is non-compliant or partially compliant with national standards in most cases, especially in terms of safe conveyance, regular desludging, and waste treatment.

Recommendations:

- Conduct regular IEC (Information, Education & Communication) activities in community to raise awareness.
- Train sanitation workers and community members on safe liquid waste handling.
- Assign local monitoring teams to track drainage conditions and service gaps.
- Use geotagged photos and GIS tools to map high-risk and non-compliant areas.
- Digitize records of septic systems, desludging schedules, and field observations.
- Regular Desludging of Septic Tanks and Soak Pits
- Upgradation of Drainage Infrastructure

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