ECO- SANITATION AND FAECAL SLUDGE MANAGEMENT: A STUDY OF SELECTED CITIES IN UTTAR PRADESH

Thesis Submitted for Partial Fulfilment of The Requirements For The Degree of Doctor of Philosophy In Civil Engineering

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Supervisor's Certificate

This is to certify that Mr. Awadhesh Kumar Gupta has completed the necessary academic turn and the swirl presented by him is a faithful record is a bonafide original work under my guidance and supervision. He has worked on the topic "**Eco- Sanitation and Faecal Sludge Management: A Study of Selected Cities in Uttar Pradesh**" under the School of Engineering and Technology, Maharishi University of Information Technology, Lucknow.

Dr Gaurav Shukla

Date:

Declaration by the Scholar

I hereby declare that the work presented in this thesis entitled " **Eco- Sanitation and Faecal Sludge Management: A Study of Selected Cities in Uttar Pradesh** " in fulfillment of the requirements for the award of Degree of Doctor of Philosophy, ubmitted in the Maharishi School of Engineering and Technology, Maharishi University of Information Technology, Lucknow is an authentic record of my own research work carried out under the supervision of Mr. Gaurav Gupta. I also declare that the work embodied in the present thesis-

i) is my original work and has not been copied from any journal/ thesis/ book; and
ii) has not been submitted by me for any other Degree or Diploma of any University/ Institution.

Awadhesh Kumar Gupta

Preface and Acknowledgement

Providing people with ecologically safe sanitation is a difficult task. To mitigate these effects, the Indian government has taken a number of steps, including greater investment in urban sanitation, policy efforts, laws, and public campaigns to enhance the country's sanitary conditions. The Government of India's Ministry of Urban Development began the Swachh Bharat Mission in October 2014 with the goal of eliminating open defecation and improving sanitary conditions in urban areas. Poor sanitation has a high cost in terms of health, and untreated sewage from cities is India's single biggest source of water contamination. This demonstrates both the magnitude of the challenge facing Indian cities and the enormous costs associated with failing to handle it. Large, centralised sewerage systems with enormous underground pipelines, pumping stations, and massive treatment facilities exist in India's larger cities. These systems are costly to construct and far more costly to run because they require constant electricity, a big amount of water, expert operators, and considerable electro-mechanical upkeep. Currently, on-site pit latrines, septic tanks, and other similar systems make for a significant number of toilets in urban areas. While human waste will be contained to a large extent under SBM, treatment will remain a major concern. Many Indian towns are already facing the effects of a lack of appropriate safe and sustainable sanitation, in the form of health problems and major pollution of water and soil resources. In contrast to the high number of on-site sanitation systems, septic tanks and pit latrines have received less attention in terms of correct construction, maintenance management, and safe disposal of faecal sludge and septage. Due to limited capacity and resources with Urban Local Bodies, there was little oversight of septic tank and pit maintenance and cleaning — in many cases, homeowners did not report cleaning for years. Although certain ULBs have desludging equipment or private companies provide cleaning services, the supply of desludging services is insufficient. Faecal sludge and septage are frequently discharged in drains and open areas of agriculture fields, posing significant health and environmental dangers. The problem of faecal sludge and septage / sewerage must be tackled holistically, with a strategy that meets the bare minimum of requirements and is acceptable and economical for all locations and populations, taking into account local circumstances. In light of this, the current study aims to look into the state of urban sanitation in a few places in Uttar Pradesh and offer recommendations for improving sanitation.

The study has been planned in five chapters. Chapter 1st is introductory one which gives brief account of urbanisation, status of urban sanitation in India and Uttar Pradesh, need of

faecal sludge management, present scenario of waste water management as well as policy perspective. It also includes the statement of research problem, objectives of study and organization of the study. Chapter 2nd is concerned with review of literature and research gap of the study. Chapter 3rd deals with profile of selected area /cities, hypothesis and research methods of the study. Chapter 4th deals with profile of urban dwellers and their access to sanitation facilities and sanitation services, septage and faecal sludge management. It also includes perception analysis of municipal officials and sludge operators regarding the inclusive and sustainable sanitation infrastructure, sanitation servicers, faecal sludge management and challenges of urban sanitation. Chapter 5th concludes the study and it consists of main findings and policy recommendations.

Inspiration encouragement, assistance, cooperation and support from professors, friends, colleagues and above all my family have been vital for accomplishment of any task of life. It is also true in case of present work, for which I have deep sense of gratitude to my professors, friends, colleagues and development professionals. I place on record the sincere appreciation of Mr. Gaurav Shukla, Assistant Professor, MUIT, Lucknow for providing guidance and supervision of the research . Without his able guidance it would not be possible for me to pursue higher degree of research.

We place on record the sincere appreciation of Prof. Nishith Rai, Director, RCUES, Lucknow for extending all kind of support in smooth conduct off the study. The cooperation and support extended by the Faculty Members, and administrative staff in the conduct of the study has been praiseworthy. I am thankful to the Members of Survey Team of the study for extending their support in data collection and field survey. Ms. Gayatry Singh took pains in data entry in SPSS Package and drawing out the inferences and results. I place on record the sincere appreciation of Mr. Sunil Barar who composed the manuscript and gave it the present shape.

ABSTRACT

Providing people with ecologically safe sanitation is a difficult task. To mitigate these effects, the Indian government has taken a number of steps, including greater investment in urban sanitation, policy efforts, laws, and public campaigns to enhance the country's sanitary conditions. The Government of India's Ministry of Urban Development began the Swachh Bharat Mission in October 2014 with the goal of eliminating open defecation and improving sanitary conditions in urban areas. Though there has been significant improvement in developing inclusive and sustainable sanitation infrastructure and sanitation services, however, many cities face challenges in sustainability of sanitation, faecal sludge management and waste water management. In light of this, the current study aims to look into the state of urban sanitation in small cities of Uttar Pradesh. It also purports to examine the status of faecal sludge and waste water management and and offer policy measures for improving sanitation. The study has been planned in five chapters. Chapter 1st is introductory one which gives brief account of urbanisation, status of urban sanitation in India and Uttar Pradesh, need of faecal sludge management, present scenario of waste water management as well as policy perspective. It also includes the statement of research problem, objectives of study and organization of the study. Chapter 2nd is concerned with review of literature and research gap of the study. Chapter 3rd deals with profile of selected area /cities, hypothesis and research methods of the study. Chapter 4th deals with profile of urban dwellers and their access to sanitation facilities and sanitation services, septage and faecal sludge management. It also includes perception analysis of municipal officials and sludge operators regarding the inclusive and sustainable sanitation infrastructure, sanitation servicers, faecal sludge management and challenges of urban sanitation. Chapter 5th concludes the study and it consists of main findings and policy recommendations.

Since the introduction of the Swachh Bharat Mission, urban sanitation has become more important. Through societal mobilisation, the Mission attempted to eliminate open defecation, collect, segregate, transport, and scientifically dispose of solid waste, and construct toilets. The main sanitation issues mentioned were a lack of toilets, insufficiency of toilets, damaged toilets, clogging of toilets, lengthy distance between toilets, dirty toilets, and faecal sludge disposal in the neighbourhood, among others. Approximately 6 percent of respondents said their toilets are linked to a sewer pipe. Approximately 62 percent of respondents said their septic tanks are located inside their homes. Septic tanks are typically cleaned every 3 to 10 years. Suction equipment owned by ULBs and private sludge operators are used to clean septic tanks.

However, just around a third of those polled said they clean their own septic tanks. Treatment technologies for seepage, waste water management, and faecal sludge are available. Small and medium-sized cities can benefit from decentralised Faecal Sludge Treatment Plants run by ULBs, Residents Welfare Societies, and NGOs. Sludge management policy should be developed by the state. Local governments must educate communities about the benefit and importance of frequent desludging after building faecal sludge treatment plants. Existing sewage treatment plant capacity should be fully utilised by addressing current obstacles, limitations, and challenges. Human faeces should not be dumped into open drains or water bodies.

Keywords: *Urban sanitation, Eco -sanitation, Swaccha Bharat Mission, Sanitation Protocols, Sustainability of Sanitation, Waster Water Management, Faecal Sludd Management, Garbage Free Cities, Sewerage Management, Management of FSTP and STPs*

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CHAPTER: 1
INTRODUCTION

The phenomenon of urbanisation is twentieth-century phenomenon. In India, fifty to sixty large cities with populations of one million or more will see the most demographic and economic expansion. Rural to urban migration creates metropolises, which offer a variety of amenities and services ranging from educational to medical to business to leisure. People relocate for many reasons, including economic gain and desire to reside in a city. Although urbanisation fosters social, economic, and cultural development, it has the potential to disturb the ecological system. Unplanned and unregulated urban agglomeration growth has a number of detrimental environmental and social implications. The urban India of today is a depressing sight to witness. With a failing drainage system and an alarming night soil removal system, cities have degraded into rubbish dumps. Moreover, untreated sewage is released into local water bodies in many towns and cities, posing health risks.

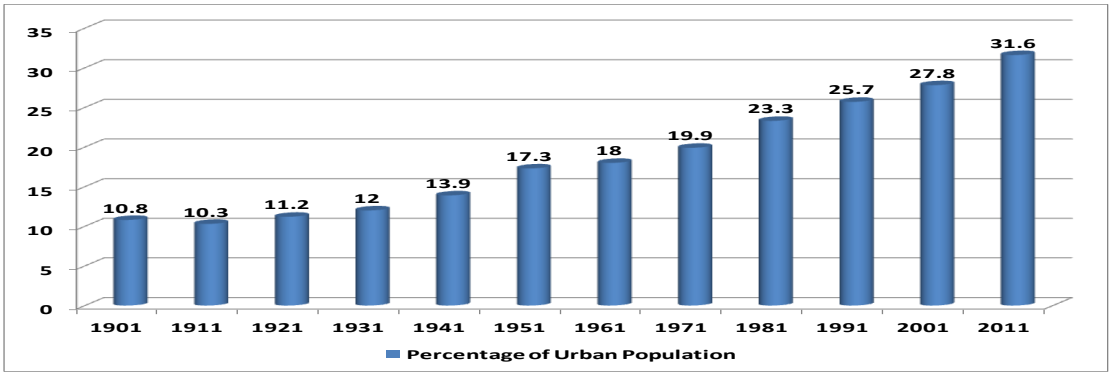
The significance of urbanisation in a country's development cannot be emphasised. In absolute terms, India's urban areas are home to over 377 million people, accounting for roughly 31% of the country's population. The urban population in India is expected to grow by 590 million by 2030, reaching about 40% of the overall population. Large cities have dominated India's urbanisation development, according to a size distribution analysis. The increasing population concentration in Class I cities over the last century indicates that the population of smaller towns has been declining over time, while the population of larger cities has increased. Importantly, whereas population growth in smaller towns has been proven to be negative, population growth in larger cities and towns has been found to be phenomenal. Cities offer advantages that are not limited to their own bounds. According to a McKinsey survey, 180 million people living near cities benefit from the economic opportunities, markets, and connecting infrastructure that cities provide. These individuals were believed to reside in rural areas surrounding India's roughly 70 largest cities. The problem of improving the delivery and scope of urban services is becoming increasingly difficult as the world's population grows. The management and delivery methods that are now in place will be put to the test. For the high demand, several distribution mechanisms would need to be changed. Expanding the scope of urban infrastructure services is difficult given the predicted significant urban population

expansion, and improving the quality of urban infrastructure services is particularly difficult in major cities, resulting in a more heterogeneous demand for urban infrastructure.

Urbanization Trends:

With barely a 13-percentage point increase in urbanisation between 1951 and 2001, India is one of the world's least urbanised countries. It does, however, have the world's second-largest urban population, with 393 cities with populations above one lakh housing more than two-thirds of the population. In 2001, the four megacities of Mumbai, Kolkata, Delhi, and Chennai, each with a population of over 6 million people, accounted for over a quarter of the urban population. According to the 2001 census, 285 million people live in 4368 cities and towns across India, accounting for 27.8% of the country's total population of 1027 million people, up from 25.7 percent in 1991. Although just 10.8% of the country's total 218 million people lived in cities and towns at the turn of the century, the urban population rose by 31.2 percent between 1991 and 2001. In 2001, there were 35 cities with populations of one million or more, up from 12 in 1981 and 23 in 1991. The country's 107.9 million urban people live in these 35 million plus cities. The urban population was predicted to be 377.1 million people in 2011, accounting for 31.6 percent of the country's population, according to the 2011 census. India had 7935 towns and cities according to the 2011 census (Chart 1.1).

Chart 1.1
Trends in Urbanization in India



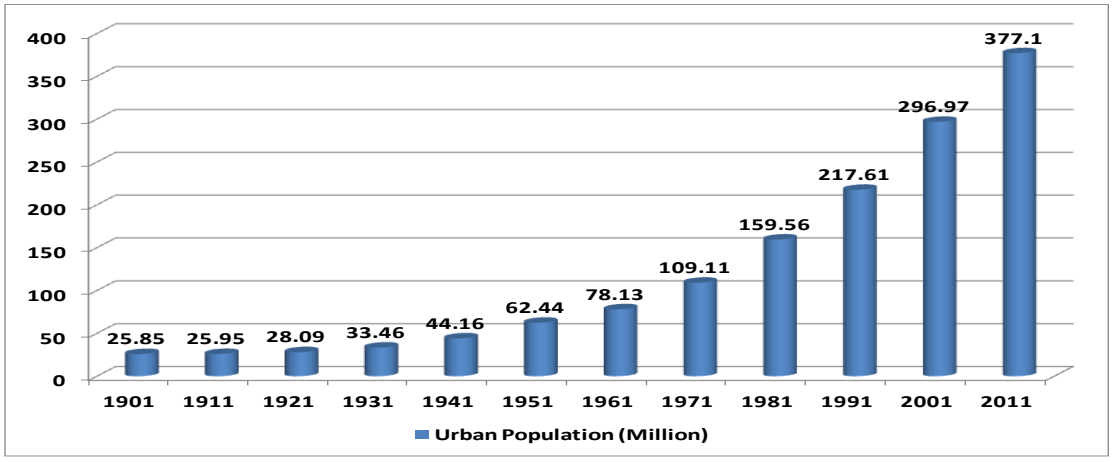
Source: Census, 2011

The significance of urbanisation in a country's development cannot be emphasised. In absolute terms, India's urban areas are home to over 340 million people, accounting for roughly 30 percent of the country's population (Chart 1.2). The urban population in India is expected to grow by 590 million by 2030, reaching about 40 per cent of the overall population. With 270 million Indians entering the workforce by 2030, India will have the world's fastest growing labour force. Job growth in cities will be even faster, growing at a rate of 3.6 percent annually,

from roughly 100 million today to 220 million in 2030. Between 2010 and 2030, cities will provide 70% of new jobs in India. McKinsey (McKinsey & Company, 2010)

Chart 1.2

Growth of Urban Population in India

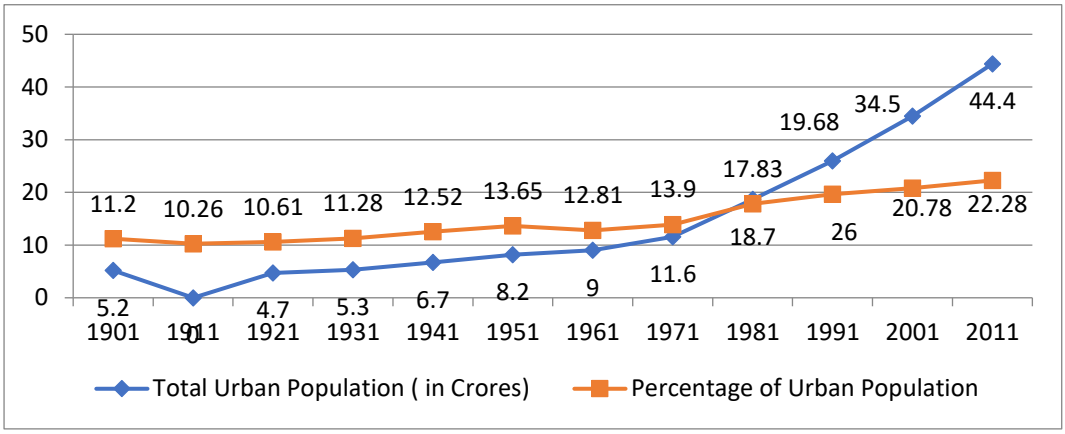


Source: Census, 2011

Surprisingly, smaller towns' populations have been dropping while larger cities' populations have risen. Unlike in smaller towns, where population growth is negative, population increase in larger cities and towns is phenomenal. A large number of people lived in cities in 2001, according to data from India's Delhi, Pondicherry, Goa, and Chandigarh. Arunachal Pradesh (7.0 percent), Andaman and Nicobar Islands (4.14 percent), Sikkim (4.83 percent), and Delhi (4.83 percent) had the fastest urban population growth from 1991 to 2001. In 2011, Uttar Pradesh has the highest population density in India, with 19.96 crore rural residents and 4.45 crore urban residents. Between 2001 and 2011, the urban population grew by 1.09 crore. Approximately 16.50 percent of India's population lives in Uttar Pradesh, with 11.80 percent in urban areas. Uttar Pradesh has 648 statutory towns, out of 4041 in India. In 2011, urban residents made up 22.28 percent of the state's overall population. However, compared to the rest of India, the state's urbanisation is moderate. It expanded by 28.75 percent between 2001 and 2011, compared to 31.80 percent between 1991 and 2001, reaching 5.83 million by 2021. Uttar Pradesh has the highest population density in India, at 16.4%. It is also the country's fourth-largest state by land area, accounting for 9%. State urbanisation has been slower. This state is less urbanised than most. In 2001, the state's urban population was 20.78 percent. From 1991 through 2001, the urban population grew 2.84 percent annually. In 2011, the state's urban population was 44.49 million, or 22.27 percent (Chart 1.3).

Chart: 1.3

Trends of Urbanization in Uttar Pradesh



Source: Census of India, 2011, Uttar Pradesh

Despite having the country's largest urban system with 700 ULBs (Table 1.1), Uttar Pradesh ranks 23rd in terms of urbanisation. In the state, there are significant geographical disparities in the level of urbanisation. According to Census-2011, the Western Region is the most urbanised, with 32.45% of the population living in cities, and the Eastern Region is the least urbanised, with 13.40 percent of the population living in cities. The Central and Bundelkhand urban populations are correspondingly 20.06 and 22.74 percent. The rise of major towns, particularly class-I towns, is faster, as evidenced by the fact that class-I towns accounted for 33.71 percent of urban population in 1951 and 60 percent in 2011. Class-I towns increased from 14 in 1991 to 54 in 2001 and 64 in 2011, while metropolitan cities increased from 6 in 2001 to 7 in 2011. People living in cities imply a spatial polarisation of job chances. There is an increasing tendency for people to migrate to larger cities. The state's urbanisation process has favoured larger cities, as evidenced by the distribution of urban population across size categories.

Table: 1.1

Urban Population in Uttar Pradesh

ULBs	Number	Area (Sq.km.)	Population
Nagar Nigam	14	2075.28	17634559
Nagar Palika Parishad	202	2392.97	15899876
Nagar Panchayat	438	2678.91	7283100
Total	**654**	**7147.16**	**40817535**

Source: Department of Urban Development, Government of U.P., 2017-18

In India's bigger cities, massive, centralised sewerage systems with various components cost Rs. 62,009 crores. According to the authorised finance pattern, the Government of India's share is Rs. 14,623 crores. Furthermore, the States are required to provide a minimum of Rs. 4,874 crores as a State/ULB contribution, which is equal to 25 percent of the Government's funding. Maharashtra has the distinction of being the first state to proclaim open defecation prohibited in all cities. Six localities, however, fell into the Open Defecation category during the recertification process. The state has committed to ODF in all metropolitan areas by October 2017. With its creative partnership with Swatch, the Pune Municipal Corporation has already established itself as a role model in trash management. SBM had built 3.5 million private toilets and 1.8 lakh public toilets in India as of June 2017.Mizoram and Andhra Pradesh are poised to follow Chandigarh in being classified as an ODF. Although the majority of states are still far behind, Madhya Pradesh, Maharashtra, Jharkhand, and Chhattisgarh have achieved great progress in this area. According to the 2011 Census of India, only 32.7 percent of urban homes have piped sewers, 38.2 percent have septic tanks, and 7 percent have pit latrines. Septic tanks, pit latrines, and open defecation pollute groundwater and surface water in many cities around the country. Sludge collection, treatment, disposal, and reuse are tough parts of urban sanitation. Faecal sludge collection, processing, and disposal is lacking in most Indian cities and towns. Sediment and non-faecal detritus collected from on-site sanitation systems such latrines, public toilets, septic tanks, and aqua privies. Septage is septic tank faeces sludge. To achieve the AMRUT and SBM aims of creating India ODF, FSM should be prioritised in urban sanitation programmes. In order to reduce the detrimental effects of open defecation, faeces should be appropriately disposed of. SWM facilities and faecal sludge disposal stations must be set up. The requirement for a fee-based service for FSM at the ULB level must be included as a condition for SBM funding. The approach should prioritise resource recovery and public-private partnerships to build local service providers. Personnel training in plumbing,

mechanical septic tank/pit desludging, and truck driving is required immediately. According to the 2011 Indian Census, approximately 81 percent of urban families have access to private toilets, 6% have access to public toilets, and 12 percent are forced to defecate in the open. So approximately ten million families still urinate in public. Open defecation and lack of access to any form of toilet facility, individual or shared, are two of India's primary sanitation difficulties. Studies show that the status and kind of toilets vary greatly among metropolitan areas. Blocked toilets, leaking taps, and fallen floors or roofs are common in disadvantaged regions (WSP-TARU, 2008). In the previous two decades, more people enjoy better sanitation (from 49 per cent in 1990 to 77 per cent in 2011). Open defecation and unimproved toilets declined from 72 million to 64 million families within the same period, while the percentage of homes lacking "basic sanitation" decreased from 32 percent to 17%. Access to sanitation varies by income, city, and state. The population of Indian cities is divided into several divisions. India's urban households are concentrated in Class I cities, reflecting a top-heavy urbanisation structure (nearly 60 per cent). While open defecation households are increasing in smaller cities, they are evenly dispersed throughout all cities. Open defecation is seen in cities of all classes, with 45 percent in Class I and II cities. A study of open defecation residences in India's major states reveals a pattern comparable to class-wise analysis. Urban defecation in open is common in the eastern and central states of Chhattisgarh, Orissa, Jharkhand, Bihar, and Madhya Pradesh. Conversely, the top five states with the most urban dwellers account for nearly half of all open defecation. Urban development schemes, programmes, and initiatives aim to improve infrastructure, services, and local administration. It also focused on state and local reforms. Between 2005 and 2012, the system was implemented in 65 towns and cities. A variety of federal projects and policies are targeted at improving urban water and sanitation. With the 74th Constitution's provisions, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) aims to strengthen municipal governments and their operations while delivering essential services to the urban poor. Seven Water and sanitation are vital services for the urban poor, who significantly rely on a well-functioning municipal administration. JNNURM invites municipalities to build CDPs that indicate their commitment to JNNURM's goals. Plans exist for all Mission cities, but they were not produced in a participatory manner. Due to the Mission's critical role in urban municipal governments with limited capacity, no consultation took place The 74th Constitutional Amendment Act also requires ULBs to have funds, functions, and officials. The JNNURM's Basic Services to the Urban Poor (BSUP) scheme has emphasised the provision of vital services for the urban poor, such as water and

sanitation. In order to make these important services self-sustaining, the project seeks to strengthen ties between asset production and asset management.

Policy Perspective:

During India's first five-year plan, water supply and sanitation were prioritised. Despite this, little money was invested until 1979. A major rise in government funding has occurred since 1980, when the International Drinking Water Supply and Sanitation Decade began, focused on rural sanitation. Because the majority of the money was provided to and spent on massive water infrastructure projects, urban sanitation remained a problem. While water has long been recognised as a "public good," proper sanitation has struggled to achieve the same status. Only in 2007, as part of a broad urban reform effort, did sanitation and water become a prominent focus. Thus, the Jawaharlal Nehru National Urban Mission and the Urban Infrastructure Development Scheme for Small and Medium Towns were born. In 2008, the Ministry of Urban Development published the National Urban Sanitation Policy. It established a comprehensive sanitation policy framework. Officially recognised as an important step in India's urban development, the national policy encouraged states and localities to plan and implement targeted initiatives to improve sanitation. A National Urban Sanitation Task Force drafted the National Urban Sanitation Policy, a set of comprehensive sanitation guidelines. Sanitation for the urban poor and those living in informal settlements became a state priority.

This framework was adopted in 2008 by the Ministry of Urban Development for monitoring and reporting important service level indicators. One of the Sewerage performance measures has a benchmark. The benchmarking technique is intended to assist cities improve services like sanitation. By delivering basic civic, social, and housing services to all Indians, the *Rajiv Awas Yojana* aims to make India slum-free under the Twelfth Plan. All slums notified or not, will be formalised so they can get the same basic services as other city inhabitants. In India, the state is in charge of cleaning. State-level steering committees and urban departments assist Urban Local Bodies in implementing sanitation at the local level. ULBs plan, design, execute, operate, and maintain water and sanitation services in cities and towns. For their part, 158 cities have developed their own city sanitation plans. In addition to designing and implementing national-level strategies on public health and sanitation, the nodal Ministry of Urban Development is also responsible for monitoring and evaluating the National Urban Sanitation Policy. Aside from the Ministry of Urban Development, institutional responsibility for the full water supply and sanitation chain is distributed among several ministries, commissions, and boards.

This complexity may also play a role in the sector's inability to carry out programmes. Water and sanitation have not been considered as a stand-alone issue because they are linked to either bad housing or the establishment of jobs. Gender has also been assumed rather than expressed directly. This demonstrates a lack of attention by policymakers to the water and sanitation requirements of women and girls, particularly in urban slums. The National Slum Development Programme provided adequate water, sanitation, housing, solid waste management, and formal and informal education in urban slums. It expanded federal support to states to help fund basic infrastructure and services in slums. Sadly, it ended in 2009-10. The 2008 National Urban Sanitation Policy intends to make India's cities and towns more community-driven, healthy, and liveable. Achieving optimal public health and environmental outcomes for all residents of Indian cities and towns, with a special focus on clean and affordable sanitation facilities for the urban poor and women, is part of the plan (Ministry of Urban Development, 2008). Open-defecation-free zones, integrated citywide sanitation, hygienic and safe disposal, and effective operation and maintenance of all sanitary infrastructure are among the policy's primary goals. State Urban Sanitation Strategies and City Sanitation Plans will be developed using the technique. Land tenure causes uncertainty and uneasiness for the urban poor. The fear of eviction is constant, and the regions lack basic utilities like safe water and sanitation, burdening women with the task of gathering water and maintaining home hygiene. However, the sanitation strategy gives no advice for dealing with the multiple organisations and parties engaged in providing water and sanitation services. The *Rajiv Awas Yojana* (RAY) aspires to "slum-free" India. Its aim is to integrate existing slums while simultaneously addressing the reasons of slum formation. The idea is to use local government budgets to offer basic services to the urban poor. Water and sanitation are among its reformative goals for the urban poor. The lack of cash for the scheme's objectives obscures its goals. With the help of housing modifications and new construction, the Integrated Housing Slum Development Program (IHSDP) tries to offer communal toilets, water and storm water drains, community baths and road paving. Slum improvement and rehabilitation are part of the inclusive urban development ideology. Despite the funding mechanism being explicitly defined, no mention of women is made in the scheme. As part of its urban reform strategy, the Ministry of Urban Development is also evaluating service delivery through Centrally Sponsored Schemes like JNNURM. With the goal of increasing service delivery accountability, it will be piloted. However, it has to be seen how much the underlying concerns of access and availability of safe water and sanitation services are addressed. Achieving an equitable supply of land, shelter, and services to all sectors of society is the goal of the National

Urban Habitat and Housing Policy (2007). Also, at all levels of decision-making, it aims to include women in housing policies and programmes. It also strives to address the housing needs of women-headed households, single women, working women, and women living in tough circumstances. This is the only policy that seeks to accommodate female viewpoints. The 11th Plan's Mid-Term Appraisal emphasises ULB-level changes including 100% cost recovery for water supply O&M, 100% cost recovery for solid waste management, and internal earmarking of funds for urban poor services. This shows that most cities have a significant backlog in providing basic urban services to their residents. According to the Indian Constitution, urban water supply and sanitation are the responsibility of the state government. The 74th Amendment currently makes municipal governments responsible for water and sanitation. Albeit responsible for supplying services to municipal and state governments, the federal government has been a substantial and prominent player in the sector of urban water supply and sanitation. A major financier, creator of broad policy frameworks, and developer of technical standards and norms, it has moulded the industry. The most successful option is to sponsor urban programmes (Wankhade, 2014). JNNURM, Swachh Bharat Mission, and AMRUT are just a few of the government-funded programmes and projects. The government's suggestions affect scheme investments. A National Urban Sanitation Policy, an advisory note on UWSS and septage management, and bi-annual National Ratings Systems and Service Level Benchmarks are all created by India's Ministry of Urban Development. Local governments have traditionally provided water, sewerage, sanitation, solid waste disposal, and street lighting. These services are supplied by state agencies, state boards, businesses, and others. State departments that execute municipal tasks include Public Health Engineering, Public Works, Urban Development, Housing Boards, Local Self Government, Water Supply and Sewerage Boards, and others (Singh, 2014). The Swachh Bharat Mission was established in October 2014 by India's Ministry of Urban Development to eradicate open defecation and improve sanitation in cities. It ran from 2014 to 2019 and covered all statutory towns. Water pollution in India is caused by untreated sewage from urban areas, which is extremely harmful to human health. This emphasises the problem's immensity and the dire repercussions of inaction. To improve municipal services and construct urban infrastructure in 500 cities, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched during the 12th Five Year Plan. The provision of necessary services (such as water, sewerage, and urban transportation) to families and the building of facilities in cities is a national priority. The HPEC calculated the required funds over a 20-year period in 2011 using 2009-10 pricing. This includes Rs. 17.3 lakh crore for urban roads and Rs. 8 lakh crore for utilities like water supply,

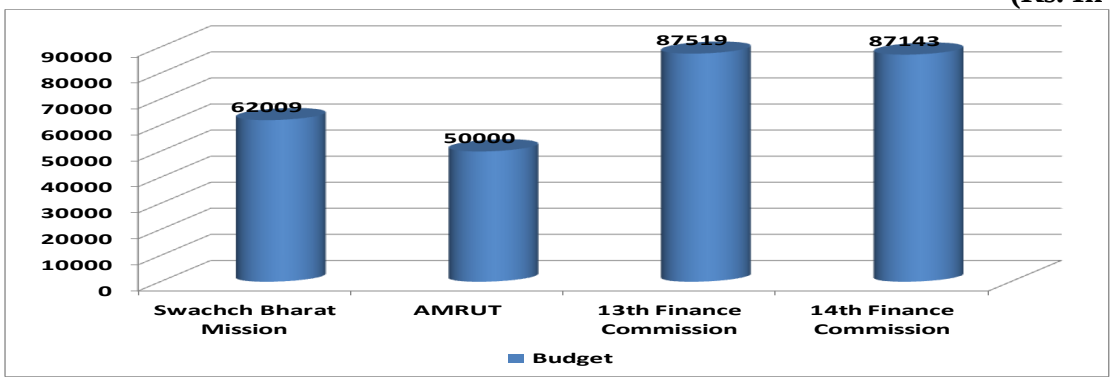
sewerage, solid waste management, and storm water drainage. Also, the anticipated O&M expenditure was Rs. 19.9 lakh crore. The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) aims to: I provide reliable water and sewerage connections to every household; (ii) improve the amenity value of cities by developing greenery and well-maintained open spaces (e.g. parks); and (iii) reduce pollution by using public transportation or building non-motorized transport facilities (e.g. walking and cycling). People, especially women, value all of these results, hence the Indian Ministry of Urban Development has developed Service Level Benchmarks (SLBs). Health and civilisation are built on sanitation, say Awasthi et al (2018). It has always been part of human growth. A lack of sanitary services results in a loss of dignity and productivity. The Indian government formed the National Urban Sanitation Policy to address sanitation issues. The research recommends that state governments adopt state urban sanitation policies and city sanitation programmes to improve urban sanitation and empower manual scavengers. Due to the lack of progress, the Indian government started the Swachh Bharat Mission to eliminate open defecation. Swachh Bharat Mission in 2014, Jal Shakti Abhiyan in 2015, and Curbing Single Use Plastic in 2019 are important measures that have assisted India's sanitation industry, according to Gangwar (2019). Rural toilets have been erected approximately 100 million times since SBM began, raising the family toilet rate to 100%. In urban areas, SBM built 60 lakh homes and 5.5 lakh public and community toilets. As of October 2nd, 2019, the Swachh Bharat Mission had completed over ten crore toilets. Unlike previous programmes, SBM is demand-driven, with the primary goal being increasing demand for toilet construction and usage. SBM strives to change the community's collective behaviour. According to Sinha (2019), growing municipal solid waste output due to urbanisation, industrialisation, and economic expansion is a serious challenge in India. Regulations 2016 stipulate many stakeholders' duties, including trash generators. For legacy rubbish, sanitary waste, and waste processing technology, the CPCB has developed criteria. Agarwal (2015) contends that clean-up policies and programmes will have little impact unless effectively funded and implemented. State and local governments can improve urban cleanliness with strong political will. Growing cities will soon need to adapt their waste disposal systems, according to Chikarmane (2015). Recycling garbage is vital to reducing raw material costs and protecting the environment. It should be supported at all levels. Kaul (2015) claims that the Swachh Bharat Abhiyan launched the country's most ambitious sanitation efforts. Water and sanitation access in our country is affected by caste, class, and gender identities. According to Pathak (2015), the government will need additional help from all sectors to achieve comprehensive sanitation by 2019. The SDGs prioritise sanitation,

cleanliness, and hygiene, according to Mishra (2018). Improved sanitation, hygiene, and cleanliness can help manage many vector-borne diseases, parasite infections, and nutritional deficiencies. He went on to say that the Swachh Bharat Mission has benefited the country greatly. Cleanliness has come to represent empowerment and a better life. According to Pathak (2017), the Ganga is in danger of extinction due to rising sewage, trade effluent, and other polluting releases. Septic tank building, total sanitation coverage, development of model cremation ghats, development of decision support systems in GIS platforms for effective planning and monitoring are all part of the Clean Ganga Mission. The Swachh Bharat Mission is unlike any other sanitation endeavour in the world, according to Iyer (2017). The Mission uses IEC to shift focus from outputs to outcomes and ODF. Mishra (2020) claims that open defecation was eradicated by October 2, 2019. This is a major historical achievement in such a short time. Cities and states have embraced the Swachh Bharat Mission's ideals. Urban India, on the other hand, faces a choice. While urban cleanliness has improved, much more needs to be done. Sludge and septage management has become critical to maintaining the cleaning spirit. Creating millions of toilets in record time is a cause for celebration, but it is also a cause for concern, according to Sengupta and Das (2019). According to Gatade (2015), implementing clean India needs significant human and financial resources. The Mission had made significant financial and political investments to obtain ODF and expand sanitary coverage.

The Swachh Bharat Mission was established in October 2014 by India's Ministry of Urban Development to eradicate open defecation and improve sanitation in cities. It ran from 2014 to 2019 and covered all statutory towns. Adopting SBM (Urban) was estimated to cost Rs. 62,009 crores, based on unit and per capita costs. According to the authorised finance pattern, the Government of India's share is Rs. 14,623 crores. Furthermore, the States are required to provide a minimum of Rs. 4,874 crores as a State/ULB contribution, which is equal to 25% of the Government's funding. For sanitation in India's cities, funds are currently available through AMRUT, Swaccha Bharat Mission, Namami Gange, and the 14th Finance Commission. AMRUT, on the other hand, covers septage and faecal sludge management. AMRUT and Namami Gange have also guaranteed sewerage connections (Chart 1.4).

Chart 1.4
Budgetary Allocation for Sanitation in India

(Rs. In Crore)



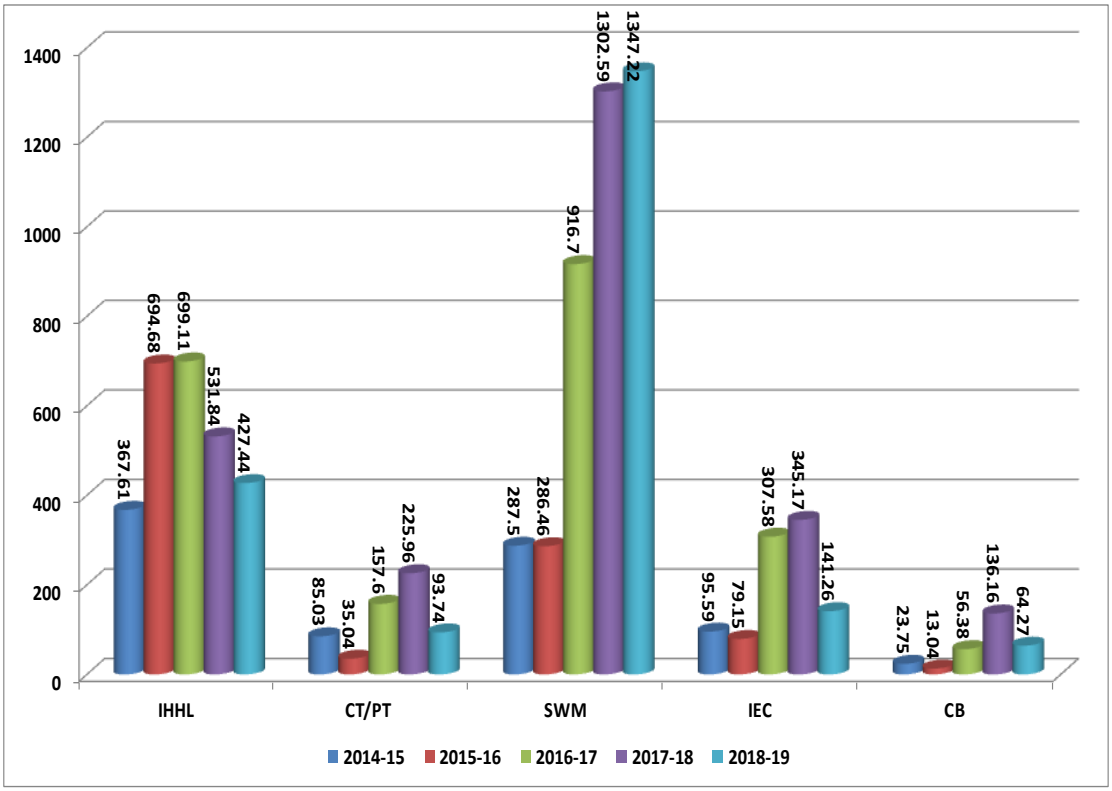
Source: Ministry of Housing and Urban Affairs, Government of India

As of January 2019, 59.64 percent of the Swachh Bharat Mission's allocations had been used, according to the Ministry of Housing and Urban Affairs' Urban Statistics Handbook 2019. Private, community, and public toilets were found to be the most often used funds, followed by solid waste management. Budgeted funds for capacity building fell short (Chart 1.5)

Chart 1.5

Release for Various Components Under Swachch Bharat Mission in India

(Rs. Cores)



Source: Urban Statistics Handbook, MoHUA, Government of India

During the years 2015-16 to 2018-19, India made significant progress under the Swachh Bharat Mission. Individual household toilets climbed from 35.32 lakh in 2015-16 to 62.70 lakh in 2018-19, while community and public toilets increased from 5.32 lakh in 2015-16 to 5.32 lakh in 2018-19. In 2018-19, almost 86 percent of wards were covered by door-to-door rubbish collection, with waste processing accounting for 51.26 percent.

They are intertwined. Difficulties with personal and dietary hygiene are all causes of disease in developing countries. In India, too. Poor sanitation contributes to high infant mortality. Previously, sanitation meant using cesspools, open ditches, pit latrines, and bucket systems. It currently encompasses waste disposal, food hygiene, personal, household, and environmental hygiene. Sanitation is crucial for our personal and social lives as well as our health. Access to excreta and waste water facilities and services promotes privacy, dignity, and a clean and healthy living environment for all. Human waste, domestic wastewater and solid trash should be collected, transported, processed, and disposed of (UN Habitat and Water Aid). Sanitation is a major predictor of quality of life and human development. Clean water and soil help keep diseases at bay, as do proper hygiene habits. Persistent infections (persistent infections) are infections caused by bacteria that live in the body. Local governments have traditionally provided water, sewerage, sanitation, solid waste disposal, and street lighting. Other state government departments that perform municipal tasks include, for example, the Public Health Engineering Department, Public Works Department, Urban Development Department, Housing Boards, Department of Local Self Government, Water Supply and Sewerage Boards, and others. Instead of parastatals, the 74th Constitutional Amendment Act established the Metropolitan and District Planning Committees. The ULBs can now take on development responsibilities. In the post-decentralized era, states have responded in various ways to parastatal entities. In contrast to Kerala and Karnataka, Tamil Nadu, Uttar Pradesh, Maharashtra, West Bengal and Andhra Pradesh have called for a shift in parastatals' functional role. The parastatal agencies have also been amalgamated. The 74th Constitutional Amendment Act also gave local governments administrative and financial rights, allowing them to plan and develop. The Swachh Bharat Mission was established in October 2014 by India's Ministry of Urban Development to eradicate open defecation and improve sanitation in cities. It ran from 2014 to 2019 and covered all statutory towns. According to the 2011 census, India's urban population is 377 million, or 31 percent of the total. By 2031, this number should reach 600 million. Approximately 8 million people in 4 041 statutory towns lack access to toilets and defecate in the open. About 7.90 million. Water pollution in India is caused by untreated

sewage from urban areas, which is extremely harmful to human health. This emphasises the problem's immensity and the dire repercussions of inaction. SBM (Urban) is expected to cost Rs. 62,009 crores, based on unit and per capita costs. The Government of India's share is Rs. 14,623 crores. The States must also contribute a minimum of Rs. 4,874 crores, or 25% of the Government's funding. Maharashtra was the first state to ban open defecation in all cities. During the recertification procedure, six places were classified as Open Defecation. The state has committed to ODF in all metropolitan areas by October 2017. With its unique affiliation with SwACHH, the Pune Municipal Corporation has already established itself as a role model for rag pickers. SBM had built 3.5 million private toilets and 1.8 lakh public toilets in India as of June 2017. They are intertwined. Difficulties with personal and dietary hygiene are all causes of disease in developing countries. In India, too. Poor sanitation contributes to high infant mortality. Previously, sanitation meant using cesspools, open ditches, pit latrines, and bucket systems. It currently encompasses waste disposal, food hygiene, personal, household, and environmental hygiene. Sanitation is crucial for our personal and social lives as well as our health. Access to excreta and waste water facilities and services promote privacy, dignity, and a clean and healthy living environment for all. Human waste, domestic wastewater and solid trash should be collected, transported, processed, and disposed of (UN Habitat and Water Aid). Sanitation is a major predictor of quality of life and human development. Clean water and soil help keep diseases at bay, as do proper hygiene habits. Persistent infections (persistent infections) are infections caused by bacteria that live in the body. Local governments have traditionally provided water, sewerage, sanitation, solid waste disposal, and street lighting. These services are supplied by state agencies, state boards, businesses, and others. The Public Health Engineering Department, Public Works Department, Urban Development Department, Housing Boards, Department of Local Self Government, Water Supply and Sewerage Boards, and other state government departments perform municipal tasks. Instead of parastatals, the 74th Constitutional Amendment Act established the Metropolitan and District Planning Committees. The ULBs can now take on development responsibilities. In the post-decentralized era, states have responded in various ways to parastatal entities. In contrast to Kerala and Karnataka, Tamil Nadu, Uttar Pradesh, Maharashtra, West Bengal and Andhra Pradesh have called for a shift in parastatals' functional role. The parastatal agencies have also been amalgamated. The 74th Constitutional Amendment Act also gave local governments administrative and financial rights, allowing them to plan and develop.

Status of Urban Sanitation:

Despite its high return on investment, sanitation has been mostly ignored in India since independence. Lack of sanitation facilities causes bad health, higher safety risks, less expenditure on education and nutrition, reduced productivity, and diminished income potential for millions of Indians, perpetuating a vicious cycle of poverty (Dasra, 2012). A growing slum population and inadequate sanitation forces about 50 million people to defecate in the open every day. Inadequate sanitation causes unhealthy children, uneducated girls, and unproductive people, increasing their susceptibility and costing India 6.4 percent of its GDP (Dasra, 2012). Sanitation difficulties are more than a minor annoyance. Water and sewage treatment will be needed as the urban population grows. The number of slum dwellers has tripled in the previous three decades, putting further strain on already stressed municipal resources. Every year, 7 million people relocate to cities, most of them end up in slums. Slums are congested, lacking essential services and amenities, filthy, and dangerous. Only half of India's 50,000 slums have been notified. Cities were not compelled to provide services to slums that were not notified. In India, around 18 percent of urban houses lack drainage. Tripura had the highest proportion (46.55 percent), followed by Kerala (45.45 percent), Assam (43.65 percent), Odisha (40.95 percent), Arunachal Pradesh (33.79 percent), and West Bengal (33.79 percent). Around $2/5^{th}$ of urban dwellings has closed drainage systems. Gujarat (69.44%), Himachal Pradesh (65 percent), Maharashtra (62.70 percent), Delhi (60.31 percent) and Punjab (60.31 percent) had the highest percentages (57.63 per cent). Nagaland (67.88 percent), Manipur (64.36 percent), Meghalaya (62.45 percent), Mizoram (59.05 percent), and Chhattisgarh (59.05 percent) had the highest proportion of homes reporting open drainage (51.42 per cent). Metropolitan and Class I cities had better drainage than tiny towns. Smaller cities have more residents without drainage than larger cities. Class II, III, and IV cities had more open drainage than metropolitan and Class I cities. Open defecation is still common in cities, with 13 percent of urban households doing so. Chhattisgarh had the largest proportion (34.44 percent), followed by Odisha (33.17 percent), Jharkhand (30.99 percent) and Bihar (30.99 percent). Overall, 81.36 percent of urban families had a latrine. A high percentage of 98.52 percent was recorded in Mizoram, followed by Tripura, Kerala, Meghalaya, Manipur, and Nagaland (94.60 percent) (93.71 per cent). As a result, 17% of urban households lack latrines. The greatest percentages were in Chhattisgarh (39.80 percent), Odisha (35.22 percent), Jharkhand (32.83 percent), and Bihar (32.83 percent). Around 6 percent of urban households use a public bathroom. The

greatest percentages were in Maharashtra (21.04 percent), Tamil Nadu (8.65 percent), Delhi (7.12 percent) and Chhattisgarh (7.12 percent).

Table 1.2 lists the different types of sanitation services by city. In urban areas, less than a third of toilets were connected to a piped sewer network, although it was as high as 62.2 percent in metropolitan cities and 47.4% in Class I cities. In Class III and Class IV cities, septic tank dependency was high. In small towns, the proportion of pit latrines was equally high. In comparison to smaller cities, the proportion of community toilets was found to be higher in larger cities.

Table: 1. 2
Category of City-wise Type of Sanitation Facilities

Category of City	Connection of Toilet				Alternative Source	
	Piped Sewer Network	Septic Tank	Other System	Total	Community Toilets	Open
India	11.9	22.2	2.3	36.4	3.2	49.8
Rural	2.2	14.7	2.5	19.4	1.9	67.3
Urban	32.7	38.2	1.7	72.6	6.0	12.6
Metropolitan	62.2	20.3	0.9	83.5	8.2	4.0
Class I Cities of Non-Metropolitan Category	28.1	46.8	1.9	76.8	4.8	10.7
All Cities	11.2	43.9	2.3	57.4	4.8	25.8
Class I	47.4	31.8	1.3	80.6	6.8	6.9
Class II	15.8	49.0	2.0	66.8	5.7	17. 9
Class III	10.8	45.4	2.3	58.5	4.8	26.0
Class IV	8.2	40.2	2.4	50.8	4.5	30.7
Class V	7.3	35.2	2.9	45.3	3.9	34.3
Class VI	9.2	36.2	3.5	48.9	3.6	31.7

Source: Census 2011.

Sanitation is a term that can be defined in a number of ways. The correct disposal of human waste and sewage is referred to as sanitation. To avoid faecal-oral disease transmission, it requires both "hardware" (latrines and sewers) and "software" (regulation and hygiene promotion). This includes potential reuse, final disposal, and wastewater discharge. The correct disposal of a range of waste items is referred to as sanitation. We imply ensuring the safety of all waste products during collection, storage, treatment, and disposal when we say "safe handling." Human waste, residential waste water, sewerage, effluents, and industrial waste products, among other things, produce a lot of garbage (Bisaria, 2015). The process of formulating and implementing policies to protect public health is known as sanitation. It also means clean and safe living circumstances, clean and safe air, efficient and safe animal, human,

and industrial waste disposal, clean and safe food, and clean and safe water (Pais, 2015). Sanitation is defined as "the provision of facilities and services for the safe disposal of human urine and faeces" by WHO. It has been proven that improving sanitation in both homes and communities improves health. UNICEF defines sanitation as "actions necessary to improve and protect people's health and well-being." Indians have a complicated relationship with purity and their attitudes on faeces. Human excrement is a major source of pathogen disease transmission, yet it is also the best compost manure for crops. Human excreta are a primary source of pathogen disease transmission, but bovine urine and excreta are sacred. Open defecation is the social norm in many communities, and it is widely assumed that people prefer open fields to confined spaces, therefore even when toilets are erected, men prefer to go out to the field. On the other side, the lack of toilets in the home has a huge influence on women and children. After nightfall, women defecating in open fields risk not just infection, but also harassment, teasing, rude remarks, and even sexual assault (Bisaria, 2015).

Beyond physical and environmental cleanliness and hygiene, Saxena (2015) has broadened the scope of sanitation. Sanitation discourse on many conflicting themes such as justice, empowerment, subaltern, multi-culturism, and social inclusion must be included in social science academia. Sulabh has also given millions of individuals the chance to participate in the social reform and empowerment movement (Pathak, 2015). The sociology of sanitation, according to Akram (2015), aids in comprehending the larger phenomenon of poor sanitation standards and sanitation deficits in the Indian setting. It also aids in comprehending the structuring discourses that contribute to poor sanitation in both personal and public life. According to Shettar (2015), sanitation and gender are linked. The majority of sanitation issues are related to gender, and vice versa. He went on to say that women are in charge of the water in the house, household hygiene, and the health of family members, particularly the sick and elderly. Srivastava (2015) emphasised the relevance of action sociology and stated that sanitation has several interconnections, the most essential of which are water supply, hygiene, and human waste disposal. As a result, environmental sanitation, public health, social deprivation, social transformation, and social institutions are all covered by sociology of sanitation. The rising role of government in expanding the coverage of toilets, changing social behaviour and toilet usage, and providing universal access to sanitation services to society has increased the relevance of environmental sanitation.

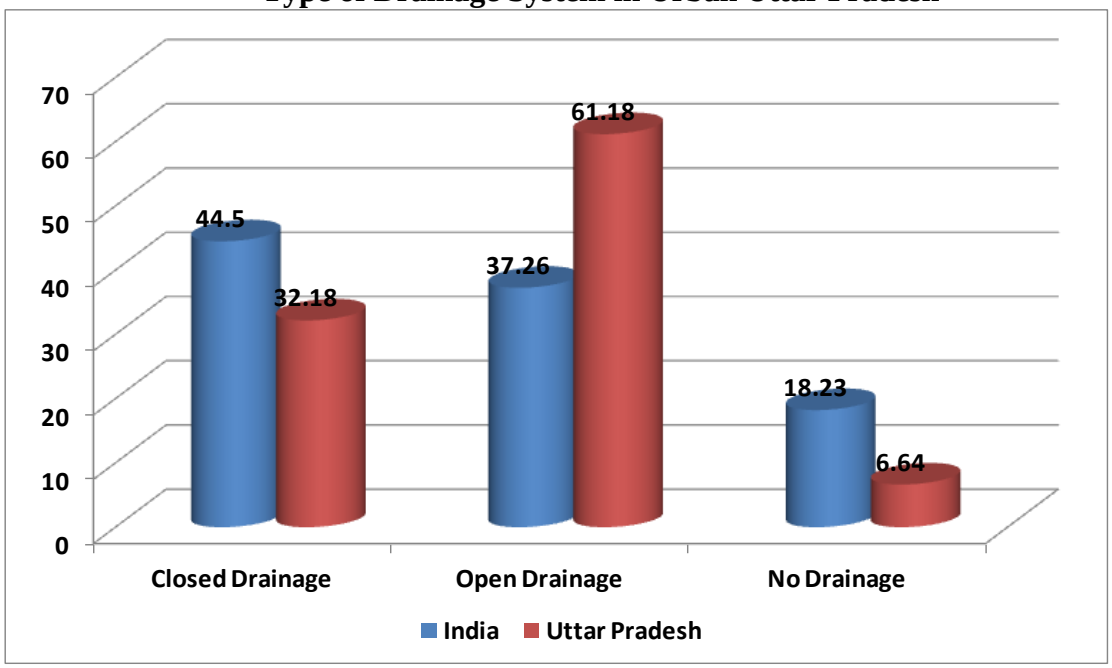
Urban Sanitation in Uttar Pradesh

Sanitation is vital to a healthy and civilised existence. Sanitation is linked to the environment because it raises the risk of water-borne illnesses. Only larger cities have sewer lines, therefore they only serve a small percentage of the urban population. As a result, most urban Indians use private septic tanks. As a result, increasing basic urban services including water, sanitation, drainage, and solid waste disposal in slums requires building infrastructure and enhancing basic urban services. Affordable and adequate sanitation for the urban poor is also required. The lack of a sewage network, inadequate wastewater treatment plant performance, and poor sanitation service delivery in metropolitan areas all contribute to poor sanitation conditions. Due to a lack of facilities, many slum dwellers defecate in public. Water sanitation in the world's second most populous country is a difficult task. The industry's troubles stem mostly from municipal governments' disinterest. An environment like India's makes this task even more challenging. Environmental sanitation strives to improve people's lives and promote society; sanitary disposal of liquid and solid human waste; management of disease vectors; Environmental sanitation includes both behaviour and facilities. Most waterborne infections, such diarrhoea, are spread by microorganisms found in human excrement.

Sanitation Status:

In India, almost 18 percent of urban dwellings have no drainage infrastructure. Tripura had the highest rate (46.55 percent), followed by Kerala (45.45 percent), Assam (43.65 percent), Odisha (40.95 percent), Arunachal Pradesh (33.79 percent), and West Bengal (33.79 percent). Approximately 2/5th of urban houses has a closed drainage system. Gujarat (69.44 percent), Himachal Pradesh (65 percent), Maharashtra (62.70 percent), Delhi (60.31 percent) and Punjab (60.31 percent) had the highest percentages (57.63 per cent). Nagaland (67.88 percent), Manipur (64.36 percent), Meghalaya (62.45 percent), Mizoram (59.05 percent) and Chhattisgarh (59.05 percent) had the greatest proportion of dwellings with open drainage (51.42 per cent).

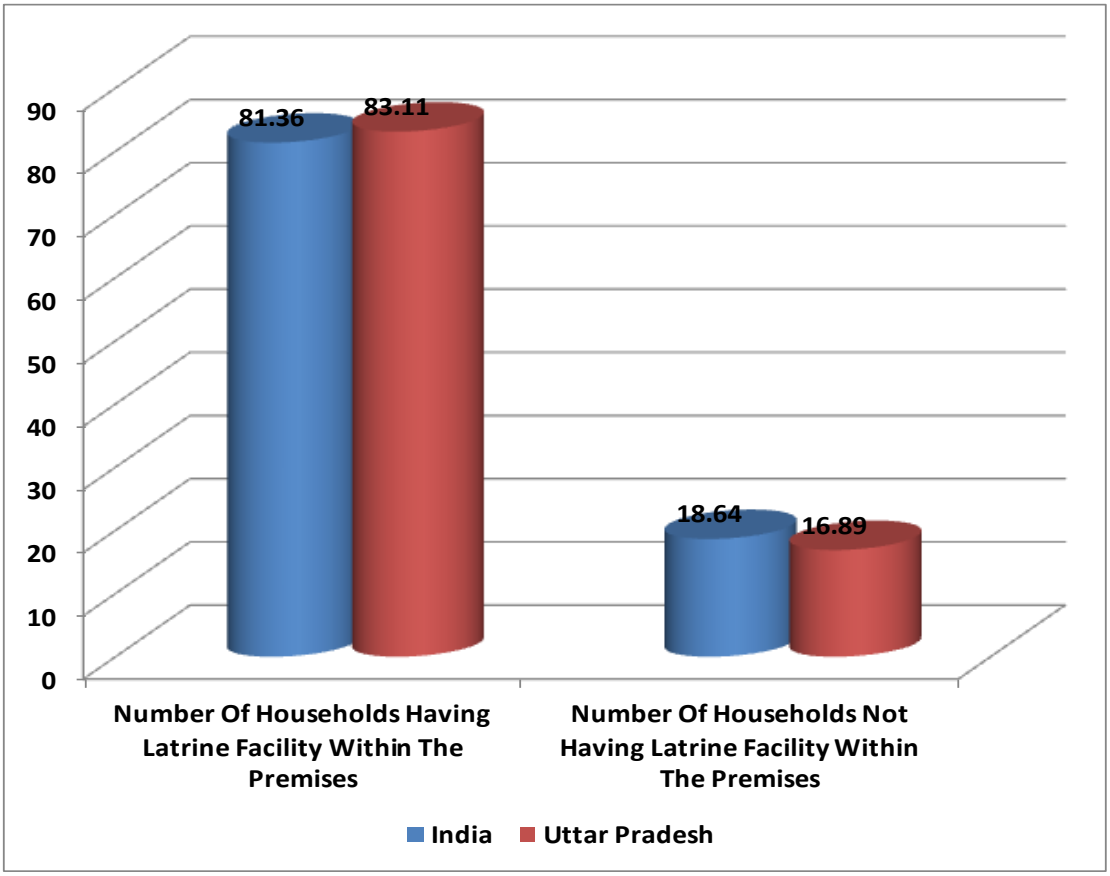
Chart: 1.6
Type of Drainage System in Urban Uttar Pradesh



Source; Census of India, 2011

Chart 1.7 shows access to toilets in urban India by state Over 13 percent of urban households report defecating in the open. The greatest proportion was in Chhattisgarh (34.44 percent), followed by Odisha (33.17 percent), Jharkhand (30.99 percent), and Bihar (30.99 percent). Overall, 81.36 percent of urban families own a latrine. This was found to be quite high in Mizoram (98.52 percent), Tripura (97.88 percent), Kerala (97.43 percent), Meghalaya (95.74 percent), Manipur (95.77 percent), Nagaland (94.60 percent) and Assam (94.60 percent). As a result, 17 percent of urban houses lack a latrine. The greatest percentages were in Chhattisgarh (39.80 percent), Odisha (35.22 percent), Jharkhand (32.83 percent) and Bihar (32.83 percent). Approximately 6% of urban households use public restrooms. Maharashtra (21.04%), Tamil Nadu (8.65 percent), Delhi (7.12 percent) and Chhattisgarh (7.12 percent) had the highest percentages (5.36 per cent).

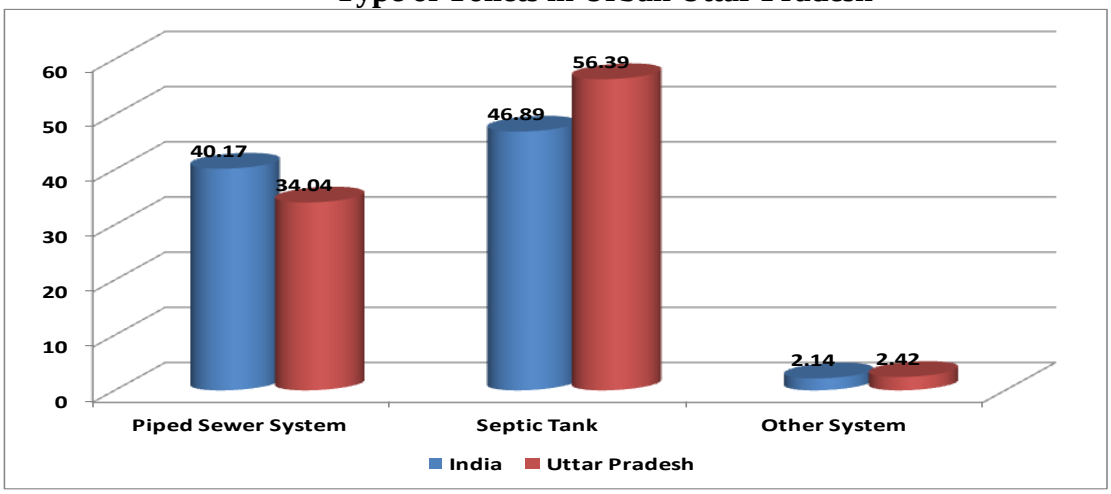
Chart: 1.7
Access to Toilets in Urban Uttar Pradesh



Source: Census, 2011

The states of Jammu & Kashmir, Uttar Pradesh, Manipur, Odisha, and Assam, are still in use. of service latrines in urban India. Chart 1.8 shows the different types of toilets by state. Gujarat (68.84 percent), Delhi (67.28 percent), Punjab (68.27 percent), and Karnataka (68.27 percent) have been strong reliance on septic tanks. At the national level, about 47 percent of toilets were found to be connected to a septic tank. Chhattisgarh had the highest rate at 80.73 percent, followed by Bihar with 76.45 percent, Jharkhand with 73.25 percent, Meghalaya with 71.77 percent, and Nagaland with 71.10 percent. Only 2/5t^{h} of urban families with latrines within their housing premises reported flush latrines connected to piped sewer systems.

Chart: 1.8
Type of Toilets in Urban Uttar Pradesh



Source: Census, 2011

Table 1.3 lists the wastewater treatment plants in India by state. A considerable number of wastewater treatment plants were found in Punjab, Maharashtra, Tamil Nadu, Uttar Pradesh, Himachal Pradesh, Rajasthan, Karnataka, and Gujarat. However, the effectiveness of these treatment plants was not discovered.

Table: 1.3
State-wise Sewerage Treatment Plants in India

State	Number of STPs
Punjab	86
Maharashtra	78
Tamil Nadu	73
Uttar Pradesh	73
Himachal Pradesh	68
Rajasthan	64
Karnataka	57
Gujarat	52
Odisha	47
Haryana	41
Chhatisgarh	36
Delhi	35
West Bengal	28
Jammu and Kashmir	25
Jharkhand	24
Uttarakhand	24
Telengana	18
Madhya Pradesh	17
Andhra Pradesh	12
Sikkim	11
Kerala	10
Goa	7
Bihar	6
Assan	5
Tripura	2
Meghalaya	1
Mizoram	1

Source: Central Pollution Control Board, 2016.

Status of SBM in Uttar Pradesh:

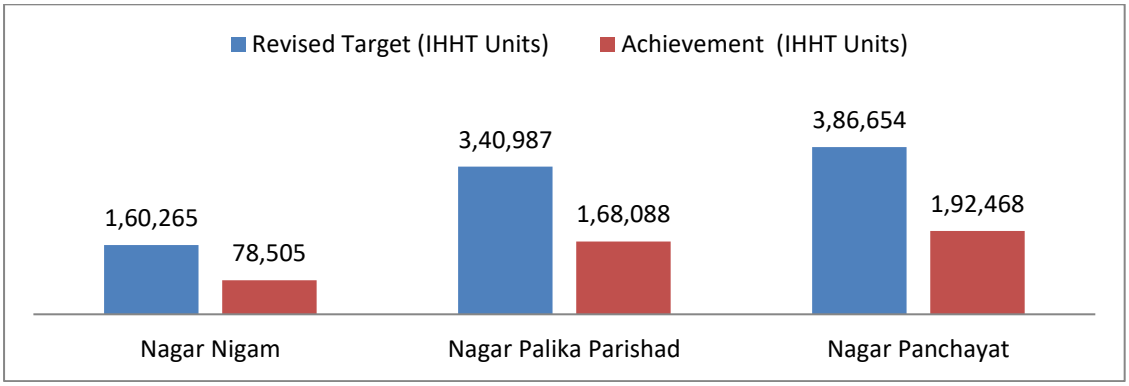
Construction of individual house hold toiled in the state of Uttar Pradesh has been found slow as compared to target fixed in the ULBs. However, progress was found comparatively higher in Nagar Panchayats than Nagar Nigam and Nagar Palika Parishad. Construction of toilets under SBM in the state is shown in Table 1.4. About 4.39 lakh individual household toilets, 12762 community toilets and 13871 public toilets have been constructed under SBM however, state is far behind the target fixed under SBM.

Table: 1.4
Construction of Toilets Under SBM in Uttar Pradesh

ULBs	Individual Household Toilets	Community Toilets	Public Toilets
Nagar Nigam	785050	8837	10802
Nagar Palika Parishad	168088	2440	2288
Nagar Panchayat	192468	1485	781
Total	**439061**	**12762**	**13871**

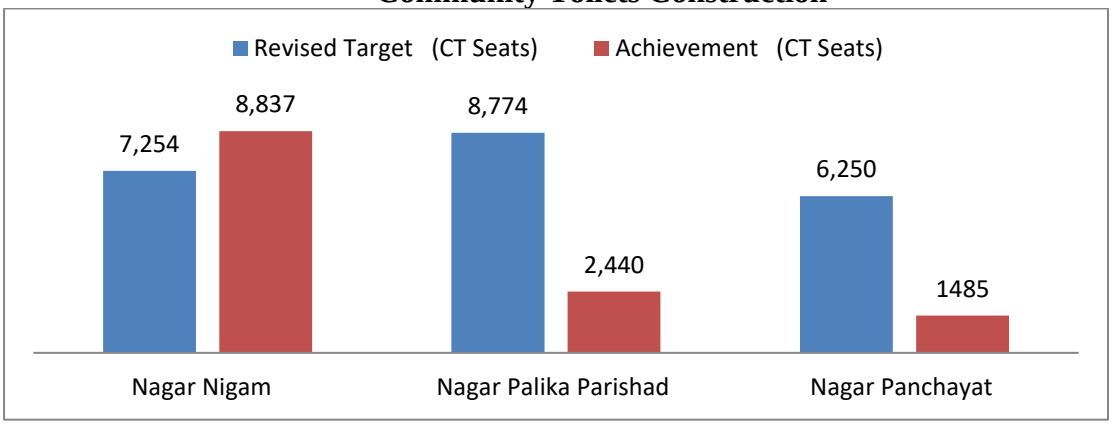
Source: Department of Urban Development, Government of U.P., March, 2018

Chart: 1.9
Individual Household Toilets Construction



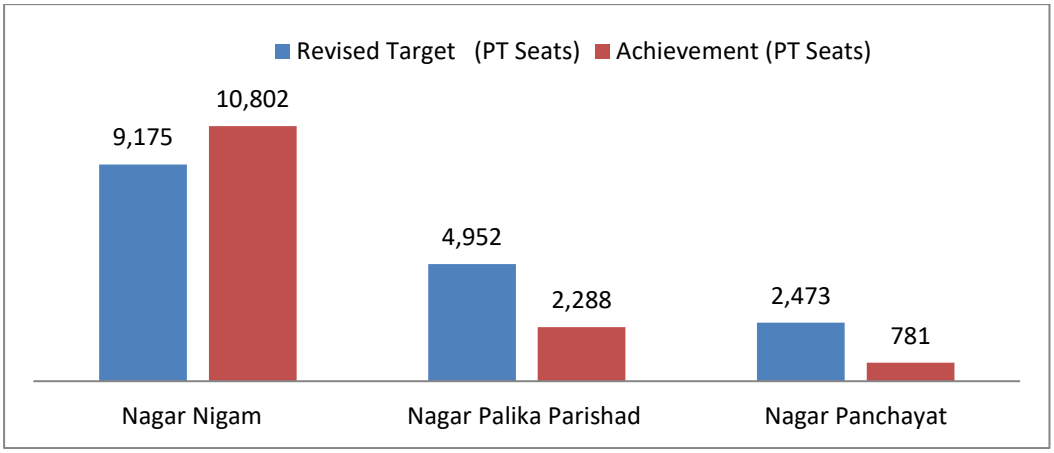
Status of community toilets has shown higher achievement in Nagar Nigams as compare to Nagar Palika Parishads and Nagar Panchayats (Chart 1.10).

Chart: 1.10
Community Toilets Construction



Construction of public toilets was reported higher than the fixed targets in Nagar Nigam while progress was found slow in other ULBs (Chart 1.11).

Chart: 1.11
Status of Public Toilets



Utilization of funds under SBM in Uttar Pradesh is shown in Table 1.5 Utilization of funds has been reported to be low as compared to fund received and funds transferred to ULBs under SBM. However, about 20 per cent funds were utilized by ULBs against funds transferred to them for construction of individual household toilets. Similarly, about 5 per cent funds were utilized against funds transferred to them for construction of community toilets under the Mission.

Table: 1.5
Utilization of Funds Under SBM in Uttar Pradesh

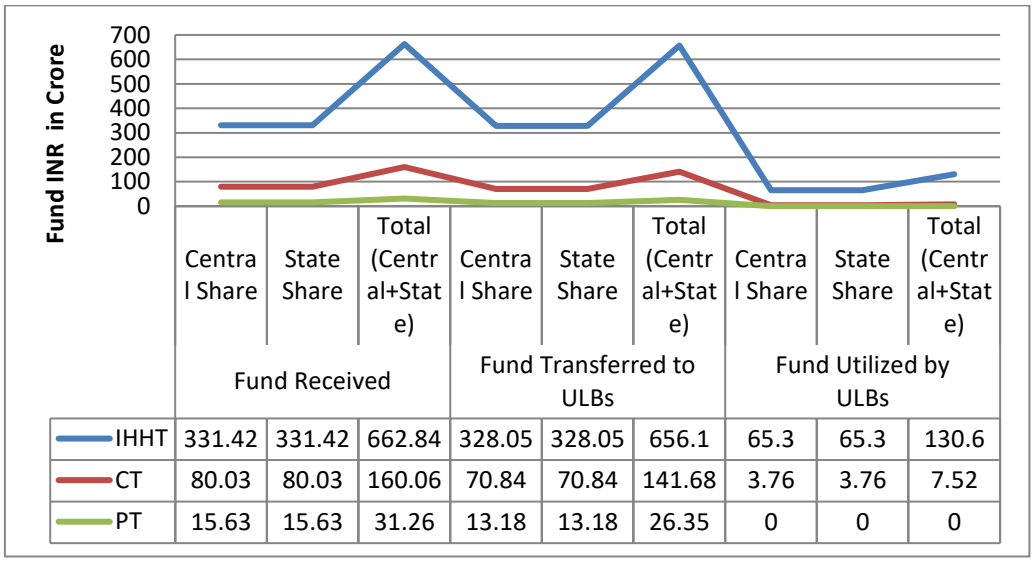
(Rs. In Crore)

Head	Funds Received	Funds Transferred to ULBs	Funds Utilized by ULBs
Individual Household Toilets	662.84	656.10	130.6
Community Toilets	160.06	141.68	7.52
Public Toilets	31.26	26.35	0.00
Urinals	0.00	0.00	0.00
Solid Waste Management	74.49	68.12	0.00
Total	**990.18**	**905.48**	**141.6**

Source: Department of Urban Development, Government of U.P., March, 2018

Central government and State government release the funds under Swachh Bharat Mission for construction of toilets. However ULBs where failed in utilization of funds (Chart 1.12).

Chart: 1.12
Funds Utilisation in Uttar Pradesh



	Fund Received			Fund Transferred to ULBs			Fund Utilized by ULBs		
	Central Share	State Share	Total (Central+State)	Central Share	State Share	Total (Central+State)	Central Share	State Share	Total (Central+State)
IHHT	331.42	331.42	662.84	328.05	328.05	656.1	65.3	65.3	130.6
CT	80.03	80.03	160.06	70.84	70.84	141.68	3.76	3.76	7.52
PT	15.63	15.63	31.26	13.18	13.18	26.35	0	0	0

Need for Septage and FSM:

In India's main cities, massive underground pipelines, pumping stations, and treatment facilities exist. It costs a lot to create and manage these systems since they require constant electricity, lots of water and expert operators. Small towns in India lack infrastructure and are unlikely to be covered by centralised sewerage systems anytime soon. According to the Central Pollution Control Board, 522 of India's 816 municipal sewage treatment plants are operating (64 percent), 79 are not (29 percent) and 145 are planned. The current treatment capacity can barely handle 37 percent of the 62,000 MLD of sewage generated in Mumbai. Over 45 percent of urban Indian dwellings use onsite pit latrines, septic tanks, or other similar systems (Census 2011). When the Swachh Bharat Mission (SBM) provides services to urban residences without toilets in the coming years, many are likely to buy onsite alternatives like pit latrines and septic tanks in places without sewerage systems. As a result, while SBM will mostly be human waste, treatment will remain a major issue. Degradation of water and soil resources and health issues are already affecting many Indian communities. Unlike most OSS systems, septic tanks and pit latrines have gotten less attention in terms of adequate construction, maintenance management, and safe disposal of faecal sludge and septage. In actuality, installations are subject to local practises, with considerable differences observed. Soak-away or drain fields, for example, are rare. Due to a lack of capacity and resources among ULBs, septic tank and pit maintenance and cleaning are unregulated. Services for desludging are few, even though certain ULBs have

equipment and commercial companies provide cleaning. Frequent thrown in sewers or open areas, faeces sludge poses major health and environmental dangers. Sanitation workers clean OSS pits and tanks in dangerous conditions, often without protective gear. Most Indian cities have a limited number of OSS toilets and septage disposal facilities and systems. Local considerations must be considered while addressing the problem of faecal sludge and septage/sewerage. Enabling elements include proper regulatory and institutional structure, capacity building, education, and awareness among all stakeholders and stakeholders. This strategy aims to improve onsite sanitation systems that generate faecal sludge, such as septic tanks, pit latrines, and other faecal sludge-generating systems. This policy only applies to on-site sanitary facilities and the regions they service. It does not include standard sewerage or wastewater/sewage networks (including treatment facilities). Synergies 12 between FSSM and sewerage systems or MSW management will be addressed. Unabridged versions of this Policy are available at http://www.unabridged.org/policy/. Urban and peri-urban sanitation is impacted or assisted by all federal Ministries, Departments, Agencies, Authorities, and Public Sector Entities. It also covers all urban local bodies, outgrowths of urban agglomerations, census towns declared by the Registrar General and Census Commissioner of India, notified areas, notified industrial townships, Indian Railways controlled areas, airports, and harbours, defence establishments, special economic zones, State and Central government organisations, pilgrimage, religious and historical sites etc. According to the 2011 Census of India, only 32.7% of urban homes use piped sewers, 38.2 percent use septic tanks, and 7 percent use pit latrines, indicating the prevalence of onsite systems. Septic tanks, pit latrines, and open defecation pollute groundwater and surface water in many cities around the country. Sludge collection, treatment, disposal, and reuse are tough parts of urban sanitation. Faecal sludge collection, processing, and disposal is lacking in most Indian cities and towns. Sediment and non-faecal detritus collected from on-site sanitation systems such latrines, public toilets, septic tanks, and aqua privies. Septage is septic tank faeces sludge. On-site sanitation systems (OSS) are responsible for the majority of facilities. Urban septic tanks and pits are commonly overlooked due to a lack of resources and abilities to monitor cleanliness and maintenance. Despite the use of high-tech cleaning equipment and commercial contractors, certain ULBs lack desludging services. Disposal of sewage waste, especially sludge, poses major health and environmental problems. Cleaners work long hours without the proper safety gear and protection. Many Indian towns lack adequate sanitary facilities, such as toilets and septage disposal systems. To adequately address the issue of sewage sludge and septage, a comprehensive plan is required, one that is both acceptable and cost-effective for a wide range

of communities and individuals (Wankhede et. al , 2014). Sludge management and ecological sanitation in Indian cities need urgent improvement (Rawat et. al.2013; Sharma et. al. 2017). WSP says the lack of infrastructure to safely carry waste from septic tanks and pits is a big issue in many municipalities and states (2008). Municipalities normally provide manual septic tank and pit removal, or privately operated honey suckers. Finding an alternative to traditional STPs for sewage sludge is difficult. Aecom & Sandec, 2010; WSP-Taru, 2008) say that collected rubbish is normally dumped in the open. The six technological and physical elements that determine the choosing of a user interface are (1) location and (2) ground type. In certain old cultures like China and India, night soil manure is still utilised, but artificial fertilisers have mostly supplanted it. Night-soil manure is still used in Japan, Vietnam, the Netherlands, and Scandinavia (IWA, 2014). Pumping septage from a cesspool or other treatment facility is called septage. Scum rises to the top of the septic tank, sludge sinks. Septage has a nasty odour and appearance. With so much oil, grit, hair, and other debris, it attracts a wide range of illnesses. Septic tanks generate a lot of septage. In horizontal, continuous flow sedimentation tanks, with this device, you can settle and digest waste. Anaerobic degradation of wastewater solids and organic matter accumulates near the tank bottom. Oil and grease, for example, will float to the surface of the liquid. It's called "scum" by some. Sludge and scum together fill half to two-thirds of the tank's capacity (prior to de-sludging). A soak-away pit should be built after a septic tank to transport sewage into the earth. Most of the rain runs into a nearby storm drain. Anaerobic digestion produces sludge and scum that settle to the tank's bottom for months. From a "traditional centralised sewerage system" to a "holistic framework," India's National Urban Sanitation Policy (NUSP) has evolved. With the National Urban Sanitation Policy (NUSP) came the City Sanitation Plan (CSP) framework and the Urban Sanitation Awards (USA). The lack of specific guidance on septage management in NUSP standards allowed for greater policy formation and state responsibility. Scavenging is prohibited by municipal building codes and institutional laws controlling the creation, powers, and obligations of local authorities and organisations. Regulation of effluent and sewage discharges is governed by the Environmental Protection Act 1986, the Municipal Act, and the Water Pollution Act 1974. This is required by the Environment (Protection) Act, as amended by the Solid Waste Management (SWM) Rules of 2016. SWM Rules 2016 allow septage to be recycled or composted in sanitary landfills. Leach pits and drainage fields are included in the National Building Code of India (BIS) (BIS). Prohibition of Manual Scavengers and Dry Latrines Act of 1993 restricts usage of dry latrines (without a water seal or flushing mechanism) and manual scavengers. The Prohibition of Employment as a Manual Scavenger and their Rehabilitation Act of 2013 made "hazardous"

sewage and septic tank cleaning illegal. For more information, see the CPHEEO Sewerage and Wastewater Treatment Manual, 2013.

Status of Sewerage Management:

About 86 percent of the household toilets in the metropolitan centres of the state have on site sanitation system, and their distribution among ULBs is 78 percent in Nagar Nigams , 98 percent in Nagar Panchayats , and 90 percent in Nagar Palika Parshads . Septic tanks in the state total 72 million, assuming that each dwelling has a single tank. There are 30.2 lakhs Nagar Nigams (NNs,) 26.7 lakhs Nagar Palika Parshads (NPPs) , and 15 lakhs Nagar Panchayats (NPs) in the various ULB categories. There are 99 STPs installed in 29 of the 652 ULBs, with a total capacity of 2646 MLD. The reported reception of sewage at STPs (71 percent) and areas not served by the sewerage network in sewered cities are two issues that need to be addressed. The cities with STPs have a chance to take use of septage control and co-treatment, subject to technological and economic feasibility. AMRUT and Namami Gange, two state-sponsored programmes, have added treatment capacity for 1948 MLD over 18 ULBs, thanks to the construction of new STPs. Upon completion, the urban areas of the state will have a total treatment capacity of 4594 MLD (Table 1.6).

Table 1.6
Category of ULB wise STPs and Their Treatment Capacity

Particulars		**Nagar Nigam**	**Nagar Palika Parishad**	**Nagar Panchayat**	**Total**
Existing	No. of ULBs	17	197	438	652
	STP Capacity (MLD)	3036.4	254.59	7.85	3298.84
	No. of STPs	75	26	3	104
Proposed	No. of ULBs	14	17	2	33
	STP Capacity (MLD)	875.38	393.55	12.4	1281.33
	No. of STPs	29	25	2	56
Total STP Capacity (MLD)	No. of ULBs	12	22	2	36
	STP Capacity	3911.78	648.14	20.25	4580.17

Source: U.P. Jal Nigam-2019

Effective scheduling systems need an accurate database of demand, an unrestricted and continuous supply of service providers, and an efficient management system for the whole process from start to finish (disposal at designated locations for treatment). The synergy of the data fields can only be tapped if the newly formed real-time database is paired with existing databases that were built for various purposes. It is hoped that this database would aid in the

design of treatment systems by providing information on factors such as plant size, technology selection, and locations for safe disposal. When PPP models are considered, this evidence-based decision-making approach will assist ULBs in implementing reforms toward an accountable and transparent ecosystem of service supply. This will help the ULBs prepare for a variety of rating methods, as well. Table 1.7 summarises the cleaning scale for several ULB kinds.

Table 1.7
A Comparison of Scheduled Emptying Services

Particulars		Nagar Nigam	Nagar Palika Parishad	Nagar Panchayat	Total
Cleaning Once in 3 Years	ST/OSS Cleaning per Year	1006758	884128	499068	2389954
	Daily Septage to be Cleaned (KL/day)	3356	2947	1664	7967
	Average Septage per ST/OSS (KL/day)	1.63	1.77	1.82	
Cleaning Once in 3 Years	ST/OSS Cleaning per Year	604055	530477	299441	1433973
	Daily Septage to be Cleaned (KL/day)	2014	1768	998	4780
	Average Septage per ST/OSS (KL/day)	2072	2.95	3.04	

Source: U.P. Jal Nigam-2019

It is recommended that ULBs plan for the septage management which includes a mandatory 5-year septic tank cleaning cycle. 72 million septic tanks / OSS in the State 1750-3000 MLD of septage treated annually 14 to 24 lakh emptying annually 600 vacuum trucks running everyday (Table 1.8).

Table 1.8
Septage Cleaning Mandate in Uttar Pradesh

Particulars	Nagar Nigam	Nagar Palika Parishad	Nagar Panchayat	Total
No. of ULBs	17	197	438	652
Septage Generation 2018 (*KL/Year*)	2000970	1900917	1107219	5009106
Septage Generation - 2018 (*KL/day*)	5482	5208	3033	13724

Septic Tank Cleaning per Year	1006758	884128	499068	2389954
No. of STs Empting in One day	914	868	506	2287
No. of 6 cum Trucks required	228	217	126	572

Source: U.P. Jal Nigam-2019

The present need for emptying trucks necessitates a total of 572 vehicles. Before determining the demand for vacuum trucks, it is necessary to take into consideration the present stock of vehicles owned and used by the private sector. According to the size of the ULB, it is suggested that the minimum number of septage cleaning and transportation machines be in working order. This will guarantee that the ULB is prepared in the event of an emergency. This fundamental mechanisation procedure is also acknowledged to be necessary to limit risks to private sector involvement, especially when periodic cleaning is imposed. The properties of the septum have a crucial role in treatment option selection. Wastewater and septage from the treatment facility might be used for a variety of public and commercial applications. This will help in the recovery of nutrients and costs, as well as the development of profit (Table 1.9).

Table 1.9

Septage Generation and Possibilities for Co-treatment

Particulars	**Nagar Nigam**	**Nagar Palika Parishad**	**Nagar Panchayat**	**Total**
No. of ULBs	17	197	438	652
Septage Generation 2018 (*KL/Year*)	2000970	1900917	1107219	5009106
Septage Generation - 2018 (*KL/day*)	5482	5208	3033	13724
No. of ULBs	14	28	6	48

Source: U.P. Jal Nigam-2019

The state government has authorised and given contracts for 57 FSTPS/Septage Management Projects, in addition to the two FSTPs in Jhansi and Unnao, although only 17 of these projects are currently under construction. FSS co-treatment in existing STPs is a more cost-effective solution than treating FSS produced in areas without a sewage network or in partially covered cities. In highly populated areas, the cost and difficulties of building a citywide sewage network with 100 percent coverage is increased. Land identification,

permissions, and the bidding procedure must all be completed before a faecal sludge treatment plant (FSTP) can be built. Another benefit of utilising the STP's existing facilities, site infrastructure, and employees is that it removes the requirement for a new operator as well as the additional expenditures involved with co-treatment site infrastructure. FSS is pumped directly into the STP or the nearest pumping station or manhole of the sewage network in many Indian cities, with no pre-treatment. In some countries, co-treatment of FSS in a STP without pre-treatment has been proven to have deleterious consequences. Because FSS has a far higher solids, organic, and nutritional load than sewage, solids deposition, obstruction, and corrosion of sewerage infrastructure, including STP, are all conceivable results. As a result, the Center for Science and Environment in New Delhi has proposed collecting wastewater samples from each STP module's influent and effluent to assess how each module is performing.

Human excreta contain nutrients and organic compounds that can be safely reused in agriculture using sustainable sanitation techniques (Andersson et al., 2016; Esrey, 2001). These systems can use slurry and manure in a variety of ways, and they can use a range of sanitation methods and approaches (Sinha et al., 2017). In other cases, however, the socio-cultural value system linked with the reuse of human excreta may act as a deterrent to ecological sanitation methods (Andersson, 2015; Nawab et al., 2006; Sinha et al., 2017). The nutrients found in human faeces and urine could help farms, especially as soil fertility declines and people increasingly rely on artificial fertilisers to compensate and enhance agricultural productivity (Is et. al., 2003; Winker et. al., 2009). India's population has gradually increased over the last 25 years as sanitary facilities have improved. Between 1990 and 2015, global adoption of improved sanitation increased from 53 to 67.5 percent, but only India's adoption increased from 19 to 40 percent during the same time period (WHO, 2013). As a result, sanitation development is vital in developing countries such as India, where sanitation levels must be improved.

This form of development activity can benefit from ecological sanitation, which improves sanitation, water, and agriculture, as well as the concepts of ecological sanitation. As a sanitation technique, ecological sanitation has encouraged circularity in the flow of produced (waste) resources into the natural environment. Human waste is segregated at the source (households) and directed to agricultural regions for use as crop fertilisers, according to a closed-loop plan (Ganesapillai et al., 2015). For example, urinary dissection toilets make it easy to separate useful (nutrients) from undesired substances (pathogens, micro-pollutants, heavy metals). South India has had similar outcomes as a result of improved soil quality and significant cost savings (Simha et al. 2017). Sanitation systems are typically evaluated just in

part. Excreta and sewage sludge are commonly excluded from emissions, transportation, and treatment services and facilities in site-based sanitation systems (latrine or septic tank-based). Local business opportunities are also overlooked, as is the possibility for waste resources such as water, nitrogen, or bio-solids to be exploited. Continuing to use inadequate solutions has resulted in significant financial losses for communities. In developing countries, on-site sanitation facilities such as private and public toilets, as well as septic tanks, collect significant amounts of waste and sewage sludge. Toilets, city-wide sewerage systems, and central wastewater treatment facilities, which are common in developed countries but useless in developing ones, are not acceptable. While there are methods for collecting sewage sludge, it is frequently discarded untreated, creating a major health danger as well as environmental damage (SCBP, 2017). Human excrement is dealt with by the sanitation system from the time it is produced until it is disposed of. Sludge from on-site sanitation systems must be safely emptied and then transferred for treatment or disposal as part of the sanitation system. Emptying and transferring human waste is an important part of the sanitation process. Regular septic tank emptying is required, as is the safe handling of faecal sludge. For sanitation service providers, homes, communities, and the environment, the process of removing and transporting faecal sludge might be made more efficient and safe. There are a variety of faecal sludge removal and transportation service providers, ranging from unaffiliated individuals to major, well-established businesses. Public utilities or non-governmental organisations may provide services in some locations, but in Uttar Pradesh, ULBs and the Uttar Pradesh Jal Nigam provide these services (UPJN). In the same location, there are a range of service providers. This is due to the wide range of on-site sanitation options and financial resources available to customers. Manual and mechanical methods, such as a bucket or a hand pump, can be used to remove sludge from an on-site sanitation system (using a mechanised pump or vacuum truck).

Vacuum trucks exist in many sizes and varieties to suit various uses. They usually hold between 200 and 16,000 litres of liquid. Vacuum trucks can haul up to 55,000 litres. A mechanised emptying system can quickly empty large tanks of on-site sanitary equipment. This procedure is far safer and healthier than manual emptying. No entry into the technology or close contact with faecal sludge is necessary, even if pump and hose operation is required. However, vacuum vehicles have a few mechanical issues. Conventional vacuum trucks can go two to three metres deep. Parking is prohibited within a 25-yard radius of the on-site sanitation equipment. It's not uncommon for large cars to be unable to enter narrow streets or terrible roads. Wastewater treatment plants, wastewater treatment plants, and sewage treatment plants

can all receive sludge directly. Because sludge is difficult to handle, it is usually dumped, buried, or discharged into the sewer system nearby. So just shifting rubbish from the collecting place is not a long-term waste management plan. Workers who empty on-site sanitation systems and handle faecal sludge face substantial risks. Emptying the pit requires wearing gloves, boots, and other protective clothing and masks, as well as washing your hands and body afterwards. Slabs or coverings must be removed to provide access and improve air movement. Allow enough time for the on-site sanitation technology to adapt. Gases like sulphur dioxide and methane can escape through venting. Never enter a pit without a rope and a safety harness. If the worker is overcome by gases or the pit walls fall, two people should carry the rope. A portable, manually controlled pump was developed to improve manual emptying efficiency while protecting people. Machines for emptying faecal sludge use electricity, fuel, or pneumatics (using pressurised air or gas). Vacuum pumps are commonly used to empty septic tanks and pour flush latrines. To access the technology, a hose is lowered through a lid. Transporting faecal sludge to the tank can be done by heavy-duty truck, lighter carts, or even human power. Faecal sludge must also be handled with care. Manual (using human or animal power) and motorised (using a fuel-powered engine) are the two main types of emptying operations. Manual service providers commonly travel by cart, wheelbarrow, wagon, or rickshaw. Vacuum trucks may also empty water-based devices like flush latrines and septic tanks. Depending on the method, the sludge may become thick and difficult to pump. In this case, diluting the faecal sludge with water makes it easier to pass. But there are also downsides. Manual drainage may be the sole option if water is scarce.

Problem Statement of Research Work:

A sound sanitation system and clean water are essential for healthy health and social and economic prosperity. People who are prone to water-borne diseases lose productivity when they cannot access these critical services. The consequences of poor sanitation, such as illness and premature mortality, are spreading globally. Economic and technological improvements have significantly improved global sanitation in recent decades. Equal access to basic health, clean water, and sanitation is a priority in India. Since the launch of the Swachh Bharat Abhiyan, India has made great strides in eradicating polio and neonatal tetanus (Swachh Bharat Mission). In India, sanitation sustainability is a major issue, and sanitation infrastructure must be improved. A sanitation system must be economically viable, socially acceptable, technically and institutionally adequate, and protect the environment and natural resources. Sustainable sanitation is a set of ideas rather than a technology. Sustainable sanitation recognises excreta

and wastewater as resources rather than waste. Cleaning is done to provide a healthy environment and break the illness cycle. It is now commonly acknowledged that sustainable sanitation drives economic growth and development. It has recently gained worldwide recognition. By October 2019, Prime Minister Narendra Modi promises his "Swachh Bharat Abhiyan" will have built 111 million toilets. Toilets aren't made to solve sanitary issues. Other concerns can turn a toilet into a trash can. Traditional Indian toilet design regards human excreta and urine as trash that must be disposed of, but contemporary technology, recycling, and waste management may turn it into a precious resource. Concerned with long-term sanitation, the Swachh Bharat Mission Guidelines Its objectives resemble those of Nirmal Bharat Abhiyan. Millions of people in India will need permanent sanitation facilities in the future years and millions of toilets and sanitation systems will need to be built. ULBs plan, design, execute, operate, and maintain water and sanitation services in cities and towns. They are intertwined. The lack of personal and food hygiene contributes to numerous diseases in India. For example, the Indian government has invested in urban sanitation and has implemented regulations and public awareness programmes. The Swachh Bharat Mission was established in 2014 by the Indian government to eradicate open defecation and improve sanitation in urban areas. As a result, while SBM will largely prevent human waste from entering sewers, waste treatment will remain a serious concern in urban areas. Health issues, disease outbreaks, and substantial contamination of water and soil resources are already affecting many Indian villages.

Objectives of Study:

- To study the policy and legal perspective of urban sanitation, septage and faecal sludge management in India, and particularly in Uttar Pradesh;
- To examine the sanitation conditions and present system of waste water, septage and faecal sludge management in selected cities in Uttar Pradesh;
- To review the municipal norms, provisions and institutional arrangements relating to septage, waste water, faecal sludge management including collection, emptying of tanks, transportation, treatment, and disposal, role of faecal sludge operators and their operational structures;
- To study the technological options for management of waste water, faecal sludge, septage and also to examine the affordability and equity issues in sanitation services;

- To examine the problems and challenges in management of sanitation, septage and waste water including faecal sludge urban centres in general and slums in particular;
- To suggest policy measures, action plan and strategies for sustainable urban sanitation, septage, faecal sludge and waste water management.

Organization of the Study:

The study has been planned in five chapters. Chapter 1st is introductory one which gives brief account of urbanisation, status of urban sanitation in India and Uttar Pradesh, need of faecal sludge management, present scenario of waste water management as well as policy perspective. It also includes the statement of research problem, objectives of study and organization of the study. Chapter 2nd is concerned with review of literature and research gap of the study. Chapter 3rd deals with profile of selected area /cities, hypothesis and research methods of the study. Chapter 4th deals with profile of urban dwellers and their access to sanitation facilities and sanitation services, septage and faecal sludge management. It also includes perception analysis of municipal officials and sludge operators regarding the inclusive and sustainable sanitation infrastructure, sanitation servicers, faecal sludge management and challenges of urban sanitation. Chapter 5th concludes the study and it consists of main findings and policy recommendations.

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Chapter: 2
LITERATURE SURVEY

Literature Survey :

Cleanliness is a broad term that has several definitions. Sanitation is the safe disposal of human waste and excreta. To reduce the spread of oral illness, both "hardware" (such latrines and sewers) and "software" (like regulation and hygiene promotion) are required. This comprises wastewater discharge, reuse, and final human excreta disposal. Sanitation is the safe disposal of waste materials. We mean "safe handling" of all waste products during collection, storage, treatment, and disposal. There is a lot of garbage produced every day (Bisaria, 2015). Sanitation is the process of developing and executing public health policies. Human and industrial waste management, food protection from biological and chemical pollution, and suitable housing in a clean and safe environment are examples of safe circumstances (Pais, 2015). Sanitation is defined as "the provision of facilities and services for the safe disposal of human urine and faeces." Assessment in homes and communities has a substantial impact on health. UNICEF defines cleanliness as "actions necessary to improve and protect people's health and well-being." Clean air and water improve people's lives and contribute to societal prosperity. In addition, adequate liquid and solid human waste management is required to prevent disease vectors. People must use their actions and resources to keep the environment clean. Pathogens present in human faeces spread most water and sanitation-related diseases. For the most part, faecal management at home is tied to basic therapy. Because (a) most hygiene-related activity happens in or near the home, and (b) changing sanitation practises often begins with little changes at home. Secondary barriers prevent stool germs from spreading to new hosts via faeces or hands. Aside from hand washing before eating or preparing food, there are other challenges to overcome. Water and sanitation provide an essential barrier between toxins, nature, and humans. In India, there are two types of sanitation systems: network-based (piped sewerage) and on-site (all other varieties). Except for piped sewerage, all other forms of sanitation are on-site systems. According to a survey, just 100 out of 300 communities had sewers (NIUA, 2005). The number of sewage cities has risen somewhat since 2011. Only 792 cities, or 10% of all cities, have more than 50% of their households connected to the sewerage system. A third of total wastewater is collected, according to various estimates (CPCB, 2009). According to the National Sanitation Ratings for 423 cities, 274 (65 percent) lack adequate arrangements for safe human excreta collection. Only 27 percent of cities gather

over 80 percent of their rubbish (MoUD, 2010). When sewerage systems exist, they are flawed. Most Indian cities have broken sewers. Missing manhole covers and catapult holes are among the numerous problems and lack of preventative maintenance (WSP-TARU, 2008). Incorrect solid waste disposal clogs sewer systems. Storm water infiltrates the sewer system, producing overflows and clogging. On-site pit latrines, septic tanks, and other similar systems are common in metro India. Over 45% of urban Indian households use on-site services, and this percentage is rising. De facto, while SBM will primarily prevent human waste, treatment will remain problematic. Health issues, disease outbreaks, and substantial contamination of water and soil resources are already affecting many Indian villages. Despite the widespread use of OSS, little attention has been made to the safe disposal of sewage sludge and septage from septic tanks and pit latrines. Due to a lack of expertise and resources, metropolitan municipal governments have minimal supervision over septic tank and pit cleanliness; many homeowners do not report cleaning for years. While some ULBs have flashy equipment or engage private cleaners, desludging services are woefully lacking. In addition to health and environmental hazards, sewage sludge and septage are often discharged in sewers. Workers in hazardous conditions clean on-site sanitation systems, pits, and tanks for long periods of time without adequate safety gear. Most Indian cities lack data on on-site sanitation infrastructure, toilets, and septage disposal practises. The problem of sewage sludge and septage/sewerage must be tackled holistically, with a strategy that is acceptable and cost-effective for all places and people (Wankhede, 2014). Sludge management and ecological sanitation in Indian cities is abysmal (Rawat et. al.2013; Sharma et. al. 2017). According to WSP (2008), there are considerable disparities across cities and states in terms of safe pit evacuation and septic tank sludge removal. While some cities provide these services, most homeowners use manual or mechanical sweepers to clear pits and septic tanks. Few sewage sludge treatment plants exist, and those that do typically use co-treatment. The trash is routinely thrown out in the open (Aecom & Sandec, 2010; Wsp-Taru, 2008). Six technological and physical criteria determine the choice of a user interface: (1) a suitable location; (2) groundwater levels; (3) contaminants; (4) water availability; and (5) climate (IWA, 2014). Human excrement has long been used as a fertiliser and soil conditioner. It is made by mixing human faeces with animal and/or plant waste. Manure from night soil is still utilised in certain ancient countries like China and India, but chemical fertilisers have replaced it in Europe and North America. However, in other places including Japan, Vietnam, the Netherlands, and Scandinavia, night-soil manure is still employed. Various techniques are utilised to prepare night-soil manure depending on local conditions (Esrey et al., 1998; Del Porto and Steinfeld, 1999). Mexico, dubbed "the world's dry

sanitation capital," is a forerunner in this industry (Peasey, 2000). The rising demand for organic fertilisers has given this old practise fresh life in recent years. Chemical fertilizer's severe ecological repercussions, as well as the natural environment, have rekindled interest (Mashauri and Senzia, 2002). The location, in the Himalayan desert, has extreme weather, making it a difficult prospect (Singh et. al., 1997; Kuniyal et. al., 2004, 2005; Oinam et. al., 2005). The need to enhance yields has led to an overuse of artificial fertilisers and pesticides in recent years (Rawat et al., 2004). As a result, the ecosystem's long-term consequences are clear (Oinam, 2004). The study area lacks suitable soils, nitrogen, and water for plant growth (Rowell, 1994). Winter snowfall not only ruins terraced fields but also causes soil nutrient leakage (Rawat et al., 2005). Using this method year after year depletes the soil's fertility. Organic manure is always in high demand in Lahaul Valley to replenish lost soil fertility and increase harvests. Due to animal population shortages, grown manure cannot meet high demand. Night-soil manure was used by farmers seeking a different manure (Drangert, 1998; Kuniyal et al., 2004). Until recently, farmers in the Lahaul Valley used night-soil for manure. It is becoming obsolete due to extensive usage of septic toilets and cheaply available chemical fertilisers to boost the yield of newly imported commercial crops (peas, potatoes, and hops). Human excrement is a resource because it provides plant nutrients and organic ingredients for agriculture (Holmqvist and Stenstrom, 2002). According to Wolgast (1993), an individual's annual faeces is equal to 250 kg of grain fertiliser. This is the annual grain need. A healthy person excretes 100–400 g faeces and 1–1.31 kg urine every day. N, P, and K are all vital nutrients for agricultural and horticulture crops (Narain, 2002). The nitrogen in urine is urea. The effect of night-soil compost on barley (Hordeum Vulgare L.) was studied in pots (Kirchmann and Pettersson, 1995) and in the field (Ki (Steineck et al., 1999; Richert Stintzing et al., 2002). According to Malkki and Heinonen-Tanski (1999), urine is rich in nitrogen, phosphate, and potassium. Urine nitrogen can be used in agriculture, say Kirchmann and Pettersson (1995). (2000). Nitrogen is absorbed by barley crops (Richert Stintzing et al., 2002). Singh claims that using urine as a fertiliser improved potato and chilli yields (2003). Human faeces as manure is safe for the ecosystem, say Danso et al.

Recycling human waste for nutrients and organic compounds makes agricultural uses safe (Andersson et al., 2016; Esrey, 2001). These systems may use a variety of sanitation techniques to promote slurry and manure utilisation (Sinha et al., 2017). However, the socio-cultural value system associated with reusing human excreta may hinder acceptance of ecological sanitation approaches (Andersson, 2015; Nawab et al., 2006; Simha et al., 2017).

Chemical fertilisers are used to increase soil fertility and agricultural output in locations where human excreta and urine are the best sources of nutrients (Is et. al., 2003; Winker et. al., 2009). In India, enhanced sanitary facilities have led to a modest increase in population proportion during the previous 25 years. However, while global sanitation penetration climbed from 53 to 67.5% between 1990 and 2015, India's only increased from 19 to 40 percent. (WHO, 2013). As a result, developing countries like India need to improve sanitation infrastructure. Ecological sanitation ideas can be used into development operations, improving sanitation as well as water and agriculture. Environmental sanitation has been promoted as a way to promote the recycling of manufactured (waste) resources. Human waste will be separated at the source (households) and rerouted to agricultural areas for use as crop fertiliser (Ganesapillai et al., 2015). For example, urinary dissection toilets are a beautiful way to separate unwanted components from helpful goods (nutrients) (pathogens, micro-pollutants, heavy metals). Similar benefits have been observed in South India with improved soil quality and lower costs (Simha et al. 2017). Often, sanitation systems are only partially examined. Excreta and sewage sludge are frequently restricted from emissions, transportation, and treatment (latrine or septic tank-based). Local economic opportunities, as well as waste resources like water, nitrogen, and biosolids, are ignored. Municipalities bear a heavy financial burden due to failures or ongoing solutions. septic tanks collect huge amounts of sewage and sewage sludge in developing countries' cities. Toilets, city-wide sewerage systems, and central wastewater treatment plants are common technologies in developed countries but ineffective in developing countries. Sludge collected by on-site sewage systems is frequently thrown untreated and unmanaged, creating major health hazards and environmental harm (SCBP, 2017). The sanitation system handles human waste from generation to disposal. The sanitation system also ensures that on-site faecal sludge is properly emptied and transported for processing or disposal. A sanitation system's ability to empty and transport faeces is crucial. Septic tank cleaning and sludge management are vital but frequently overlooked services. It is possible to improve the efficiency and safety of faecal sludge emptying and transportation. Service providers for faecal sludge emptying and transportation range from individuals to formal and major organisations. In some regions, public utilities or non-profits provide services, but in Uttar Pradesh, ULBs and the Uttar Pradesh Jal Nigam do so. Several service providers operate in the same area. This is due to the complexity and accessibility of on-site sanitation systems, as well as customer ability to pay. They come in various sizes and varieties to suit various demands. They usually hold 200-16,000 litres. Vacuum trucks can hold up to 55,000 litres of liquid. Automated tank emptying is a quick and effective way to empty on-site sanitation systems. It is also far safer

and healthier than manual emptying. Service providers must run the pump and move the hose, but not enter the technology or touch the faeces. However, vacuum trucks have technological constraints. Vacuum trucks can only suck down 2–3 metres. They must also be parked within 25 yards of the on-site sanitation technology. Particularly in unplanned and informal settlements, large cars are usually unable to access narrow streets. Vacuum trucks or other large vehicles with storage tanks can normally convey sludge directly to the treatment, utilisation, or disposal site. Due to the difficulty of transporting faecal sludge, most manual service providers either dump or bury it nearby, or put it in the local sewer system. Emptying on-site sanitation systems and handling faecal sludge might be hazardous. They must understand the need of wearing gloves, boots, protective gear, and masks when emptying the pit. Then wash your hands and body with soap. To improve access and air circulation, a slab or cover must be removed. Let the on-site sanitation technology vent for a few minutes before starting work. Gases including methane, ammonia, and sulphur dioxide can escape while new air enters. a pit with no harness and no safety rope. Two people should hold the rope that can be used to rescue a worker out of the pit if the pit walls collapse. Hand-held pumps were designed to boost manual emptying efficiency while protecting workers' health and safety. Machines for evacuating faeces use electricity, gasoline, or pneumatics (using pressurised air or gas). Vacuum pumps that are attached to a hose and lowered into water-based on-site sanitation technologies like pour flush latrines and septic tanks via an access cover work well to empty these systems. Less-expensive designs use a storage tank hooked up to a truck or trailer, or even human power. It is also necessary to carry faecal sludge safely. Manual (using human or animal power) and motorised (using electricity) emptying technologies (using a fuel-powered engine). Carriage by human or animal power is common among manual service providers. Vacuum trucks may also empty water-based devices like septic tanks and dump latrines. Depending on the technology, the sludge can become difficult to pump. In this case, diluting the faecal sludge with water helps it flow more smoothly. But this is inefficient and costly. In the absence of water, manual emptying may be the only choice.

Research Scope:

The literature review reveals a dearth of research findings and statistics on poor people having universal access to urban sanitation. Urban septage and faecal sludge management statistics are scarce in India. A lack of attention has been paid to eco- sanitation in India's smaller cities. We need a strategy that meets the basic standards, is acceptable and affordable for all areas and people, and takes into account local realities. Due to the importance of

sanitation on the national development agenda, this study is both policy and practical. The present study attempts to bridge the academic gap and enrich the contents in the subject of research. The study has been confined to the state of Uttar Pradesh, however, it focusses on small cities which are not covered in centralised sewerage system and thus, require scientific processes of collection, transportation, processing/ treatment and disposal of waste water including faecal sludge. The study highlights the present status of urban sanitation, its sustainability, faecal sludge management and suggesting a road map for improving sanitation conditions in urban centres.

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CHAPTER: 3
MATERIALS AND METHODOLOGY

Profile of Selected Cities:

In 2011, Uttar Pradesh had a population of 19.96 crore, with 15.51 crore residing in rural areas and 4.45 crore in urban areas, or 22.28 percent. About 16 percent of India's statutory towns are in Uttar Pradesh. On the other hand, there are 653 urban local bodies in Uttar Pradesh. Water supply, drainage, sewerage, and solid waste management are all stressed. According to the 2011 census, 34.04 percent of state toilets are piped, while 56.39 percent use septic tanks. Many toilets discharge into open drains, damaging the environment. We studied four cities/towns. These are Bahraich (Eastern Uttar Pradesh), Loni (Western Uttar Pradesh), Banda (Bundelkhand), and Mirzapur (Eastern Uttar Pradesh). Ghaghra lies in Bahraich, while Mirzapur (Ganga) and Banda (Ken) are river towns. AMRUT encompasses all Nagar Palika Parishads. Bahraich is in eastern Uttar Pradesh. In 2011, the town had 1,86,241 residents and 30,061 homes. The town has nine zones. Despite 87 percent toilet coverage, there is no sewerage infrastructure or sewage treatment facility. The waste created was calculated as 27 MLD. As a result, waste water and faecal sludge management infrastructure is lacking. Loni is a city in Ghaziabad district with 512296 inhabitants distributed into 14 zones. This area has 91,138 households. Coverage of latrines (individual or communal) was 99.94%, and sewerage network coverage was 5.10%. There is a 22.5 km sewer network and a 30 MLD sewer treatment facility with a 50% treatment efficiency. Banda is a rocky town in Bundelkhand. The city has 160473 residents, distributed into 31 wards and 28748 dwellings. SLIP reported 57.55 percent coverage of latrines under AMRUT. The sewerage network is 14.3 km long and covers barely 4% of the town. 11563 households will need septage management in 2021. Mirzapur is on the Ganga in eastern Uttar Pradesh. It has a population of 233691 and 35 wards. It is estimated that 34029 houses have latrines. Although sewage systems service roughly 40% of homes, the effectiveness of waste water collection is said to be less than 40%. The sewer network had a capacity of 18 million litres per day and was 240.4 km long. 16875 households will need septage management in 2021. Most ULBs in the state lack proper sewage and faecal sludge management. A system for desludging septic tanks and clearing sewer lines is in place, however there is no regular cleaning of septic tanks, and private operators only empty them when notified of overflows. They are self-contained and dump faeces in open drains, water bodies, and open areas because most septic tanks are not designed to scientific or industry standards, environmental degradation is more likely. Faecal sludge is not properly treated or

disposed of in the selected municipalities. This increases ground water contamination. As a result, proper septage and faecal sludge control is required. It would also be essential to set up and operate a sewage treatment plant in each of the nominated communities (Table 3.1).

Table 3.1
Sanitation Profile of Selected Cities

Particulars	Loni	Mirzapur	Bahraich	Banda
Population (Lakh,	5.12	2.33	1.86	1.60
Wards	55	35	31	31
Zones	14	12	9	6
Toilets Coverage	99.9%	77.8%	87.0%	57.5%
Sewer Network	22.5 km	14.87 km	NIL	14.3 km
Coverage of Sewerage Network	5.1	39.5	NIL	4.0
Waste Water Generation	36 MLD	27.2 MLD	27 MLD	20 MLD
STP Capacity	30 MLD	18 MLD	NIL	4 MLD

Source: SLIPs of Selected Cities

Profile of Bahraich:

The district is situated in the sub-Himalayan area, close to Nepal's northern border. The district covers 5237 square kilometres. During Census 2011, the entire population of Bahraich Nagar Palika Parishad was recorded to be 1.86 lakh. Bahraich has an 891 females to 1000 males' sex ratio and a literacy rate of 51.1 percent. Literacy is one of the most important social indicators used to assess a community's progress. It has an impact on various population dynamics. Bahraich Nagar Palika Parishad is in charge of a total of 30,460 households, to which it provides basic services such as water and sewerage. It also has the authority to construct roads within the Bahraich Nagar Palika Parishad's boundaries and levy taxes on properties that fall within its control. The city's current garbage generation rate is 65 MT/day. According to the 2001 census, 87.69% of homes had access to a toilet. However, according to the Nagar Palika Parishad, 89 percent of toilets are accessible. The city's toilet coverage was reported to be 57.69 percent. Nagar Palika has also built 16 public toilets, while SBM has built 652 individual household toilets and is now building 745 individual household toilets. In the city, there is no sewerage system. The previous sewer line has been decommissioned, and there is no sewer treatment system in place. The city produces approximately 27 MLD of waste

water. The Nagar Palika Parishad has suction equipment and has established a system for regularly emptying septic tanks. However, when septic tanks become clogged or overflow, residents request that the local government clean them. ULB charges Rs. 1000 for a one-time septic tank cleaning.

Private and state tube wells and borings with pump sets are used to develop ground water in the Bahraich district. Through diverse structures, the district's ground water development spans from 42.25 percent in Mihipurwa block to 68.30 percent in Chitaura block. Dug wells, bore wells, and state tube wells are used to develop ground water in all blocks of the district. In Bahraich, the only source of water is groundwater. Currently, 21 tube wells with a total discharge of 1000 lpm are operational. The water supply is 21 MLD, which equates to 106.59 LPCD with NRW, according to the 2011 census population. After chlorination, water is delivered. Water is delivered in the amount of 21 MLD, and the chlorination capability is acceptable. The current total water supply in Nagar Palika Parishad is 21 MLD, with a 7.6 ML elevated storage capacity. Water is delivered to users in the Nagar Palika Parishad by direct pumping and raised reservoirs. Total water demand in 2021 is 33.32 MLD for a population of 2,15,000 people, and storage demand is 33.32 MLD, however we presently have 7.6 MLD, leaving a 3.5 MLD storage capacity shortfall. The water supply distribution pipe line is 113 kilometres long. The overall length of the road is 249.41 kilometres. Pipe lines are not installed in 136.41 kilometres, and water supply coverage is not universal.

Because the ULB only has 163 regular staff, it relies on contracting and outsourcing for sanitation. However, the city has implemented door-to-door rubbish collection in most of the wards, and sanitary conditions have been judged to be satisfactory. The city has enough sanitary equipment to keep the streets clear and swept on a regular basis. The city, on the other hand, requires compactors and additional community trash cans. Because the city lacks a centralised sewerage infrastructure, there is a lot of room for a faecal sludge management treatment plant. There is no suitable plan in place for safely disposing of sludge after septic tanks have been desludged. As a result of the dumping of faecal sludge and other pollutants, aquatic bodies are being polluted. There is no suitable location for the safe disposal of solid trash, so rubbish is deposited beside roads near water bodies and drains.

Banda's Profile:

Banda is a town in Bundelkhand, situated in south of the Yamuna river. The town is well connected to major cities by rail and transportation. Banda is connected to Jhansi and

Allahabad by National Highway 76. State Highway 92 connects Banda with Fatehpur. State Highway 76 connects Allahabad. Kanpur is reached by NH 86, with train links to all major cities including Kolkata, Delhi, Mumbai, Lucknow, Bhopal and Varanasi. Currently, the city has 20,045 households, compared to only 18,500 in 2001. While the total slum population was 9,290 in 2001, it grew to 12,380 in 2011, showing that poor individuals from nearby rural districts including Mahoba, Mawai, Kanwara, and Palri sought work in Banda. In 2011, the city had 2185 notified slum houses. According to the 2011 India census, Banda has 1,60,482 residents, with males making up 53% and females 47%. During 2001-11, the city's population grew by about 20 percent, making it one of the fastest growing in India. Currently, the city has 20,045 households, compared to only 18,500 in 2001. The average family size has shrunk from 6.5 to 5.6 over the decade. The city has 31 wards.

Due to development and a large influx of people in the region, solid waste management is a key concern in NPP Banda. NPP Banda is currently in charge of solid waste collection, transportation, and disposal within the NPP Banda boundaries. Based on the city's population, it's projected that the city produces about 0.7 MT of solid trash every day. Street sweepers collect trash from the streets and move it to a central location. NPP Banda only has one truck, one dumper placer, three tractor trailers, one garbage compactor, two small Turks, and two auto tippers to transport waste to the disposal site. The auto tipper is a vehicle that travels around the city collecting rubbish on a daily basis. There is currently no trash treatment facility in the city, and waste is discarded at random in low-lying regions or along the side of the road. Current trash disposal techniques in low-lying terrain, sewers, rivers, and aquatic bodies are contaminating ground water and posing a health risk. Banda generates approximately 21.7 metric tonnes of solid trash every month. The city's collecting efficiency is 100 percent. A solid waste dumping site is located 10 kilometres outside of Banda.

There are 16000 flush toilets and 7 communal toilets in Banda. So, out of a total of 20,045 houses, 16000 (79.8 percent) had access to restrooms. Nearly 76 percent of the business sector lacks toilets. Only 14.29 kilometres of sewerage infrastructure exist in the city at this time. In the city, there is no separate sewerage system. The city's total road length is 254.80 kilometres. In the city, there is only one STP. However, the STP is currently not operational due to a variety of factors, despite its overall capacity of 4 MLD. In the city, there is currently no decentralised waste treatment system. The city's total sewer generation is 16.0 MLD. For the year 2017, the Swatch Baharat Mission aims to install 4068 private household toilets, 108 community toilet seats, and 123 public toilet seats (Table 3.2).

Table: 3.2
Existing Sewerage and Septage Scenario

Existing Sewerage & Septage Scenario	
Sewer Network	*14.29 Km*
Road Length	*254.80 km*
Coverage of Sewerage Network	*5.81%*
Existence of STP	*one*
Treatment Capacity of STP	*4 MLD.*
Percentage . Of HHs With Latrines	*13377*
Waste Water Generated	*16.0 MLD.*

Source: Nagar Palika Parishad, Banda

Because the city currently lacks a sewerage system, no offsite water treatment is possible. Many families in P Banda use septic tanks and soak pits to dispose of their black water (from toilets). Grey water from kitchens and bathrooms goes into open drains untreated. The number of homes with septic tanks is unclear at this time. It is also collecting data on the number of toilet seats and wastewater disposal systems in Banda City. According to a JT Urja survey, most homes use septic tanks with soak pits or septic tanks alone. People in the neighbourhood noticed that most people design septic tanks based on space rather than CPHEEO requirements. The city has no sewage management system. Because Banda City lacks adequate infrastructure for septage control, most septic tank overflow is deposited straight into open drains. Tank sludge is also poured into sewers untreated. Unplanned development activity causes poor waste management planning. Almost 64% of the city's population has access to piped water, with 122 lpcd per person. Water comes from the adjacent Ken River and local underground water. Banda's water supply is managed by Irrigation and Public Health Department (I&PH) and Nagar Palika Parishad Banda. For domestic and commercial connections, NPP Banda is in charge of water distribution and pumping, while I &PH is in charge of bulk water treatment. City raw water comes primarily from the surface. This network is 207.65 km long. The city contains 20 tube wells, however water is scarce in the summer (Figure 3.3)

Table: 3.3
Existing Water Supply Scenario

Existing Scenario of Water Supply	
Supply of Water	*109 LPCD*
Tap Water Connection	*16243*
Coverage	*57.0 %*
Tube Well	*20*
Discharge from Tubewells 300 Lpm	*3.5 MLD*
Total Capacity	*17.5 MLD*
Water Supply	*109 LPCD*
Water Treatment Capacity	*17.5 ML*

Total OHT	*06 Nos.*
Storage of OHT Capacity	*13.74 ML.*
Water Reservoir	*07 Nos.*
Storage Capacity	*4.56 ML*
Storage of OHT Capacity	*13.74 ML.*
Length of Distribution Network	*207.65 Kms*
Total NRW	*50%.*

Source: Nagar Palika Parishad, Banda

NPP, Banda is currently in charge of solid waste collection, transportation, and disposal within the NPP, Banda boundaries. Based on the city's population, it's projected that the city produces about 0.7 MT of solid trash every day. Street sweepers collect trash from the streets and move it to a central location. The auto tipper travels around the city collecting rubbish on a regular basis in order to transport it to the disposal site. There is currently no trash treatment facility in the city, and waste is discarded at random in low-lying regions or along the side of the road. Current trash disposal techniques in low-lying terrain, sewers, rivers, and aquatic bodies are contaminating ground water and posing a health risk. Household garbage, business waste, biomedical waste, and industrial waste are all created in the city. The city generates roughly 21.7 MT of solid trash each month, which equates to about 150 grammes per capita per day. The city is divided into wards/circles for the purpose of solid waste management. A Sanitary Inspector is in charge of each ward/circle. Primary waste collection refers to rubbish collection from residents' homes or waste collection in communal waste containers by sanitary employees or residents themselves. In practically the entire city, there is no coordinated system for waste collection from door to door. Community bins are likewise not readily available in handy locations for waste disposal. Waste from households, restaurants, and shops is dumped on the side of the roads/streets or thrown into nallahs, open drains, and open spaces, among other places. It was also discovered that the area around the DP containers or dustbins is unsanitary and unsightly because most people do not properly dispose of their garbage within the container or waste home. Although the Nagar Palika Parishad has enough sanitary infrastructure, the city lacks a scientific land fill location.

Sanitation operations require a substantial amount of people, particularly sanitation workers and safai karamcharis, with the majority of them working on a contract basis (temporary basis). The majority of these workers are uneducated and unskilled. Low levels of awareness, commitment, and discipline, as well as resource

diversion, absenteeism, and other issues, have all been reported among these workers. Furthermore, sanitation employees are exposed to a variety of disease vectors at various phases of waste processing due to the nature of their employment. As a result of their excessive exposure, their morbidity rate is frequently high, resulting in low productivity as well as a high mortality rate. To address these challenges, it is suggested that NPP, Banda dedicate necessary resources to guarantee effective people management and health and safety actions. These interventions include a variety of short-term training courses held on a regular basis throughout the year for all levels of sanitation workers on the significance and importance of their work to the city, how to deal with issues of alcoholism and drug addiction, occupational health and safety, personal health protection, and other topics.

Profile of Mirzapur:

Mirzapur is a district in southern Uttar Pradesh. It is bordered by Varanasi and Sant Ravidas Nagar to the north, Allahabad to the west, and Sonebhadra and Madhya Pradesh to the south. The district is 64 km east-west and 32 km north-south. The Ganges has been the city's life. It encircles the city to the north. The river Ojhala runs through the city. It meets Ganges from the south. This is impassable. Vindhyachal's Vindhyavasini temple is famous. Vindhyachal Dham is a sacred site in India. Located between the holy cities of Prayag and Kashi. On the Ganga's bank stands the Vindhyavasini Devi Temple. The district has numerous Ghats with old sculptures. Vindhyachal is a Nagar Palika Parishad city in Mirzapur district, Uttar Pradesh. Mirzapur-cum-Vindhyachal has 35 wards with five-year elections. A population of 234,871 people, 125,601 males and 109,270 females, was recorded in the 2011 Census of India. The city is run by Nagar Palika Parishad.

Mirzapur has a 10-acre location for its 100 tonnes of garbage every day, around 8 miles from town. However, the site is steeply gullied, eroded, and low-lying, with soft, porous soil that allows leachate to quickly contaminate the groundwater and nearby wells. Land filling of rejects will necessitate costly lining (compacted clay or 1/4-inch thick plastic) and rock soling to support truck traffic. Due to the site's low-lying location at the valley's bottom, extensive pipe and pumping solutions will be necessary. Soil contamination can occur even if the site is levelled.Status of sewerage network and service levels is shown in Table 3.4 As per information available from Nagar Palika Parishad, sewerage network is existing 14.87 km. Covering the

households of 39.46 per cent. The coverage of sewerage services was recorded high in Vindhyachal (29 per cent) as against 10.46 per cent in Mirzapur city. There is gap of 22.19 per cent in the coverage of toilets, 60.54 per cent in sewerage network services and 60.54 per cent in efficiency of collection of sewerage. A total of 270 km. Sewer length has been proposed to be laid in Mirzapur. As per AMRUT, Rs. 100 crores investment has been proposed under sewerage and septage management in the city during the period of 2015-16 – 2019-20.

Table: 3.4
Status of Sewerage Network And Service Levels

Sr. No.	Indicators	Existing Service Level	MOUD Benchmark	Reliability
1	Coverage Of Toilets	77.81%	100%	D
2	Sewerage Network	39.46	100%	A
3	Collection Efficiency Of Sewerage	39.46	100%	D
4	Treatment Efficiency of Sewerage	40%	100%	A

Source: SLIP, Sewerage under AMRUT, Mirzapur Nagar Palika Parishad.

In Mirzapur, the sewer network is 14.87 km long, with 39.46 percent of homes linked, whereas in Vindhyachal, the sewer network coverage is 10.46 percent. So most toilets are septic tank connected. The town has 6 suction machines for suction machine clearance. The city has 5 percent sewerage network. About 91.12 percent of homes have septic tanks. Table 3.5 shows sewage treatment system. The city currently generates 30 MLD waste water and it is expected to reach by 50 MLD by 2015. Mirzapur has two STPs. A 4 MLD STP is located in Vindhyachal, while a 14 MLD STP using UASB technology is located in Mirzapur.

Table: 3.5
Sewerage Treatment System

Sr. No.	Location	Capacity (MLD)	Inflow in the STP (MLD)	Efficiency in %
1	Mirzapur city	**14**	**14**	**100**
2	Vindhyachal	**4**	**4**	**100**
	Total	**18**	**18**	**100**

Source: SLIP, Sewerage under AMRUT, Mirzapur Nagar Palika Parishad.

In Nagar Palika Paris had, there is no decentralized waste treatment system exists. Sewerage generated in city-27.24 MLD Reaches to STP through drainage system. There is septic tank dependency in the towns as sewerage network is inadequate. Presently, water production in city has been reported to be 28.8 MLD. Out of which 21.8 MLD water production has been from ground water while 7 MLD water production has been from surface water

source. There are 1511 hand pumps and 62 power bores with pump sets. Coverage of water supply connections has been reported to be 59 per cent. Thus, there is gap of 41 per cent. Overall, water distribution pipe line was reported 355 kms in the city.

There are 1156 persons employed in Nagar Palika and most of them were on contractual and outsourcing staff. There is huge gap of sanctioned and actual posts, highlighting the large number of vacancies in non-centralized services cadre. Mirzapur- Vindhyachal is historical city with cultural importance; however, sanitation conditions are not good. There is imperative need to widen the coverage of toilets in Vindhachal region while sewerage connections and widening of sewer network as proposed under AMRUT has to be accelerated. Regular cleaning of public and community toilets is also needed. In order to curb the problem of open defecation in Vidhyachal, it is suggested to construct more community toilets. The community mobilization through IEC is also required to encourage public for construction and use of individual household toilets.

Profile of Loni:

Loni is a town in Ghaziabad district, Uttar Pradesh, India. There are three ways to go to Loni. In addition to Delhi and NOIDA, Loni is well connected to Bulandshahar Meerut Saharanpur Haridwar. Many individuals commute daily to Delhi, Noida, Greater Noida, and Gurgaon. This community has grown rapidly in recent decades. Due to its proximity to Delhi, this town has seen an unprecedented surge in population. Others have moved from Delhi. In 2011, Loni Nagar Palika Parishad had a population of 5,12,296. The population of Loni Nagar Palika Parishad was 3,10,328 in 2001 and 5,12,296 in 2011. Thus, from 2001 and 2011, there was a net addition of 2,01,968 people, or around 65%.

The main source of water is underground. NPPL has 45 tube wells with a daily capacity of 45 Million Litres (MLD). Currently, the storage capacity cannot match the city's water needs. Loni relies on groundwater because there is none. The city has 14 water supply zones. Sixty-one kilometres of the water supply distribution network are covered, with the remaining 156 kms projected to be covered by 2021. UP Jal Nigam plans, designs, and builds water projects. Nagar Palika is in charge of operations and maintenance. Loni plans to minimise NRW through modernising systems. Loni's key goals are to extend universal coverage, regularise unlawful connections, expand coverage area by building new pipeline, raise per capita water supply, improve water quality, and increase collection efficiency. Loni manages all new projects.

NPPL has a project plan to improve water services. The project will be funded 50% by the GOI under the AMRUT initiative and 50% by the UP state government.

The city's sewerage infrastructure is poorly covered and serviced. Only 5.10 percent of the city's sewerage network is directly connected to municipal sewerage. Currently, sewerage and drainage systems are intertwined. There is no systematic way to collect and treat septic waste. Some city dwellers link their septic tanks to drains. Small to medium sized private vehicles with suction pumps and tankers to clean sewage tanks on demand. No decentralised waste treatment system in Nagar Palika. It also contains a jetting equipment for septic tank cleaning. Project Manager, Yamuna Pollution Control Unit operates the sewerage. Because of the large territory under its authority; solid waste management is a crucial concern in Loni. Based on the city's population, it is projected that the city creates roughly 222 TPD of solid waste every day, or.31kg/capita/day of garbage. Nagar Palika is only capable of clearing 6 MT of rubbish with the vehicles it has on hand and the employees it has hired for the job. In Loni city, the total estimated wastewater output was reported to be 36 MLD. The city has a septic tank connection system at the household level, as well as a 22.5-kilometer collection network. The waste water overflows from the septic tanks mix with the drain water, contaminating the ground water. Because the installed sewerage system is not accessible by the public, no offsite water treatment is possible. Many families in Loni utilise septic tanks and soak pits to dispose of their black water (from toilets). Grey water from kitchens and bathrooms is untreated and released into open drains. The number of families using a septic tank for wastewater disposal or the coverage of septic tanks in homes and slums is unknown at this time.

The river Yamuna is flowing at a distance of approximately 5 kms from Loni town. The quality of water of this river is not fit for human consumption and it requires costly head works, complete and comprehensive treatment and lengthy rising main. Moreover, the flow available in this river is not adequate round the year. In comparison, the quality of ground water in and around Loni town is good enough for human consumption and the tube wells are quite successful in the area. Thus, drawing ground water from tube wells is the only alternative as the reliable source of water. At present, there are 4 no. water supply zones, but the distribution of water in the town is inequitable and proper pressure is not maintained in many areas. Moreover, the existing water supply system is catering to the needs of vary small population and area of the town. Therefore, rezoning of the water supply arrangements has been done on city level. The city has 79 MLD water demand however, 75 MLD water is being supplied.

Within its jurisdiction, the Nagar Palika is in charge of delivering basic infrastructural services as well as other civic functions. Aside from NPP, a number of state-level agencies are involved in city planning and service provision. NPP, like the other ULBs in Uttar Pradesh, is in charge of providing basic infrastructure and other civic services within its boundaries. Aside from NPP, a number of state-level agencies are involved in city planning and service provision. The Nagar Palika has a severe manpower shortage and must rely on outsourcing and contract workers for cleanliness. The city generates 36 MLD of waste water, although it has a treatment capacity of 30 MLD. The Nagar Palika is approximately 22 kilometres long. 5 percent of the population is served by a sewer network. There are two STP plants, but neither of them is functioning properly. Thus, decentralized approaches of waste water management are called for. The drainage system has been found in poor shape as Department of Forest has not allowed concrete construction of drains in certain areas. The dairy industries and other household industrial units also causing pollution as animal dung and industrial waste is being thrown into open drains.

FSSM Plan:

There are huge gaps in management of septage and faecal sludge in the selected cities of the state. Table 3.6 depicts the FSSM gaps in the cities.

Table 3.6
FSM Gap Identification and Faecal Sludge Quantification

Particulars	Unit	Bahraich	Banda	Loni	Mirzapur
Population 2011	**Persons**	**1,86,000**	**1,60,000**	**5,12,000**	**2,33,000**
Population not covered under Sewerage Network	%	100	96	60.5	94.9
Decadal Growth rate (U.P. Urban)	%	28.76	28.76	28.76	28.76
Projected Population 2041 considering design period = 20 years for FSTP from 2021	Persons	7,18,481	6,18,048	19,77,754	9,00,032
Population for which FSTP required	Persons	7,18,481	5,93,326	11,96,541	8,54,131
Floating Population (5% of resident Population)	Persons	35,924	29,666	59,827	42,707

Total Population for which FSTP required	Persons	7,54,405	6,22,992	12,56,368	8,96,837
Total Sludge Accumulation per day (considering 0.00021 KLD per capita sludge accumulation rate in containment units as per CHPEEO plus 5% by non-residential properties)	KLD or m3	166	137	277	198
No. of FSTPs (Each of 32 KLD capacity) required	No.	5	4	9	6

Area requirement of Faecal Sludge Treatment Plant (FSTP) with the capacity of 32 KLD is shown in table 3.7.

Table 3.7
Area Requirement for Proposed FSTP
(1 Unit of 32 KLD Capacity)

Sl. No.	Modules	Nos	Area (sq.m)	Total Area (sq.m)
1	Screening and Grit Chamber	4	5.87	23.48
2	Stabilization Reactor	4	70.60	282.4
3	Sludge Drying Bed	48	47.5	2280
4	Settler + AF + CT	1	61.44	61.44
5	Vertical Planted Gravel Filter	1	117.4	117.4
Total area for treatment modules				**2764.72**
Total area for supporting structures				**6275.28**
Total FSTP Area				**9040 m^2**

Chart 3.1

Layout of FSTP of 1 Unit of 32 KLD Capacity

The estimated Operation and Maintenance cost of the proposed unit of FSTP is shown in table 3. 8.

Table 3.8
Estimated O&M Cost for 1 Unit of FSTP of 32 KLD Capacity

SI. No.	O&M Costing -FSTP, 1 Unit of 32 KLD Capacity					
1	**Man power(A)**	**Quantity**	**Rate/ salary (Rs.)**	**Monthly cost (Rs.)**	**Total Cost (Rs.)**	**Total cost/year (Rs.)**
a	Cost Incurred for an Operator	2	12,000	24,000	2,88,000	2,88,000
b	Cost Incurred for labours	3	7,000	21,000	2,52,000	2,52,000
	Subtotal(A)				5,40,000	**5,40,000**
2	**Maintenance Activities(B)**	**Frequency**		**Remarks**		
a	Periodic maintenance of pumps (repairs and replacements) for 7 pumps	regular maintenance		0.55% of the total construction cost	1,90,637	1,90,637
b	Sand replacement in SDB			based on BOQ	2,25,460	1,12,730
c	Maintenance of integrated settler AF				18,717	18,717
d	Replacement of AF filter materials				45,060	15,020
e	Replacement of screens in Screening chamber			based on BOQ	8,000	2,667
f	Replacement of sand and carbon filter materials in Pressurized sand carbon filter	once in 2 years		based on actuals	50,000	25,000
g	Replacement of UV lamps			based on actuals	1,50,000	75,000
h	Diesel and other oil for generator and tiller			see Note 1	6,12,000	6,12,000

i	Regular maintenance for tiller and generator			0.13% of the total constructi on cost	45,060	45,060
j	Replacement of SDB roof sheets			based on BOQ and quotation	22,82,944	4,56,589
k	Land scaping maintenance			Lumpsum	30,000	30,000
l	Miscellaneous cost			0.27% of the constructi on cost	93,585	93,585
	Total (B)				36,27,878	**16,77,005**
3	**Power Consumption (C)**	**Total KwH /Day**	**Rate/ KWH**	**Cost for power consumpt ion /Month**	**Cost / year**	
a	Power Consumption in entire plant	27	6.5	5,265	63,180	63,180
	Total cost for power consumption/year (C)					**63,180**
GST 18%((A+B+C) x18%) =D						4,10,433
	Total O&M cost(A+B+C+D)					**26,90,618**
Note 1	Consumption of diesel by generator(7.5KvA)- 7 lts/hour; Assuming there is power cut for 3 hours a day; Consumption for a year= 7600 lts.					
	Tiller- consumes at least 2 liters of diesel per hour; no of running hours: 3 hours/day; consumption in a year= 2200 lts; Change of oil in generator and tiller: Rs.6000/ 3months; Rs.24000/year					

The estimated cost of FSTP is shown in table 3.9.

Table 3.9
Estimated Total Cost of FSTPs in 4 Cities

Description	Bahraich		Banda		Loni		Mirzapur	
	Nos	Cost in Rs.	Nos	Cost in Rs.	Nos	Cost in Rs.	Nos	Cost in Rs.
Grand Total for Capital Cost	5	21,62,16,645	4	17,85,53,101	9	36,00,82,086	6	25,70,38,580
Grand Total for O&M Cost/year		1,39,86,696		1,15,50,304		2,32,93,112		1,66,27,399

The selected cities have vast potential for setting up FSTPs as sewerage treatment facility is found to be grossly inadequate. Mirzapur- Vindhyachal has sewerage treatment facility, however, coverage of population under the facility is found to be low. Similarly, in Loni, the STP is reported to be non- functional ever since its establishment. The cost of FSTP is found to be much lower than the cost of STP, hence it is suggested that local governments should opt for FSTPs.

Need of Study:

Sanitation is vital to human growth and a civilised existence. Sanitation is linked to the environment because it raises the risk of water-borne illnesses. Because centralised sewerage systems are only found in larger cities, urban sewer coverage is minimal. As a result, most urban Indians use private septic tanks. As a result, increasing basic urban services including water, sanitation, drainage, and solid waste disposal in slums requires building infrastructure and enhancing basic urban services. Affordable and adequate sanitation for the urban poor is also required. The lack of a sewage network, inadequate wastewater treatment plant performance, and poor sanitation service delivery in metropolitan areas all contribute to poor sanitation conditions. All three are interconnected. Unsafe drinking water, poor environmental sanitation, and poor personal and nutritional hygiene all enhance disease spread. As a result, India is worried about waterborne infections. Sanitation currently encompasses waste management, food and personal hygiene, and environmental hygiene. It promotes both individual and collective health. Human excreta and waste water are handled in a manner that respects users' privacy and dignity while simultaneously providing a clean and healthy living environment. Sewage and solid waste management should be part of the sanitation

infrastructure. On expects the study to benefit the urban community by teaching them proper cleanliness and waste water disposal.

Hypothesis of Study:

The present study has been conducted keeping in view of the following hypotheses:

- *The outreach and accessibility of sanitation services vary across the states, regions, cities and population strata;*
- *Urban environment, built up environment, morphology, living patters affect the sanitation conditions;*
- *Urban local governments lack proper and adequate infrastructure and facilities for providing sanitation services;*
- *The community is not aware and sensitized for construction of scientific septic tanks their regular desludging and safe disposal of faecal sludge;*
- *The urban local governments lack regulation, proper system for desludging and treatment of faecal sludge and its safe disposal ;*
- *The sludge operators dispose off faecal sludge in open environment without proper treatment and thus, leading to environment pollution and health hazards.*

Methodology:

The present study is empirical in nature and based on mainly primary data collected through field survey. Besides, the study has been analytical in its approach as it envisages critical review of the pertinent literature on waste water management, seepage and faecal sludge management.

Coverage:

The field survey has been conducted in 4 cities/ towns viz. **Mirzapur, Bahraich , Banda and Loni , in Uttar Pradesh** . Mirzapur is situated at the bank of river Ganga while Banda is situated at the bank of river Kane. Loni (Ghaziabad) and Bahraich cities are located in plain areas where river Yamuna and Saryu, respectively, pass nearby. All the cities are managed by Nagar Palika Parishads. The study will include survey of urban households, sanitary workers and sludge operators, and municipal officials.

Data Collection:

The study has covered urban households, municipal officials and sludge operators in each selected city in order to examine the septage and faecal sludge management at the household level. The sample comprises about 609 urban households, 51 municipal official and 12 sludge operators/ sanitary workers in all the selected cities. In order to conduct household survey, the cities were divided into various zones and wards. Moreover, the households were divided on the basis of their dependence on sewerage system such as sewer system, septic tanks, and other system including households connecting their toilets directly to drains or using community toilets. Accordingly, the population strata was developed and proportionate stratified sampling has been ensured in order to select samples of households in each city of the state. The selection of households has been based on stratified random sampling procedure, representing the major zones / wards of the cities. In-depth interview were conducted with the key stakeholders, including people's representatives of ULBs, (Councillors), municipal officials, private and government sludge operators, contractors, and representatives of Resident Welfare Associations, NGOs, and community based organizations.

Data Analysis:

The filled in interview schedules were thoroughly checked and processed through use of SPSS package while data has been tabulated with the help of relevant statistical tools. The primary and secondary data has been analyzed, interpreted and discussed besides critical appreciation of pertinent literature. The policy measures are based on analysis of data and review of literature.

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CHAPTER: 4
ANALYSIS OF FIELD DATA

Sanitation is an essential part of human development and a healthy, civilized life. Sanitation is linked to the environment because it reduces the incidence of water-borne infections, which leads to poor health. Larger cities have sewer systems, thus they only service a tiny percentage of the urban population. As a result, many Indian cities still use individual septic tanks. As a result, improving essential urban services like water, sanitation, drainage, and garbage disposal in slums is critical. It is also necessary to provide adequate sanitary facilities for the urban poor. The lack of a sewage network, poor functioning of sewerage treatment facilities and poor delivery of sanitation services in metropolitan areas make most towns and cities unsanitary. In the absence of facilities, many slum dwellers defecate in public. Table 4.1 shows respondents' gender. The bulk of responses were men. In Mirzapur and Loni, most responses were female.

Table: 4.1
Gender of Respondents

City	Male	Female	Total
Mirzapur	121	36	157
	77.1%	22.9%	100.0%
Loni	120	31	151
	79.5%	20.5%	100.0%
Banda	120	29	149
	80.5%	19.5%	100.0%
Bahraich	142	10	152
	93.4%	6.6%	100.0%
Total	**503**	**106**	**609**
	82.6%	**17.4%**	**100.0%**

Source: Field Survey

Religion of respondents is shown in Table 4.2. Majority of respondents were Hindus. However, more than half of the respondents in Bahraich and slightly less than 1/4th respondents in Loni were Muslims.

Table: 4.2
Religion of Respondents

City	Hindu	Muslim	Christian	Sikh	Jain	Total
Mirzapur	130	26	0	1	0	157
	82.8%	16.6%	0.0%	0.6%	0.0%	100.0%
Loni	115	36	0	0	0	151
	76.2%	23.8%	0.0%	0.0%	0.0%	100.0%
Banda	119	28	1	0	1	149
	79.9%	18.8%	0.7%	0.0%	0.7%	100.0%
Bahraich	65	84	0	0	3	152
	42.8%	55.3%	0.0%	0.0%	2.0%	100.0%
Total	**429**	**174**	**1**	**1**	**4**	**609**
	70.4%	**28.6%**	**0.2%**	**0.2%**	**0.7%**	**100.0%**

Source: Field Survey

Caste of respondents is shown in Table 4.3. Slightly less than 1/3rd respondents were from General Caste while respondents from OBCs, SCs and STs were reported to be about 2/5th. Thus, about 1/4th respondents were from minority communities.

Table: 4.3
Caste of Respondents

City	General	OBC	SC	ST	Minority Community	Total
Mirzapur	38	75	6	19	19	157
	24.2%	47.8%	3.8%	12.1%	12.1%	100.0%
Loni	56	39	33	0	23	151
	37.1%	25.8%	21.9%	0.0%	15.2%	100.0%
Banda	56	49	19	0	25	149
	37.6%	32.9%	12.8%	0.0%	16.8%	100.0%
Bahraich	42	20	6	0	84	152
	27.6%	13.2%	3.9%	0.0%	55.3%	100.0%
Total	**192**	**183**	**64**	**19**	**151**	**609**
	31.5%	**30.0%**	**10.5%**	**3.1%**	**24.8%**	**100.0%**

Source: Field Survey

Class of respondents is shown in Table 4.4. About 60 per cent respondents were from upper and middle class while respondents from lower class and poor/ marginalized class were about 2/5th.

Table: 4.4
Class of Respondents

City	Upper Class	Middle Class	Lower Class	Poor and Marginalized	Total
Mirzapur	4	81	71	1	157
	2.5%	51.6%	45.2%	0.6%	100.0%
Loni	11	101	37	2	151
	7.3%	66.9%	24.5%	1.3%	100.0%
Banda	6	50	83	10	149
	4.0%	33.6%	55.7%	6.7%	100.0%
Bahraich	9	101	36	6	152
	5.9%	66.4%	23.7%	3.9%	100.0%
Total	**30**	**333**	**227**	**19**	**609**
	4.9%	**54.7%**	**37.3%**	**3.1%**	**100.0%**

Source: Field Survey

Age of respondents is shown in Table 4.5. About 1/4th respondents were from the age group of less than 35 years. About 30 per cent respondents were from the age group of 35-45 years while slightly more than 1/4th respondents were from the age group of 45-55 years. Thus, about 18 per cent respondents were from age group of 55 years and above.

Table: 4.5
Age of Respondents

City	Less Than 25 Years	25-35 Years	35-45 Years	45-55 Years	55 Years and Above	Total
Mirzapur	3	40	53	45	16	157
	1.9%	25.5%	33.8%	28.7%	10.2%	100.0%
Loni	8	24	42	56	21	151
	5.3%	15.9%	27.8%	37.1%	13.9%	100.0%
Banda	22	31	37	29	30	149
	14.8%	20.8%	24.8%	19.5%	20.1%	100.0%
Bahraich	10	20	52	27	43	152
	6.6%	13.2%	34.2%	17.8%	28.3%	100.0%
Total	**43**	**115**	**184**	**157**	**110**	**609**
	7.1%	**18.9%**	**30.2%**	**25.8%**	**18.1%**	**100.0%**

Source: Field Survey

Education of respondents is shown in Table 4.6. About 1/4th respondents were either illiterate or literate while more than 1/4th respondents had primary to junior high school level education. About 1/4th respondents were graduates and postgraduates while about 1/4th respondents were high school and intermediate class.

Table: 4.6
Education of Respondents

City	Illiterate	Literate	Primary	Junior High School	High School	Intermediate	Graduation	Post-Graduation	Others	Total
Mirzapur	39	17	41	28	8	12	12	0	0	157
	24.8%	10.8%	26.1%	17.8%	5.1%	7.6%	7.6%	0.0%	0.0%	100.0%
Loni	15	13	16	28	24	24	29	1	1	151
	9.9%	8.6%	10.6%	18.5%	15.9%	15.9%	19.2%	0.7%	0.7%	100.0%
Banda	24	4	7	18	19	14	43	20	0	149
	16.1%	2.7%	4.7%	12.1%	12.8%	9.4%	28.9%	13.4%	0.0%	100.0%
Bahraich	32	3	17	11	22	20	20	24	3	152
	21.1%	2.0%	11.2%	7.2%	14.5%	13.2%	13.2%	15.8%	2.0%	100.0%
Total	**110**	**37**	**81**	**85**	**73**	**70**	**104**	**45**	**4**	**609**
	18.1%	**6.1%**	**13.3%**	**14.0%**	**12.0%**	**11.5%**	**17.1%**	**7.4%**	**0.7%**	**100.0%**

Source: Field Survey

Type of family of respondents is shown in Table 4.7. About 59 per cent respondents were from joint families while about 2/5th respondents were from nuclear families. The proportion of respondents from nuclear families was recorded high in Mirzapur followed by Loni.

Table: 4.7
Type of Family of Respondents

City	Nuclear Family	Joint Family	Extended Family	Total
Mirzapur	94	63	0	157
	59.9%	40.1%	0.0%	100.0%
Loni	78	73	0	151
	51.7%	48.3%	0.0%	100.0%
Banda	21	127	1	149
	14.1%	85.2%	0.7%	100.0%
Bahraich	53	96	3	152
	34.9%	63.2%	2.0%	100.0%
Total	**246**	**359**	**4**	**609**
	40.4%	**58.9%**	**0.7%**	**100.0%**

Source: Field Survey

Family occupation of respondents is shown in Table 4.8. About 20 per cent respondents reported that their main family occupation is private and government service while about 2/5th respondents reported their family occupation as petty business, self-business and shop. About 1/3rd respondents reported that their main family occupation is labour. It was found more pronouncing in Banda followed by Mirzapur.

Table: 4.8
Family Occupation of Respondents

City	Government Job	Private Job	Petty Business	Labour	Self-Business	Shop	Others	Total
Mirzapur	4	17	29	64	30	10	3	157
	2.5%	10.8%	18.5%	40.8%	19.1%	6.4%	1.9%	100.0%
Loni	18	26	19	26	41	13	8	151
	11.9%	17.2%	12.6%	17.2%	27.2%	8.6%	5.3%	100.0%
Banda	10	8	25	70	2	13	21	149
	6.7%	5.4%	16.8%	47.0%	1.3%	8.7%	14.1%	100.0%
Bahraich	18	19	5	42	31	21	16	152
	11.8%	12.5%	3.3%	27.6%	20.4%	13.8%	10.5%	100.0%
Total	**50**	**70**	**78**	**202**	**104**	**57**	**48**	**609**
	8.2%	**11.5%**	**12.8%**	**33.2%**	**17.1%**	**9.4%**	**7.9%**	**100.0%**

Source: Field Survey

Annual family income of respondents is shown in Table 4.9. The overwhelming majority of respondents reported that their annual family income is less than Rs. 50,000. However, a significant proportion of respondents in Loni were from higher income group i.e. more than 50,000.

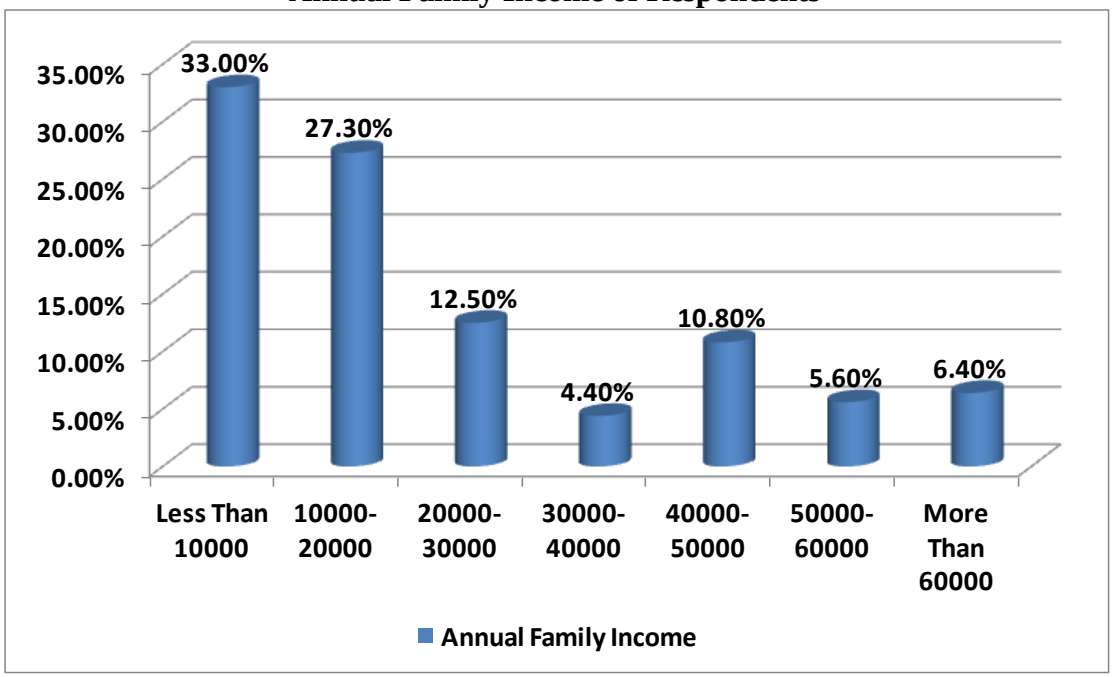
Table: 4.9
Annual Family Income of Respondents

(Rs.)

City	Less Than 10000	10000-20000	20000-30000	30000-40000	40000-50000	50000-60000	More Than 60000	Total
Mirzapur	44	41	35	5	15	9	8	157
	28.0%	26.1%	22.3%	3.2%	9.6%	5.7%	5.1%	100.0%
Loni	23	17	8	11	45	20	27	151
	15.2%	11.3%	5.3%	7.3%	29.8%	13.2%	17.9%	100.0%
Banda	96	31	14	3	3	0	2	149
	64.4%	20.8%	9.4%	2.0%	2.0%	0.0%	1.3%	100.0%
Bahraich	38	77	19	8	3	5	2	152
	25.0%	50.7%	12.5%	5.3%	2.0%	3.3%	1.3%	100.0%
Total	**201**	**166**	**76**	**27**	**66**	**34**	**39**	**609**
	33.0%	**27.3%**	**12.5%**	**4.4%**	**10.8%**	**5.6%**	**6.4%**	**100.0%**

Source: Field Survey

Chart: 4.1
Annual Family Income of Respondents



The respondents were asked that whether they have BPL Card in their family. About 12 per cent respondents reported that they have BPL card in their family. It was found more pronouncing in Mirzapur followed by Bahraich (Table 4.10).

Table: 4.10
Whether You Have BPL Card In Your Family

City	Yes	No	Total
Mirzapur	36	121	157
	22.9%	77.1%	100.0%
Loni	2	149	151
	1.3%	98.7%	100.0%
Banda	11	138	149
	7.4%	92.6%	100.0%
Bahraich	27	125	152
	17.8%	82.2%	100.0%
Total	**76**	**533**	**609**
	12.5%	**87.5%**	**100.0%**

Source: Field Survey

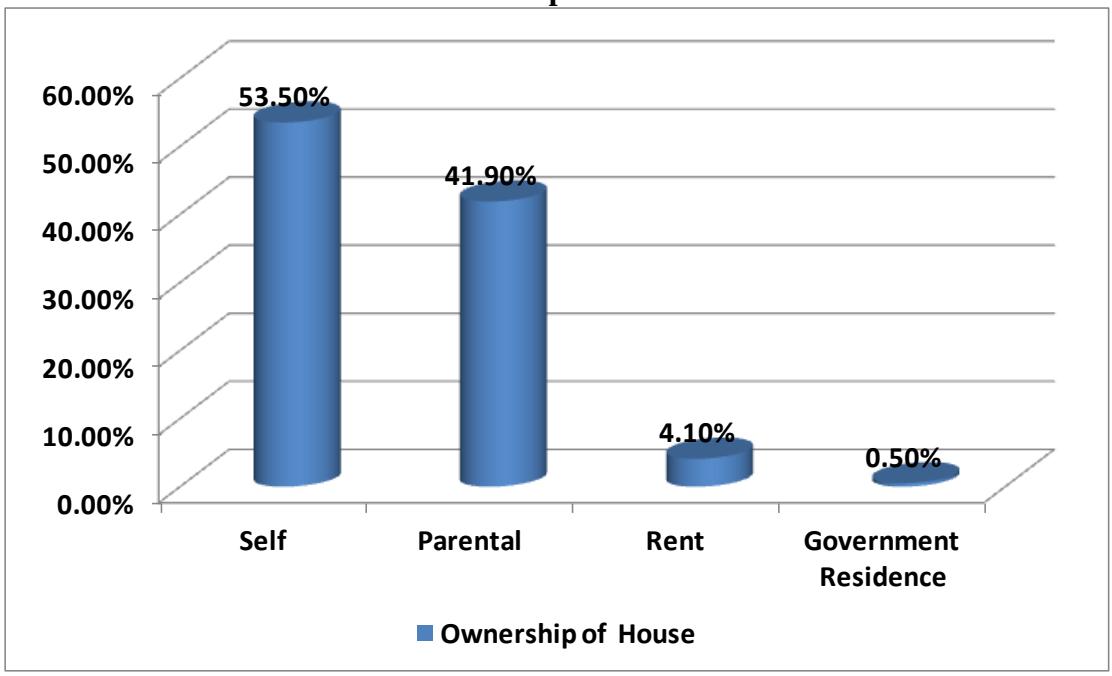
Ownership of house is shown in Table 4.11. More than half of the respondents repored that they own house. However, about 42 per cent respondents revealed that they are living in parental house. It was found more pronouncing in Mirzapur followed by Banda. A significant proportion of respondents in Banda and Loni were found living in rented house.

Table: 4.11
Ownership of House

City	Self	Parental	Rent	Government Residence	Total
Mirzapur	42	109	3	3	157
	26.8%	69.4%	1.9%	1.9%	100.0%
Loni	81	61	9	0	151
	53.6%	40.4%	6.0%	0.0%	100.0%
Banda	53	85	11	0	149
	35.6%	57.0%	7.4%	0.0%	100.0%
Bahraich	150	0	2	0	152
	98.7%	0.0%	1.3%	0.0%	100.0%
Total	**326**	**255**	**25**	**3**	**609**
	53.5%	**41.9%**	**4.1%**	**0.5%**	**100.0%**

Source: Field Survey

Chart: 4.2
Ownership of House



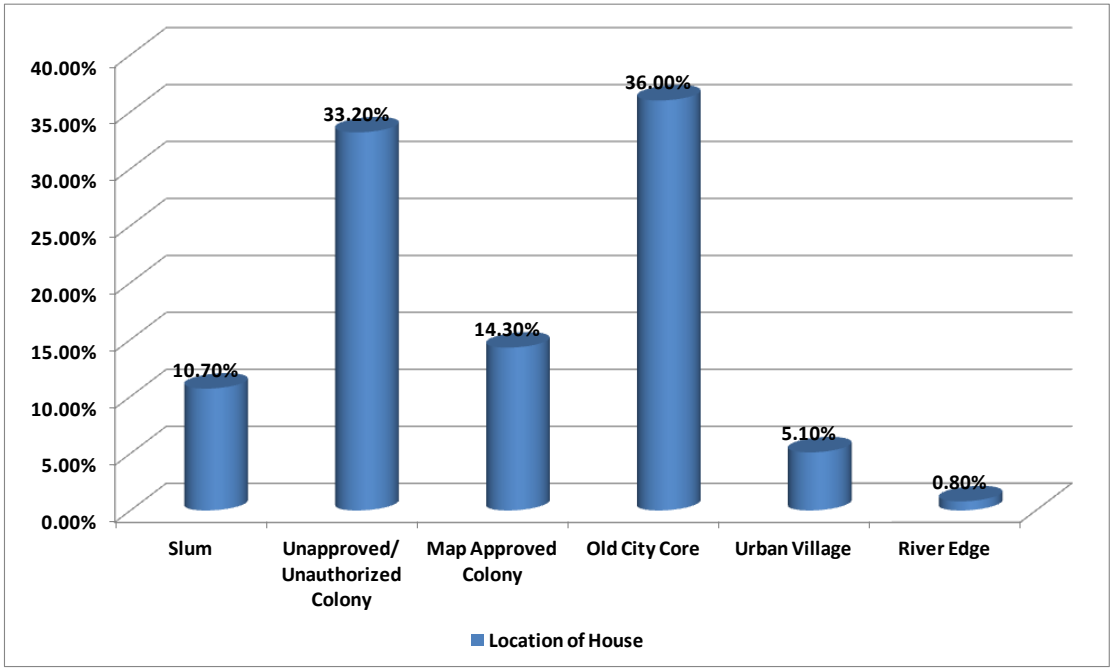
Location of house is shown in Table 4.12. About 36 per cent respondents reported that their house is located in old city. It was found more pronouncing in Banda (98 per cent) followed by Bahraich (42.1 per cent). About 1/3rd respondents reported that the house is located in unauthorized/ unapproved colony. It was found more pronouncing in Loni (58.3 per cen) followed by Mirzapur (57.3 per cent). However, about 1/3rd respondents in Loni reported that their house is located in map approved colony.

Table: 4.12
Location of House

City	Slum	Unapproved/ Unauthorized Colony	Map Approved Colony	Old City Core	Urban Village	River Edge	Total
Mirzapur	18	90	16	2	26	5	157
	11.5%	57.3%	10.2%	1.3%	16.6%	3.2%	100.0%
Loni	1	88	50	7	5	0	151
	0.7%	58.3%	33.1%	4.6%	3.3%	0.0%	100.0%
Banda	3	0	0	146	0	0	149
	2.0%	0.0%	0.0%	98.0%	0.0%	0.0%	100.0%
Bahraich	43	24	21	64	0	0	152
	28.3%	15.8%	13.8%	42.1%	0.0%	0.0%	100.0%
Total	**65**	**202**	**87**	**219**	**31**	**5**	**609**
	10.7%	**33.2%**	**14.3%**	**36.0%**	**5.1%**	**0.8%**	**100.0%**

Source: Field Survey

Chart: 4.3
Location of House



Type of house is shown in Table 4.13. Most of respondents reported that their house is pucca and semi-pucca. However, a significant proportion of respondents in Bahraich and Mirzapur were found living in kuccha houses.

Table: 4.13
Type of House

City	Kuccha	Pacca	Semi- Pucca	Total
Mirzapur	20	128	9	157
	12.7%	81.5%	5.7%	100.0%
Loni	0	146	5	151
	0.0%	96.7%	3.3%	100.0%
Banda	9	108	32	149
	6.0%	72.5%	21.5%	100.0%
Bahraich	21	128	3	152
	13.8%	84.2%	2.0%	100.0%
Total	**50**	**510**	**49**	**609**
	8.2%	**83.7%**	**8.0%**	**100.0%**

Source: Field Survey

Drinking/ water source in house is shown in Table 4.14. About 57 per cent respondents reported that they have individual tape for drinking water. It was found more pronouncing in Banda (86.6 per cent) followed by Bahraich (55.9 per cent). However, about 1/3rd respondents in Bahraich were depend on individual hand pump. Similarly, more than half of the respondents in MIrzapur reported that they take drinking water from public stand post. About 30 per cent respondents in Loni revealed that they are depend on tubewell/submersible pump.

Table: 4.14
Drinking / Water Source in House

City	Public Stand Post	Public Hand Pump	Individual Tap	Individual Hand pump	Boring / Tube well/ Submersible	Total
Mirzapur	80	13	52	5	7	157
	51.0%	8.3%	33.1%	3.2%	4.5%	100.0%
Loni	20	0	82	4	45	151
	13.2%	0.0%	54.3%	2.6%	29.8%	100.0%
Banda	13	6	129	1	0	149
	8.7%	4.0%	86.6%	0.7%	0.0%	100.0%
Bahraich	1	0	85	51	15	152
	0.7%	0.0%	55.9%	33.6%	9.9%	100.0%
Total	**114**	**19**	**348**	**61**	**67**	**609**
	18.7%	**3.1%**	**57.1%**	**10.0%**	**11.0%**	**100.0%**

Source: Field Survey

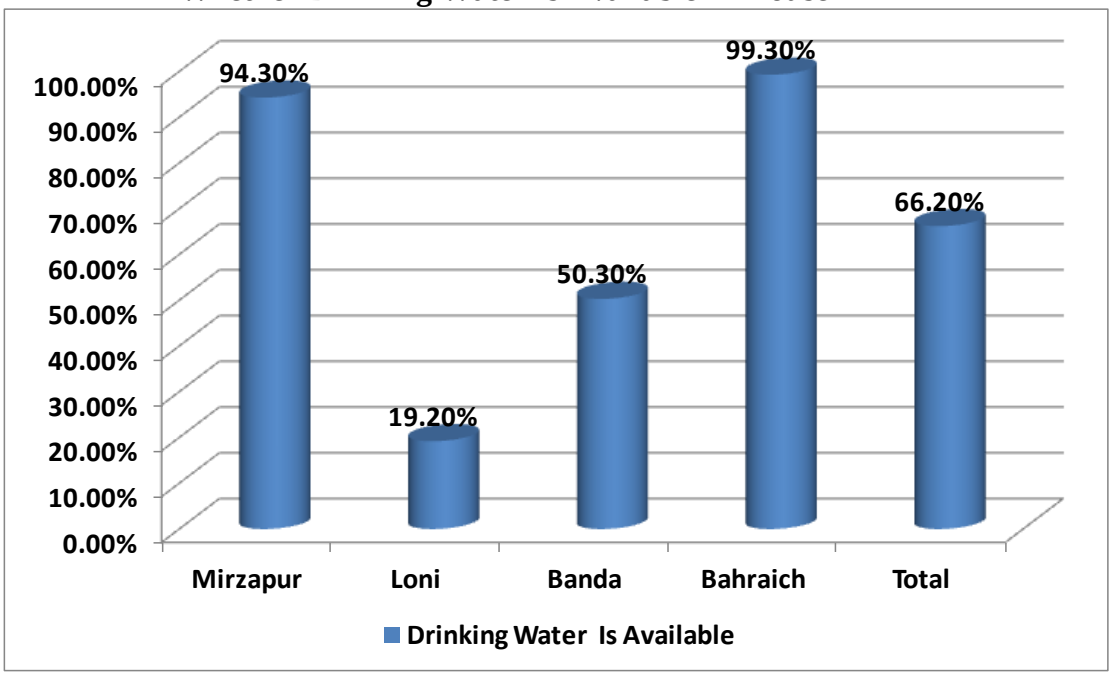
The respondents were asked that whether drinking water is available in house. About 2/3rd respondents reported that drinking water is available in their house. It was found more pronouncing in Bahraich followed by Mirzapur (Table 4.15).

Table: 4.15
Whether Drinking Water Is Available In House

City	Yes	No	Total
Mirzapur	148	9	157
	94.3%	5.7%	100.0%
Loni	29	122	151
	19.2%	80.8%	100.0%
Banda	75	74	149
	50.3%	49.7%	100.0%
Bahraich	151	1	152
	99.3%	0.7%	100.0%
Total	**403**	**206**	**609**
	66.2%	**33.8%**	**100.0%**

Source: Field Survey

Chart: 4.4
Whether Drinking Water Is Available In House



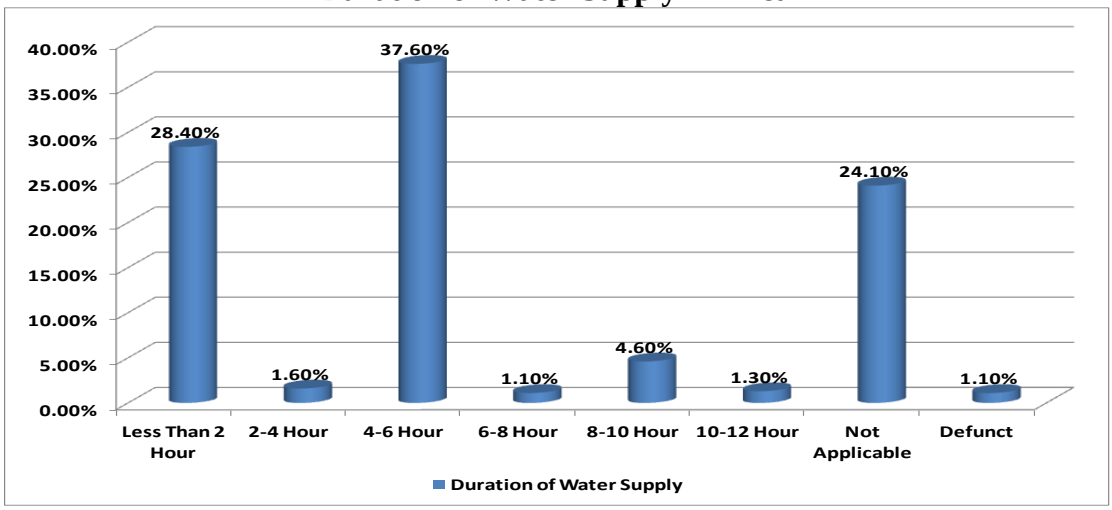
Duration of water supply in area is shown in Table 4.16. About 38 per cent respondents reported that duration of water supply in their area is about 4 to 6 hours. However, about 30 per cent respondents revealed that they have water supply for less than 4 hours. Thus, about 6 per cent respondents reported that they have water supply of more than 6 hours.

Table: 4.16
Duration of Water Supply In Area

City	Less Than 2 Hour	2-4 Hour	4-6 Hour	6-8 Hour	8-10 Hour	10-12 Hour	Not Applicable	Defunct	Total
Mirzapur	0	0	126	6	0	0	25	0	157
	0.0%	0.0%	80.3%	3.8%	0.0%	0.0%	15.9%	0.0%	100.0%
Loni	2	2	98	0	0	0	49	0	151
	1.3%	1.3%	64.9%	0.0%	0.0%	0.0%	32.5%	0.0%	100.0%
Banda	126	7	2	0	0	0	7	7	149
	84.6%	4.7%	1.3%	0.0%	0.0%	0.0%	4.7%	4.7%	100.0%
Bahraich	45	1	3	1	28	8	66	0	152
	29.6%	0.7%	2.0%	0.7%	18.4%	5.3%	43.4%	0.0%	100.0%
Total	**173**	**10**	**229**	**7**	**28**	**8**	**147**	**7**	**609**
	28.4%	**1.6%**	**37.6%**	**1.1%**	**4.6%**	**1.3%**	**24.1%**	**1.1%**	**100.0%**

Source: Field Survey

Chart: 4.5
Duration of Water Supply In Area



Source of water supply in house is shown in Table 4.17. Majority of respondents reported that they take drinking water from municipal drinking water supply network. It was found more pronouncing in Banda (90.6 per cent) followed by MIrzapur (82.6 per cent). About 44 per cent respondents in Bahraich reported that they are taking drinking water from hand pumps and bore well. Similarly, more than 1/3rd respondents in Loni revealed that they are taking drinking water from bore well and hand pumps.

Table: 4.17
Source of Water Supply In House

City	Tap Municipal Supply	Hand Pump	O. H. T	Bore Well	Other	Total
Mirzapur	130	18	2	7	0	157
	82.8%	11.5%	1.3%	4.5%	0.0%	100.0%
Loni	99	3	3	46	0	151
	65.6%	2.0%	2.0%	30.5%	0.0%	100.0%
Banda	135	7	0	0	7	149
	90.6%	4.7%	0.0%	0.0%	4.7%	100.0%
Bahraich	85	51	1	15	0	152
	55.9%	33.6%	0.7%	9.9%	0.0%	100.0%
Total	**449**	**79**	**6**	**68**	**7**	**609**
	73.7%	**13.0%**	**1.0%**	**11.2%**	**1.1%**	**100.0%**

Source: Field Survey

Type of access to house is shown in Table 4.18. Majority of respondents reported that they have street road to get access to their house. However, more than 1/4th respondents reported that they have brick road to get access to their house. It was found more pronouncing in Bahriach followed Loni.

Table: 4.18
Type of Access To House

City	Street Road	Brick Road	Kaccha Rasta	Total
Mirzapur	141	16	0	157
	89.8%	10.2%	0.0%	100.0%
Loni	68	67	16	151
	45.0%	44.4%	10.6%	100.0%
Banda	140	6	3	149
	94.0%	4.0%	2.0%	100.0%
Bahraich	82	70	0	152
	53.9%	46.1%	0.0%	100.0%
Total	**431**	**159**	**19**	**609**
	70.8%	**26.1%**	**3.1%**	**100.0%**

Source: Field Survey

The respondents were asked that whether their house has electricity connection. Most of the respondents reported that their house is electrified. However, a significant proportion of respondents in Mirzapur and Banda reported that their house is not electrified (Table 4.19).

Table: 4.19
Does Your House Has Electricity Connection

City	Yes	No	Total
Mirzapur	142	15	157
	90.4%	9.6%	100.0%
Loni	151	0	151
	100.0%	0.0%	100.0%
Banda	142	7	149
	95.3%	4.7%	100.0%
Bahraich	148	4	152
	97.4%	2.6%	100.0%
Total	**583**	**26**	**609**
	95.7%	**4.3%**	**100.0%**

Source: Field Survey

The respondents were asked that where household solid waste is being collected. Majority of respondents reported that household solid waste is being collected in dustbin. It was found more pronouncing in Loni (82.8 per cent) followed by Bahraich (78.9 per cent). However, a large proportion of respondents in Banda and MIrzapur reported that solid waste is being stored in a corner / house or undecided space (Table 4.20).

Table: 4.20
Where Does Household Solid Waste Get Collected

City	Dustbin	House Corner	No Decided Space	Total
Mirzapur	95	29	33	157
	60.5%	18.5%	21.0%	100.0%
Loni	125	19	7	151
	82.8%	12.6%	4.6%	100.0%
Banda	86	32	31	149
	57.7%	21.5%	20.8%	100.0%
Bahraich	120	18	14	152
	78.9%	11.8%	9.2%	100.0%
Total	**426**	**98**	**85**	**609**
	70.0%	**16.1%**	**14.0%**	**100.0%**

Source: Field Survey

The respondents were asked that where household solid waste is eing disposed of. Majority of respondents reported that household solid waste is being collected through sweeper and dustbin. However, a large proportion of respondents in Banda and Mirzapur reported that household solid waste is being dumped at road side (Table 4.21).

Table: 4.21
Where Your Household Solid Waste Goes

City	Dustbin	Sweeper	Road Side	Total
Mirzapur	64	22	71	157
	40.8%	14.0%	45.2%	100.0%
Loni	64	44	43	151
	42.4%	29.1%	28.5%	100.0%
Banda	17	48	84	149
	11.4%	32.2%	56.4%	100.0%
Bahraich	9	108	35	152
	5.9%	71.1%	23.0%	100.0%
Total	**154**	**222**	**233**	**609**
	25.3%	**36.5%**	**38.3%**	**100.0%**

Source: Field Survey

The respondents were asked that whether there is public bin/dustbin in their locality. Less than half of the respondents reported that there is public dustbin in their locality. However, 60 per cent respondents in Banda and Bahraich reported that there is no public dustbin in their locality (Table 4.22).

Table: 4.22
Whether There Is Public Bin / Dustbin In Your Locality

City	Yes	No	Total
Mirzapur	90	67	157
	57.3%	42.7%	100.0%
Loni	88	63	151
	58.3%	41.7%	100.0%
Banda	60	89	149
	40.3%	59.7%	100.0%
Bahraich	61	91	152
	40.1%	59.9%	100.0%
Total	**299**	**310**	**609**
	49.1%	**50.9%**	**100.0%**

Source: Field Survey

Frequency of taking solid waste from public bin is shown in Table 4.23. About half of the respondents reported that sometimes or at very less frequency solid waste is being taken from public dustbin. Thus, about 22 per cent respondents reported that solid waste is being always collected from public dustbin.

Table: 4.23
Frequency of Taking Solid Waste from Public Bin

City	Always	Mostly	Sometimes	Very Less	Never	Total
Mirzapur	17	34	13	26	0	90
	18.9%	37.8%	14.4%	28.9%	0.0%	100.0%
Loni	25	19	17	26	1	88
	28.4%	21.6%	19.3%	29.5%	1.1%	100.0%
Banda	10	15	5	30	0	60
	16.7%	25.0%	8.3%	50.0%	0.0%	100.0%
Bahraich	13	2	30	12	4	61
	21.3%	3.3%	49.2%	19.7%	6.6%	100.0%
Total	**65**	**70**	**65**	**94**	**5**	**299**
	21.7%	**23.4%**	**21.7%**	**31.4%**	**1.7%**	**100.0%**

Source: Field Survey

Awareness of urban development missions/schemes is shown in Table 4.24. Most of the respondents were found aware of Swachh Bharat Mission. However, awareness about other urban missions such as Smart City, PMAY, DAY-NULM, AMRUT and Namami Gangey was reported to be low. About 2/3rd respondents in Mirzapur were found aware of Namami Gangey while about 44 per cent respondents in Bahraich were aware of AMRUT. Similarly, about 2/5th respondents in Banda were aware of PMAY.

Table: 4.24
Awareness of Urban Development Missions/Schemes

City	Smart City Mission	PMAY	DAY-NULM	SBM	AMRUT	Namami Gangey
Mirzapur	53	57	59	136	46	105
	33.8%	36.3%	37.6%	86.6%	29.3%	66.9%
Loni	16	36	34	143	6	53
	10.6%	23.8%	22.5%	94.7%	4.0%	35.1%
Banda	23	64	15	140	52	15
	15.4%	43.0%	10.1%	94.0%	34.9%	10.1%
Bahraich	5	0	1	152	67	0
	3.3%	0.0%	0.7%	100.0%	44.1%	0.0%
Total	**97**	**157**	**109**	**571**	**171**	**173**
	15.9%	**25.8%**	**17.9%**	**93.8%**	**28.1%**	**28.4%**

Source: Field Survey

Source of information of urban development missions/schemes is shown in Table 4.25. Main source of information of urban development missions/ schemes included television, advertisement and news.

Table: 4.25
Source of Information of Urban Development Missions/ Schemes

City	TV	Radio	News	Advertisement	Others
Mirzapur	135	13	16	56	3
	86.0%	8.3%	10.2%	35.7%	1.9%
Loni	114	1	16	80	7
	75.5%	0.7%	10.6%	53.0%	4.6%
Banda	137	29	24	32	1
	91.9%	19.5%	16.1%	21.5%	0.7%
Bahraich	104	6	24	19	8
	68.4%	3.9%	15.8%	12.5%	5.3%
Total	**490**	**49**	**80**	**187**	**19**
	80.5%	**8.0%**	**13.1%**	**30.7%**	**3.1%**

Source: Field Survey

The respondents were asked that whether diseases spread due to insanitary conditions. Most of the respondents were of the view that diseases spread due to insanitary conditions (Table 4.26).

Table: 4.26
Do You Think That Diseases Spread Due To Insanitary Conditions

City	To Great Extant	Generally	Very Less	Total
Mirzapur	19	119	19	157
	12.1%	75.8%	12.1%	100.0%
Loni	74	58	19	151
	49.0%	38.4%	12.6%	100.0%
Banda	137	6	6	149
	91.9%	4.0%	4.0%	100.0%
Bahraich	115	24	13	152
	75.7%	15.8%	8.6%	100.0%
Total	**345**	**207**	**57**	**609**
	56.7%	**34.0%**	**9.4%**	**100.0%**

Source: Field Survey

The respondents were asked that whether ULBs are providing sanitation facilities. Most of the respondents reported that they are well aware that ULBs are providing sanitation facilities (Table 4.27).

Table: 4.27
Are You Aware That ULBs Are Providing Sanitation Facilities

City	Yes	No	Total
Mirzapur	145	12	157
	92.4%	7.6%	100.0%
Loni	146	5	151
	96.7%	3.3%	100.0%
Banda	142	7	149
	95.3%	4.7%	100.0%
Bahraich	142	10	152
	93.4%	6.6%	100.0%
Total	**575**	**34**	**609**
	94.4%	**5.6%**	**100.0%**

Source: Field Survey

Responsibility of cleaning of roads is shown in Table 4.28. Most of the respondents reported that the responsibility of cleaning of roads lies with sanitation workers of Urban Local Bodies.

Table: 4.28
Responsibility of Cleaning of Roads

City	Sanitation Worker Of Local Body/ Municipal Body	Private Sanitation Worker / Operator	Any Other
Mirzapur	148	0	0
	94.3%	0.0%	0.0%
Loni	146	1	2
	96.7%	0.7%	1.3%
Banda	145	2	0
	97.3%	1.3%	0.0%
Bahraich	145	0	5
	95.4%	0.0%	3.3%
Total	**584**	**3**	**7**
	95.9%	**0.5%**	**1.1%**

Source: Field Survey

Frequency of cleaning of street/lanes in their areas is shown in Table 4.29. More than half of the respondents reported that streets/lanes are daily cleaned in their areas. However, more than 1/4th respondents reported that sometimes streets and lanes are cleaned in their areas. Similarly, about 18 per cent respondents reported that streets/lanes are cleaned on weekly basis.

Table: 4.29
Frequency of Cleaning of Street/ Lanes In Your Area

City	Daily	Weekly	Sometimes	Never	Total
Mirzapur	140	3	14	0	157
	89.2%	1.9%	8.9%	0.0%	100.0%
Loni	20	35	93	3	151
	13.2%	23.2%	61.6%	2.0%	100.0%
Banda	130	1	18	0	149
	87.2%	0.7%	12.1%	0.0%	100.0%
Bahraich	33	73	45	1	152
	21.7%	48.0%	29.6%	0.7%	100.0%
Total	**323**	**112**	**170**	**4**	**609**
	53.0%	**18.4%**	**27.9%**	**0.7%**	**100.0%**

Source: Field Survey

Responsibility of collection of solid waste in locality/area is shown in Table 4.30. Most of the respondents reported that the responsibility of collection of solid waste in their locality lies with ULBs.

Table: 4.30
Responsibility of Collection of Solid Waste In Locality/ Area

City	ULB	Private Contractor	Other	Total
Mirzapur	157	0	0	157
	100.0%	0.0%	0.0%	100.0%
Loni	143	1	7	151
	94.7%	0.7%	4.6%	100.0%
Banda	145	1	3	149
	97.3%	0.7%	2.0%	100.0%
Bahraich	146	2	4	152
	96.1%	1.3%	2.6%	100.0%
Total	**591**	**4**	**14**	**609**
	97.0%	**0.7%**	**2.3%**	**100.0%**

Source: Field Survey

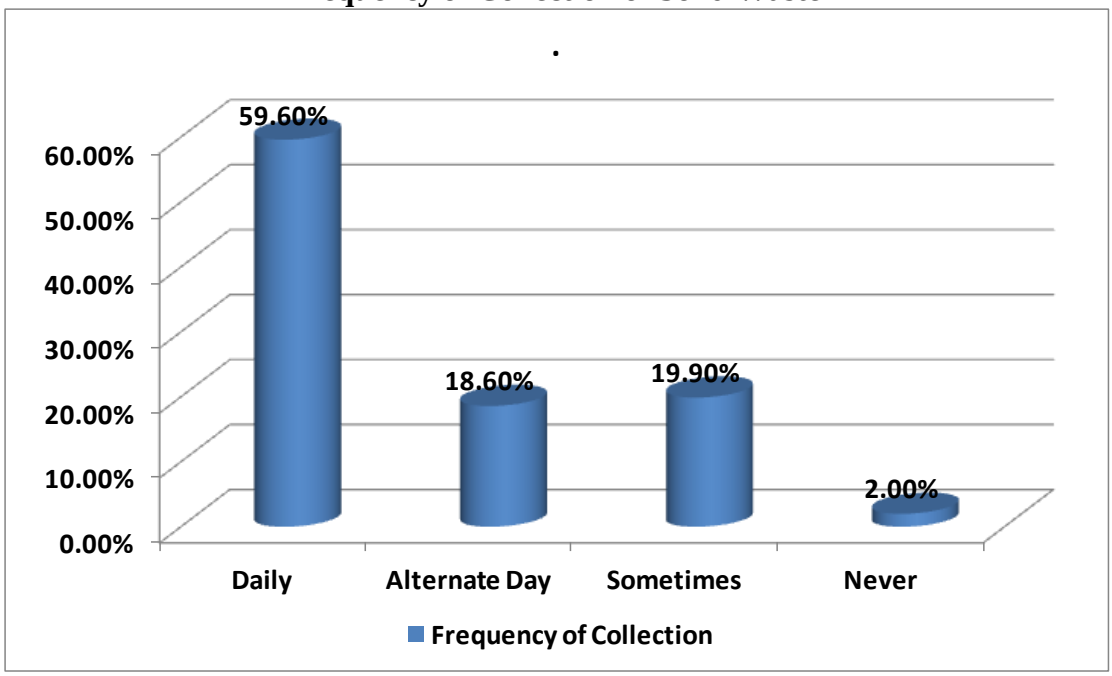
Frequency of collection of solid waste is shown in Table 4.31. About 60 per cent respondents reported that solid waste is being collected daily basis. However, about 19 per cent respondents revealed that solid waste is being collected on alternative day. A large proportion of respondents in Loni and Bahraich reported that sometimes solid waste is being collected from their areas.

Table: 4.31
Frequency of Collection of Solid Waste

City	Daily	Alternate Day	Sometimes	Never	Total
Mirzapur	132	14	11	0	157
	84.1%	8.9%	7.0%	0.0%	100.0%
Loni	17	65	64	5	151
	11.3%	43.0%	42.4%	3.3%	100.0%
Banda	124	11	12	2	149
	83.2%	7.4%	8.1%	1.3%	100.0%
Bahraich	90	23	34	5	152
	59.2%	15.1%	22.4%	3.3%	100.0%
Total	**363**	**113**	**121**	**12**	**609**
	59.6%	**18.6%**	**19.9%**	**2.0%**	**100.0%**

Source: Field Survey

Chart: 4.6
Frequency of Collection of Solid Waste



Means of waste collection is shown in Table 4.32. Majority of respondents reported that thela /hammer carts are being used in collection of solid waste. However, open truck /tractor is mainly used in Loni city.

Table: 4.32
Means of Waste Collection

City	Auto	Thela/ Hammer Cart	Open Truck/ Tractor	Others
Mirzapur	1	154	0	2
	0.6%	98.1%	0.0%	1.3%
Loni	0	6	142	2
	0.0%	4.0%	94.0%	1.3%
Banda	2	137	9	2
	1.3%	91.9%	6.0%	1.3%
Bahraich	7	91	46	6
	4.6%	59.9%	30.3%	3.9%
Total	**10**	**388**	**197**	**12**
	1.6%	**63.7%**	**32.3%**	**2.0%**

Source: Field Survey

Sewerage, Septage and Faecal Sludge Management

Providing ecologically safe sanitation to the world's second most populated country is a daunting task. The difficulties facing the urban sanitation sector stem from municipal governments' poor priority. This endeavour is made more challenging in India, where new paradigms of plans, programmes, and initiatives might challenge people's customs and beliefs. Environmental sanitation seeks to improve people's lives while simultaneously advancing society. This includes disposing of human waste, controlling disease vectors, and providing personal and home hygiene washing facilities. Environmental sanitation includes both behavior and facilities. Most waterborne infections, such as diarrhea, are spread by pathogens present in human excrement. The faecal-oral pathway is by far the most important method of transmission. This mechanism works in many ways. Controlling faeces at home is frequently the most effective basic intervention on health. This is because (a) most hygiene-related activity occurs in or near the home, and (b) improving hygienic practices often begins with the household. After entering the environment via faeces or hands, secondary barriers prevent faecal germs from multiplying and spreading to new hosts. Secondary barriers include washing hands before handling food, preparing, cooking, storing, and reheating food to reduce pathogen survival and growth. Water and sanitation serve as a buffer between toxins, nature, and humans. Despite a decade of attention on the misery of the urban poor and clean water, the number and percentage of people without access to sanitation services continues to rise. While overall urban sanitation coverage (63%) appears high, coverage rates for the urban poor are substantially lower. Thus, developing country governments and local governments face an increasing sanitation challenge. Unsanitary circumstances often have ramifications beyond their origins. Untreated human and residential waste can affect not only the local ecosystem, but also

groundwater, lakes and rivers. Many Indian cities get their raw water from reservoirs 30-50 km distant. Environmental pollution not only endangers public health but also poses a huge financial burden on cities. Urban pollution is a key impediment to sustained economic progress in emerging countries.Accessible to toilet/latrine facility is shown in Table 4.33. Most of the respondents reported that they have access to toilet facilities. However, about 38 per cent respondents in Bahraich had combined household toilet facility. A negligible proportion of respondents in Loni and Banda were found using public/community toilets.

Table: 4.33
Accessible To Toilet / Latrine Facility

City	Individual/ Separate	Individual / Combined	Public	Community	Total
Mirzapur	154	3	0	0	157
	98.1%	1.9%	0.0%	0.0%	100.0%
Loni	146	0	5	0	151
	96.7%	0.0%	3.3%	0.0%	100.0%
Banda	123	22	2	2	149
	82.6%	14.8%	1.3%	1.3%	100.0%
Bahraich	94	58	0	0	152
	61.8%	38.2%	0.0%	0.0%	100.0%
Total	**517**	**83**	**7**	**2**	**609**
	84.9%	**13.6%**	**1.1%**	**0.3%**	**100.0%**

Source: Field Survey

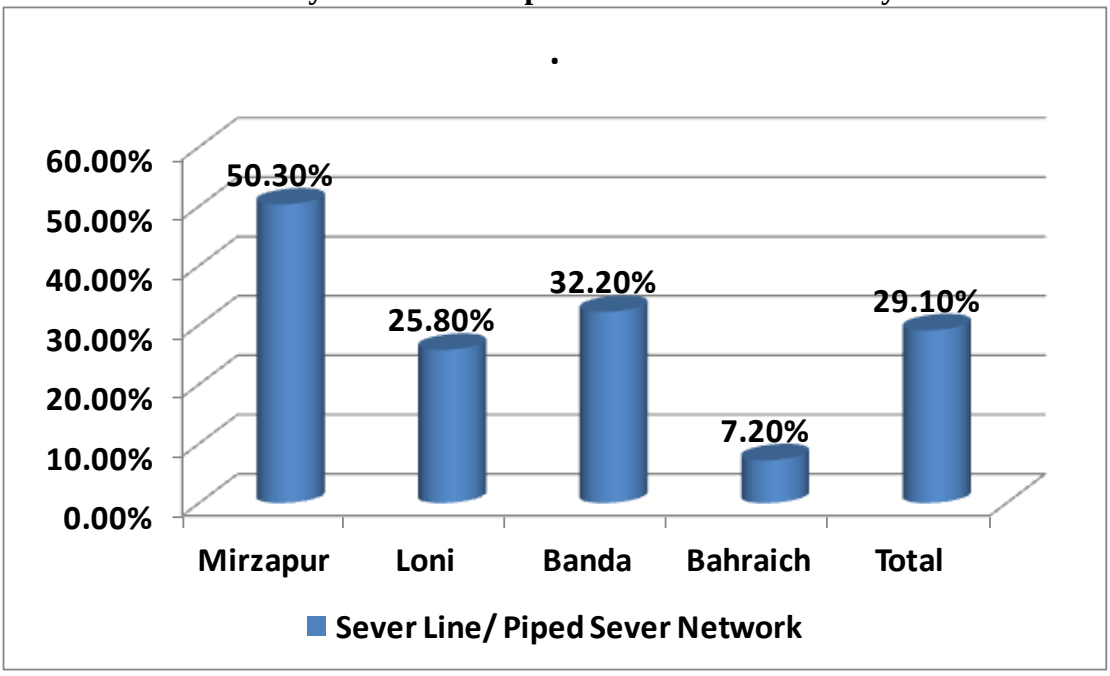
The respondents were asked that whether there is any sever line/piped sever network facility in their area. About 29 per cent respondents revealed that there is sever line facility in their areas. However, piped sever network facility in Bahraich was found to be defunct. The availability of sever line facility was recorded high in MIrzapur (50.3 per cent) followed by Banda (32.2 per cent) (Table 4.34).

Table: 4.34
Whether There Is Any Sever Line/ Piped Sever Network Facility In Your Area

City	Yes	No	Cannot Say	Total
Mirzapur	79	68	10	157
	50.3%	43.3%	6.4%	100.0%
Loni	39	111	1	151
	25.8%	73.5%	0.7%	100.0%
Banda	48	101	0	149
	32.2%	67.8%	0.0%	100.0%
Bahraich	11	139	2	152
	7.2%	91.4%	1.3%	100.0%
Total	**177**	**419**	**13**	**609**
	29.1%	**68.8%**	**2.1%**	**100.0%**

Source: Field Survey

Chart: 4.7
Whether There Is Any Sever Line/ Piped Sever Network Facility In Your Area



Responsibility of operation and maintenance of sewerage is shown in Table 4.35. Most of respondents reported that the responsibility of operation and maintenance of sewerage facility lies with sanitary workers of local bodies. However, a large proportion of respondents in Bahraich were not aware of the fact.

Table: 4.35
Responsibility of Operation and Maintenance of Sewerage

City	Sanitary Workers Of Local Body	Private Contractor	Don't Know	Other	Total
Mirzapur	76	0	3	0	79
	96.2%	0.0%	3.8%	0.0%	100.0%
Loni	34	0	0	5	39
	87.2%	0.0%	0.0%	12.8%	100.0%
Banda	41	1	6	0	48
	85.4%	2.1%	12.5%	0.0%	100.0%
Bahraich	7	0	3	1	11
	63.6%	0.0%	27.3%	9.1%	100.0%
Total	**158**	**1**	**12**	**6**	**177**
	89.3%	**0.6%**	**6.8%**	**3.4%**	**100.0%**

Source: Field Survey

Frequency of cleaning of sewerage/piped sever in their local area is shown in Table 4.36. About 3/4th respondents were not aware about the frequency of cleaning of sewerage/piped sever network in their areas. However, more than 2/5th respondents in Mirzapur and Loni revealed that sewerage/piped sever network is being cleaned if it is blocked.

Table: 4.36
Frequency of Cleaning of Sewerage / Piped Sever In Your Local Area

City	Once In A Year	Before Mansoon	On Blockage	Cannot Say	Total
Mirzapur	4	0	73	80	157
	2.5%	0.0%	46.5%	51.0%	100.0%
Loni	0	1	62	88	151
	0.0%	0.7%	41.1%	58.3%	100.0%
Banda	2	2	2	143	149
	1.3%	1.3%	1.3%	96.0%	100.0%
Bahraich	9	1	2	140	152
	5.9%	0.7%	1.3%	92.1%	100.0%
Total	**15**	**4**	**139**	**451**	**609**
	2.5%	**0.7%**	**22.8%**	**74.1%**	**100.0%**

Source: Field Survey

The respondents were asked that whether they have any complaint/grievance related to sanitation to any authority local body. About 1/4th respondents revealed that they made complaint/grievances related to sanitation. It was found more pronouncing in Loni (51.1 per cent) followed by Mirzapur (33.9 per cent) (Table 4.37).

Table: 4.37
Whether You Have Any Complaint / Grievance Related To Sanitation To Any Authority Local Body

City	Yes	No	Total
Mirzapur	52	105	157
	33.1%	66.9%	100.0%
Loni	77	74	151
	51.0%	49.0%	100.0%
Banda	16	133	149
	10.7%	89.3%	100.0%
Bahraich	13	139	152
	8.6%	91.4%	100.0%
Total	**158**	**451**	**609**
	25.9%	**74.1%**	**100.0%**

Source: Field Survey

Type of authority for making complaints/grievances is shown in Table 4.38. The complaints were made mainly to ULBs, local leaders and CMO office.

Table: 4.38
Type of Authority for Making Complaints / Grievances

City	ULB	Local Leader	Police	CMO	Other
Mirzapur	22	37	0	0	1
	14.0%	23.6%	0.0%	0.0%	0.6%

Loni	56	24	2	5	2
	37.1%	15.9%	1.3%	3.3%	1.3%
Banda	7	8	1	0	1
	4.7%	5.4%	0.7%	0.0%	0.7%
Bahraich	6	9	0	0	0
	3.9%	5.9%	0.0%	0.0%	0.0%
Total	**91**	**78**	**3**	**5**	**4**
	14.9%	**12.8%**	**0.5%**	**0.8%**	**0.7%**

Source: Field Survey

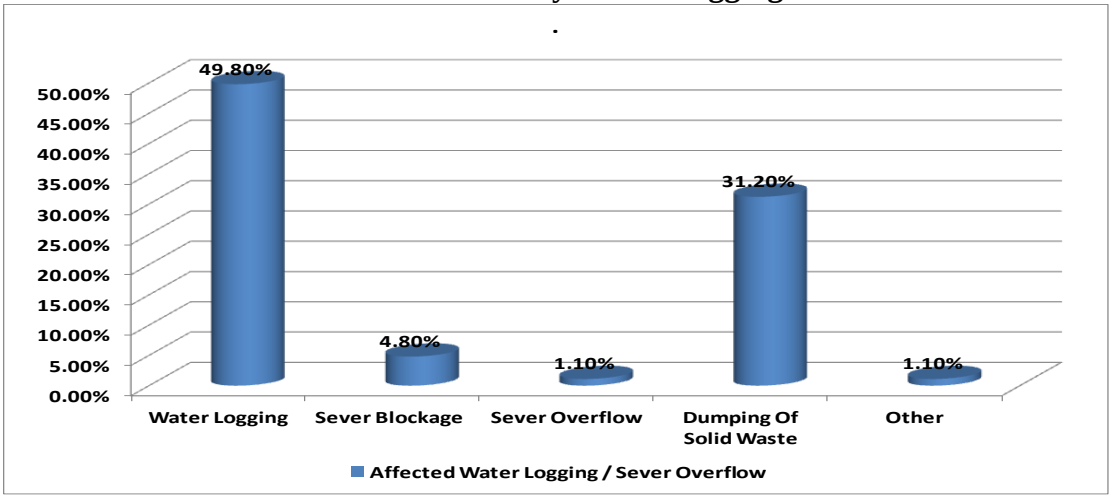
The respondents were asked that whether their area is affected by water logging / sever overflow. About half of the respondents revealed that their area is affected by water logging. It was found more pronouncing in Loni (90.1 per cent) followed by Mirzapur (60.5 per cent). Less than 1/3rd respondents further reported that solid waste is being dumped in their areas. It was found more pronouncing in Loni (55.6 per cent) (Table 4.39).

Table: 4.39
Whether Your Area Is Affected By Water Logging / Sever Overflow

City	Water Logging	Sever Blockage	Sever Overflow	Dumping Of Solid Waste	Other
Mirzapur	95	19	7	28	0
	60.5%	12.1%	4.5%	17.8%	0.0%
Loni	136	0	0	84	4
	90.1%	0.0%	0.0%	55.6%	2.6%
Banda	51	10	0	45	2
	34.2%	6.7%	0.0%	30.2%	1.3%
Bahraich	21	0	0	33	1
	13.8%	0.0%	0.0%	21.7%	0.7%
Total	**303**	**29**	**7**	**190**	**7**
	49.8%	**4.8%**	**1.1%**	**31.2%**	**1.1%**

Source: Field Survey

Chart: 4.8
Whether Your Area Is Affected By Water Logging / Sever Overflow



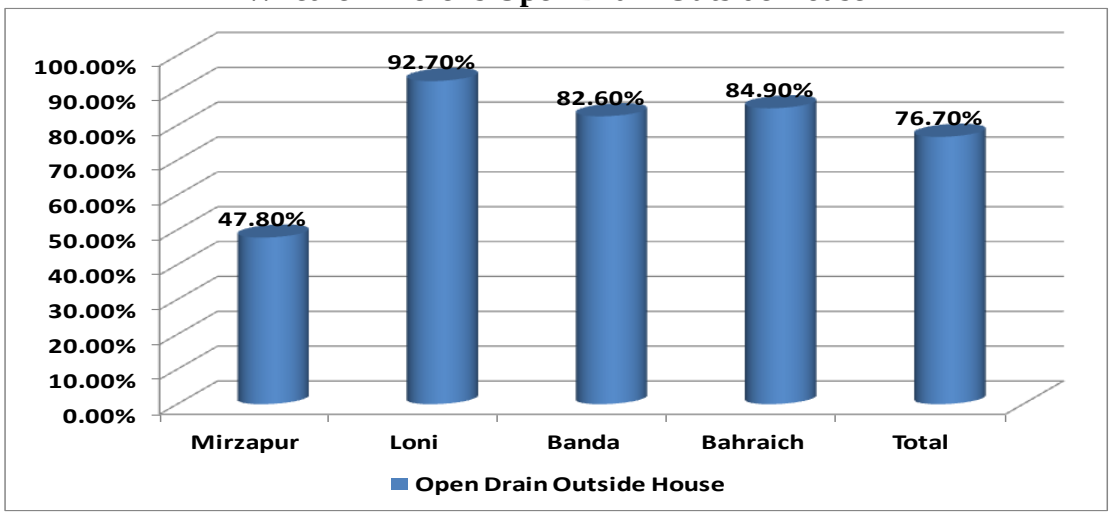
The respondents were asked that whether there is open drain outside house. About 77 per cent respondents reported that there is open drain outside their house. It was found more pronouncing in Loni (92.7 per cent) followed by Bahraich (84.9 per cent) (Table 4.40).

Table: 4.40
Whether There Is Open Drain Outside House

City	Yes	No	Total
Mirzapur	75	82	157
	47.8%	52.2%	100.0%
Loni	140	11	151
	92.7%	7.3%	100.0%
Banda	123	26	149
	82.6%	17.4%	100.0%
Bahraich	129	23	152
	84.9%	15.1%	100.0%
Total	**467**	**142**	**609**
	76.7%	**23.3%**	**100.0%**

Source: Field Survey

Chart: 4.9
Whether There Is Open Drain Outside House



Frequency of cleaning of drain is shown in Table 4.41. About half of the respondents reported that drains are cleaned on weekly basis. It was found more pronouncing in Banda (70.7 percent) followed by Bahraich (64.3 per cent). However, about 28 per cent respondents reported that drains are cleaned on daily basis. It was found more pronouncing in MIrzapur (48 per cent) followed by Loni (47.1 per cent).

Table: 4.41
Frequency of Cleaning of Drain

City	Daily	Alternate Day	Weekly	Others	Total
Mirzapur	36	2	33	4	75
	48.0%	2.7%	44.0%	5.3%	100.0%
Loni	66	48	26	0	140
	47.1%	34.3%	18.6%	0.0%	100.0%
Banda	9	20	87	7	123
	7.3%	16.3%	70.7%	5.7%	100.0%
Bahraich	19	20	83	7	129
	14.7%	15.5%	64.3%	5.4%	100.0%
Total	**130**	**90**	**229**	**18**	**467**
	27.8%	**19.3%**	**49.0%**	**3.9%**	**100.0%**

Source: Field Survey

Responsibility of cleaning of open drains is shown in Table 4.42. About half of respondents reported that sanitary workers of ULBs are responsible for cleaning of open drains. It was found more pronouncing in Banda (79.7 per cent) followed by Mirzapur (52 per cent). Howeverf, about 1/3rd respondents revealed that they themselves clean open drains. It was found more pronouncing in Loni (54.3 per cent) followed by MIrzapur (46.7 per cent). Similarly, more than 1/4th respondents in Bahraich revealed that their family members clean open drains.

Table: 4.42
Responsibility of Cleaning of Open Drains

City	Self	House Member	Servant	Sanitary Worker	Community Level	Total
Mirzapur	35	1	0	39	0	75
	46.7%	1.3%	0.0%	52.0%	0.0%	100.0%
Loni	76	17	1	36	10	140
	54.3%	12.1%	0.7%	25.7%	7.1%	100.0%
Banda	15	4	0	98	6	123
	12.2%	3.3%	0.0%	79.7%	4.9%	100.0%
Bahraich	31	35	5	58	0	129
	24.0%	27.1%	3.9%	45.0%	0.0%	100.0%
Total	**157**	**57**	**6**	**231**	**16**	**467**
	33.6%	**12.2%**	**1.3%**	**49.5%**	**3.4%**	**100.0%**

Source: Field Survey

The respondents were asked that whether they know that local body is responsible for provision of water supply and sewerage. More than half of the respondents reported that they are aware that provision of water supply and sewerage is the responsibility of Urban Local

Bodies. However, a large proportion of respondents was found either unknown or could not respond on the view point (Table 4.43).

Table: 4.43
Do You Know That Local Body Is Responsible For Provision of Water Supply and Sewerage

City	Yes	No	Cannot Say	Total
Mirzapur	68	70	19	157
	43.3%	44.6%	12.1%	100.0%
Loni	114	13	24	151
	75.5%	8.6%	15.9%	100.0%
Banda	109	27	13	149
	73.2%	18.1%	8.7%	100.0%
Bahraich	32	13	107	152
	21.1%	8.6%	70.4%	100.0%
Total	**323**	**123**	**163**	**609**
	53.0%	**20.2%**	**26.8%**	**100.0%**

Source: Field Survey

The respondents were asked that whether people of their locality contribute in sanitation works. About 3/4th respondents reported that people from their locality contribute in sanitation work. It was found more pronouncing in Loni (90.1 per cent) followed by Bahraich (80.3 per cent). (Table 4.44).

Table: 4.44
Whether People of Your Locality Contribute In Sanitation Works

City	Yes	No	Total
Mirzapur	101	56	157
	64.3%	35.7%	100.0%
Loni	136	15	151
	90.1%	9.9%	100.0%
Banda	89	60	149
	59.7%	40.3%	100.0%
Bahraich	122	30	152
	80.3%	19.7%	100.0%
Total	**448**	**161**	**609**
	73.6%	**26.4%**	**100.0%**

Source: Field Survey

Responsibility of sanitation services is shown in Table 4.45. About 57 per cent respondents were of the view that responsibility of sanitation services lies with ULBs. It was found more pronouncing in Loni (80.5 per cent). Thus, majority of the respondents in Banda and about half of the respondents in Bahraich and MIrzapur made the responsibility of sanitation services to public.

Table: 4.45
Responsibility of Sanitation Services

City	Public	ULB	Total
Mirzapur	54	58	112
	48.2%	51.8%	100.0%
Loni	25	103	128
	19.5%	80.5%	100.0%
Banda	61	35	96
	63.5%	36.5%	100.0%
Bahraich	31	33	64
	48.4%	51.6%	100.0%
Total	**171**	**229**	**400**
	42.8%	**57.3%**	**100.0%**

Source: Field Survey

Type of toilet/latrine facility is shown in Table 4.46. Most of the respondents reported that they have flush toilet facility in their house. However, a negligible proportion of respondents in Banda and Loni were found depending on community toilet.

Table: 4.46
Type of Toilet/ Latrine Facility

City	Flush	Community Toilet	Total
Mirzapur	157	0	157
	100.0%	0.0%	100.0%
Loni	145	6	151
	96.0%	4.0%	100.0%
Banda	140	9	149
	94.0%	6.0%	100.0%
Bahraich	152	0	152
	100.0%	0.0%	100.0%
Total	**594**	**15**	**609**
	97.5%	**2.5%**	**100.0%**

Source: Field Survey

The respondents were asked that whether community toilet has been constructed. About 13 per cent respondents reported that community toilet has been constructed. However, a large proportion of respondents in Loni and MIrzapur could not respond on the view point (Table 4.47).

Table: 4.47
Whether Community Toilet Has Been Constructed

City	Yes	No	Cannot Say	Total
Mirzapur	38	74	45	157
	24.2%	47.1%	28.7%	100.0%
Loni	5	77	69	151
	3.3%	51.0%	45.7%	100.0%
Banda	12	131	6	149
	8.1%	87.9%	4.0%	100.0%
Bahraich	24	126	2	152
	15.8%	82.9%	1.3%	100.0%
Total	**79**	**408**	**122**	**609**
	13.0%	**67.0%**	**20.0%**	**100.0%**

Source: Field Survey

The respondents were asked that whether community toilets are adequate. About 16 per cent respondents reported that community toilets are adequate. However, most of respondents in Bahraich and MIrzapur were against the view point (Table 4.48).

Table: 4.48
Whether Community Toilets Are Adequate

City	Yes	No	Cannot Say	Total
Mirzapur	6	32	0	38
	15.8%	84.2%	0.0%	100.0%
Loni	4	1	0	5
	80.0%	20.0%	0.0%	100.0%
Banda	2	8	2	12
	16.7%	66.7%	16.7%	100.0%
Bahraich	1	22	1	24
	4.2%	91.7%	4.2%	100.0%
Total	**13**	**63**	**3**	**79**
	16.5%	**79.7%**	**3.8%**	**100.0%**

Source: Field Survey

Maintenance of community toilets is shown in Table 4.49. About 2/3rd respondents reported that ULB is maintaining the community toilet while about 22 per cent respondents reported that Sulabh International is maintaining the toilet. About 70 per cent respondents in Bahraich and most of respondents in Banda reported that Sramik Bharti, Public Sector Enterprises and private organizations are maintaining community toilets.

Table: 4.49
Maintenance of Community Toilets

City	ULB	Sulabh International	Sramik Bharti	Public Sector Enterprises	Private Organization	Other
Mirzapur	38	0	0	0	0	0
	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Loni	5	0	0	0	0	0
	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Banda	1	1	2	2	6	0
	8.3%	8.3%	16.7%	16.7%	50.0%	0.0%
Bahraich	7	16	1	0	0	1
	29.2%	66.7%	4.2%	0.0%	0.0%	4.2%
Total	**51**	**17**	**3**	**2**	**6**	**1**
	64.6%	**21.5%**	**3.8%**	**2.5%**	**7.6%**	**1.3%**

Source: Field Survey

The respondents were asked that whether community/public toilet has been constructed recently. A negligible proportion of respondents reported that community toilets/public toilets have been recently constructed. These toilets were constructed mainly under SBM and CSR initiatives (Table 4.50).

Table: 4.50
Whether Community / Public Toilet Has Been Constructed Recently

City	Yes	No	Total
Mirzapur	1	156	157
	0.6%	99.4%	100.0%
Loni	6	145	151
	4.0%	96.0%	100.0%
Banda	15	134	149
	10.1%	89.9%	100.0%
Bahraich	3	149	152
	2.0%	98.0%	100.0%
Total	**25**	**584**	**609**
	4.1%	**95.9%**	**100.0%**

Source: Field Survey

Responsibility of maintenance of community toilets is shown in Table 4.51. The overwhelming majority of respondents reported that the responsibility of maintenance of community toilets lies with sanitary workers and employees of ULBs. However, a significant proportion of respondents in Mirzapur and Bahraich reported that community is responsible for maintenance of community toilets.

Table: 4.51
Responsibility of Maintenance of Community Toilets

City	Community	Sanitation Worker	Employees Of ULB	Other	Total
Mirzapur	10	24	4	0	38
	26.3%	63.2%	10.5%	0.0%	100.0%
Loni	0	0	6	0	6
	0.0%	0.0%	100.0%	0.0%	100.0%
Banda	1	5	8	4	18
	5.6%	27.8%	44.4%	22.2%	100.0%
Bahraich	5	5	14	0	24
	20.8%	20.8%	58.3%	0.0%	100.0%
Total	**16**	**34**	**32**	**4**	**86**
	18.6%	**39.5%**	**37.2%**	**4.7%**	**100.0%**

Source: Field Survey

The respondents were asked that whether they pay daily for use of community / public toilets. The use of community toilets was reported in Loni and Banda. The respondents reported that they are paying more than Rs. 5 for using of community/public toilets. More than half of the respondents using community/public toilets were found satisfied. They further reported that the charges for use of community/public toilets are reasonable (Table 4.52).

Table: 4.52
Whether You Pay Daily For Use of Community/Public Toilets

City	More Than 5 Rupees	Total
Loni	5	5
	100.0%	100.0%
Banda	4	4
	100.0%	100.0%
Total	**9**	**9**
	100.0%	**100.0%**

Source: Field Survey

Main problem in their areas is shown in Table 4.53. Lack of toilets, inadequacy of toilets, flies and termites, disposal of local sludge in area, blocking of toilets, dirty toilets, dilapidated toilets, long distance of toilets, filling of tank of toilets are some of the main problems being faced by the residence.

Table: 4.53
Main Problem In Your Area

Problems	Mirzapur	Loni	Banda	Bahraich	Total
Lack Of Toilets	0	1	125	124	250
	0.0%	0.7%	83.9%	81.6%	41.1%
Inadequate Of Toilets	0	1	73	21	95
	0.0%	0.7%	49.0%	13.8%	15.6%
Dirty Toilets	0	0	4	2	6
	0.0%	0.0%	2.7%	1.3%	1.0%
Dilapidated Toilet	1	4	6	5	16
	0.6%	2.6%	4.0%	3.3%	2.6%
Blocking Of Toilet	1	0	1	6	8
	0.6%	0.0%	0.7%	3.9%	1.3%
Poor Maintenance Of Toilet	0	0	0	4	4
	0.0%	0.0%	0.0%	2.6%	0.7%
Long Distance Of Toilet	0	3	1	5	9
	0.0%	2.0%	0.7%	3.3%	1.5%
Insecurity Use Of Toilet In Night	1	1	0	0	2
	0.6%	0.7%	0.0%	0.0%	0.3%
Bad Odor From Toilet	1	1	0	3	5
	0.6%	0.7%	0.0%	2.0%	0.8%
Lack Of Electricity In Toilet	0	0	0	2	2
	0.0%	0.0%	0.0%	1.3%	0.3%
Filling Of Tank Of Toilet	0	0	6	4	10
	0.0%	0.0%	4.0%	2.6%	1.6%
Use Of Toilet Is Costly	0	3	1	1	5
	0.0%	2.0%	0.7%	0.7%	0.8%
Disposal Of Local Sludge In Area	0	0	0	17	17
	0.0%	0.0%	0.0%	11.2%	2.8%
Breakage Of Pets	0	0	0	5	5
	0.0%	0.0%	0.0%	3.3%	0.8%
Flies And Termites	3	0	0	17	20
	1.9%	0.0%	0.0%	11.2%	3.3%
Lack Of Privacy In Toilet	1	1	0	2	4
	0.6%	0.7%	0.0%	1.3%	0.7%
Multi Users Of Toilets	1	0	0	4	5
	0.6%	0.0%	0.0%	2.6%	0.8%
No Problem	0	3	0	0	3
	0.0%	2.0%	0.0%	0.0%	0.5%
Cannot Say /Do Not Know	0	1	1	1	3
	0.0%	0.7%	0.7%	0.7%	0.5%
Others	0	0	0	4	4
	0.0%	0.0%	0.0%	2.6%	0.7%

Source: Field Survey

The respondents were asked that whether they think that all persons of their family are using toilets. Most of the respondents reported that all persons from their family are using toilet. However, about half of the respondents in Bahraich were either neutral on the view point or not aware that whether their family members are using toilets. (Table 4.54).

Table: 4.54
Do You Think That All Persons of Your Family Are Using Toilets

City	Yes	No	Cannot Say	Total
Mirzapur	149	4	4	157
	94.9%	2.5%	2.5%	100.0%
Loni	151	0	0	151
	100.0%	0.0%	0.0%	100.0%
Banda	121	11	17	149
	81.2%	7.4%	11.4%	100.0%
Bahraich	75	20	57	152
	49.3%	13.2%	37.5%	100.0%
Total	**496**	**35**	**78**	**609**
	81.4%	**5.7%**	**12.8%**	**100.0%**

Source: Field Survey

The respondents were asked that whether they have constructed toilet under SBM. About 15 per cent respondents revealed that they have constructed toilets under SBM. It was found more pronouncing in Mirzapur (30.6 per cent) followed by Banda (20.1 per cent) (Table 4.55).

Table: 4.55
Whether You Have Constructed Toilet Under SBM

City	Yes	No	Total
Mirzapur	48	109	157
	30.6%	69.4%	100.0%
Loni	4	147	151
	2.6%	97.4%	100.0%
Banda	30	119	149
	20.1%	79.9%	100.0%
Bahraich	9	143	152
	5.9%	94.1%	100.0%
Total	**91**	**518**	**609**
	14.9%	**85.1%**	**100.0%**

Source: Field Survey

Source of information on SBM is shown in Table 4.56. Major source of information on SBM was reported to be media mainly electronic media. However, a significant proportion of respondents in Mirzapur reported that government workers inform them about SBM Mission.

Table: 4.56
Source Of Information on SBM

City	Electronic Media	Print Media	Government Worker	Ward Counselor	Others
Mirzapur	68	8	30	2	0
	43.3%	5.1%	19.1%	1.3%	0.0%
Loni	6	3	2	0	0
	4.0%	2.0%	1.3%	0.0%	0.0%
Banda	120	36	5	0	2
	80.5%	24.2%	3.4%	0.0%	1.3%
Bahraich	94	19	5	0	5
	61.8%	12.5%	3.3%	0.0%	3.3%
Total	**288**	**66**	**42**	**2**	**7**
	47.3%	**10.8%**	**6.9%**	**0.3%**	**1.1%**

Source: Field Survey

The respondents were asked that whether they received subsidy for construction of toilets. More than 3/4th respondents revealed that they received subsidy for construction of toilets under SBM. However, about 60 per cent respondents in Banda and more than 2/5th respondents in Bahraich reported that they could not get subsidy for construction of toilets (Table 4.57).

Table: 4.57
Whether You Received Subsidy for Construction of Toilets

City	Yes	No	Total
Mirzapur	48	0	48
	100.0%	0.0%	100.0%
Loni	4	0	4
	100.0%	0.0%	100.0%
Banda	12	18	30
	40.0%	60.0%	100.0%
Bahraich	5	4	9
	55.6%	44.4%	100.0%
Total	**69**	**22**	**91**
	75.8%	**24.2%**	**100.0%**

Source: Field Survey

Cost of toilet construction is shown in Table 4.58. About half of the respondents reported that cost of toilet construction has been less than Rs. 15000. It was found more pronouncing in Bahraich followed by Banda. However, cost of construction of toilets was reported high in MIrzapur followed by Loni.

Table: 4.58
Cost of Toilet Construction

City	Less Than 10000	10000-15000	15000-20000	20000 - 25000	More Than 25000	Total
Mirzapur	5	4	36	3	0	48
	10.4%	8.3%	75.0%	6.3%	0.0%	100.0%
Loni	2	1	1	0	0	4
	50.0%	25.0%	25.0%	0.0%	0.0%	100.0%
Banda	6	17	5	1	1	30
	20.0%	56.7%	16.7%	3.3%	3.3%	100.0%
Bahraich	3	5	1	0	0	9
	33.3%	55.6%	11.1%	0.0%	0.0%	100.0%
Total	**16**	**27**	**43**	**4**	**1**	**91**
	17.6%	**29.7%**	**47.3%**	**4.4%**	**1.1%**	**100.0%**

Source: Field Survey

The respondents were asked that whether they obtained loan for toilet construction. A negligible proportion of respondents reported that they obtained loan for construction of toilets. It was reported in Bahraich and Banda (Table 4.59).

Table: 4.59
Whether You Obtained Loan For Toilet Construction

City	Yes	No	Cannot Say	Total
Mirzapur	0	46	2	48
	0.0%	95.8%	4.2%	100.0%
Loni	0	4	0	4
	0.0%	100.0%	0.0%	100.0%
Banda	1	11	18	30
	3.3%	36.7%	60.0%	100.0%
Bahraich	1	6	2	9
	11.1%	66.7%	22.2%	100.0%
Total	**2**	**67**	**22**	**91**
	2.2%	**73.6%**	**24.2%**	**100.0%**

Source: Field Survey

The respondents were asked that they use recently constructed toilet. About 3/4th respondents admitted that they are using recently constructed toilets. However, about 2/3rd respondents in Banda and 1/3rd respondents in Bahraich admitted that they are not using constructed toilets perhaps due to non-availability of water connection, close door etc. (Table 4.60).

Table: 4.60
Do You Use Recently Constructed Toilet

City	Yes	No	Total
Mirzapur	48	0	48
	100.0%	0.0%	100.0%
Loni	3	1	4
	75.0%	25.0%	100.0%
Banda	11	19	30
	36.7%	63.3%	100.0%
Bahraich	6	3	9
	66.7%	33.3%	100.0%
Total	**68**	**23**	**91**
	74.7%	**25.3%**	**100.0%**

Source: Field Survey

Responsibility of cleaning of household individual toilet is shown in Table 4.61. About 2/3rd respondents reported that they themselves bear the responsibility of cleaning of household toilets. About 1/3rd respondents in Bahraich and 1/4th respondents in Loni reported that female members of their house are cleaning household toilets.

Table: 4.61
Responsibility of Cleaning of Household Individual Toilet

City	Self	House Lady	Sweeper
Mirzapur	48	2	0
	100.0%	4.2%	0.0%
Loni	2	1	1
	50.0%	25.0%	25.0%
Banda	7	4	0
	23.3%	13.3%	0.0%
Bahraich	4	3	0
	44.4%	33.3%	0.0%
Total	**61**	**10**	**1**
	67.0%	**11.0%**	**1.1%**

Source: Field Survey

The respondents were asked that whether toilet of their house is connected with sever line. About 1/4th respondents in Mirzapur reported that their toilets are connected with sever line. Thus, most of the respondents most of the respondents reported that they are depend on septic tank. It is t be noted that partial coverage of sever line has been reported in Loni and Banda and thus, a significant proportion of household have got connection of their toilet with sever line besides connecting with septic tank (Table 4.62).

Table: 4.62
Whether Toilet of Your House Is Connected With Sever Line

City	Yes	No	Not Applicable	Both	Total
Mirzapur	38	119	0	0	157
	24.2%	75.8%	0.0%	0.0%	100.0%
Loni	0	129	5	17	151
	0.0%	85.4%	3.3%	11.3%	100.0%
Banda	0	120	4	25	149
	0.0%	80.5%	2.7%	16.8%	100.0%
Bahraich	0	147	0	5	152
	0.0%	96.7%	0.0%	3.3%	100.0%
Total	**38**	**515**	**9**	**47**	**609**
	6.2%	**84.6%**	**1.5%**	**7.7%**	**100.0%**

Source: Field Survey

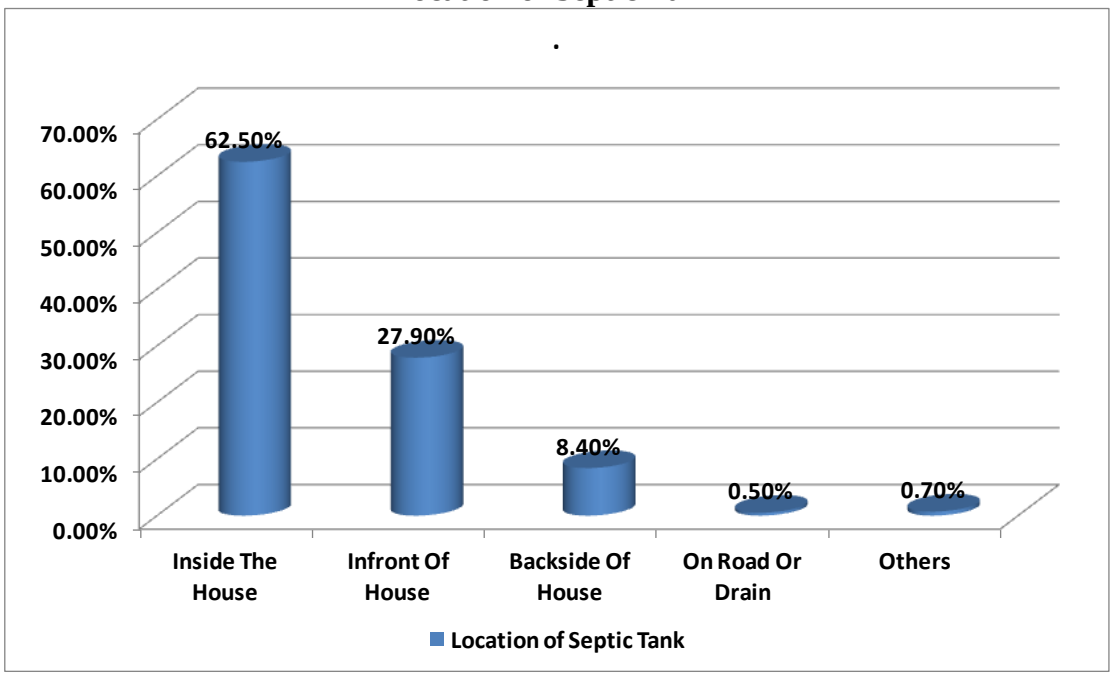
Location of septic tank is shown in Table 4.63. About 62 per cent respondents reported that septic tank is located inside their house. It was found more pronouncing in Loni (80.1 per cent (followed by Mirzapur (79.8 per cent). More than half of the respondents in Bahraich reported that septic tank is located in front or backside of their house. Similarly about 2/5th respondents in Banda admitted that septic tank is located inside or backside of their house.

Table: 4.63
Location of Septic Tank

City	Inside The House	Infront Of House	Backside Of House	On Road Or Drain	Others	Total
Mirzapur	95	22	0	1	1	119
	79.8%	18.5%	0.0%	0.8%	0.8%	100.0%
Loni	117	19	7	0	3	146
	80.1%	13.0%	4.8%	0.0%	2.1%	100.0%
Banda	72	54	18	1	0	145
	49.7%	37.2%	12.4%	0.7%	0.0%	100.0%
Bahraich	67	62	22	1	0	152
	44.1%	40.8%	14.5%	0.7%	0.0%	100.0%
Total	**351**	**157**	**47**	**3**	**4**	**562**
	62.5%	**27.9%**	**8.4%**	**0.5%**	**0.7%**	**100.0%**

Source: Field Survey

Chart: 4.10
Location of Septic Tank



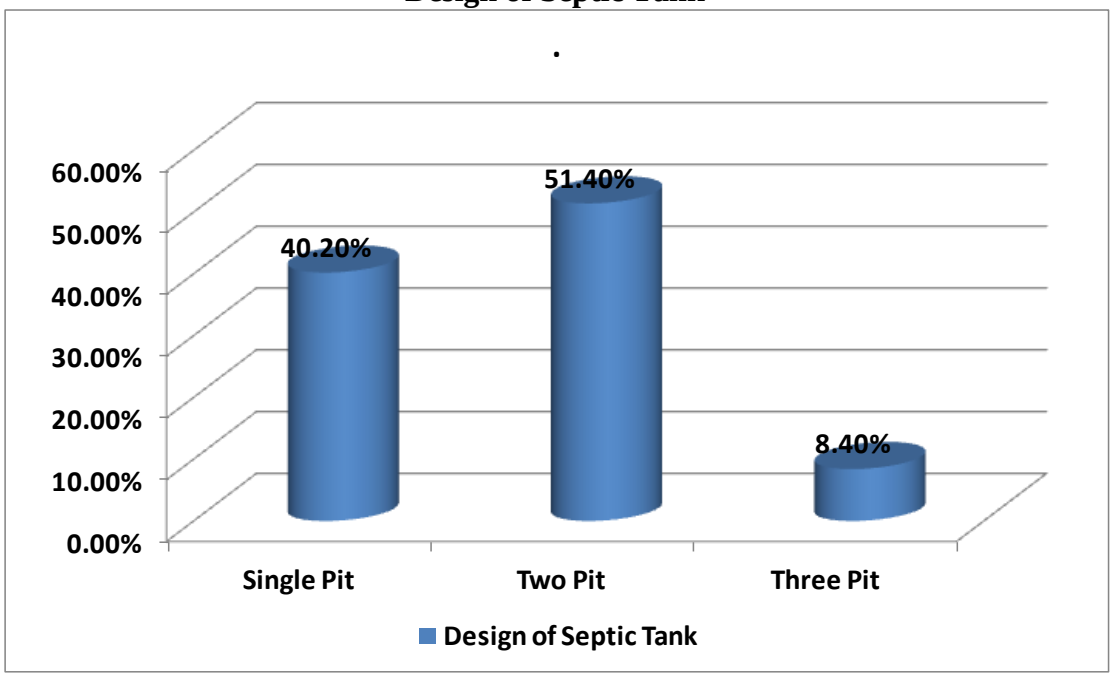
Design of septic tank is shown in Table 4.64. More than half of the respondents reported that they have 2 pits septic tank. It was found more pronouncing in Banda followed by Bahraich. However, more than half of the respondents in Loni and Mirzapur reported that they have single pit septic tank. A significant proportion of respondents in Bahraich and Banda reported that they have three pit toilets.

Table: 4.64
Design of Septic Tank

City	Single Pit	Two Pit	Three Pit	Total
Mirzapur	62	49	8	119
	52.1%	41.2%	6.7%	100.0%
Loni	81	64	1	146
	55.5%	43.8%	0.7%	100.0%
Banda	43	87	15	145
	29.7%	60.0%	10.3%	100.0%
Bahraich	40	89	23	152
	26.3%	58.6%	15.1%	100.0%
Total	**226**	**289**	**47**	**562**
	40.2%	**51.4%**	**8.4%**	**100.0%**

Source: Field Survey

Chart: 4.11
Design of Septic Tank



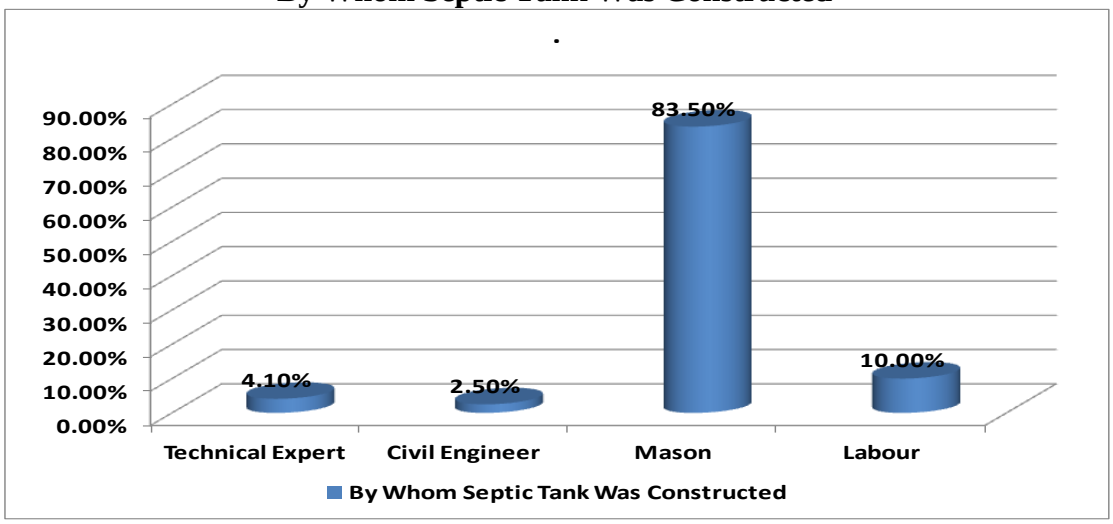
The respondents were asked that by whom septic tank was constructed. Most of the respondents revealed that their septic tank were constructed by Mason without technical guidance. Even a significant proportion of respondents in Mirzapur and Loni reported that septic tank were constructed by labours. Thus, about 12 perc ent respondents in Mirzapur admitted that septic tanks were constructed under the supervision of technical experts (Table 4.65).

Table: 4.65
By Whom Septic Tank Was Constructed

City	Technical Expert	Civil Engineer	Mason	Labour	Total
Mirzapur	15	0	80	24	119
	12.6%	0.0%	67.2%	20.2%	100.0%
Loni	8	3	106	29	146
	5.5%	2.1%	72.6%	19.9%	100.0%
Banda	0	7	136	2	145
	0.0%	4.8%	93.8%	1.4%	100.0%
Bahraich	0	4	147	1	152
	0.0%	2.6%	96.7%	0.7%	100.0%
Total	**23**	**14**	**469**	**56**	**562**
	4.1%	**2.5%**	**83.5%**	**10.0%**	**100.0%**

Source: Field Survey

Chart: 4.12
By Whom Septic Tank Was Constructed



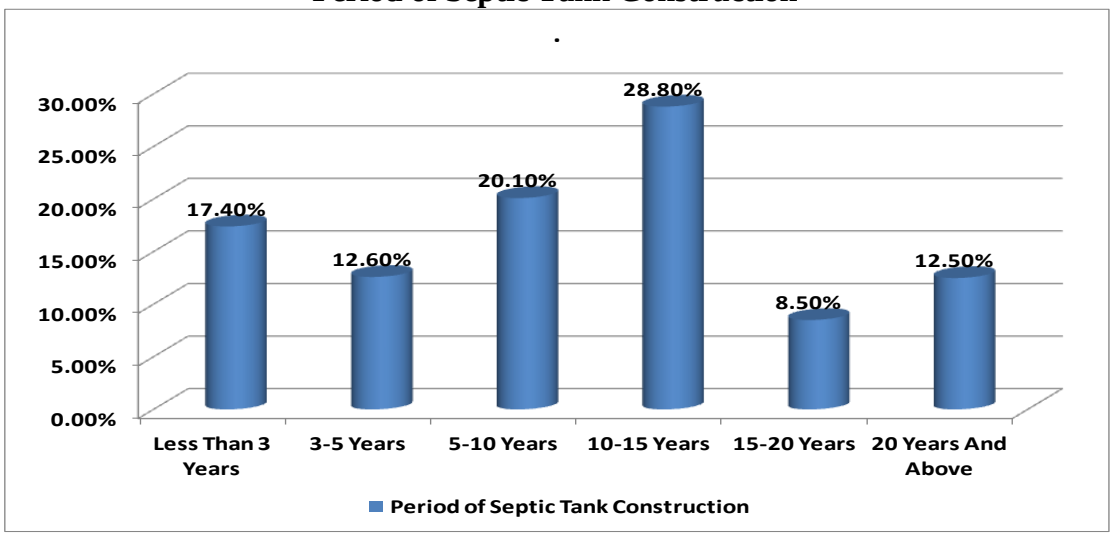
Period of septic tank construction is shown in Table 4.66. About 1/3rd respondents reported that they constructed septic tank recently that is less than 5 years. However, about half of the respondents reported that they constructed their septic tank before 5-15 years. About 20 per cent respondents further reported that they constructed their septic tank before `15 years.

Table: 4.66
Period of Septic Tank Construction

City	Less Than 3 Years	3-5 Years	5-10 Years	10-15 Years	15-20 Years	20 Years And Above	Total
Mirzapur	61	17	9	13	3	16	119
	51.3%	14.3%	7.6%	10.9%	2.5%	13.4%	100.0%
Loni	21	18	29	52	13	13	146
	14.4%	12.3%	19.9%	35.6%	8.9%	8.9%	100.0%
Banda	6	18	44	48	2	27	145
	4.1%	12.4%	30.3%	33.1%	1.4%	18.6%	100.0%
Bahraich	10	18	31	49	30	14	152
	6.6%	11.8%	20.4%	32.2%	19.7%	9.2%	100.0%
Total	**98**	**71**	**113**	**162**	**48**	**70**	**562**
	17.4%	**12.6%**	**20.1%**	**28.8%**	**8.5%**	**12.5%**	**100.0%**

Source: Field Survey

Chart: 4.13
Period of Septic Tank Construction



Frequency of septic tank filling is shown in Table 4.67. About 18 per cent respondents reported that their septic tanks are still not filled. It was found more pronouncing in Mirzapur (95 per cent) followed by Banda (85.5 per cent). Thus, about 20 per cent respondents reported that their septic tanks filled during 3-15 years interval.

Table: 4.67
Frequency of Septic Tank Filling

City	Less Than 3 Years	3-5 Years	5-10 Years	10-15 Years	Not Filled	Total
Mirzapur	0	0	1	5	113	119
	0.0%	0.0%	0.8%	4.2%	95.0%	100.0%
Loni	3	18	12	9	104	146
	2.1%	12.3%	8.2%	6.2%	71.2%	100.0%
Banda	1	4	6	10	124	145
	0.7%	2.8%	4.1%	6.9%	85.5%	100.0%
Bahraich	0	3	25	16	108	152
	0.0%	2.0%	16.4%	10.5%	71.1%	100.0%
Total	**4**	**25**	**44**	**40**	**449**	**562**
	0.7%	**4.4%**	**7.8%**	**7.1%**	**79.9%**	**100.0%**

Source: Field Survey

Disposal of waste water of septic tank in case of not filling is shown in Table 4.68. Those who reported that their septic tanks are filled further said that they dispose septic tank sludge and waste water into closed drains, water bodies and sever line.

Table: 4.68
Disposal of Waste Water of Septic Tank in Case of Not Filling

City	Disposal In Closed Drain	Flow In Sever Line	Flow In Pond/ Lake
Mirzapur	28	9	31
	23.5%	7.6%	26.1%
Loni	11	4	22
	7.5%	2.7%	15.1%
Banda	4	0	3
	2.8%	0.0%	2.1%
Bahraich	49	9	0
	32.2%	5.9%	0.0%
Total	**92**	**22**	**56**
	16.4%	**3.9%**	**10.0%**

Source: Field Survey

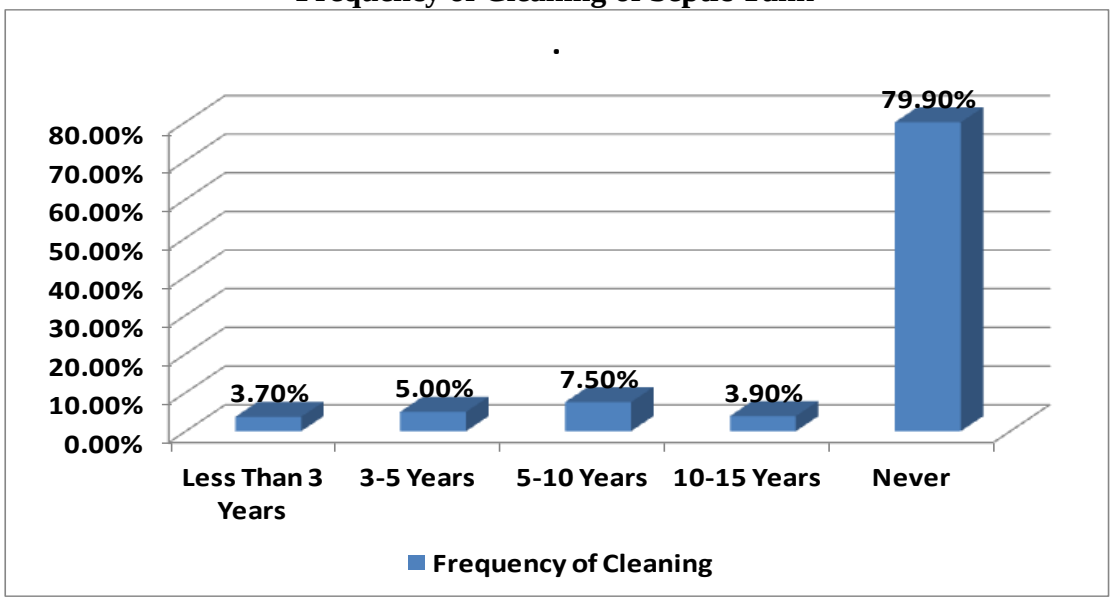
Frequency of cleaning of septic tank is shown in Table 4.69. A significant proportion of respondents reported that they clean their septic tank in the interval of 3-15 years period.

Table: 4.69
Frequency of Cleaning of Septic Tank

City	Less Than 3 Years	3-5 Years	5-10 Years	10-15 Years	Never	Total
Mirzapur	0	1	5	0	113	119
	0.0%	0.8%	4.2%	0.0%	95.0%	100.0%
Loni	10	10	12	10	104	146
	6.8%	6.8%	8.2%	6.8%	71.2%	100.0%
Banda	3	2	7	9	124	145
	2.1%	1.4%	4.8%	6.2%	85.5%	100.0%
Bahraich	8	15	18	3	108	152
	5.3%	9.9%	11.8%	2.0%	71.1%	100.0%
Total	**21**	**28**	**42**	**22**	**449**	**562**
	3.7%	**5.0%**	**7.5%**	**3.9%**	**79.9%**	**100.0%**

Source: Field Survey

Chart: 4.14
Frequency of Cleaning of Septic Tank



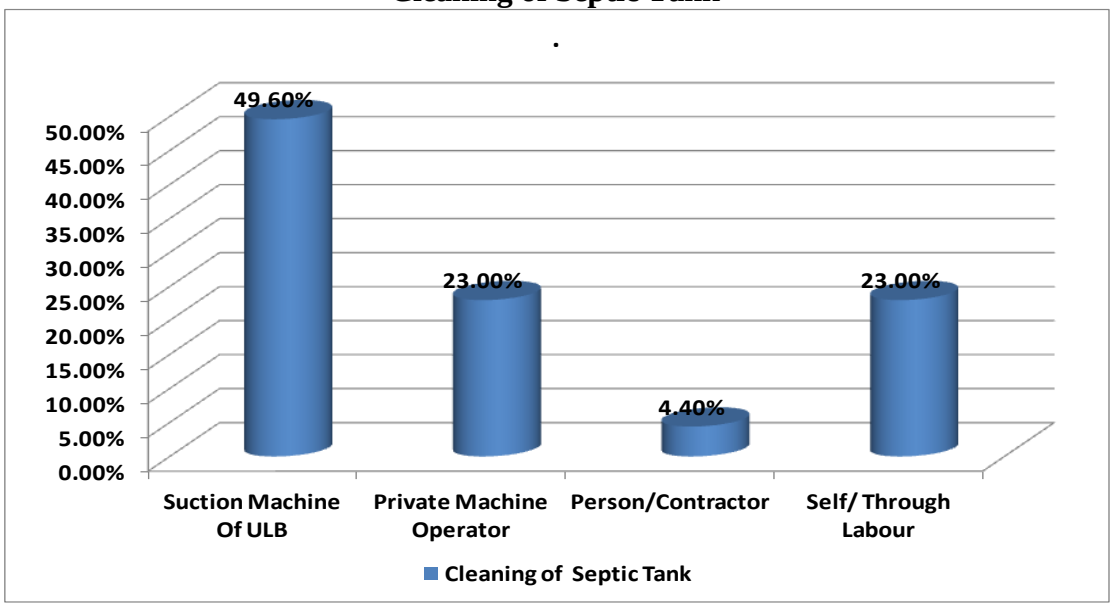
Cleaning of septic tank is shown in Table 4.70. Septic tanks are being cleaned by mainly suction machine of ULBs, private machine operators and contractors. However, about 1/4th respondents admitted that they themselves cleaned septic tank with the help of labours. It was found more pronouncing in Bahraich followed by Banda.

Table: 4.70
Cleaning of Septic Tank

City	Suction Machine Of Ulb	Private Machine Operator	Person/Contractor	Self/ Through Labour	Total
Mirzapur	4	1	0	1	6
	66.7%	16.7%	0.0%	16.7%	100.0%
Loni	9	25	5	3	42
	21.4%	59.5%	11.9%	7.1%	100.0%
Banda	16	0	0	5	21
	76.2%	0.0%	0.0%	23.8%	100.0%
Bahraich	27	0	0	17	44
	61.4%	0.0%	0.0%	38.6%	100.0%
Total	**56**	**26**	**5**	**26**	**113**
	49.6%	**23.0%**	**4.4%**	**23.0%**	**100.0%**

Source: Field Survey

Chart: 4.15
Cleaning of Septic Tank



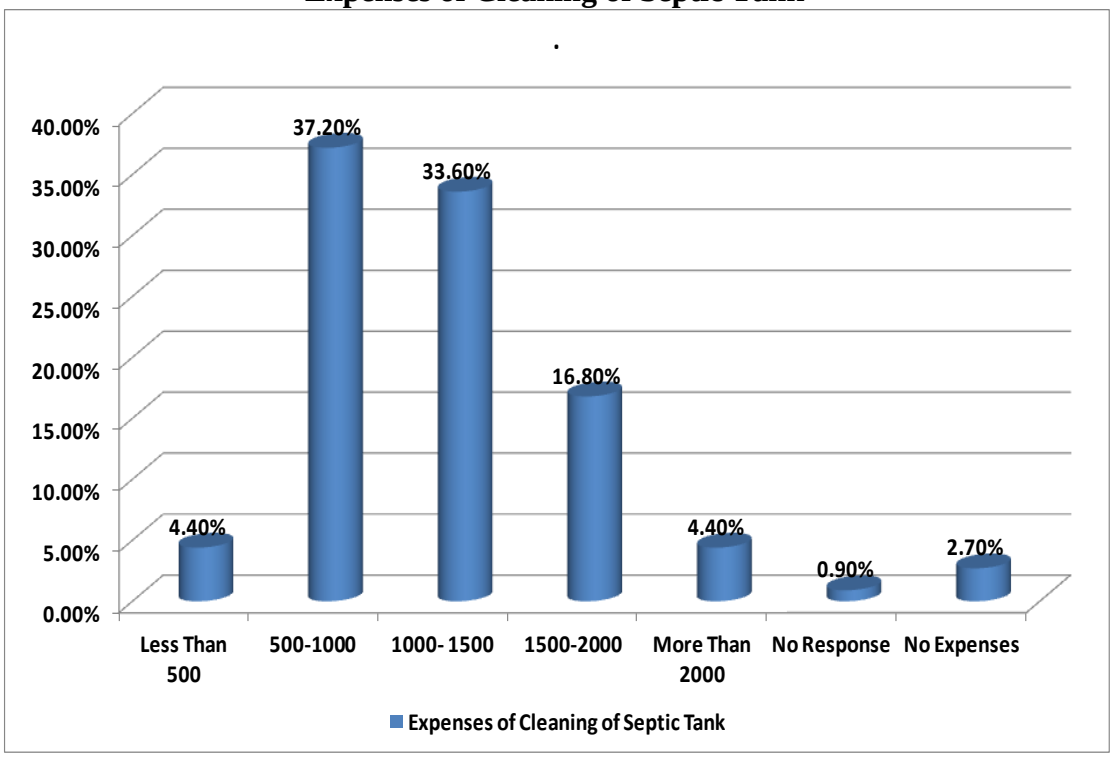
Expenses of cleaning of septic tank are shown in Table 4.71. About 2/5th respondents admitted that the cost of cleaning of septic tank was less than Rs. 1000. However, more than half of the respondents admitted that the cost of one time cleaning of septic tank was more than Rs. 1000.

Table: 4.71
Expenses of Cleaning of Septic Tank

City	Less Than 500	500-1000	1000-1500	1500-2000	More Than 2000	No Response	No Expenses	Total
Mirzapur	1	0	2	2	1	0	0	6
	16.7%	0.0%	33.3%	33.3%	16.7%	0.0%	0.0%	100.0%
Loni	2	10	20	4	4	0	2	42
	4.8%	23.8%	47.6%	9.5%	9.5%	0.0%	4.8%	100.0%
Banda	2	5	6	8	0	0	0	21
	9.5%	23.8%	28.6%	38.1%	0.0%	0.0%	0.0%	100.0%
Bahraich	0	27	10	5	0	1	1	44
	0.0%	61.4%	22.7%	11.4%	0.0%	2.3%	2.3%	100.0%
Total	**5**	**42**	**38**	**19**	**5**	**1**	**3**	**113**
	4.4%	**37.2%**	**33.6%**	**16.8%**	**4.4%**	**0.9%**	**2.7%**	**100.0%**

Source: Field Survey

Chart: 4.16
Expenses of Cleaning of Septic Tank



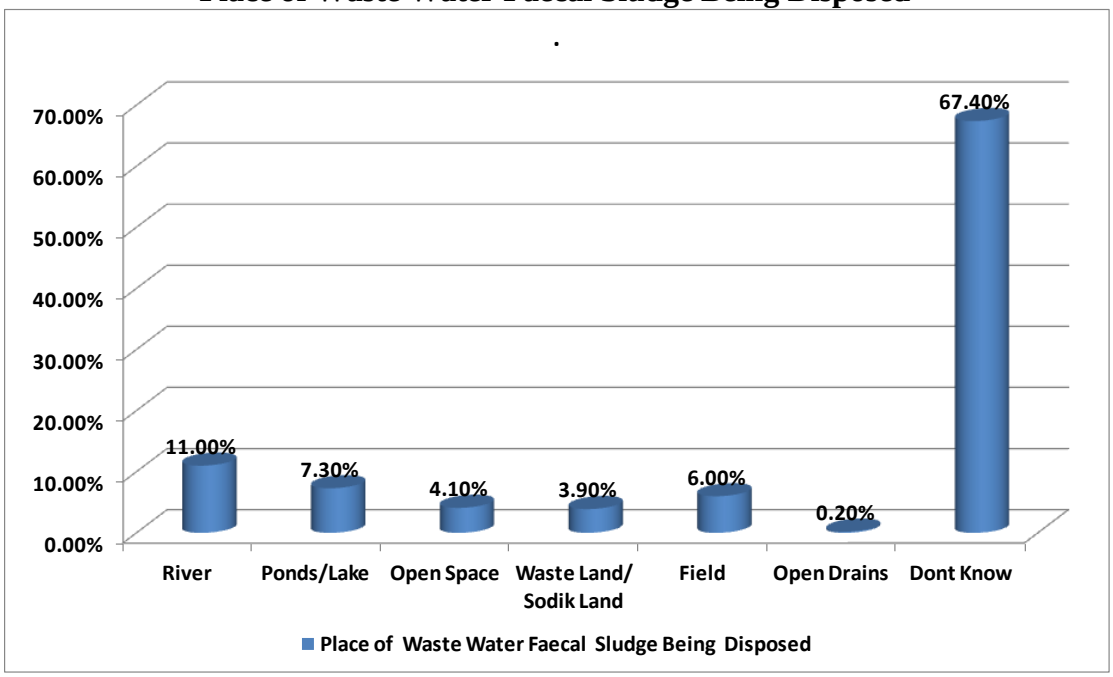
Place of was water faecal sludge being disposed is shown in Table 4.72. Majority of the respondents were not aware about the places of waste wear / facel sludge disposal. However, waste water and septic tank sludge is not being properly collected, treated and scientifically disposed off in many local bodies.

Table: 4.72
Place of Waste Water Faecal Sludge Being Disposed

City	River	Ponds/Lake	Open Space	Waste Land/ Sodik Land	Field	Open Drains	Dont Know	Total
Mirzapur	2	1	2	9	8	0	97	119
	1.7%	0.8%	1.7%	7.6%	6.7%	0.0%	81.5%	100.0%
Loni	5	13	6	8	11	1	102	146
	3.4%	8.9%	4.1%	5.5%	7.5%	0.7%	69.9%	100.0%
Banda	3	5	12	2	7	0	116	145
	2.1%	3.4%	8.3%	1.4%	4.8%	0.0%	80.0%	100.0%
Bahraich	52	22	3	3	8	0	64	152
	34.2%	14.5%	2.0%	2.0%	5.3%	0.0%	42.1%	100.0%
Total	**62**	**41**	**23**	**22**	**34**	**1**	**379**	**562**
	11.0%	**7.3%**	**4.1%**	**3.9%**	**6.0%**	**0.2%**	**67.4%**	**100.0%**

Source: Field Survey

Chart: 4.17
Place of Waste Water Faecal Sludge Being Disposed



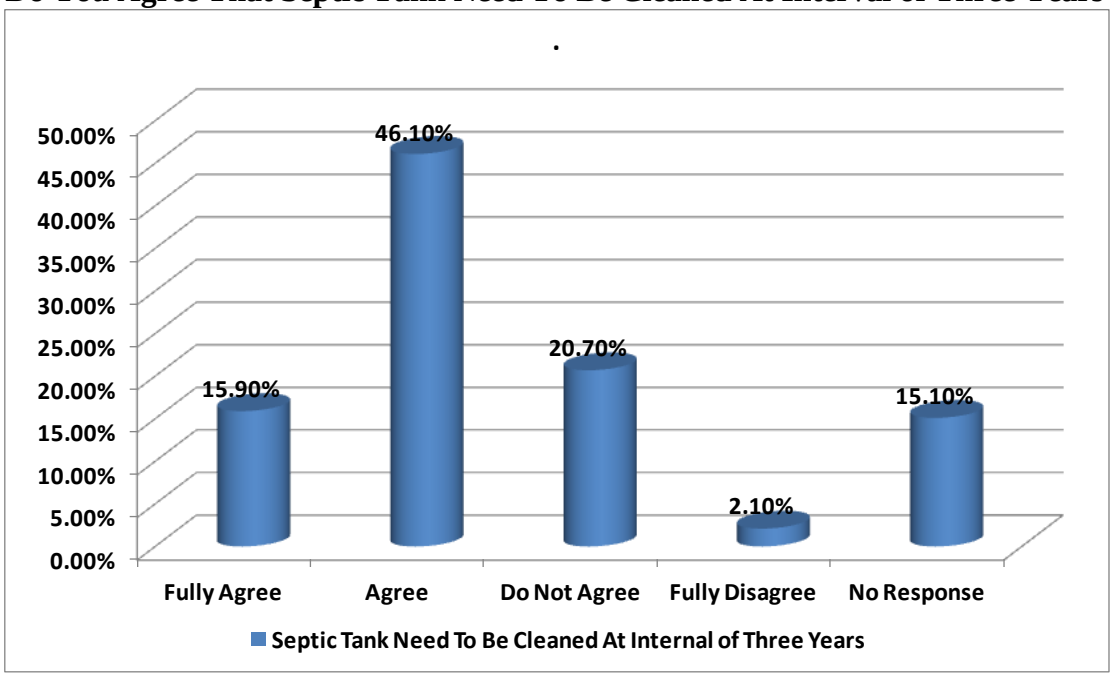
The respondents were asked that whether they agree that septic tank need to be cleaned at interval of three years. About 60 per cent respondents were found agreed on the view point that septic tanks will be regularly cleaned on the interval of 3 yeas period. However, A large proportion of respondents in Mirzapur and Loni were against the view point (Table 4.73).

Table: 4.73
Do You Agree That Septic Tank Need To Be Cleaned At Interval of Three Years

City	Fully Agree	Agree	Do Not Agree	Fully Disagree	No Response	Total
Mirzapur	22	36	46	3	50	157
	14.0%	22.9%	29.3%	1.9%	31.8%	100.0%
Loni	46	60	35	3	7	151
	30.5%	39.7%	23.2%	2.0%	4.6%	100.0%
Banda	14	99	18	1	17	149
	9.4%	66.4%	12.1%	0.7%	11.4%	100.0%
Bahraich	15	86	27	6	18	152
	9.9%	56.6%	17.8%	3.9%	11.8%	100.0%
Total	**97**	**281**	**126**	**13**	**92**	**609**
	15.9%	**46.1%**	**20.7%**	**2.1%**	**15.1%**	**100.0%**

Source: Field Survey

Chart: 4.18
Do You Agree That Septic Tank Need To Be Cleaned At Interval of Three Years



Problems in cleaning of septic tank are shown in Table 4.74. The main problems in cleaning of septic tank include lack of access of suction machine/truck loader to septic tank; lack of funds, lack of public awareness lack of adequate cleaning equipments, lack of truck loaders, lack of technically7 qualified municipal staff and lack of sludge operators.

Table: 4.74
Problems in Cleaning of Septic Tank

City	Lack Of Adequate Cleaning Equipments	Lack Of Access Of Suction Machine / Trucks/ Loader To Septic Tank	Lack Of Truck Loader	Sludge Operator	Lack Of Technically Qualified Municipal Staff	Lack Of Fund	Lack Of Public Awareness	Others
Mirzapur	6	52	13	2	12	19	6	1
	5.0%	43.7%	10.9%	1.7%	10.1%	16.0%	5.0%	0.8%
Loni	31	42	47	23	36	40	32	3
	21.2%	28.8%	32.2%	15.8%	24.7%	27.4%	21.9%	2.1%
Banda	13	15	8	8	5	15	19	0
	9.0%	10.3%	5.5%	5.5%	3.4%	10.3%	13.1%	0.0%
Bahraich	13	19	6	9	2	5	22	0
	8.6%	12.5%	3.9%	5.9%	1.3%	3.3%	14.5%	0.0%
Total	**63**	**128**	**74**	**42**	**55**	**79**	**79**	**4**
	11.2%	**22.8%**	**13.2%**	**7.5%**	**9.8%**	**14.1%**	**14.1%**	**0.7%**

Source: Field Survey

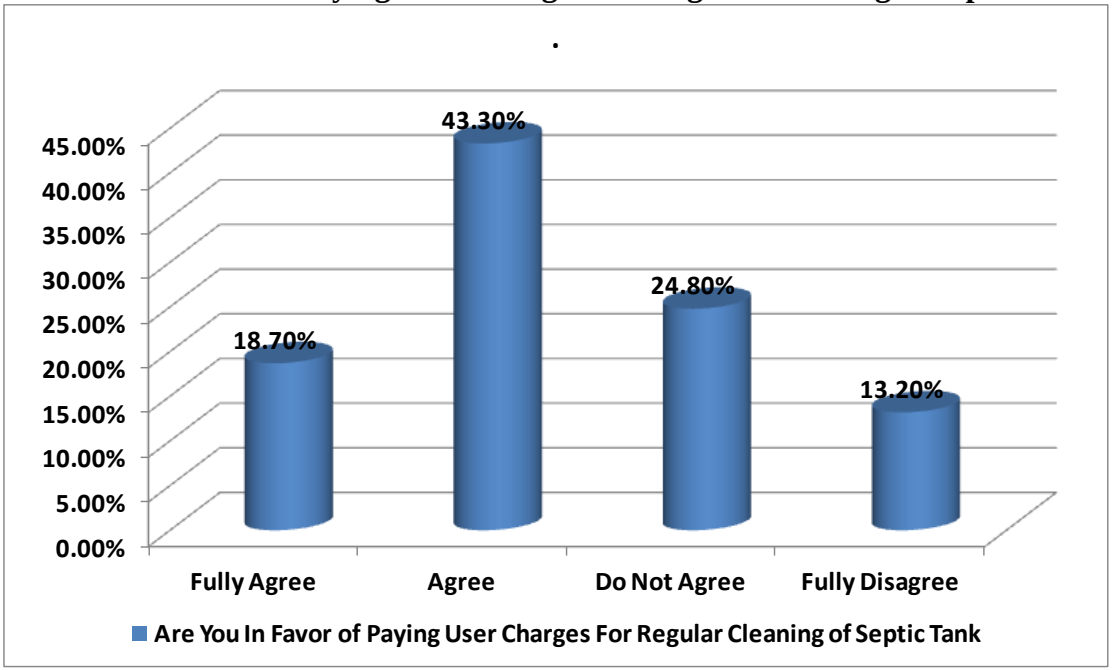
The respondents were asked that whether they in favour of paying user charges for regular cleaning of septic tank. About 60 per cent respondents were willing to pay user charges for regular cleaning of their septic tank. However, a large proportion of respondents in MIrzapur and Bahraich were not willing to pay user charges for cleaning of septic tank (Table 4.75).

Table: 4.75
Are You In Favor of Paying User Charges For Regular Cleaning of Septic Tank

City	Fully Agree	Agree	Do Not Agree	Fully Disagree	Total
Mirzapur	19	41	52	6	118
	16.1%	34.7%	44.1%	5.1%	100.0%
Loni	56	37	23	30	146
	38.4%	25.3%	15.8%	20.5%	100.0%
Banda	18	100	24	3	145
	12.4%	69.0%	16.6%	2.1%	100.0%
Bahraich	12	65	40	35	152
	7.9%	42.8%	26.3%	23.0%	100.0%
Total	**105**	**243**	**139**	**74**	**561**
	18.7%	**43.3%**	**24.8%**	**13.2%**	**100.0%**

Source: Field Survey

Chart: 4.19
Are You In Favor of Paying User Charges For Regular Cleaning of Septic Tank



Willingness to pay if ULB takes the responsibility of regular cleaning of septic tank is shown in Table 4.76. About 57 per cent respondents were found willing to pay provided that ULB takes the responsibility of regular cleaning of septic tank. It was found more pronouncing in Banda followed by Loni.

Table: 4.76
Willingness To Pay If ULB Takes The Responsibility of Regular Cleaning of Septic Tank

City	Yes	No	Total
Mirzapur	53	104	157
	33.8%	66.2%	100.0%
Loni	93	58	151
	61.6%	38.4%	100.0%
Banda	114	35	149
	76.5%	23.5%	100.0%
Bahraich	90	62	152
	59.2%	40.8%	100.0%
Total	**350**	**259**	**609**
	57.5%	**42.5%**	**100.0%**

Source: Field Survey

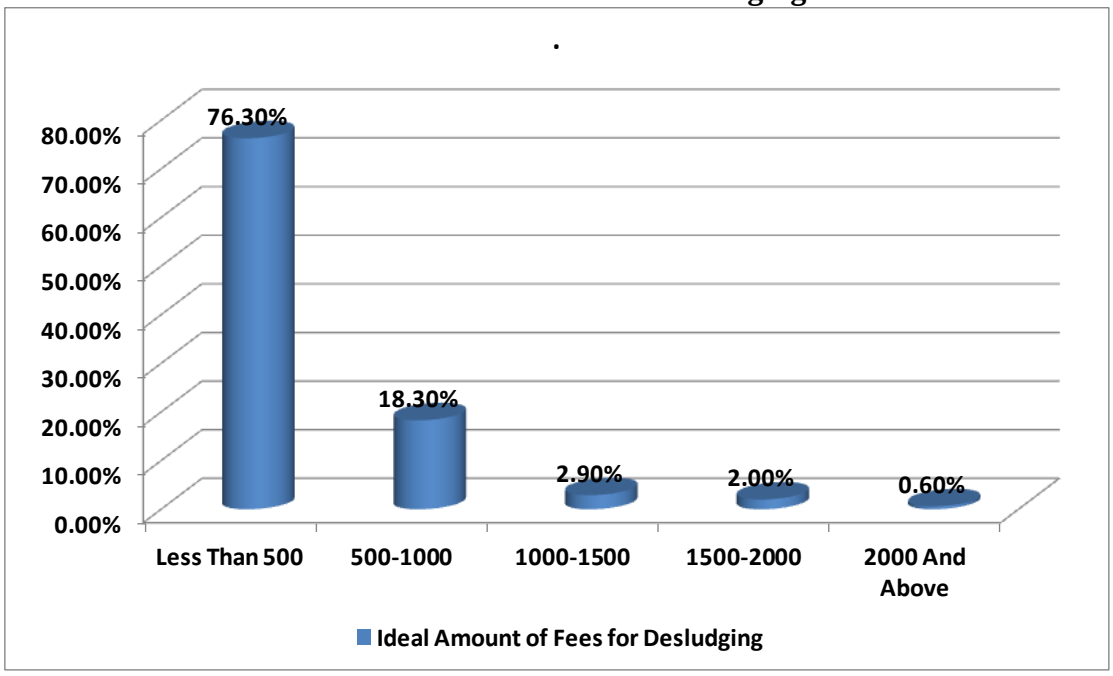
Ideal amount of fees for desludging is shown in Table 4.77. The ideal amount of fee for regular desludging of septic tank was reported to be less than Rs. 1000. However, majority of respondents were in favour of Rs. 500 as user charge for one time cleaning of septic tank.

Table: 4.77
Ideal Amount of Fees for Desludging

City	Less Than 500	500-1000	1000-1500	1500-2000	2000 And Above	Total
Mirzapur	37	14	2	0	0	53
	69.8%	26.4%	3.8%	0.0%	0.0%	100.0%
Loni	61	20	4	6	2	93
	65.6%	21.5%	4.3%	6.5%	2.2%	100.0%
Banda	109	2	2	1	0	114
	95.6%	1.8%	1.8%	0.9%	0.0%	100.0%
Bahraich	60	28	2	0	0	90
	66.7%	31.1%	2.2%	0.0%	0.0%	100.0%
Total	**267**	**64**	**10**	**7**	**2**	**350**
	76.3%	**18.3%**	**2.9%**	**2.0%**	**0.6%**	**100.0%**

Source: Field Survey

Chart: 4.20
Ideal Amount of Fees for Desludging



Level of satisfaction with sanitation is shown in Table 4.78. Most of the respondents were found satisfied with sanitation. However, about 22 per cent respondents in Loni and 10 percent respondents in Bahraich could not respond on the view point.

Table: 4.78
Level of Satisfaction With Sanitation

City	To Great Extent	To Some Extent	Cannot Say	Total
Mirzapur	6	140	11	157
	3.8%	89.2%	7.0%	100.0%
Loni	12	106	33	151
	7.9%	70.2%	21.9%	100.0%
Banda	23	115	11	149
	15.4%	77.2%	7.4%	100.0%
Bahraich	27	110	15	152
	17.8%	72.4%	9.9%	100.0%
Total	**68**	**471**	**70**	**609**
	11.2%	**77.3%**	**11.5%**	**100.0%**

Source: Field Survey

Satisfaction of cleaning of roads/streets is shown in Table 4.79. Most of the respondents were found satisfied with cleaning of roads and street. It was found more pronouncing in Mirzapur followed by Banda.

Table: 4.79
Satisfaction of Cleaning of Roads/ Streets

City	Yes	No	Total
Mirzapur	152	5	157
	96.8%	3.2%	100.0%
Loni	106	45	151
	70.2%	29.8%	100.0%
Banda	121	28	149
	81.2%	18.8%	100.0%
Bahraich	109	43	152
	71.7%	28.3%	100.0%
Total	**488**	**121**	**609**
	80.1%	**19.9%**	**100.0%**

Source: Field Survey

Satisfaction level of sanitation services is shown in Table 4.80. Satisfaction level of sanitation services was found high for collection of waste, sweeping of streets/roads, transportation of solid waste, water supply, flow of water, cleaning of drainage. However, a large promotion of respondents were dissatisfied with cleaning of public toilets, maintenance of sewerage, flow of drinking water and water supply.

Table: 4.80
Satisfaction Level of Sanitation Services

	Very Satisfied	Satisfied	Dissatisfied	Total
Water Supply	48	336	225	609
	7.9%	55.2%	36.9%	100.0%
Flow Of Water	45	324	240	609
	7.4%	53.2%	39.4%	100.0%
Sweeping Of Street/ Road	47	375	187	609
	7.7%	61.6%	30.7%	100.0%
Cleaning Of Drainages	46	327	236	609
	7.6%	53.7%	38.8%	100.0%
Maintenance Of Sewerage	41	254	314	609
	6.7%	41.7%	51.6%	100.0%
Collection Of Waste	46	412	151	609
	7.6%	67.7%	24.8%	100.0%
Transportation Of Solid Waste	43	356	210	609
	7.1%	58.5%	34.5%	100.0%
Cleaning Of Public Toilets	40	223	346	609
	6.6%	36.6%	56.8%	100.0%

Source: Field Survey

Perception Analysis of Municipal Officials

In view of the examining the status of urban sanitation, policy perspective pertaining to institutional arrangements, septage and faecal sludge management, survey of concerned municipal officials in the selected cities has been conducted. In this part of the report, analysis of view perception related to urban sanitation has been ensured. Gender of respondents is shown in Table 4.81. Most of the respondents were males however; one respondent in Mirzapur was female.

Table: 4.81
Gender of Respondents

City	Male	Female	Total
Mirzapur	9	1	10
	90.0%	10.0%	100.0%
Loni	21	0	21
	100.0%	0.0%	100.0%
Banda	6	0	6
	100.0%	0.0%	100.0%
Bahraich	14	0	14
	100.0%	0.0%	100.0%
Total	**50**	**1**	**51**
	98.0%	**2.0%**	**100.0%**

Source: Field Survey.

Age of respondents is shown in Table 4.82. About 55 per cent respondents were from the age group of less than 35 years. This was found more pronouncing in Bahraich (64.3 percent) followed by Banda (50 percent). About 45 per cent respondents were from the age group of 35-55 years. This was found more pronouncing in Mirzapur (60 per cent).

Table: 4.82
Age of Respondents

City	Less than 25 years	25-35 years	35-45 years	45-55 years	55 years and above	Total
Mirzapur	1	2	3	3	1	10
	10.0%	20.0%	30.0%	30.0%	10.0%	100.0%
Loni	0	8	6	4	3	21
	0.0%	38.1%	28.6%	19.0%	14.3%	100.0%
Banda	0	3	1	1	1	6
	0.0%	50.0%	16.7%	16.7%	16.7%	100.0%
Bahraich	3	6	4	1	0	14
	21.4%	42.9%	28.6%	7.1%	0.0%	100.0%
Total	**4**	**19**	**14**	**9**	**5**	**51**
	7.8%	**37.3%**	**27.5%**	**17.6%**	**9.8%**	**100.0%**

Source: Field Survey.

Education of respondents is shown in Table 4.83. About 2/5th respondents were graduates while about 16 per cent respondents were postgraduates. The proportion of graduate and post graduate respondents was recorded high in Mirzapur followed by Bahraich. About 1/3rd respondents in Banda were technically qualified while about 10 per cent respondents in Mirzapur were professionals.

Table: 4.83
Education of Respondents

City	Graduate	Post Graduate	Technical	Professional	Other	Total
Mirzapur	7	1	0	1	1	10
	70.0%	10.0%	0.0%	10.0%	10.0%	100.0%
Loni	4	2	1	0	14	21
	19.0%	9.5%	4.8%	0.0%	66.7%	100.0%
Banda	3	1	2	0	0	6
	50.0%	16.7%	33.3%	0.0%	0.0%	100.0%
Bahraich	7	4	0	0	3	14
	50.0%	28.6%	0.0%	0.0%	21.4%	100.0%
Total	**21**	**8**	**3**	**1**	**18**	**51**
	41.2%	**15.7%**	**5.9%**	**2.0%**	**35.3%**	**100.0%**

Source: Field Survey.

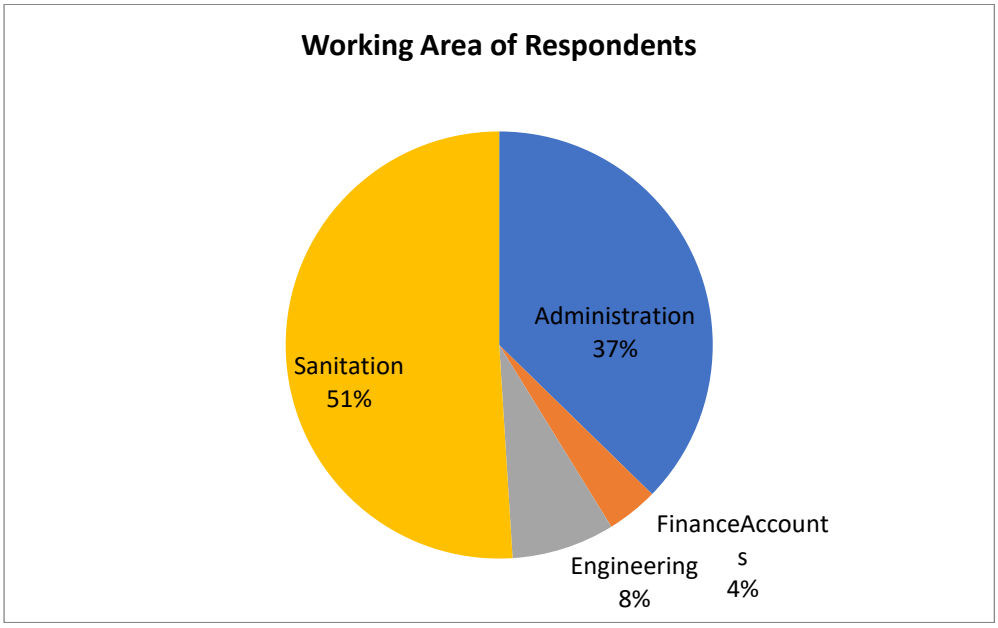
Working area of respondents is shown in Table 4.84. More thasn half of the respondents were engaged in sanitation work. It was found more pronouncing in Mirzapur (70 per cent) followed by Loni (52.4 per cent) and Bahraich (50 per cent). Thus, about 37 per cent respondents were from administrative wing of ULBs. This was found more pronouncing in Bahraich followed by Loni. About 2/3rd respondents in Banda were from engineering wing.

Table: 4.84
Working Area of Respondents

City	Administration	Finance/Accounts	Engineering	Sanitation	Total
Mirzapur	2	1	0	7	10
	20.0%	10.0%	0.0%	70.0%	100.0%
Loni	9	1	0	11	21
	42.9%	4.8%	0.0%	52.4%	100.0%
Banda	1	0	4	1	6
	16.7%	0.0%	66.7%	16.7%	100.0%
Bahraich	7	0	0	7	14
	50.0%	0.0%	0.0%	50.0%	100.0%
Total	**19**	**2**	**4**	**26**	**51**
	37.3%	**3.9%**	**7.8%**	**51.0%**	**100.0%**

Source: Field Survey.

Chart: 4.21



Nature of job is shown in Table 4.85. About 61 per cent respondents reported that they are permanent. It was found more pronouncing in Banda (83.3 per cent) followed by Mirzapur (80 per cent) and Bahraich (71.4 per cent). More than 1/4th respondents were on contractual and outsourcing basis. This was found more pronouncing in Loni (57.1 per cent).

Table: 4.85
Nature of Job

City	Permanent	Temporary	Contractual	Outsourcing	Others	Total
Mirzapur	8	0	1	0	1	10
	80.0%	0.0%	10.0%	0.0%	10.0%	100.0%
Loni	8	1	10	2	0	21
	38.1%	4.8%	47.6%	9.5%	0.0%	100.0%
Banda	5	0	1	0	0	6
	83.3%	0.0%	16.7%	0.0%	0.0%	100.0%
Bahraich	10	4	0	0	0	14
	71.4%	28.6%	0.0%	0.0%	0.0%	100.0%
Total	**31**	**5**	**12**	**2**	**1**	**51**
	60.8%	**9.8%**	**23.5%**	**3.9%**	**2.0%**	**100.0%**

Source: Field Survey.

Presently AMRUT, Swachch Bharat Mission, Pradhan Mantri Housing for All, DAY-NULM are being implemented in all the selected cities. However, Namami Gange is also being implemented in Mirzapur Nagar Palika Parishad. All the respondents reported that ULBs are responsible for sanitation in their jurisdiction areas. However, more than half of the respondents reported that ULBs are responsible for water supply. Water supply is being ensured by Jal Sansthan in Banda and Bahraich. Jal Sansthan is being administered by U.P. Jal Nigam (Table 4.86).

Table: 4.86
Who Is Responsible For Water Supply

City	ULB	Jal Nigam / Water Works	Others	Both	Total
Mirzapur	9	0	0	1	10
	90.0%	0.0%	0.0%	10.0%	100.0%
Loni	9	12	0	0	21
	42.9%	57.1%	0.0%	0.0%	100.0%
Banda	0	6	0	0	6
	0.0%	100.0%	0.0%	0.0%	100.0%
Bahraich	10	3	1	0	14
	71.4%	21.4%	7.1%	0.0%	100.0%
Total	**28**	**21**	**1**	**1**	**51**
	54.9%	**41.2%**	**2.0%**	**2.0%**	**100.0%**

Source: Field Survey.

Most of the respondents reported that ULBs are responsible for solid waste management. However, a significant proportion of respondents in Bahraich and Loni reported that other agencies are also responsible for solid waste management. It is to be noted that in

these cities, private agencies have been empanelled for door to door waste collection and its disposal (Table 4.87).

Table: 4.87
Who Is Responsible For Solid Waste Disposal

City	ULB	Others	Both	Total
Mirzapur	10	0	0	10
	100.0%	0.0%	0.0%	100.0%
Loni	18	3	0	21
	85.7%	14.3%	0.0%	100.0%
Banda	5	0	1	6
	83.3%	0.0%	16.7%	100.0%
Bahraich	13	1	0	14
	92.9%	7.1%	0.0%	100.0%
Total	**46**	**4**	**1**	**51**
	90.2%	**7.8%**	**2.0%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether roads, streets in slums of city are being sweeped daily. Most of the respondents reported that roads and streets of urban areas and slums are being sweeped daily. However, a significant proportion of respondents in Banda were against the view point (Table 4.88).

Table: 4.88
Whether Roads and Streets in Slums of City Are Sweeped Daily

City	Yes	No	Total
Mirzapur	10	0	10
	100.0%	0.0%	100.0%
Loni	21	0	21
	100.0%	0.0%	100.0%
Banda	5	1	6
	83.3%	16.7%	100.0%
Bahraich	14	0	14
	100.0%	0.0%	100.0%
Total	**50**	**1**	**51**
	98.0%	**2.0%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether there is arrangement of door to door solid waste collection. Most of the respondents reported that there is arrangement of door-to-door solid waste collection. However, door to door waste collection facility is available partially in all the selected local bodies. In Bahraich, door to door waste collection has been outsourced to a private agency while in other cities, municipal sanitary staff is engaged in door-to-door waste collection in some of the wards. Moreover, ULBs have installed compactors and constructed

waste collection points in all the wards. The citizens are dumping their municipal waste in these points and municipal staff is responsible for transportation of waste and its disposal (Table 4.89).

Table: 4.89
Whether There Is Arrangement of Door To Door Solid Waste Collection

City	Yes	No	Total
Mirzapur	9	1	10
	90.0%	10.0%	100.0%
Loni	20	1	21
	95.2%	4.8%	100.0%
Banda	5	1	6
	83.3%	16.7%	100.0%
Bahraich	13	1	14
	92.9%	7.1%	100.0%
Total	**47**	**4**	**51**
	92.2%	**7.8%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether institutional arrangements for waste collection are appropriate. More than 2/3rd respondents were of the view that institutional arrangements for waste collection are appropriate. However, slightly less than half of the respondents in Loni and 1/3rd respondents in Banda were against the view point (Table 4.90).

Table: 4.90
Whether Institutional Arrangement For Waste Collection In Your Area Is Appropriate

City	Yes	No	Total
Mirzapur	8	2	10
	80.0%	20.0%	100.0%
Loni	11	10	21
	52.4%	47.6%	100.0%
Banda	4	2	6
	66.7%	33.3%	100.0%
Bahraich	12	2	14
	85.7%	14.3%	100.0%
Total	**35**	**16**	**51**
	68.6%	**31.4%**	**100.0%**

Source: Field Survey.

Frequency of waste collection is shown in Table 4.91. Most of the respondents reported that waste is collected daily by sanitary staff /private operators. However, a significant proportion of respondents in Banda and Bahraich revealed that waste is being collected on alternate days by sanitation staff and private operators.

Table: 4.91
Frequency of Waste Collection By Sanitary Staff/ Private Operator

City	Daily	Alternate Day	Total
Mirzapur	10	0	10
	100.0%	0.0%	100.0%
Loni	20	1	21
	95.2%	4.8%	100.0%
Banda	5	1	6
	83.3%	16.7%	100.0%
Bahraich	12	2	14
	85.7%	14.3%	100.0%
Total	**47**	**4**	**51**
	92.2%	**7.8%**	**100.0%**

Source: Field Survey.

Means of waste collection are shown in Table 4.92. Multiple means of waste collection are being used in ULBs. Truck/tractors, hand carts and auto rickshaws are being generally used for waste collection in all the ULBs.

Table: 4.92
Means of Waste Collection

	Mirzapur	Loni	Banda	Bahraich	Total
Auto Rickshaw	5	0	2	3	10
	50.0%	0.0%	33.3%	21.4%	19.6%
Thela/ Hand Cart	7	1	6	9	23
	70.0%	4.8%	100.0%	64.3%	45.1%
Truck/ Tractor	6	21	5	9	41
	60.0%	100.0%	83.3%	64.3%	80.4%
Other	7	0	0	1	8
	70.0%	0.0%	0.0%	7.1%	15.7%

Source: Field Survey.

Use of equipment for cleaning of septic tanks/sewer line is shown in Table 4.93. All the selected ULBs reported that they have adequate number of suction machines for desludging of septic tanks and cleaning of sewer line. However, in all the ULBs some private sludge operators from nearby cities are also engaged in desludging of septic tanks as and when they

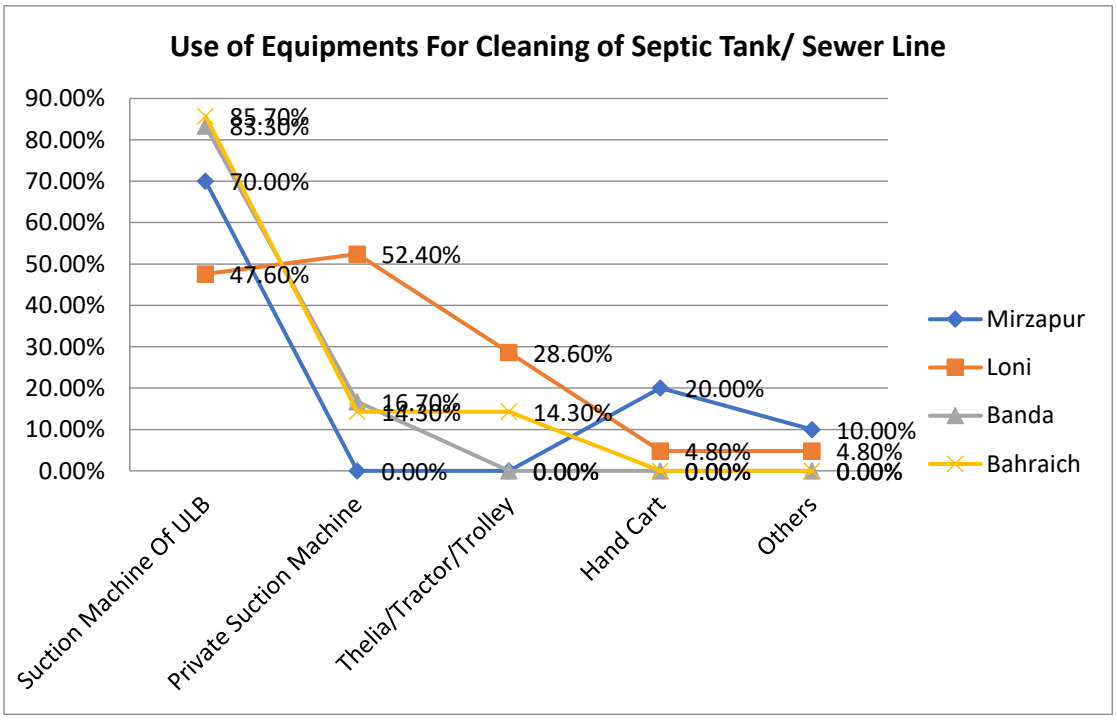
are called by citizens. Officials also reported that tractors/trolleys and hand carts are also being used in cleaning of septic tanks/sewer lines.

Table: 4.93
Use of Equipment For Cleaning of Septic Tank/ Sewer Line

	Mirzapur	Loni	Banda	Bahraich	Total
Suction Machine Of ULB	7	10	5	12	34
	70.0%	47.6%	83.3%	85.7%	66.7%
Private Suction Machine	0	11	1	2	14
	0.0%	52.4%	16.7%	14.3%	27.5%
Honey Suckers	0	0	0	0	0
	0.0%	0.0%	0.0%	0.0%	0.0%
Thelia/Tractor/Trolley	0	6	0	2	8
	0.0%	28.6%	0.0%	14.3%	15.7%
Hand Card	2	1	0	0	3
	20.0%	4.8%	0.0%	0.0%	5.9%
Others	1	1	0	0	2
	10.0%	4.8%	0.0%	0.0%	3.9%

Source: Field Survey.

Chart: 4.22



The respondents were asked that whether sewer line exists in their areas. Sewer line exists partially in Mirzapur and Loni while in Banda and Bahraich, sewer line has been found defunct. There are no sewerage treatment plants in these cities. In Loni, sewer line has been laid down under UIDSSMT. However, connection of toilets with sewer system is being ensured

under AMRUT. Similarly, connection of toilets with sewer system is being ensured under AMRUT in Mirzapur also. However, in other cities, no connection of toilet with sewer system is being undertaken due to lack of functional sewer system (Table 4.94).

Table: 4.94
Whether Sewer Line Exists in City

City	No	Yes	Total
Mirzapur	1	9	10
	10.0%	90.0%	100.0%
Loni	0	21	21
	0.0%	100.0%	100.0%
Banda	5	1	6
	83.3%	16.7%	100.0%
Bahraich	7	7	14
	50.0%	50.0%	100.0%
Total	**13**	**17**	**51**
	25.5%	**33.3%**	**100.0%**

Source: Field Survey.

Most of the respondents reported that water supply arrangement has been ensured in slums. However, a large proportion of respondents in Bahraich (28.6 per cent) and Banda (16.7 per cent) reported that no such arrangement has been made in slums (Table 4.95).

Table: 4.95
Whether Water Supply Arrangement Has Been Ensured In Slums

City	Yes	No	Total
Mirzapur	10	0	10
	100.0%	0.0%	100.0%
Loni	21	0	21
	100.0%	0.0%	100.0%
Banda	5	1	6
	83.3%	16.7%	100.0%
Bahraich	10	4	14
	71.4%	28.6%	100.0%
Total	**46**	**5**	**51**
	90.2%	**9.8%**	**100.0%**

Source: Field Survey.

Source of drinking water in city is shown in Table 4.96. Hand pumps, submersible pumps and tape water supply are main source of drinking water in the surveyed areas. However, multiple source of drinking water were reported in all the cities. It is to be noted that partial water supply through pipe network has been ensured in Banda and Bahraich however, hand pumps and water supply through tankers are also common in these cities. Pipe water supply network was found more prevalent in Mirzapur and Loni.

Table: 4.96
Source of Drinking Water In City

	Mirzapur	Loni	Banda	Bahraich	Total
Tap Water	4	5	2	2	13
	40.0%	23.8%	33.3%	14.3%	25.5%
Hand Pump	9	16	3	12	40
	90.0%	76.2%	50.0%	85.7%	78.4%
Well	3	0	4	0	7
	30.0%	0.0%	66.7%	0.0%	13.7%
Submersible	10	9	0	1	20
	100.0%	42.9%	0.0%	7.1%	39.2%
Others	4	1	1	0	6
	40.0%	4.8%	16.7%	0.0%	11.8%

Source: Field Survey.

Source of drinking water in slums is shown in Table 4.97. Hand pumps, submersible pumps and tape water are main source of drinking water in slum areas. However, sources of drinking water in slums vary across the selected cities.

Table: 4.97
Source of Drinking Water In Slum Area

	Mirzapur	Loni	Banda	Bahraich	Total
Tap water	4	5	2	0	11
	40.0%	23.8%	33.3%	0.0%	21.6%
Hand pump	9	16	4	14	43
	90.0%	76.2%	66.7%	100.0%	84.3%
Well	3	0	4	0	7
	30.0%	0.0%	66.7%	0.0%	13.7%
Submersible	10	5	0	0	15
	100.0%	23.8%	0.0%	0.0%	29.4%
others	3	0	0	0	3
	30.0%	0.0%	0.0%	0.0%	5.9%

Source: Field Survey.

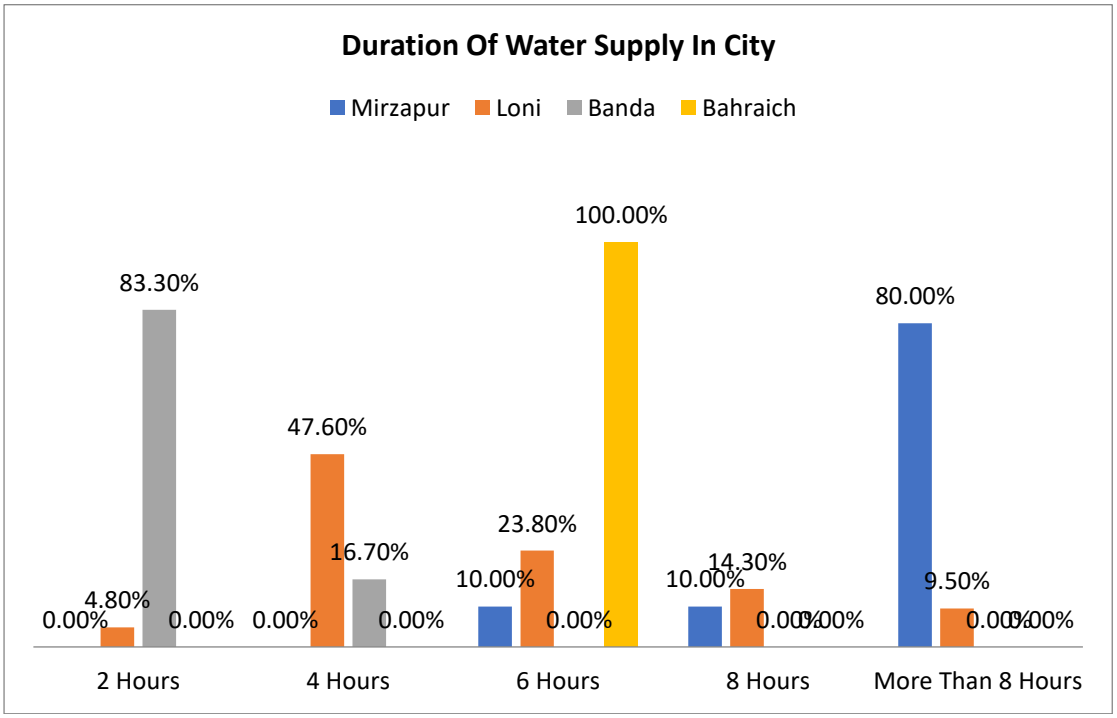
Duration of water supply in city is shown in Table 4.98. More than 1/3rd respondents reported that duration of water supply is less than 4 hours. It was found more pronouncing in Banda (100 per cent) followed by Loni (52.4 per cent). About 2/5th respondents further reported that water supply is about 6 hours. This was found more pronouncing in Bahraich (100 per cent). Thus, slightly more than 1/4th respondents revealed that water supply is more than 6 hours. This was found more pronouncing in Mirzapur (90 per cent).

Table: 4.98
Duration Of Water Supply In City

City	2 Hours	4 Hours	6 Hours	8 Hours	More Than 8 Hours	Total
Mirzapur	0	0	1	1	8	10
	0.0%	0.0%	10.0%	10.0%	80.0%	100.0%
Loni	1	10	5	3	2	21
	4.8%	47.6%	23.8%	14.3%	9.5%	100.0%
Banda	5	1	0	0	0	6
	83.3%	16.7%	0.0%	0.0%	0.0%	100.0%
Bahraich	0	0	14	0	0	14
	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
Total	**6**	**11**	**20**	**4**	**10**	**51**
	11.8%	**21.6%**	**39.2%**	**7.8%**	**19.6%**	**100.0%**

Source: Field Survey.

Chart: 4.23



The respondents were asked that whether community toilets are adequate. Majority of the respondents reported that community toilets are adequate. This was found more pronouncing in Bahraich and Loni. However, about 20 per cent respondents revealed that community toilets are inadequate. This was found more pronouncing in Mirzapur and Banda (Table 4.99).

Table: 4.99
Whether Community Toilets Are Adequate

City	Yes	No	Cannot Say	Total
Mirzapur	5	4	1	10
	50.0%	40.0%	10.0%	100.0%
Loni	18	3	0	21
	85.7%	14.3%	0.0%	100.0%
Banda	2	2	2	6
	33.3%	33.3%	33.3%	100.0%
Bahraich	12	1	1	14
	85.7%	7.1%	7.1%	100.0%
Total	**37**	**10**	**4**	**51**
	72.5%	**19.6%**	**7.8%**	**100.0%**

Source: Field Survey.

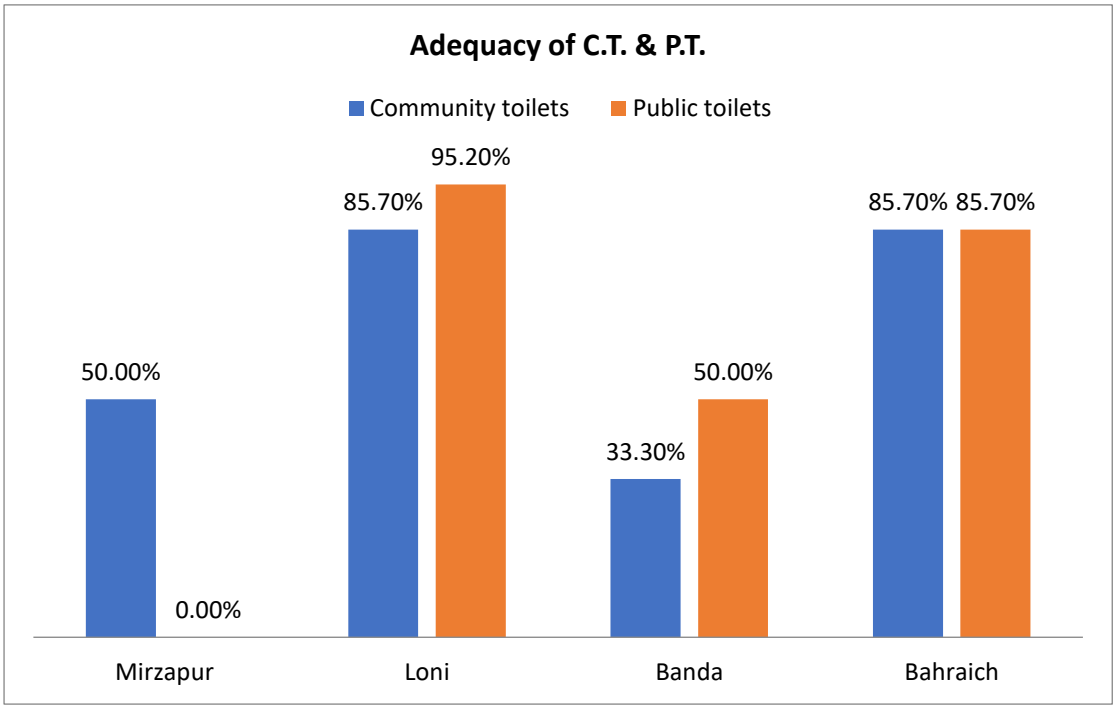
The respondents were further asked that whether public toilets are adequate. More than 2/3rd respondents reported that public toilets are adequate. This was found more pronouncing in Loni (95.2 per cent) followed by Bahraich (85.7 per cent). However, most of the respondents in Mirzapur and about 1/3rd respondents in Banda reported that public toilets are inadequate (Table 4.100).

Table: 4.100
Whether Public Toilets Are Adequate

City	Yes	No	Cannot Say	Total
Mirzapur	0	9	1	10
	0.0%	90.0%	10.0%	100.0%
Loni	20	1	0	21
	95.2%	4.8%	0.0%	100.0%
Banda	3	2	1	6
	50.0%	33.3%	16.7%	100.0%
Bahraich	12	1	1	14
	85.7%	7.1%	7.1%	100.0%
Total	**35**	**13**	**3**	**51**
	68.6%	**25.5%**	**5.9%**	**100.0%**

Source: Field Survey.

Chart: 4.24



The respondents were asked that whether community is eager to construct toilets under SBM. Most of the respondents reported that community is eager to construct toilets under SBM. However, a significant proportion of respondents in Mirzapur and Loni were not in position to express their views on the point (Table 4.101).

Table: 4.101
Whether Community Is Eager To Construct Toilet Under SBM

City	Yes	Cannot Say	Total
Mirzapur	9	1	10
	90.0%	10.0%	100.0%
Loni	19	2	21
	90.5%	9.5%	100.0%
Banda	6	0	6
	100.0%	0.0%	100.0%
Bahraich	14	0	14
	100.0%	0.0%	100.0%
Total	**48**	**3**	**51**
	94.1%	**5.9%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether fund has been mobilized from CSR for community toilets. Only 6 per cent respondents reported that funds have been mobilized from CSR for community toilets. This was reported in Bahriach only. Thus, majority of the

respondents reported that funds are not been mobilized from CSR for construction of community toilets (Table 4.102).

Table: 4.102
Whether Fund Has Been Mobilized From CSR For Community Toilets

City	Yes	No	Cannot Say	Total
Mirzapur	0	9	1	10
	0.0%	90.0%	10.0%	100.0%
Loni	0	14	7	21
	0.0%	66.7%	33.3%	100.0%
Banda	0	4	2	6
	0.0%	66.7%	33.3%	100.0%
Bahraich	3	6	5	14
	21.4%	42.9%	35.7%	100.0%
Total	**3**	**33**	**15**	**51**
	5.9%	**64.7%**	**29.4%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether toilets are connected with sewer line. About 18 per cent respondents reported that toilets are connected with sewer line. This was found more pronouncing in Bahraich and Mirzapur. It is to be noted that sewer line in Bahraich and Banda is found to be defunct however, some toilets are connected with sewer system. In Loni, sewer line has been recently constructed however; connection of toilets with sewer line is under progress. Thus, partial sewer line coverage has been reported in Mirzapur (Table 4.103).

Table: 4.103
Whether Toilets Are Connected With Sewer Line

City	Yes	No	Cannot Say	Total
Mirzapur	3	6	1	10
	30.0%	60.0%	10.0%	100.0%
Loni	2	14	5	21
	9.5%	66.7%	23.8%	100.0%
Banda	0	5	1	6
	0.0%	83.3%	16.7%	100.0%
Bahraich	4	6	4	14
	28.6%	42.9%	28.6%	100.0%
Total	**9**	**31**	**11**	**51**
	17.6%	**60.8%**	**21.6%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether community toilets have been constructed under SBM. More than 3/4th respondents reported that community toilets have been constructed under SBM. This was found more pronouncing in Loni followed by Bahraich. However, about 70 per cent respondents in Mirzapur were found against the view point (Table 4.104).

Table: 4.104
Whether Community Toilets Have Been Constructed Under SBM

City	Yes	No	Cannot Say	Total
Mirzapur	2	7	1	10
	20.0%	70.0%	10.0%	100.0%
Loni	20	1	0	21
	95.2%	4.8%	0.0%	100.0%
Banda	5	1	0	6
	83.3%	16.7%	0.0%	100.0%
Bahraich	12	1	1	14
	85.7%	7.1%	7.1%	100.0%
Total	**39**	**10**	**2**	**51**
	76.5%	**19.6%**	**3.9%**	**100.0%**

Source: Field Survey.

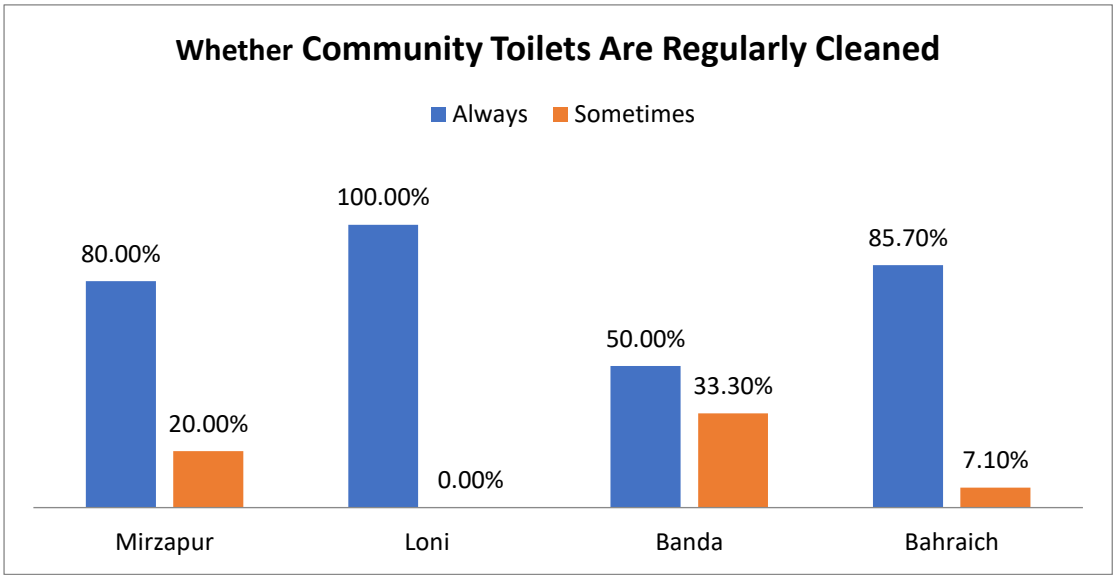
The respondents were asked that whether community toilets are regularly cleaned. About 86 per cent respondents reported that community toilets are regularly cleaned. This was found more pronouncing in Loni followed by Bahraich and Mirzapur. However, about 1/3rd respondents in Banda and 20 per cent respondents in Mirzapur reported that sometimes community toilets are cleaned (Table 4.105).

Table: 4.105
Whether Community Toilets Are Regularly Cleaned

City	Always	Sometimes	Occasionally	Total
Mirzapur	8	2	0	10
	80.0%	20.0%	0.0%	100.0%
Loni	21	0	0	21
	100.0%	0.0%	0.0%	100.0%
Banda	3	2	1	6
	50.0%	33.3%	16.7%	100.0%
Bahraich	12	1	1	14
	85.7%	7.1%	7.1%	100.0%
Total	**44**	**5**	**2**	**51**
	86.3%	**9.8%**	**3.9%**	**100.0%**

Source: Field Survey.

Chart: 4.25



The respondents were asked that whether open defecation has reduced due to construction of community toilets. About 2/3rd respondents reported that construction of community toilets has reduced open defecation to great extent. This was found more pronouncing in Loni (95.2 per cent). However, about 80 per cent respondents in Mirzapur and 2/3rd respondents in Banda reported that construction of community toilets has reduced open defecation to some extent. This shows that effective uses of community toilets have not been ensured due to some reasons (Table 4.106).

Table: 4.106
Whether Open Defecation Has Reduced Due To Construction of Community Toilets

City	To Great Extent	To Some Extent	Total
Mirzapur	2	8	10
	20.0%	80.0%	100.0%
Loni	20	1	21
	95.2%	4.8%	100.0%
Banda	2	4	6
	33.3%	66.7%	100.0%
Bahraich	9	5	14
	64.3%	35.7%	100.0%
Total	**33**	**18**	**51**
	64.7%	**35.3%**	**100.0%**

Source: Field Survey.

Satisfaction with disposal of solid waste is shown in Table 4.107. Most of the respondents were found satisfied with disposal of solid waste however, dissatisfaction level regarding disposal of solid waste was recorded high in Banda (50 per cent) and Loni (19 per cent).

Table: 4.107
Are You Satisfied With Disposal of Solid Waste

City	Fully Agree	Agree	Disagree	Total
Mirzapur	0	10	0	10
	0.0%	100.0%	0.0%	100.0%
Loni	12	5	4	21
	57.1%	23.8%	19.0%	100.0%
Banda	0	3	3	6
	0.0%	50.0%	50.0%	100.0%
Bahraich	7	7	0	14
	50.0%	50.0%	0.0%	100.0%
Total	**19**	**25**	**7**	**51**
	37.3%	**49.0%**	**13.7%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether there is any scheme of septage management. About 1/4th respondents reported that there is scheme of septage management in ULBs. This was found more pronouncing in Mirzapur. It is to be noted that no proper septage management scheme has been implemented in ULBs however, in view of growing importance of environment, enforcement of environmental laws by NGT, ULBs have been instructed to regulate desludging of septic tanks/pit latrines and cleaning of sewer line through their own suction machines. Besides, suction machine operators are asked to disposed off sludge at the prescribed ponds directly linking to STPs (Table 4.108).

Table: 4.108
Whether There Is Any Scheme Of Septage Management

City	Yes	No	Cannot say	Total
Mirzapur	8	1	1	10
	80.0%	10.0%	10.0%	100.0%
Loni	2	6	13	21
	9.5%	28.6%	61.9%	100.0%
Banda	1	4	1	6
	16.7%	66.7%	16.7%	100.0%
Bahraich	2	6	6	14
	14.3%	42.9%	42.9%	100.0%
Total	**13**	**17**	**21**	**51**
	25.5%	**33.3%**	**41.2%**	**100.0%**

Source: Field Survey.

The respondents were further asked that whether there is any scheme of facecal sludge management. Less than 10 per cent respondents reported that there is scheme of faecal sludge management. It is to be noted that under AMRUT scheme, budgetary provision has been made for septage and faecal sludge management and thus, officials are thinking that there is separate

scheme for faecal sludge management. Most of the ULBs have already purchased sunction machines along with tankers for cleaning of septic tanks and pit latrines. In some of the ULBs, private sludge operators are also working (Table 4.109).

Table: 4.109
Whether There Is Any Scheme of Faecal Sludge Management

City	Yes	No	Cannot say	Total
Mirzapur	0	1	9	10
	0.0%	10.0%	90.0%	100.0%
Loni	1	14	6	21
	4.8%	66.7%	28.6%	100.0%
Banda	1	4	1	6
	16.7%	66.7%	16.7%	100.0%
Bahraich	3	9	2	14
	21.4%	64.3%	14.3%	100.0%
Total	**5**	**28**	**18**	**51**
	9.8%	**54.9%**	**35.3%**	**100.0%**

Source: Field Survey.

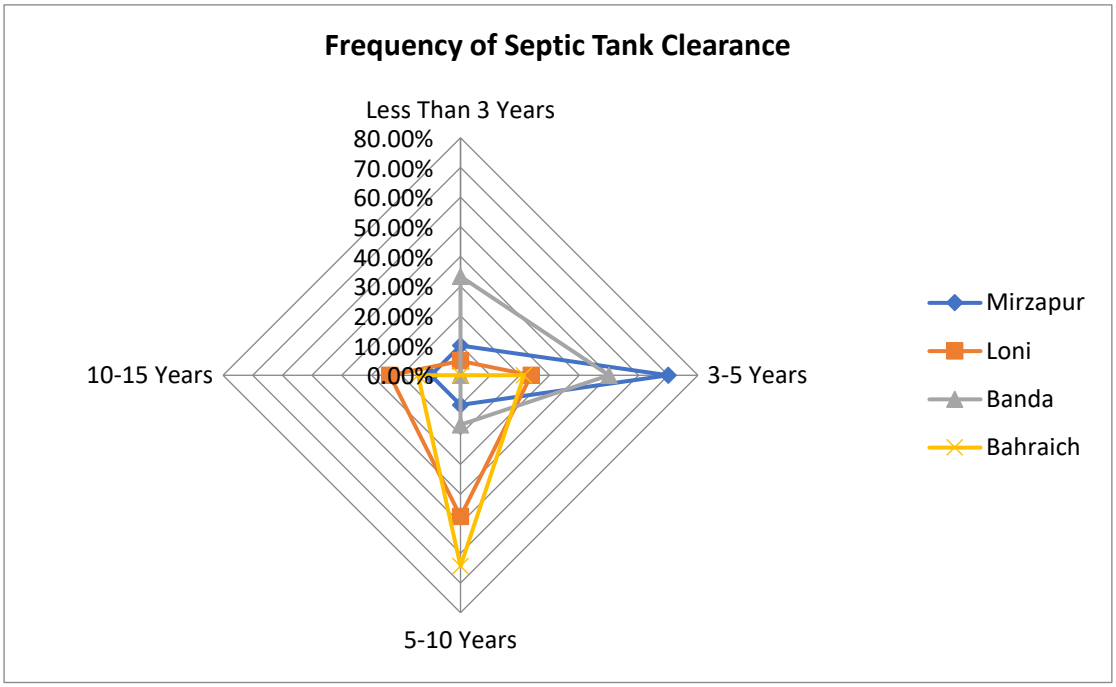
Frequency of septic tanks clearance is shown in Table 4.110. About 2/5th respondents reported that septic tanks are being cleaned in the interval of 5 to 10 years. This was found more pronouncing in Bahraich (64.3 per cent) followed by Loni (47. 6 per cent). About 1/4th respondents in Loni and 14 per cent respondents in Bahraich further reported that septic tanks are being cleaned after 10 years. Thus, slightly more than 1/3rd respondents reported that septic tanks are being desludged during 3-5 years. This was found more pronouncing in Mirzapur (70 per cent) followed by Banda (50 per cent).

Table: 4.110
Frequency of Septic Tank Clearance

City	Less Than 3 Years	3-5 Years	5-10 Years	10-15 Years	Total
Mirzapur	1	7	1	1	10
	10.0%	70.0%	10.0%	10.0%	100.0%
Loni	1	5	10	5	21
	4.8%	23.8%	47.6%	23.8%	100.0%
Banda	2	3	1	0	6
	33.3%	50.0%	16.7%	0.0%	100.0%
Bahraich	0	3	9	2	14
	0.0%	21.4%	64.3%	14.3%	100.0%
Total	**4**	**18**	**21**	**8**	**51**
	7.8%	**35.3%**	**41.2%**	**15.7%**	**100.0%**

Source: Field Survey.

Chart: 4.26



The respondents were asked that whether helpline has been created for regular cleaning of septic tanks for citizen. About 1/4th respondents reported that helpline has been created for regular cleaning of septic tanks for citizens. This was found more pronouncing in Bahraich (85.7 per cent). It is to be noted that Bahraich Nagar Palika Parishad has maintained proper register and receiving applications from citizens for regular cleaning of septic tanks. ULB also charges Rs. 1000 for one time desludging of septic tank. In other cities, the sludge operators have publicized their contact number for desludging of septic tanks. However, in all the ULBs, citizens have been communicated that ULB provides the services of desludging and disposal of sludge of septic tanks (Table 4.111).

Table: 4.111
Whether Helpline Has Been Created For Regular Cleaning of Septic Tank For Citizen

City	Yes	No	Cannot Say	Total
Mirzapur	0	9	1	10
	0.0%	90.0%	10.0%	100.0%
Loni	0	19	2	21
	0.0%	90.5%	9.5%	100.0%
Banda	1	4	1	6
	16.7%	66.7%	16.7%	100.0%
Bahraich	12	2	0	14
	85.7%	14.3%	0.0%	100.0%
Total	**13**	**34**	**4**	**51**
	25.5%	**66.7%**	**7.8%**	**100.0%**

Source: Field Survey.

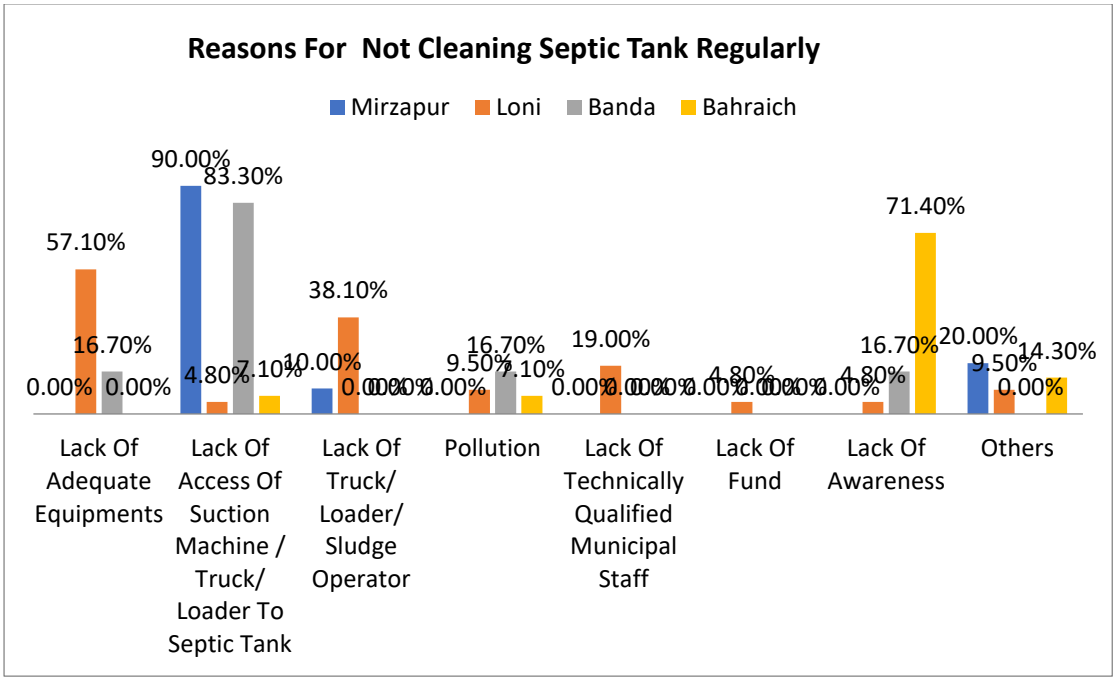
Reasons for not cleaning of septic tanks regularly are shown in Table 4.112. Lack of access of suction machines/trucks/loaders to septic tanks, lack of community awareness, lack of adequate equipments, lack of truck / loader/sludge operator, lack of technically qualified municipal staff and pollution are some of the mains reasons for not cleaning of septic tanks regularly.

Table: 4.112
Reasons For Not Cleaning Septic Tank Regularly

	Mirzapur	Loni	Banda	Bahraich	Total
Lack Of Adequate Equipments	0	12	1	0	13
	0.0%	57.1%	16.7%	0.0%	25.5%
Lack Of Access Of Suction Machine / Truck/ Loader To Septic Tank	9	1	5	1	16
	90.0%	4.8%	83.3%	7.1%	31.4%
Lack Of Truck/ Loader/ Sludge Operator	1	8	0	0	9
	10.0%	38.1%	0.0%	0.0%	17.6%
Pollution	0	2	1	1	4
	0.0%	9.5%	16.7%	7.1%	7.8%
Lack Of Technically Qualified Municipal Staff	0	4	0	0	4
	0.0%	19.0%	0.0%	0.0%	7.8%
Lack Of Fund	0	1	0	0	1
	0.0%	4.8%	0.0%	0.0%	2.0%
Lack Of Awareness	0	1	1	10	12
	0.0%	4.8%	16.7%	71.4%	23.5%
Others	2	2	0	2	6
	20.0%	9.5%	0.0%	14.3%	11.8%

Source: Field Survey.

Chart: 4.27



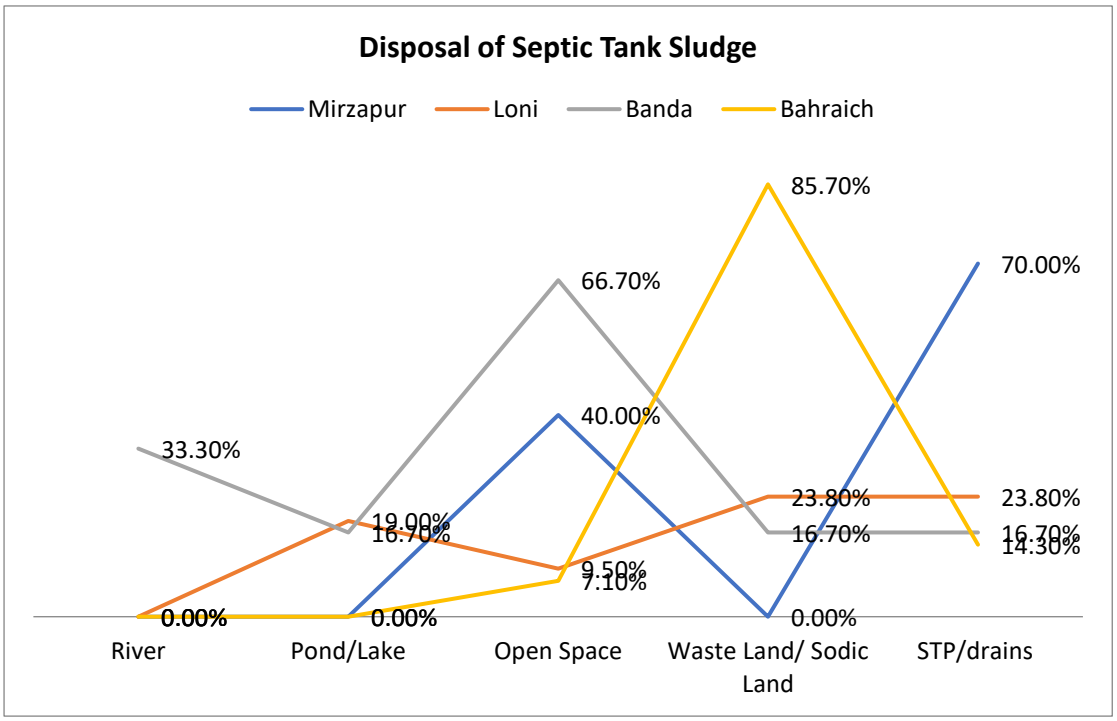
Disposal of septic tanks sludge is shown in Table 4.113. Sludge from septic tanks after desludging is being disposed off at STPs /drains connected with sewer system in Mirzapur and Loni. However, in other cities, sludge is being thrown into water bodies and open drains or open spaces.

Table: 4.113
Disposal of Septic Tank Sludge

	Mirzapur	Loni	Banda	Bahraich	Total
River	0	0	2	0	2
	0.0%	0.0%	33.3%	0.0%	3.9%
Pond/Lake	0	4	1	0	5
	0.0%	19.0%	16.7%	0.0%	9.8%
Open Space	4	2	4	1	11
	40.0%	9.5%	66.7%	7.1%	21.6%
Waste Land/ Sodic Land	0	5	1	12	18
	0.0%	23.8%	16.7%	85.7%	35.3%
STP/Drains	7	5	1	2	15
	70.0%	23.8%	16.7%	14.3%	29.4%

Source: Field Survey.

Chart: 4.28



The respondents were asked that whether ULB has been adequate facilities for management of septage and faecal sludge. More than half of the respondents reported that facilities for management of septage and faecal sludge are adequate. It was found more

pronouncing in Mirzapur and Banda. However, about 45 per cent respondents were against the view point mainly in Loni and Bahraich. It is to be noted that present facilities for management of septage and faecal sludge are not adequate in all the selected ULBs as the efficiency of suction machines, transportation of faecal sludge and treatment of faecal sludge has been reported to be quite low (Table 4.114).

Table: 4.114
Whether ULB Has Adequate Facilities For Management Of Septage And Faecal Sludge

City	Fully Agree	Agree	Disagree	Fully Disagree	Total
Mirzapur	0	10	0	0	10
	0.0%	100.0%	0.0%	0.0%	100.0%
Loni	0	7	14	0	21
	0.0%	33.3%	66.7%	0.0%	100.0%
Banda	0	5	1	0	6
	0.0%	83.3%	16.7%	0.0%	100.0%
Bahraich	1	5	2	6	14
	7.1%	35.7%	14.3%	42.9%	100.0%
Total	**1**	**27**	**17**	**6**	**51**
	2.0%	**52.9%**	**33.3%**	**11.8%**	**100.0%**

Source: Field Survey.

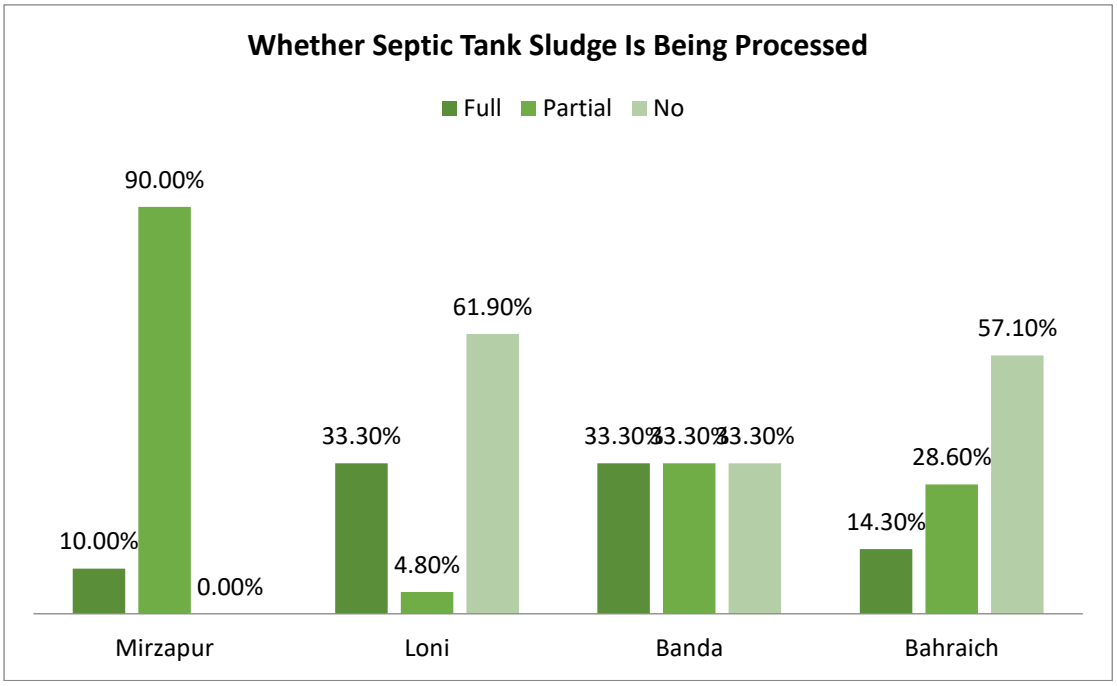
The respondents were asked that whether septic tank sludge is being processed. More than half of the respondents reported that partial and full processing of faecal sludge is being ensured in ULBs. However, this has been ensured only in those cities where sewerage treatment plants are functional and faecal sludge after desludging of septic tanks is being transported to these plants (Table 4.115).

Table: 4.115
Whether Septic Tank Sludge Is Being Processed

City	Partial	Full	No	Total
Mirzapur	9	1	0	10
	90.0%	10.0%	0.0%	100.0%
Loni	1	7	13	21
	4.8%	33.3%	61.9%	100.0%
Banda	2	2	2	6
	33.3%	33.3%	33.3%	100.0%
Bahraich	4	2	8	14
	28.6%	14.3%	57.1%	100.0%
Total	**16**	**12**	**23**	**51**
	31.4%	**23.5%**	**45.1%**	**100.0%**

Source: Field Survey.

Chart: 4.29



The respondents were asked that whether ULB will make avail land in future for construction of FSTP. All the respondents reported that presently land is not available for construction of FSTP however, more than 1/4th respondents reported that ULB will make avail land in future for such purpose. A large proportion of respondents were not in position to report on the view point (Table 4.116).

Table: 4.116
Whether ULB Will Make Avail Land In Future for FSTP

City	Yes	No	Cannot Say	Total
Mirzapur	1	1	8	10
	10.0%	10.0%	80.0%	100.0%
Loni	8	7	6	21
	38.1%	33.3%	28.6%	100.0%
Banda	3	0	3	6
	50.0%	0.0%	50.0%	100.0%
Bahraich	2	2	10	14
	14.3%	14.3%	71.4%	100.0%
Total	**14**	**10**	**27**	**51**
	27.5%	**19.6%**	**52.9%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether ULB has been empanelled private sludge operators. About 1/4th respondents reported that ULBs have empanelled private sludge operators for desludging of septic tanks. This was found more pronouncing in Mirzapur

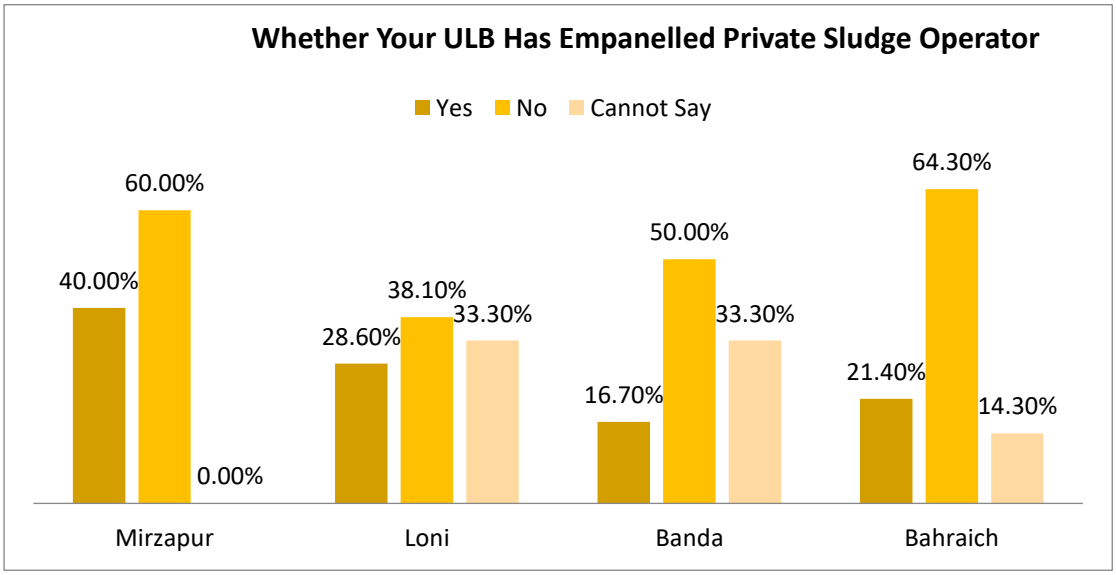
followed by Loni. It is to be noted that ULBs have registration of private operators and have fixed user charges for desludging of septic tanks (Table 4.117).

Table: 4.117
Whether Your ULB Has Empanelled Private Sludge Operator

City	Yes	No	Cannot Say	Total
Mirzapur	4	6	0	10
	40.0%	60.0%	0.0%	100.0%
Loni	6	8	7	21
	28.6%	38.1%	33.3%	100.0%
Banda	1	3	2	6
	16.7%	50.0%	33.3%	100.0%
Bahraich	3	9	2	14
	21.4%	64.3%	14.3%	100.0%
Total	**14**	**26**	**11**	**51**
	27.5%	**51.0%**	**21.6%**	**100.0%**

Source: Field Survey.

Chart: 4.30



The respondents were further asked that whether ULB needs FSTP. About 3/4th respondents reported that FSTP is required for effective management of faecal sludge. However, a large proportion of respondents were found unaware about the importance of FSTP (Table 4.118).

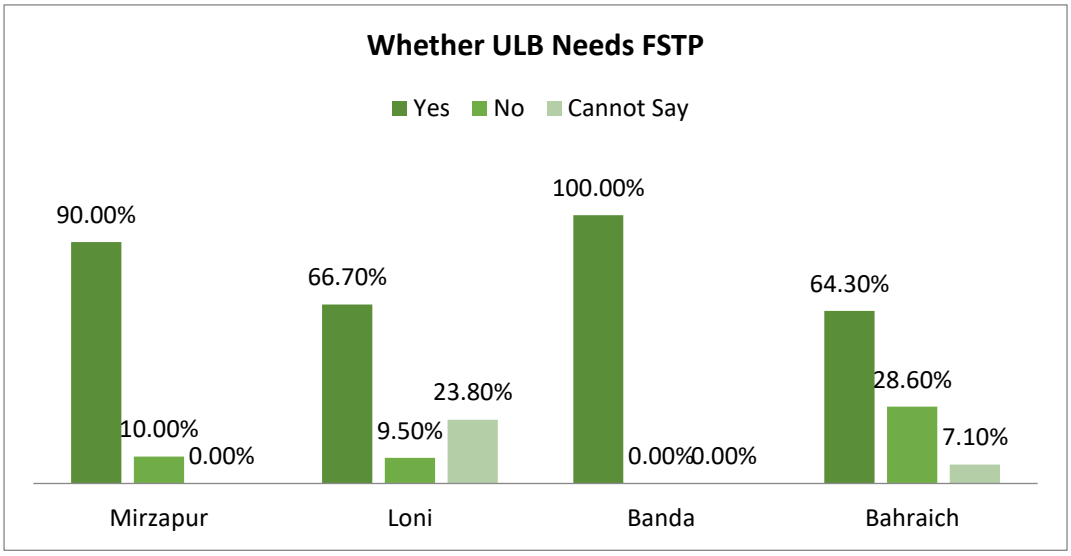
Table: 4.118
Whether ULB Needs FSTP

City	Yes	No	Cannot Say	Total
Mirzapur	9	1	0	10
	90.0%	10.0%	0.0%	100.0%
Loni	14	2	5	21
	66.7%	9.5%	23.8%	100.0%

Banda	6	0	0	6
	100.0%	0.0%	0.0%	100.0%
Bahraich	9	4	1	14
	64.3%	28.6%	7.1%	100.0%
Total	**38**	**7**	**6**	**51**
	74.5%	**13.7%**	**11.8%**	**100.0%**

Source: Field Survey.

Chart: 4.31



The respondents were asked that whether SBM, AMRUT, Namami Gange will improve cleanliness. More than 2/3rd respondents reported that SBM, AMRUT and Namami Gange will improve urban sanitation and cleanliness to great extent. This was found more pronouncing in Banda followed by Mirzapur and Bahraich. Less than 1/4th respondents further reported that such schemes will improve cleanliness to some extent. This was found more pronouncing in Loni (Table 4.119).

Table: 4.119
Whether SBM, AMRUT, Namami Gange Will Improve Cleanliness

City	To Great Extent	To Some Extent	No	Total
Mirzapur	8	1	1	10
	80.0%	10.0%	10.0%	100.0%
Loni	11	8	2	21
	52.4%	38.1%	9.5%	100.0%
Banda	5	1	0	6
	83.3%	16.7%	0.0%	100.0%
Bahraich	11	2	1	14
	78.6%	14.3%	7.1%	100.0%
Total	**35**	**12**	**4**	**51**
	68.6%	**23.5%**	**7.8%**	**100.0%**

Source: Field Survey.

Problems in implementation of SBM are shown in Table 4.120. Social mobilization, delay in release of funds for individual household toilets, identification of houses for toilet construction are some of the main problems in implementation of SBM. However, problems in implementation of SBM vary across the cities.

Table: 4.120
Problems in Implementation of SBM

	Mirzapur	Loni	Banda	Bahraich	Total
Social Mobilization	9	5	6	10	30
	90.0%	23.8%	100.0%	71.4%	58.8%
Identification Of Houses For Toilet Construction	1	6	1	0	8
	10.0%	28.6%	16.7%	0.0%	15.7%
Lack Of Fund	0	0	0	1	1
	0.0%	0.0%	0.0%	7.1%	2.0%
Delay In Release Of Funds For IHT	5	2	0	1	8
	50.0%	9.5%	0.0%	7.1%	15.7%
Lack Of Resource Mobilization From Corporation Sector/ Private Sector	0	0	0	0	0
	0.0%	0.0%	0.0%	0.0%	0.0%
Other	0	5	0	1	6
	0.0%	23.8%	0.0%	7.1%	11.8%

Source: Field Survey.

The respondents were asked that whether JAICA, Namami Gange, AMRUT and SBM have positive impact on sanitation. Most of the respondents accepted that JAICA, Namami Gange, AMRUT and SBM have positive impact on sanitation. About half of the respondents reported that these schemes have greater impact on sanitation (Table 4.121).

Table: 4.121
Whether JAICA, Namami Gange, AMRUT And SBM Have Positive Impact On Sanitation

City	To Great Extent	To Some Extent	No	Total
Mirzapur	0	10	0	10
	0.0%	100.0%	0.0%	100.0%
Loni	12	9	0	21
	57.1%	42.9%	0.0%	100.0%
Banda	2	4	0	6
	33.3%	66.7%	0.0%	100.0%
Bahraich	11	2	1	14
	78.6%	14.3%	7.1%	100.0%
Total	**25**	**25**	**1**	**51**
	49.0%	**49.0%**	**2.0%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether toilets have been constructed on river side. Only a negligible proportion of respondents revealed that toilets have been constructed on river side. This was found more pronouncing in Mirzapur. Construction of toilets on river side prevents water pollution as tourists and households nearby ghats do not have sanitary toilets (Table 4.122).

Table: 4.122
Whether Toilets Have Been Constructed On River Side

City	Yes	No	Cannot Say	Total
Mirzapur	1	9	0	10
	10.0%	90.0%	0.0%	100.0%
Loni	1	16	4	21
	4.8%	76.2%	19.0%	100.0%
Banda	0	3	3	6
	0.0%	50.0%	50.0%	100.0%
Bahraich	0	13	1	14
	0.0%	92.9%	7.1%	100.0%
Total	**2**	**41**	**8**	**51**
	3.9%	**80.4%**	**15.7%**	**100.0%**

Source: Field Survey.

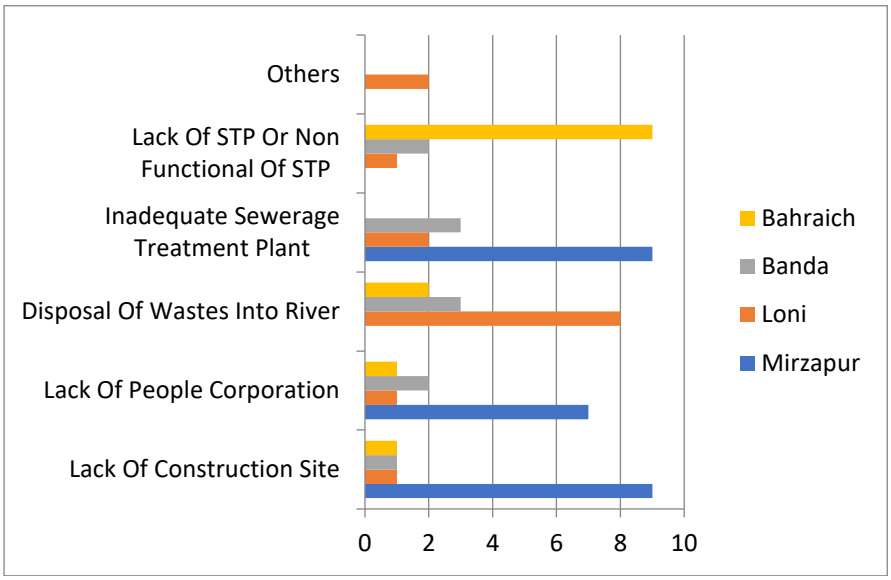
Problems of sanitation are shown in Table 4.123. Inadequate sewerage treatment plants, lack of STP and non-functioning of STP, disposal of waste into river, lack of construction sites for community toilets are some of the main problems in urban sanitation. However, problems of sanitation vary across the selected cities.

Table: 4.123
Problems of Sanitation

	Mirzapur	Loni	Banda	Bahraich	Total
Lack Of Construction Site	9	1	1	1	12
	90.0%	4.8%	16.7%	7.1%	23.5%
Lack Of People Corporation	7	1	2	1	11
	70.0%	4.8%	33.3%	7.1%	21.6%
Disposal Of Wastes Into River	0	8	3	2	13
	0.0%	38.1%	50.0%	14.3%	25.5%
Inadequate Sewerage Treatment Plant	9	2	3	0	14
	90.0%	9.5%	50.0%	0.0%	27.5%
Lack Of STP Or Non Functional Of STP	0	1	2	9	12
	0.0%	4.8%	33.3%	64.3%	23.5%
Others	0	2	0	0	2
	0.0%	9.5%	0.0%	0.0%	3.9%

Source: Field Survey.

Chart: 4.32
Problems of Sanitation



Satisfaction with sanitation services is shown in Table 4.124. About 2/3rd respondents were found satisfied with cleaning of drains, sweeping of streets / roads, collection and transportation of waste, water supply, sewerage and cleaning of public toilets. About 1/3rd respondents were found very satisfied with the sanitation services.

Table: 4.124
Satisfaction with Sanitation Services

	Very Satisfied	Satisfied	Dissatisfied	Total
Water Supply	15	34	2	51
	29.4%	66.7%	3.9%	100.0%
Regular Supply Of Water	15	34	2	51
	29.4%	66.7%	3.9%	100.0%
Sweeping Streets/ Roads	15	35	1	51
	29.4%	68.6%	2.0%	100.0%
Cleaning Of Drains	15	35	1	51
	29.4%	68.6%	2.0%	100.0%
Sewerage	15	34	2	51
	29.4%	66.7%	3.9%	100.0%
Collection Of Solid Waste	16	33	2	51
	31.4%	64.7%	3.9%	100.0%
Transportation Of Waste	16	33	2	51
	31.4%	64.7%	3.9%	100.0%
Cleaning Of Public Toilets	17	33	1	51
	33.3%	64.7%	2.0%	100.0%

Source: Field Survey.

Numbers of complaints of sanitation in a week are shown in Table 4.125. About 88 per cent respondents reported that they receive less than 10 complaints of sanitation in a week.

This was found more pronouncing in Mirzapur followed by Loni and Bahraich. However, about 2/3rd respondents in Banda said that they receive 10-20 complaints of sanitation in a week.

Table: 4.125
Number Of Complaints Of Sanitation In A Week

City	1-10	10-20	20-30	Total
Mirzapur	10	0	0	10
	100.0%	0.0%	0.0%	100.0%
Loni	20	0	1	21
	95.2%	0.0%	4.8%	100.0%
Banda	2	4	0	6
	33.3%	66.7%	0.0%	100.0%
Bahraich	13	0	1	14
	92.9%	0.0%	7.1%	100.0%
Total	**45**	**4**	**2**	**51**
	88.2%	**7.8%**	**3.9%**	**100.0%**

Source: Field Survey.

Duration of disposal of complaints is shown in Table 4.126. More than half of the respondents revealed that they dispose off complaints within 24 hours. This was found more pronouncing in Bahraich. However, slightly less than half of the respondents reported that they resolve the complaints of sanitation within a week. This was found more pronouncing in Loni followed by Banda.

Table: 4.126
Duration Of Disposal Of Complaints

City	Within 24 Hours	One Week	15 Days	Total
Mirzapur	4	5	1	10
	40.0%	50.0%	10.0%	100.0%
Loni	6	15	0	21
	28.6%	71.4%	0.0%	100.0%
Banda	2	4	0	6
	33.3%	66.7%	0.0%	100.0%
Bahraich	14	0	0	14
	100.0%	0.0%	0.0%	100.0%
Total	**26**	**24**	**1**	**51**
	51.0%	**47.1%**	**2.0%**	**100.0%**

Source: Field Survey.

Analysis of Views of Sludge Operators

From the moment of generation through disposal, the sanitation system deals with human excreta. The sanitation system also takes care of properly emptying faecal sludge from on-site sanitation technologies and transports the sludge to be treated or disposed of. A sanitation system's ability to empty and transport faecal sludge is crucial. Septic tank emptying and faecal sludge management are important services that are frequently overlooked. For sanitation service providers, homes, communities, and the environment, emptying and transporting faecal sludge can be made more efficient and safe. For faecal sludge emptying and transportation, there are a variety of service providers ranging from informal and independent individuals to formal and huge corporations. In some locations, public utilities or non-governmental groups provide services; however, in Uttar Pradesh, these services are supplied by ULBs and the Uttar Pradesh Jal Nigam. In the same region, there are a range of service providers. This is due to the complexity and accessibility of various on-site sanitation systems, as well as the ability of clients to pay for the services. Manual emptying (using a bucket or hand pump) and automated emptying (using a mechanized pump or vacuum truck) are the two methods for emptying sludge from an on-site sanitation device. All the respondents were males and engaged in urban areas for their job. Nature of job of respondents is shown in Table 4.127. Most of the respondents reported that they have been engaged in the work as outsourcing employees. One respondent in Banda reported that he is permanent employee.

Table: 4.127
Nature of Job of Respondents

City	Permanent	Out source	Total
Mirzapur	0	2	2
	0.0%	100.0%	100.0%
Bahraich	0	2	2
	0.0%	100.0%	100.0%
Loni	0	7	7
	0.0%	100.0%	100.0%
Banda	1	0	1
	100.0%	0.0%	100.0%
Total	**1**	**11**	**12**
	8.3%	**91.7%**	**100.0%**

Source: Field Survey.

Period of engagement in work is shown in Table 4.128. More than 2/3rd respondents reported that they are engaged in the work for last 5 -10 years while about 1/4th respondents

revealed that they are engaged in the job for last 5 years. Engagement with work for a long period was reported high in Banda followed by Loni.

Table: 4.128
Period of Engagement In Work

City	3-5 years	5-10 years	10-15 years	Total
Mirzapur	0	1	1	2
	0.0%	50.0%	50.0%	100.0%
Bahraich	1	1	0	2
	50.0%	50.0%	0.0%	100.0%
Loni	2	5	0	7
	28.6%	71.4%	0.0%	100.0%
Banda	0	1	0	1
	0.0%	100.0%	0.0%	100.0%
Total	**3**	**8**	**1**	**12**
	25.0%	**66.7%**	**8.3%**	**100.0%**

Source: Field Survey.

To address a variety of demands, vacuum trucks come in a number of sizes and styles. They usually have a capacity of 200 to 16,000 litres of storage. Conventional vacuum trucks have a capacity of up to 55,000 litres. Mechanized emptying, especially of big tanks, can be a quick and effective approach to empty on-site sanitation devices. In comparison to manual emptying methods, it is also considerably safer and healthier for service providers. Service providers must run the pump and move the hose, but they are not required to enter the technology or come into direct touch with the faeces.

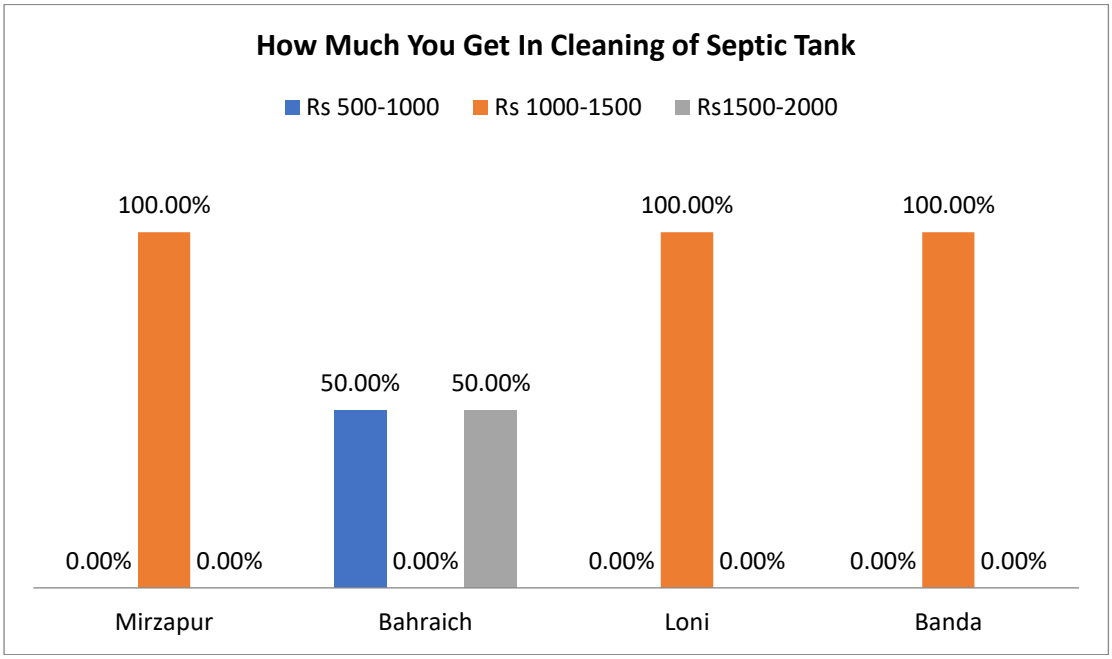
Vacuum trucks, on the other hand, have some technical constraints. Typically, vacuum trucks can only suck down to a depth of 2 to 3 metres. Depending on the pump's strength, they must also be parked within 25 metres of the on-site sanitation technology. Large cars, especially in unplanned and informal areas, are frequently unable to access narrow streets and bad roads. Most of the respondents reported that they are getting Rs. 1000-1500 for desludging of septic tanks. It was found more pronouncing in Mirzapur followed by Loni and Banda. However, about 8 per cent respondents reported that they are getting less than Rs. 1000 for the work. Similarly, the same proportion of respondents reported that they are getting Rs. 1500-2000 for the job. It is to be noted that Rs. 1000 is being charged for desludging of septic tanks by ULBs in Bahraich while Rs. 1500 is being charged by ULB in Mirzapur, Loni and Banda for desludging of septic tanks. However, in Loni and Bahraich, private sludge operators charge higher than the rate of ULB for the purpose (Table 4.129).

Table: 4.129
How Much You Get In Cleaning of Septic Tank

City	500-1000	1000-1500	1500-2000	Total
Mirzapur	0	2	0	2
	0.0%	100.0%	0.0%	100.0%
Bahraich	1	0	1	2
	50.0%	0.0%	50.0%	100.0%
Loni	0	7	0	7
	0.0%	100.0%	0.0%	100.0%
Banda	0	1	0	1
	0.0%	100.0%	0.0%	100.0%
Total	**1**	**10**	**1**	**12**
	8.3%	**83.3%**	**8.3%**	**100.0%**

Source: Field Survey.

Chart: 4.33



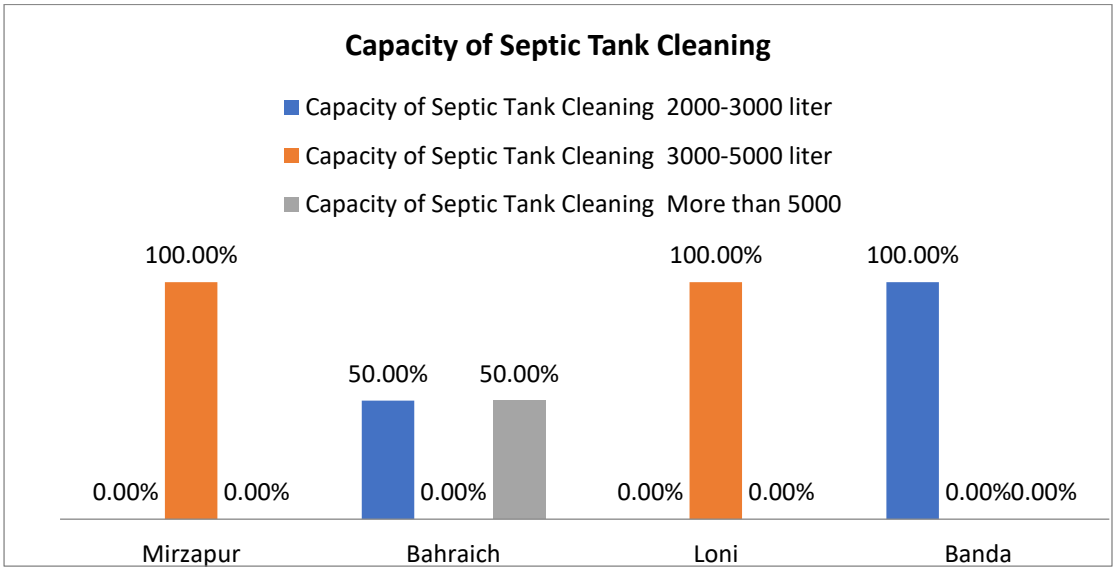
Capacity of septic tank of cleaning is shown in Table 4.130. About 3/4th respondents reported that their capacity of desludging of septic tanks is in between 3000-5000 liters. However, about 17 per cent respondents reported that their capacity of tank for desludging is less than 3000 liters. One respondent in Bahraich reported the capacity of tank for more than 5000 liters.

Table: 4.130
Capacity of Septic Tank Cleaning

City	2000-3000 liter	3000-5000 liter	More than 5000	Total
Mirzapur	0	2	0	2
	0.0%	100.0%	0.0%	100.0%
Bahraich	1	0	1	2
	50.0%	0.0%	50.0%	100.0%
Loni	0	7	0	7
	0.0%	100.0%	0.0%	100.0%
Banda	1	0	0	1
	100.0%	0.0%	0.0%	100.0%
Total	**2**	**9**	**1**	**12**
	16.7%	**75.0%**	**8.3%**	**100.0%**

Source: Field Survey.

Chart: 4.34



All the respondents reported that they receive less than 20 applications for desludging of septic tank in a week. On an average, 2-3 applications for desludging of septic tanks are being received in ULBs per day. However, desludging of septic tanks is being done where suction machine is easily accessible to septic tanks for its cleaning. Thus, less than 20 septic tanks are being desludged by sludge operators in a week (Table 4.131).

Table: 4.131
How Many Applications You Receive For Desludging Of Septic Tank In A Week

City	Less than 20	Total
Mirzapur	2	2
	100.0%	100.0%
Bahraich	2	2
	100.0%	100.0%
Loni	7	7
	100.0%	100.0%
Banda	1	1
	100.0%	100.0%
Total	**12**	**12**
	100.0%	**100.0%**

Source: Field Survey.

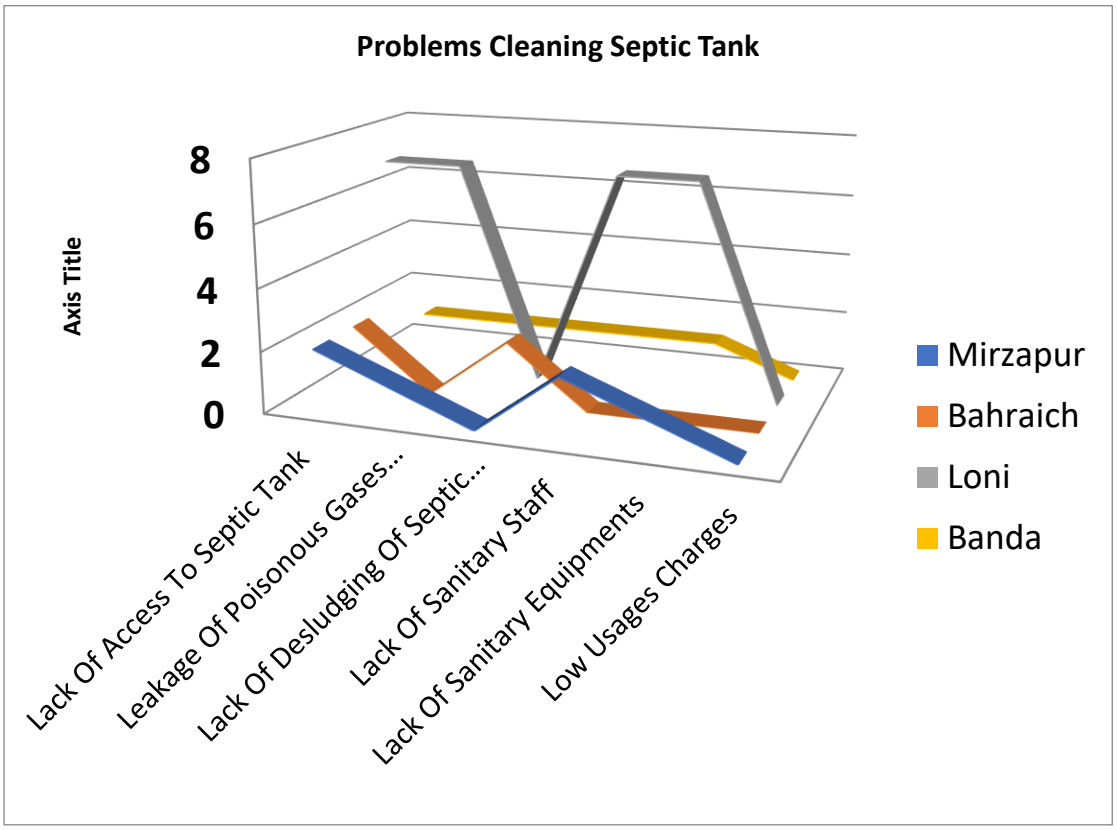
Problems in cleaning of septic tanks are shown in Table 4.132. The main problems in cleaning of septic tanks were reported to be lack of access of suction machine to septic tanks, leakage of poisonous gases from septic tanks, lack of desludging of septic tanks for a long period, lack of sanitary staff and lack of sanitary equipment.

Table: 4.132
Problems in Cleaning of Septic Tank

	Mirzapur	Bahraich	Loni	Banda	Total
Lack Of Access To Septic Tank	2	2	7	1	12
	100.0%	100.0%	100.0%	100.0%	100.0%
Leakage Of Poisonous Gases From Septic Tank	1	0	7	1	9
	50.0%	0.0%	100.0%	100.0%	75.0%
Lack Of Desludging Of Septic Tank for a Long Period	0	2	0	1	3
	0.0%	100.0%	0.0%	100.0%	25.0%
Lack Of Sanitary Staff	2	0	7	1	10
	100.0%	0.0%	100.0%	100.0%	83.3%
Lack Of Sanitary equipment	1	0	7	1	9
	50.0%	0.0%	100.0%	100.0%	75.0%
Low Usages Charges	0	0	0	0	0
	0.0%	0.0%	0.0%	0.0%	0.0%

Source: Field Survey.

Chart: 4.35



Vacuum trucks or other large vehicles with storage tanks can normally convey sludge directly to the treatment, utilization, or disposal site. To avoid transporting faecal sludge, manual service providers usually dump it nearby or dispose of it in the local sewer system. Moving sludge a few metres away from where it was gathered is not a long-term or sanitary alternative. Emptying on-site sanitation systems and handling faecal sludge might be hazardous. They must understand the need of wearing gloves, boots, protective gear, and masks when emptying the pit. Then wash your hands and body with soap. To improve access and air circulation, a slab or cover must be removed. Let the on-site sanitation technology vent for a few minutes before starting work. Gases including methane, ammonia, and sulphur dioxide can escape while new air enters. a pit with no harness and no safety rope. If the worker is overcome by gas or the pit walls fall, two people should be holding the rope. Hand-held pumps were designed to boost manual emptying efficiency while protecting workers' health and safety. Machines for evacuating faeces use electricity, fuel, or pneumatic systems (using pressurized air or gas). Septic tanks and pour-flush latrines can be effectively emptied with vacuum pumps. The pump connects to a pipe that is lowered into the technology. For smaller jobs, human-powered carts or heavy-duty trucks with storage tanks are used. It is also vital to transport the faecal sludge safely. Transport technologies, like emptying, are classified as either manual

(human or animal power) or motorised (fuel-powered engine). Manual service providers typically use simple, low-cost conveyance means such a cart, wheelbarrow, waggon, or rickshaw. Vacuum trucks may also empty septic tanks and dump flush latrines. Depending on the technology, sludge can become difficult to pump. In this case, diluting the faecal sludge with water helps it flow more smoothly. But this is inefficient and possibly costly. If water isn't available, manual draining may be the only option.

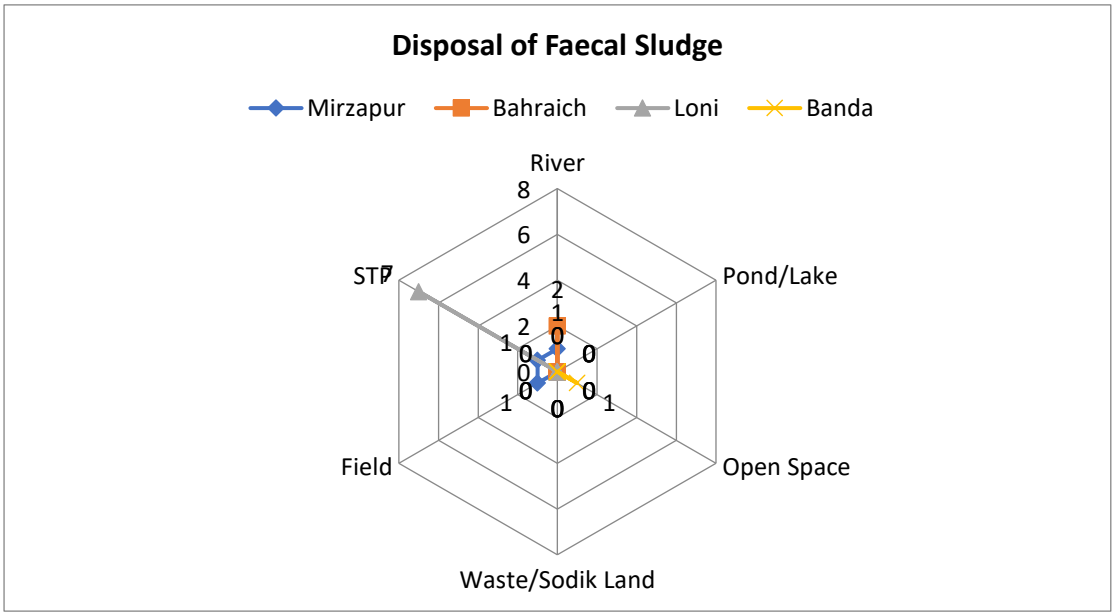
Table 4.133 shows how faecal sludge is disposed of. More than two-thirds of respondents said they empty their tanks after desludging at designated places for faecal sludge disposal at wastewater treatment facilities or the sewer network. This was discovered to be more prominent in Loni, while the sludge operator of ULB in Mirzapur was also told to empty the septic tanks after desludging them at the sewer network or STP. In Bahraich and Banda, however, sludge operators are disposing of faecal sludge after desludging septic tanks in open space and waterways due to the lack of a functioning sewage network.

Table: 4.133
Disposal of Faecal Sludge

	Mirzapur	**Bahraich**	**Loni**	**Banda**	**Total**
River	1	2	0	0	3
	50.0%	100.0%	0.0%	0.0%	25.0%
Pond/Lake	0	0	0	0	0
	0.0%	0.0%	0.0%	0.0%	0.0%
Open Space	0	0	0	1	1
	0.0%	0.0%	0.0%	100.0%	8.3%
Waste/Sodik Land	0	0	0	0	0
	0.0%	0.0%	0.0%	0.0%	0.0%
Field	1	0	0	0	1
	50.0%	0.0%	0.0%	0.0%	8.3%
STP	1	0	7	0	8
	50.0%	0.0%	100.0%	0.0%	66.7%

Source: Field Survey.

Chart: 4.36



The respondents were asked that whether they have been appointed by ULB for desludging of septic tanks. All the selected ULBs reported that they have own suction machines for desludging of septic tanks and cleaning of sewer lines however, in Loni and Bahraich, private sludge operators have also been registered by ULB to operate for cleaning of septic tanks on reasonable rates (Table 4.134).

Table: 4.134

Whether You Have Been Appointed By ULB For Desludging Of Septic Tank

City	Yes	Total
Mirzapur	2	2
	100.0%	100.0%
Bahraich	2	2
	100.0%	100.0%
Loni	7	7
	100.0%	100.0%
Banda	1	1
	100.0%	100.0%
Total	**12**	**12**
	100.0%	**100.0%**

Source: Field Survey.

The respondents were asked that whether they have created help line for citizens. About 2/3rd respondents revealed that they have created help line for citizens for the desludging of septic tanks. However, there is no proper help line in all the selected ULBs as ULBs are receiving applications directly for desludging of septic tanks and private sludge operators have

publicized their contact numbers for desluging of septic tanks at the time of need. However, urban dwellers request for desludging of septic tanks only in case of over flow or clogging of sewer line (Table 4.135).

Table: 4.135
Whether You Have Created Help Line For Citizens

City	Yes	No	Total
Mirzapur	1	1	2
	50.0%	50.0%	100.0%
Bahraich	0	2	2
	0.0%	100.0%	100.0%
Loni	7	0	7
	100.0%	0.0%	100.0%
Banda	0	1	1
	0.0%	100.0%	100.0%
Total	**8**	**4**	**12**
	66.7%	**33.3%**	**100.0%**

Source: Field Survey.

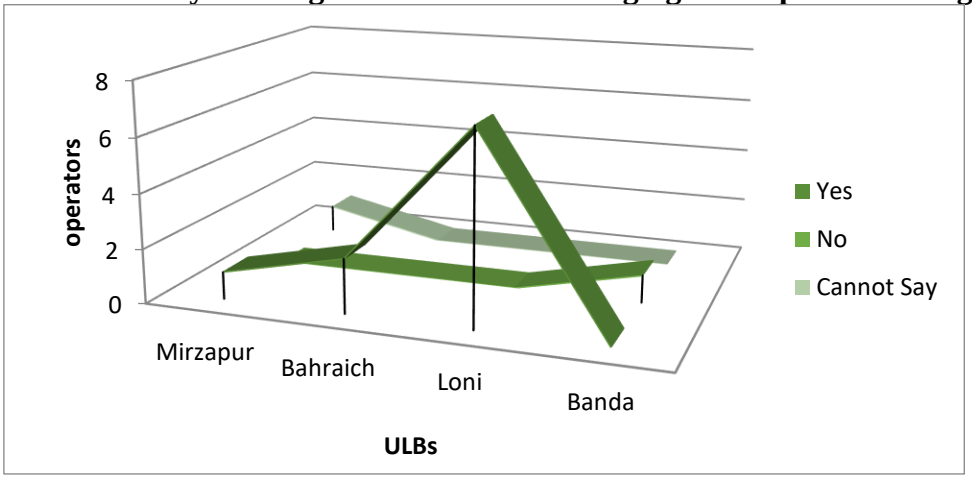
The respondents were asked that whether community is being informed for desludging of septic tanks regularly. The overwhelming majority of respondents reported that community is being informed for desludging of septic tanks regularly. However, community is not sensitized enough for desluging of septic tanks regularly. Only in case of blockage of sewer line and over flow of septic tanks, the community requests to ULB officials for desludging or cleaning the blockage (Table 4.136).

Table: 4.136
Whether Community Is Being Informed For Desludging For Septic Tank Regularly

City	Yes	No	Cannot Say	Total
Mirzapur	1	0	1	2
	50.0%	0.0%	50.0%	100.0%
Bahraich	2	0	0	2
	100.0%	0.0%	0.0%	100.0%
Loni	7	0	0	7
	100.0%	0.0%	0.0%	100.0%
Banda	0	1	0	1
	0.0%	100.0%	0.0%	100.0%
Total	**10**	**1**	**1**	**12**
	83.3%	**8.3%**	**8.3%**	**100.0%**

Source: Field Survey.

Chart: 4.37
Whether Community Is Being Informed For Desludging For Septic Tank Regularly



There are many protective measures that should be put in place when emptying and transporting fecal sludge. This is often known as a multi-barrier approach. The following table shows barriers that can be used to avoid the spread of pathogens and protect public health. Most of the respondents reported that they have adequate equipment for desludging of septic tanks. However, one respondent in Mirzapur revealed that he do not have adequate equipments for desludging of septic tanks. It is to be noted that sludge operators do not have necessary safety equipment such as long boots, gloves, mask etc. However, municipal officials reported that sanitary staff including sludge operators does not demand for such equipment/safety measure (Table 4.137).

Table: 4.137
Do You Have Adequate Equipment For Desludging Of Septic Tank

City	Yes	No	Total
Mirzapur	1	1	2
	50.0%	50.0%	100.0%
Bahraich	2	0	2
	100.0%	0.0%	100.0%
Loni	7	0	7
	100.0%	0.0%	100.0%
Banda	1	0	1
	100.0%	0.0%	100.0%
Total	**11**	**1**	**12**
	91.7%	**8.3%**	**100.0%**

Source: Field Survey.

The respondents were asked that whether sludge is being processed after desludging of septic tanks. About 2/3rd respondents revealed that sludge is being treated at sewerage treatment plants in Loni and Mirzapur however, inother places sludge after desludging of septic tanks is

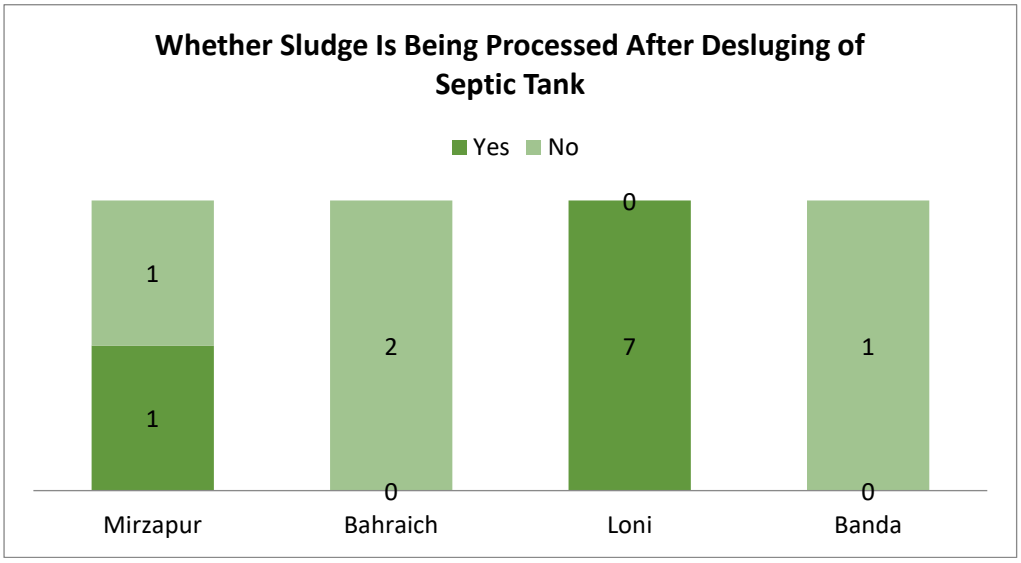
being dumped into water bodies or open space. Even in the cities where partial sewer system exists, some operators disposed off sludge after desludging of septic tanks in open spaces /river bodies without any kine of treatment (Table 4.138).

Table: 4.138
Whether Sludge Is Being Processed After Desluging of Septic Tank

City	Yes	No	Total
Mirzapur	1	1	2
	50.0%	50.0%	100.0%
Bahraich	0	2	2
	0.0%	100.0%	100.0%
Loni	7	0	7
	100.0%	0.0%	100.0%
Banda	0	1	1
	0.0%	100.0%	100.0%
Total	**8**	**4**	**12**
	66.7%	**33.3%**	**100.0%**

Source: Field Survey.

Chart: 4.38



The respondents were asked that whether public resists for disposal of sludge after desludging of septic tanks. Most of the respondents revealed that public is resisting for disposal of sludge after desludging of septic tanks at open spaces /water bodies / drains etc. as disposal of sludge has higher level of odor and contaminate water bodies besides, high level of pollution (Table 4.139).

Table: 4.139
Whether Public Resists For Disposal of Sludge After Desluging of Septic Tank

City	Yes	No	Total
Mirzapur	2	0	2
	100.0%	0.0%	100.0%
Bahraich	1	1	2
	50.0%	50.0%	100.0%
Loni	7	0	7
	100.0%	0.0%	100.0%
Banda	1	0	1
	100.0%	0.0%	100.0%
Total	**11**	**1**	**12**
	91.7%	**8.3%**	**100.0%**

Source: Field Survey.

Fecal sludge must be emptied and transported in a way that protects service providers, households, communities, and the environment. Fecal sludge is a major source of pathogens, such as bacteria, viruses, protozoa and helminthes that cause disease..The respondents were further asked that whether they are aware that disposal of sludge of septic tanks into water bodies pollute environment. Most of the respondents were of the view that disposal of sludge of septic tanks into water bodies pollute environment (Table 4.140).

Table: 4.140
Do You Know That Disposal of Sludge of Septic Tank Into Water Bodies Pollute Environment

City	Yes	No	Total
Mirzapur	2	0	2
	100.0%	0.0%	100.0%
Bahraich	1	1	2
	50.0%	50.0%	100.0%
Loni	7	0	7
	100.0%	0.0%	100.0%
Banda	1	0	1
	100.0%	0.0%	100.0%
Total	**11**	**1**	**12**
	91.7%	**8.3%**	**100.0%**

Source: Field Survey.

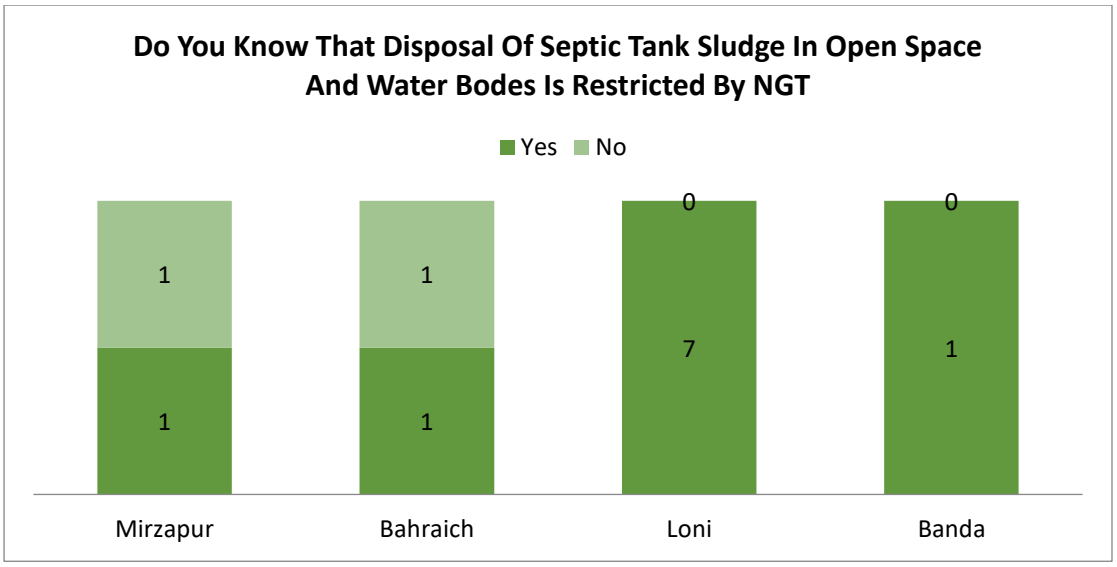
The respondents were further asked that whether they are aware that disposal of septic tanks sludge in open space and water bodies have been restricted by NGT. Most of the respondents were found aware about the fact. However, about 17 per cent respondents mainly in Mirzapur and Bahraich were found unaware about the fact (Table 4.141).

Table: 4.141
Do You Know That Disposal Of Septic Tank Sludge In Open Space And Water Bodes Is Restricted By NGT

City	Yes	No	Total
Mirzapur	1	1	2
	50.0%	50.0%	100.0%
Bahraich	1	1	2
	50.0%	50.0%	100.0%
Loni	7	0	7
	100.0%	0.0%	100.0%
Banda	1	0	1
	100.0%	0.0%	100.0%
Total	**10**	**2**	**12**
	83.3%	**16.7%**	**100.0%**

Source: Field Survey.

Chart: 4.39



Expectations from government for regular and appropriate management of desludging of septic tanks are shown in Table 4.142. Finance, field and subsidy are some of the expectations of sludge operators for management of desludging of septic tanks. The sludge operators reported that they require finance with subsidy for treatment of sludge while land is also required for setup of faecal sludge treatment plant and disposal of treated sludge.

Table: 4.142
Expectations From Government For Regular And Appropriate Management Of Desludging Of Septic Tank

	Mirzapur	Bahraich	Loni	Banda	Total
Technical	0	2	0	0	2
	0.0%	100.0%	0.0%	0.0%	16.7%
Finance	2	0	7	1	10
	100.0%	0.0%	100.0%	100.0%	83.3%

Subsidy	1	0	6	0	7
	50.0%	0.0%	85.7%	0.0%	58.3%
Field	1	0	7	0	8
	50.0%	0.0%	100.0%	0.0%	66.7%
Others	2	0	7	0	9
	100.0%	0.0%	100.0%	0.0%	75.0%

Source: Field Survey.

The analysis shows that most of the respondents are males. They mainly belong to Hindu community. The respondents were mainly from low socio- economic profile as their educational levels were recorded poor and their family income was low. However, most of the respondents reported that they have access to household individual toilets and facility of drinking water. However, duration of municipal water supply was recorded low. The ULBs are providing sanitation services, however, duration of water supply, collection of solid wastes and its safe disposal, cleaning of drains, provision of public bins etc. were recorded to be poor.

Sanitation is an essential part of human development and a healthy, civilized life. Sanitation is linked to the environment because it reduces the incidence of water-borne infections, which leads to poor health. Larger cities have sewer systems, thus they only service a tiny percentage of the urban population. As a result, many Indian cities still use individual septic tanks. Due to a lack of sanitation coverage and reliance on conventional septic tanks, sanitation workers clean and scavenge toilets. Also, sanitation workers lack the tools, equipment, and supplies to regularly clean septic tanks, communal toilets, and roadways. As a result, improving essential urban services like water, sanitation, drainage, and garbage disposal in slums is critical. It is also necessary to provide adequate sanitary facilities for the urban poor. The lack of a sewage network, poor functioning of sewerage treatment facilities and poor delivery of sanitation services in metropolitan areas make most towns and cities unsanitary. In the absence of facilities, many slum dwellers defecate in public. Only the construction and upkeep of public/community toilets in slums can prevent open defecation. Because the government alone cannot provide universal sanitation, all stakeholders, including the community, civil society, NGOs, local governments, and women's groups, must actively participate. This component of the research looks at urban demography and access to water, sanitation, and sewerage. Managing faecal sludge involves collecting, transporting, processing, and using or disposing of it (like a pit latrine or septic tank). It covers the last three aspects of sanitation. The data show that sludge operators are responsible for emptying septic tanks and pit latrines, but citizens do not regularly clean septic tanks. Desludging costs vary by city, and sludge operators

struggle. Private operators provide services outside of ULB jurisdictions, whereas ULBs provide services within their domains. Private operators sometimes dump sludge into open drains after desludging septic tanks and pit latrines at designated sites at sewer line / STP if sewer line exists or drains, while government sludge operators do the same. Most sludge operators and workers are unaware of basic health, hygiene, and safety hazards.

All the respondents accepted that sanitation campaign has been launched under SBM for social mobilization for construction of toilets as well as their effective uses. The campaign has also contributed significantly in improving the conditions of urban sanitation and community participation in solid waste collection, transportation and disposal. The analysis of view perception of concerned officials regarding the institutional arrangements, delivery of municipal services and sanitation simply demonstrates that there is vast scope for improving for improving the conditions of urban sanitation. The institutional arrangements for delivery of basic services are grossly inadequate.. The delivery of basic services such as drinking water supply, drainage, collection of garbage, etc. has been reported to be poor in slums and backward areas.

Emptying, transporting, treating, and using or disposing of faecal sludge from an on-site sanitation technology are all part of faecal sludge management (like a pit latrine or septic tank). It deals with the final three elements of a sanitation system. According to the findings, sludge operators are responsible for emptying septic tanks and pit latrines when needed, however there is no regular practice of citizens cleaning septic tanks. Desludging fees vary by city, and sludge operators have difficulty desludging their tanks. Both ULBs and private entities oversee sludge operators. Sludge operators for ULBs give services within their jurisdictions, whilst private operators provide services outside of their jurisdictions. Private operators sometimes dispose of sludge into open drains after desluding septic tanks and pit latrines at suggested points at sewer line / STP if sewer line exists or drains, whereas government sludge operators dispose of sludge after desluding septic tanks and pit latrines at suggested points at sewer line / STP if sewer line exists or drains. The majority of sludge operators and personnel lack proper safety precautions and are uninformed about health, hygiene, and safety issues.

CHAPTER: 5

CONCLUSION AND FUTURE SCOPE

India has a National Urban Sanitation Policy. For this reason, the Indian government has advised states to adopt state urban sanitation policies and city sanitation plans, which will provide guidelines for improving city cleanliness and empowering manual scavengers. However, this improvement is regarded insufficient. Sanitation is the major duty of municipal governments. Most local governments lack the resources to tackle the daunting task of urban sanitation. The Ministry of Urban Development's 2009 service level benchmarking study on urban sanitation in India corroborates this. Sanitation services fall short of the criteria. Urban municipal governments are responsible for collecting solid waste, yet more than a quarter of it is not collected, which is concerning. Drains clog due to littering, particularly plastic garbage. Many urban homes lack sanitary toilets, and those that do exist are not cleaned properly or regularly. Insufficient cleanliness, water availability, and privacy prevented effective use of private and public toilets. To enhance urban infrastructure and improve municipal services in 500 cities, the Ministry of Urban Development created the Atal Mission for Rejuvenation and Urban Transformation (AMRUT). A national goal is to improve the quality of life for all people, especially the poor and disadvantaged, by providing basic utilities (water, sewerage, and urban transportation). For this reason, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) aims to: 1) make sure that everyone has access to clean drinking water and sewage; 2) make cities more pleasant by creating greenery and well-maintained parks; and 3) reduce pollution by using public transportation or building non-motorized transportation facilities (e.g. walking and cycling). People, especially women, value these outcomes, hence the Indian Ministry of Urban Development has created Service Level Benchmarks to measure them (SLBs).

Sanitation is a state duty in India. State-level steering committees and urban departments assist and guide Urban Local Bodies in implementing sanitation at the local level. ULBs plan, design, execute, operate, and maintain water and sanitation services in cities and towns. Assisting states and ULBs in capacity-building and training, providing financial assistance for City Sanitation Plans through existing government schemes, and monitoring are all duties of the nodal Ministry of Housing and Urban Affairs. Beyond the Ministry of Housing and Urban Affairs, institutional responsibility for water supply and

sanitation is shared by a number of ministerial ministries, commissions, and boards. This issue may also contribute to programme failure. Only 13 percent of India's wastewater gets treated, according to one estimate. Around 40 percent of 350 million urban residents use sewers, 47% use septic tanks, and 2 percent use alternative systems. The country lacks recognised septage treatment facilities. As a result, household waste pollutes India's surface waters at 80 percent. A huge proportion of people in India use surface water for washing and drinking, resulting in a high incidence of waterborne illnesses. In Orissa and Rajasthan, up to 80% of toilets are connected to septic tanks. As more people use private sanitation, the number of septic tanks has risen dramatically. Many septic tanks are unavailable for desludging and maintenance. The Indian National Building Code requires annual maintenance and desludgement of septic tanks. "Clean the tank's bottom when it's full of septage." Cleaning should be done every 12 months. However, no one agency is assigned to implement this Code. Few cities have adopted desludging policies. Most cities, however, have yet to enact septage management legislation, and ULBs are unprepared to deal with the issue. Octopus management is gaining popularity as a way to improve water quality and public health The NUSP refocuses national attention on onsite sanitation systems and safe septage collection and disposal, requiring state and local governments to adopt sanitation plans.

We need a strategy that meets the basic standards, is acceptable and affordable for all areas and people, and takes into account local realities. Capacity building, education, and awareness among all stakeholders must also be addressed. Septic tanks, pit latrines, and other faecal sludge-generating systems are examples of onsite sanitation systems that can be improved. This policy solely applies to on-site sanitary facilities and the regions covered by them. It does not cover wastewater or sewerage networks (including treatment facilities). Distinguishing the synergies between FSSM and sewage systems or municipal solid waste management

Due to a lack of sanitary coverage and reliance on conventional septic tanks, sanitation workers clean and scavenge toilets. Sanitation workers also lack the tools, equipment, and materials needed to regularly clean communal toilets and sweep roads and streets. The sanitary employees also misunderstand the MSW Management Rules. Not having access to essential amenities like sanitation and clean water is a big cause for concern after more than 60 years of freedom. Il n'y a pas de concerted effort to provide sanitation As a result, improving essential urban services like water, sanitation, drainage, and garbage

disposal in slums is critical. It is also necessary to provide adequate sanitary facilities for the urban poor. The lack of a sewage network, poor functioning of sewerage treatment facilities, and poor delivery of sanitation services in metropolitan areas make most towns and cities unsanitary. In the absence of facilities, many slum dwellers defecate in public. Only the construction and maintenance of public toilets in slums can prevent open defecation. Because the government cannot guarantee universal access to sanitation for the urban poor, all parties, including the community, civil society, NGOs, local governments, and women's groups, must actively participate. He added that slum dwellers are particularly vulnerable since they must defecate in the open due to a lack of sanitary latrines. Because women are unable to defecate during the day, open defecation generates harassment and sexual assault against women and girls, as well as an increase in urinary infections. This session had five papers and presentations. The lack of water in houses is concerning, as it affects the effective usage of toilets. Apart from the lack of urinals, public restrooms have been found to be disorganised. The absence of community engagement and education on sanitation services for the urban poor has also been noticed. Since the poor have defecated in the open, they have had little incentive to utilise toilets. As a result, community-based organisations must do more to promote cleanliness among the poor.

Main Research Findings:

Sanitation and Municipal Finance:

- Since the introduction of the Swachh Bharat Mission, urban sanitation has become more important. Through societal mobilisation, the Mission attempted to eliminate open defecation, collect, segregate, transport, and scientifically dispose of solid waste, and construct toilets. The Mission will run from 2014 until 2019. However, in Uttar Pradesh, the progress of SBM has been found to be slow. By March 2018, just a small percentage of the cash granted to ULBs had been used to build household and community toilets.
- The Government of India intends to improve sanitary conditions in Class I cities with an investment of Rs. 50000 crores for the period 2014-19. Sewage and septage management, water supply, storm water drainage, non-motorized urban transportation, capacity building and reforms, as well as the creation of green space and parks, are all covered by the Mission. The majority of the money allocated under the Mission have been allocated to water supply and sewerage management,

including septage, in the state of Uttar Pradesh. Green space development and parks have received about 2% of the budget.

- Overall, sanitation coverage has been geared toward large cities, since metropolitan cities have a piped sewer network of more than 60%, compared to only 1/3 of the piped sewer network in urban regions. As a result, reliance on septic tanks was found to be high in small and medium cities, but low in metropolitan areas. In the same way, drainage facilities were found to be high in Class I cities and poor in small towns. Even the fraction of cities with no drainage was found to be high in small cities and low in large cities.

- Sewerage treatment plants are likewise geared toward large cities, since STPs are built along river banks in India's major cities. A big number of STPs aren't working properly, resulting in a large amount of untreated sewage being dumped into bodies of water and sewers, polluting the water. In the state of Uttar Pradesh, there is no appropriate septage management, and faecal sludge is discharged into water bodies, sewers, and open space, polluting the environment. • Although ULBs have suction devices for cleaning septic tanks, septic tanks are only desludged when the community requests it or when there is a blockage or overflow. In 2016-17, government grants contributed for 90% of municipal income in Nagar Palika Parishads, while tax revenue accounted for 6%. Between 2014-15 and 2016-17, the state of Uttar Pradesh had a considerable surplus of municipal revenue. Municipal income in a few Uttar Pradesh ULBs also showed a high reliance on government grants, with just approximately 10% of the ULBs' revenue coming from their own sources.

- Civic amenities and development account for nearly two-thirds of municipal spending in the state; nevertheless, it was found to be high in Nagar Panchayats and low in Municipal Corporations. Establishment expense accounted for roughly 2/5th of expenditure in municipal corporations, while it accounted for about 36% of expenditure in Nagar Palika Parishads. During 2016-17, sanitation expenditure accounted for 20.55 percent of total expenditure in Municipal Corporations, 25.78 percent in Nagar Palika Parishads, and 24.31 percent in Nagar Panchayats. However, in selected ULBs during 2016-17, sanitation spending as a percentage of total expenditure was 9.3% in Mirzapur, 3.9 percent in Loni, 11.7 percent in Banda, and

6.1 percent in Bahraich. During the years 2012-13 to 2016-17, all of the cities studied saw a significant decrease in sanitation spending.

Municipal Officials:

- The sanitation sector accounted for more than half of the responses, while the administrative wing accounted for roughly 37%. The majority of them were discovered to be permanent, but roughly 36% were found to be temporary, contractual, or outsourcing employees.
- ULB is responsible for sanitary services, according to all respondents, however Jal Nigam / Water Works is responsible for water delivery in cities, according to around 2/5 of respondents. Similarly, ULBs are primarily responsible for solid waste management. All of the selected ULBs have begun the door-to-door collection process; however, in certain cities, this service is only partially covered. The majority of respondents thought institutional garbage collection arrangements were adequate.
- Suction equipment for cleaning septic tanks and sewer lines were reported by the majority of respondents. Although public sludge operators operate in Loni, Banda, and Bahraich, their presence is reported to be limited in Banda and Bahraich. In Mirzapur, Loni, and Banda, sewer lines are partially functional; however, sewer lines in Banda and Bahraich have been discovered to be defunct.
- Hand pumps are the primary source of drinking water in cities, according to the majority of respondents. Water supply duration was found to be poor in Banda and high in Mirzapur, Bahraich, and Loni.
- The majority of respondents said communal and public restrooms are adequate. The community is likewise ready to build toilets as part of SBM. SBM also led to the construction of community toilets, according to the majority of respondents. In Mirzapur, however, the majority of respondents were opposed to the viewpoint. The majority of respondents also stated that community toilets are cleaned on a regular basis. The majority of respondents said that the construction of communal toilets had significantly reduced open defecation.

- Septic tanks are cleaned every 5-10 years, according to roughly 2/5 of respondents, whereas septic tanks are cleaned every 3-5 years, according to about 1/3 of respondents. The majority of Bahraich respondents stated that a helpline had been established for individuals to call in order to have their septic tanks cleaned on a regular basis. However, there is no equivalent helpline in other cities. The primary reasons for not cleaning septic tanks on a regular basis include a lack of access to suction machines/trucks/loaders, inadequate equipment, a lack of community awareness, and a shortage of truck/loader/sludge operators. The majority of respondents agreed that vacuum tanks are discharged in waste land, open space, and water bodies after septic tanks have been desludged. Septic tank waste is being poured into drains connecting to sewage lines in Mirzapur, Loni, and Banda, resulting in partial treatment.
- Approximately one-fifth of respondents said they might make land available in the future for the development of a faecal sludge treatment facility. ULBs have empanelled private sludge operators, according to slightly more than a quarter of respondents. ULBs require faecal sludge treatment plants, according to almost 3/4 of respondents. However, it was observed to be low in Loni due to the presence of a piped sewer network and STPs.
- Inadequate sewer treatment plants, a lack of STPs or non-functional STPs, garbage discharge into rivers, a lack of construction sites, and a lack of public participation were noted as the top sanitation issues.
- The majority of the sludge operators were hired on an outsourced basis. However, the majority of them had 5 to 10 years of experience. The majority of them reported receiving up to Rs. 1500 for cleaning one-time septic tanks.
- Septic tank cleaning capacity ranges from 3000 to 5000 litres, according to almost 3/4 of responders. The capacity of vacuum tanks, on the other hand, was found to be low in Banda and Bahraich. Sludge operators hired by ULBs clean an average of 2-3 tanks every day.
- The biggest challenge in cleaning septic tanks, according to sludge operators, is lack of access to septic tanks, leakage of poisonous gases from septic tanks, lack

of sanitary employees, lack of sanitary equipment, and failure to desludge septic tanks after a lengthy period of time.

- After desludging septic tanks, all respondents in Loni and half of the respondents in Mirzapur said they dispose of faecal sludge at pre-determined points linking to STPs, while sludge operators in other places said they dispose of faecal sludge in open space, rivers, and sewers.
- About two-thirds of respondents said a helpline had been established for citizens to call in order to have their septic tanks cleaned on a regular basis. The majority of respondents also stated that the community is constantly informed about septic tank desludging. Although the majority of respondents said they have suitable equipment for desludging septic tanks, sludge operators highlighted in their in-depth discussions that most cities lack adequate safety precautions and equipment.
- Sludge is handled and treated at STPs in Loni and Mirzapur, according to the majority of responders. Other cities, on the other hand, do not have such a provision. The majority of respondents stated that the public opposes the discharge of sludge after septic tanks have been deslugged. The majority of the respondents were aware that dumping sludge into water bodies pollutes the environment and has been prohibited by the NGT.

Urban Households:

- Males from Hindu groups made up the vast majority of responses. They primarily belonged to the General and Backward Castes. Approximately half of the respondents were from a lower socioeconomic status, were marginalised, or were poor. Their educational attainment is deemed to be inadequate. Nuclear families accounted for around 2/5 of responses, while combined families accounted for about 58 percent. Labor, tiny business, private jobs, and self-employment were identified as their primary family occupations. As a result, in the majority of cases, their monthly family income was reported to be poor.
- The majority of the respondents were discovered to be living in their own homes. About 36 percent of respondents said their home is in the old city, while about 2/5 said their home is in slums or unapproved /unauthorized colonies. However, almost

3/4 of those polled lived in pucca dwellings. The majority of respondents stated that their house is accessible via street roadways.

- The majority of respondents were aware of the Swachh Bharat Mission. However, AMRUT was reported to have a poor level of public awareness. They were discovered to be aware that ULBs provide sanitary services. They further stated that sanitary staff from local governments washes the roadways in their districts. However, less than half of the respondents said they have access to public trash cans in their communities. About half of the respondents also stated that their neighbourhoods' streets and roads are cleaned on a daily basis, and the majority of the respondents agreed that ULBs collect solid waste in their areas.
- Approximately 3/4 of respondents said there were open drains outside their home. However, more than half of the respondents said that sanitary staff clean these drains on a weekly basis.
- The vast majority of respondents stated that they have access to safe drinking water in their homes. Individual cassette and individual hand pumps were the primary sources of drinking water. In Banda and Loni, water delivery via piped network was at an all-time high. However, in the vast majority of cases, the duration of water delivery was observed to be short.
- About 29 percent of respondents said their neighbourhoods have a piped sewer system. The majority of respondents said that sanitary employees from local governments are in charge of the sewerage system's operation and upkeep. Water logging is a problem in about half of the respondents' neighbourhoods. In Loni, it was discovered to be more pronounced. Around 31 percent of respondents also stated that solid waste dumping has an impact on their community.
- The main sanitation issues mentioned were a lack of toilets, insufficiency of toilets, damaged toilets, clogging of toilets, lengthy distance between toilets, dirty toilets, and faecal sludge disposal in the neighbourhood, among others.
- Approximately 85 percent of respondents stated that they have a toilet in their home. Loni had the best pronunciation, followed by Bahraich and Banda. The majority of people said they have flush toilets. The most common causes for open defecation were a lack of cash for toilet construction, a lack of toilets in the house, a lack of room for toilet construction, and a habit of open defecation.

- In Loni, the adequacy of community toilets was found to be high, whereas in Mirzapur and Bahraich, it was found to be low. ULBs, Sulabh International, Shramik Bharti, and public sector enterprises all maintain community toilets. The majority of responders said that communal toilets and public toilets have recently been built using SBM. Employees of ULBs and sanitation staff clean these restrooms.
- Approximately 15 percent of responders said they have built individual household toilets using SBM. Approximately 3/4 of these responders were also given incentives to build toilets. In the majority of situations, the cost of toilets was less than Rs. 20000.
- Approximately 6 percent of respondents said their toilets are linked to a sewer pipe. Mirzapur had the most pronouncing, followed by Loni. However, 8 percent of respondents said their toilets are connected to the sewage line as well as septic tanks. Loni and Banda were determined to be more pronouncing.
- Approximately 62 percent of respondents said their septic tanks are located inside their homes. In Loni and Mirzapur, this was found to be more pronounced. Septic tanks are also reported to be positioned in front of about 28% of respondents' homes. In their septic tanks, almost 51 percent of respondents said they have two sections. The majority of responders, on the other hand, disclosed that their septic tanks were built by Masons and labourers. About 47 percent of respondents said their septic tanks were built in the last ten years, while more than half said their septic tanks were built 10-20 years ago.
- Approximately 80 percent of respondents stated that their septic tanks had not yet been filled. A substantial percentage of respondents said their septic tanks had full in the last 5 to 15 years. The majority of respondents stated that faecal sludge is disposed of in open drains, closed drains, and sewer lines once septic tanks are filled or overflow.
- Septic tanks are typically cleaned every 3 to 10 years. Suction equipment owned by ULBs and private sludge operators are used to clean septic tanks. However, just around a third of those polled said they clean their own septic tanks. In Bahraich and Banda, this was found to be more pronounced. In the majority of situations, the cost of cleaning septic tanks for a single time was estimated to be less than Rs. 1500.

Septic tanks should be cleaned every three years, according to more than half of the respondents.

- Lack of access of suction machines/trucks/loaders to septic tanks, lack of funds, lack of public awareness, lack of truck loaders, lack of adequate cleaning equipment, lack of sludge operators, and lack of technically qualified municipal staff were reported as the main problems in septic tank cleaning. More over half of the respondents were in favour of paying user fees to clean septic tanks on a regular basis.

Future Scope :

- Treatment technologies for seepage, waste water management, and faecal sludge are available. Small and medium-sized cities can benefit from decentralised Faecal Sludge Treatment Plants run by ULBs, Residents Welfare Societies, and NGOs. Sludge management policy should be developed by the state. Notably, the state was the first to adopt a solid waste management policy. RCUES Lucknow, in collaboration with UNICEF, developed a State Urban Sanitation Policy based on the National Urban Sanitation Policy. The government has indicated that WUSP will draught a State Policy on Faecal Sludge Management.
- Private sludge operators have been delivering desludging services where public agencies have failed for many years. Private septage operators do not use treatment facilities because they were not properly contacted or involved in the facility's setting and design. Include private sludge operators, CBOs, and sanitation workers early in the planning process, desludging, disposal of faecal sludge, and treatment facilities. The ULBs must manage the system by hiring private sludge operators, setting user fees or tying them to property taxes, establishing locations of disposal of faecal sludge after desludgement by sludge operators, and assuring sanitation employees' safety and security while desludgement.
- Local governments must educate communities about the benefit and importance of frequent desludging after building faecal sludge treatment plants. Surveying family perceptions and concerns regarding sanitation and septic tanks can help cities identify target audiences and tailor essential messaging. Cities can then implement the campaign, measure public sentiment, and adjust future advertising efforts.
- ULBs will need to explore the efficacy of alternative treatment methods, improvements, reuse and recycling options, as well as new treatment technologies such combining

solid and human waste composting. This technique may also help integrate onsite sanitation management and treatment into the curriculum, resulting in future professionals who are capable and devoted to addressing this important national issue.

- Suction machines/vacuum tanks must be upgraded, mechanised vehicles purchased, and safety procedures and equipment implemented. The number of sanitary workers necessary should be increased due to increased community awareness and sensitization. In order to remind communities to desludge septic tanks on time, ULBs should create a system to manage community applications, funds received, and desludge dates. It will take a community study to identify the number of septic tanks, willingness to pay user fees, and frequency of septic tank desludging.
- ULBs may need to change the property tax structure to include frequent desludging fees. Charges for desludging are considered as sewage in all ULBs because sewerage is only charged when a piped sewer network exists. Its own.
- ULBs must build faecal sludge treatment facilities, raise awareness about regular septic tank desludging, safe faecal sludge disposal at faecal sludge treatment facilities, and composting of human excreta and animal dung as well as solid wastes.
- Public-private partnerships should be promoted more in sanitation. Women's groups, thrift and credit clubs, civic societies, NGOs, and other non-profit organisations should be involved in waste collecting and street and road cleaning. Stakeholders should be active participants. Residents, businesses, and regulators are all stakeholders. Government and non-governmental sanitation measures can only reach a tiny population.
- User charges for sanitary services such as garbage collection, cleaning and upkeep of public restrooms, street sweeping and drainage should be enforced properly. Due to escalating costs of water production and sewerage services, citizens must pay user fees to keep water utilities and sewage treatment plants operational.
- Existing sewage treatment plant capacity should be fully utilised by addressing current obstacles, limitations, and challenges. Human faeces should not be dumped into open drains or water bodies.
- A competent policy for septage and faecal sludge management is essential because many urban residents use old septic tank technology. The policy should also address issues including proper technology, frequent septic tank cleaning, solid waste disposal from septic tanks, and sanitary employee training and capacity growth.

- Sanitary workers should be regularly trained in new technologies, equipment, and instruments, as well as existing norms and standards. First, local service providers must assess their own needs in order to increase capacity. As a result, they will control the process. The capacity-building programme must be staged to adequately involve service providers.
- Sanitation staff should be given with appropriate tools, equipment, and materials. Cities' municipal governments are in charge of this. This could be achieved by charging for sanitation services.
- It is vital to educate and communication of community. A public awareness campaign is needed to prevent open defecation and the usage of dry latrines, especially in high-risk locations.
- In densely populated locations, community septic tanks should be erected to reduce pollution. In flood-prone areas, leach pit technology has proven ineffective and risky.
- Identifying beneficiaries, creating awareness, building and maintaining the scheme should be left to technically qualified and well-respected NGOs and community-based organisations.
- Enough community toilets in strategic locations are necessary to combat open defecation and improve urban living conditions. Building more public restrooms should be a priority for markets, schools, universities, bus and train hubs. The current community restrooms' seating capacity must also be enhanced. Because water supply in communal toilets is vital, it is necessary to re-bore failing bore wells.
- Septic tank cleaning may be automated, reducing manual labour. Technology/mechanized systems with sufficient safety precautions and specialist training are required for manhole operations.
- A sustainable structure of governance for pro-poor programmes and welfare-oriented activities should be promoted in the sanitation sector. The urban poor can help manage municipal waste. Successful models may be built and replicated if these activities were included in civic legislation.
- The gap between infrastructure and services must be addressed as soon as possible to ensure their mainstreaming into the formal system and improve sanitation. Affordability of sanitation services is a major challenge, as is financial and environmental sustainability. Slums and developing areas badly need more communal restrooms. Slum dwellers and the destitute will defecate less openly. The community

should be responsible for maintaining such public restrooms. RWSs, NGOs, and other volunteer groups may also manage community and public bathrooms. Community toilets should set user fees in consultation with the community, utilising family unit criteria.

- NGOs, RWSs, volunteer groups, and other academic institutions can help raise community awareness about the need of establishing and maintaining scientific septic tanks. Masons, on the other hand, need to be trained to build better septic tanks. The same goes for NGOs and other non-profits. Efforts should be focused on establishing Master Trainers to quickly sensitise the community.

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