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Transforming the Urban Waste Mountains: Lessons from Indore's Bioremediation of Legacy Waste

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ABSTRACT

Waste management in urban areas can pose manifold challenges that can threaten the goal of achieving sustainable cities. The need of the hour is to assess the existing waste management practices in our cities and explore new alternatives to develop cost-effective, non-hazardous long-term waste management plans. The Solid Waste Management Rules 2016 instructed Urban Local Bodies (ULBs) in India to investigate and analyse existing dumpsites to explore their potential for biomining and bioremediation. This paper briefly touches upon the challenges posed by poorly managed municipal solid waste and also provides a glimpse into measures adopted by the Indore Municipal Corporation (IMC) in successful implementation of Bio-remediation of process.

Keywords: *Municipal Solid Waste Management; Bioremediation; Legacy Waste; Indore.*

URBAN WASTE CHALLENGE: AN INTRODUCTION

Cities have always been a complex system of production and consumption. With this characteristic of the city comes exponential population growth, improved incomes, and therefore increased consumption, subsequently leading to the copious amounts of waste being generated. In its 2018 report titled "What A Waste 2.0: A Global Snapshot of Global Solid Waste Management to 2050", the World Bank estimates that waste generation will increase from 2.01 billion tonnes

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in 2016 to 3.40 billion tonnes in 2050. A 2014 Planning Commission report stated that urban India generates 62 million tonnes of municipal solid waste (MSW) annually. It also predicted that the volume will increase to 165 million tonnes by 2030. In 2016, The Centre for Science and Environment (CSE) published *Not In My Backyard: Solid Waste Management in Indian Cities* report, highlighting the concerns of overflowing landfills in Indian cities. It recommended avoiding the use of scarce and valuable land for disposing waste and to treat waste as a resource. In recent years, the Urban Local Bodies (ULBs) in India have attempted to explore new methods of waste disposal and re-invent waste management in the country largely due to the Swachh Bharat mission launched in 2014. In the second phase launched in September 2021, the focus was on making cities garbage-free with efficient source segregation, 100 per cent door-to-door collection and complete remedial treatment of the waste.

This paper highlights various urban solid waste challenges in India and elucidates the meticulous planning, rigorous efforts, coordination, collaboration and cooperation involved in the bioremediation process and its successful implementation.

Proper management of urban solid waste has posed a serious challenge for ULBs and citizens globally, especially in developing countries. MSW Management System involves activities associated with the generation, storage, collection, transfer and transport, processing, and disposal of solid wastes however, in most cities, it comprises only of four activities, i.e., waste generation, collection, transportation, and disposal (Bundela, Gautam, et al. 2010). Improper management of waste can directly or indirectly affect many aspects of a city and its citizens, leaving ULBs with a manifold of unforeseen challenges to tackle, such as – Spatial challenges, Societal Challenges, Health Challenges, and Environmental Challenges.

Spatial Challenges

In Indian cities, land is a scarce and expensive resource however, landfilling is a common method adopted by many ULBs to manage urban waste. In India, most of the solid waste is disposed off by landfilling in low-lying areas located in and around the urban centres (Kumar, Gaikwad et al. 2004). Almost 70–90 per cent of landfills in India are open dumpsites (Jha, Sharma, et al. 2008). Indian megacities like Delhi, Bangalore, Chennai, Kolkata and Mumbai have landfills that have amassed waste for almost two to three decades and waste dumped have reached a height of 300 feet in Bhalswa, Delhi to 78 feet in Kolkata (S. Goswami & S. Baswak, 2021). Landfills are an unpleasant sight and

can damage the city's aesthetics and blanket its surroundings with an unbearable stench. Through Landfill Reclamation ULBs can avoid high costs for acquiring new land and also recover reclamation costs with sales or use of recovered materials (USEPA, 1997).

Societal Challenges (Caste and Class)

Right from the waste being collected from everyone's doorstep to its transportation, segregation, or recycling, the entire process of waste management involves people from the lowest rung of the society. These include the poor, individuals at the bottom of the caste hierarchy, women, the elderly, and at times even children. They often work in unhealthy conditions, lack social security or health insurance, lack education and training opportunities, and face strong social stigma (Kaza, Yao, et al. 2018). The kins of these workers also take over this job once they retire or die, thus this work is 'reserved' for the poor and the lower caste and they are trapped in this cycle.

Health and Wellbeing

Improper waste management can cause health hazards both for those who handle the waste and also for those who live near the dumping sites or Waste Management Plants. Those who are constantly exposed to the landfills are often at the risk of having musculoskeletal disorders, decreased lung functions and respiratory issues, mental health issues among several other health risks. Constant interaction with waste can also expose the workers to skin diseases, infections, depression, and intestinal problems created due to flies feeding on the waste (Garrido, Bittner, et al. 2015). Moreover, if these waste dumping sites are close to human settlements then there is probability of leachate contaminating the water supply, attract disease-spreading rodents and emit odour. One of the reasons for the Surat's Pneumonic Plague in 1994 was the mismanagement of waste and sewers. The Plague affected as many as 1200 people and claimed 63 lives. Zero-Landfill cities will not only be a step closer to achieving sustainable cities but also developing healthy cities.

Environmental Challenges

Improper waste management can affect the environment at various levels: soil, air, and groundwater. It can even contribute to climate change due to organic waste generating Green House Gases like carbon dioxide and methane. If the waste is directly disposed off onto the surface of the land, without a protective layer as a barrier, the toxic and harmful substances found in Municipal Solid Waste can penetrate

the soil thereby depleting its quality and also affect the ground water. It can alter the physical, physico-chemical, and chemical properties of soil. This would also reduce overall soil strength and consequently its usefulness as a foundation material (Pillai, Peter, et al. 2014).

Burning of waste, either intentional or unintentional, can pose risk to the environment. Open burning of waste generates dangerous carcinogens like dioxins, furans and black carbon which is a short-lived climate pollutant that contributes to climate change. The organic compound found mostly in domestic waste produces methane, a significant contributor to global warming (Mor, Suman, et al. 2006). This methane can also cause fires in landfills that can rage over for hours and at times, even days. The Delhi Fire Services (DFS) data brings to light the alarming rate of these landfill fires as the Bhalswa site had 69 major fire incidents, Okhla 35 and Ghazipur 27 in 2018 (The Times of India, 2019).

MUNICIPAL WASTE MANAGEMENT IN INDIA

Discerning the quantity, quality, and characteristics of waste is crucial to devise a cost-effective and efficient waste management approach that would not only address the current issues but also foresee and prevent future crises. Central Pollution Control Board's data on solid waste generation in 46 metropolitan cities revealed that for the year 2015-16 Mumbai (11,000TPD), Delhi (8,000TPD), Chennai (5,000TPD), Bangalore (3700TPD), Kolkata (4000TPD), Hyderabad (4000TPD) and Ahmedabad (2500TPD) generated the most waste. However, sufficient data regarding the composition of waste in India is severely lacking due to segregation of waste not being a prevalent practice. In 2011, High Powered Expert Committee's report titled 'Indian Urban Infrastructure and Services' stated that due to poor enforcement of The Municipal Solid Waste (Management and Handling) Rules, 2000, neither Households nor Municipalities practice segregation of biodegradable waste from the rest. These rules, framed by Ministry of Environment and Forest (MoEF), defined Municipal Solid Waste (MSW) as "commercial and residential wastes generated in a municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes". The Solid Waste Management Rules, 2016 extended its jurisdiction beyond municipal area and also emphasized the need for source segregation of waste by the generators and assigned responsibility to Resident Welfare and Market Associations, gated communities, institution and SEZ. It is believed of MSW that the major components include food waste, plastic, rags, metal and glass, and small quantities of hazardous waste like electric bulbs, batteries, automotive parts, discarded medicines, and chemicals, etc.

Negligence and lack of stringent laws has led to around 3159 dumpsites to emerge in India over the years (Centre for Science and Environment, 2020). World Bank's 2018 report titled "What a Waste 2.0" revealed that 77% of waste generated in India is disposed in dumpsites, 18% is composted and only 5% is recycled. However, Swachh Survekshan, a competitive monitoring framework for accelerating Swachhata outcomes in Urban India, conducted annually by Government of India to assess and rank urban areas on their cleanliness, hygiene and sanitation, shows the changes in MSWM in India. Swachh Survekshan 2017 which was conducted across 500 Indian cities found that 297 cities practiced door-to-door collection of waste, in 407 cities 75% of the residential areas were found to be substantially clean and in 85 cities segregation of waste was sustained at all levels of waste processing in more than 75% of the wards. In 2021, the number of cities surveyed had increased exponentially to cover 4320 cities. The survey found that 1161 ULBs had enhanced their waste collection process, 1493 have started waste segregation process, 762 cities have constituted bulk rule /act waste generator to process waste on-site. These figures are a reflection of the positive changes that have developed in MSWM and an indication that ULBs across the nation are gradually moving towards achieving the goals setup by the Swachh Bharat Abhyan.

Moreover, new and innovative approaches have also emerged in Indian cities. NITI Aayog in its 2021 report titled 'Waste-Wise Cities - Best practices in municipal solid waste management' documented the best practices in MSWM in 28 Indian cities across 15 states to highlight environment friendly and financially sustained practices adopted by several ULBs to manage their MSW. The cities were identified in 10 thematic areas of MSWM. Panaji achieved 99% source segregation by segregating waste into 16 fractions, its collection on designated dates and continuous information, education and communication (IEC). Jamshedpur has become a model for material recovery by constructing 20 km of roads using non-recyclable plastic from its Dry Waste Collection Centres and popularizing eco-bricks in schools and households. Bruhat Bengaluru Mahanagara Palike utilized Information, Communication and Technology (ICT) such as Radio Frequency Identification (RFID) based attendance system, geo-tagging of collection routes and mobile app Ezetap to monitor Garbage-Vulnerable Points to ensure 100% door-to-door collection and make the city free from garbage-vulnerable points.

BIOREMEDIATION PROCESS

Bioremediation, in simple terms, uses living micro-organisms to decompose contaminants. This process stimulates the growth of certain

microbes that feed on contaminants, changing them into small amounts of water or harmless gases like Carbon Dioxide and Ethene. It was first used on a large scale in 1972 to clean up Sun Oil pipeline spill in Ambler, Pennsylvania and since it has been used to remove pollutants from water bodies, groundwater, soil, etc. and restore them to their original pristine state. The success of the bioremediation process depends on the right selection criteria and performance criteria (Azubuike, Chikere & Okpokwasili, 2016).

The nature of the pollutant, the extent of pollution, type of environment, location, cost, and environmental policies for the region are some of the selection criteria that are considered when choosing any bioremediation technique (Frutos et al. 2012; Smith et al. 2015). Based on the site of application, bioremediation techniques can be categorised as ex situ or in situ. In situ technology involves treatment of the contaminated material on the same site. In situ technology might be enhanced (bioventing, biosparging, and phytoremediation) or may not need any enhancement (intrinsic bioremediation or natural attenuation). Ex-situ technique requires physical transportation of the contaminated material to another area for treatment under a controlled environment. Out of the two ex-situ is more expensive due to the cost of excavating and transporting the material and can also have risks due to improper handling. However, it is preferred due to it being faster, easier to control and applicable for a variety of contaminants as compared to in situ technique. For bioremediation to be effective, performance criteria, i.e. the right conditions like the soil structure, moisture level, pH level, oxygen level, temperature and microbial diversity are also vital (Vidali, 2001). Right conditions allow the microbes to grow, multiply and eat more contaminants and in the absence of favourable conditions and contaminants, these microbes die (EPA, 2012).

Bioremediation does have certain limitations. For instance, only a few fungi or bacteria can act on the organic compound and it can be very difficult to destroy a large percentage of chemicals. It is also a very long process that takes time to show visible effects. However, it offers great benefits thereby making it a viable option that ULBs can adopt to reduce the volume of waste in their respective jurisdictions. It is a natural process that poses no threat to the health and well being of those near the site nor to the environment.

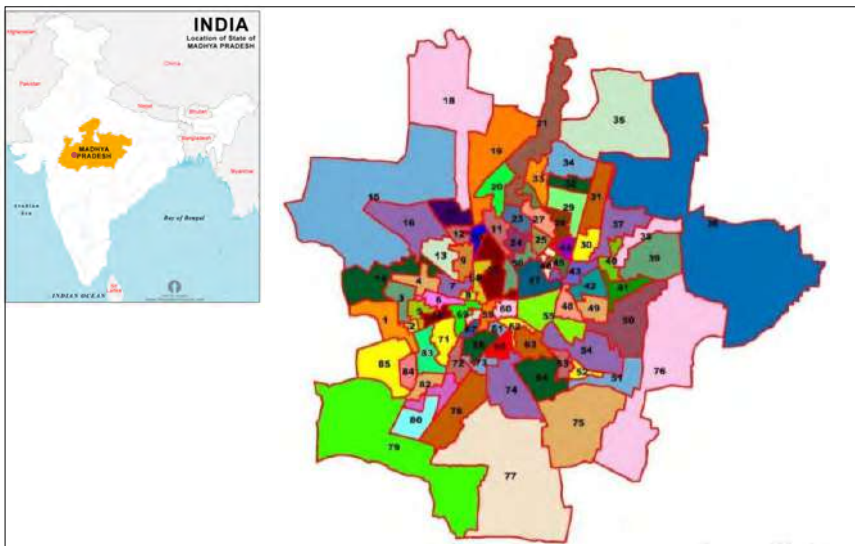
The ULBs were now pressured to undertake long-term solutions instead of merely adopting a band-aid approach to address the immediate needs.

CASE STUDY : INDORE MUNICIPAL CORPORATION

Indore: City Profile

Indore, located in the western region of Madhya Pradesh (M.P.), lies within the tributaries of Shipra River (Fig. 1). With an elevation of 553 meters above sea level, Indore has two main rivers, Chamba (west) and Kshipra. The City had a population of approx. 3,272,335 (according to Census 2011) with a population density of 839 persons per square kilometre and had decadal growth rate of about 33%. The sex ratio was 924 and the literacy rate was 82%. Indore has Marathi as the main language spoken by the majority of the population. Other languages spoken in the city are Hindi, Gujarati, Sindhi and English.

Fig. 1: Location Map of Indore Municipal Corporation (IMC)



Source: Indore Municipal Corporation.

Indore is the major hub for commercial activities but it also includes traditional agro-industries, modern corporate and IT companies making it one of the busiest cities in M.P. It also has numerous engineering and management schools to cover the supply of the growing demand for professionals. Indore's markets are filled with traditional businesses of textiles, IT & automobiles and steel industries, contributing substantially to Indore's economy, making it the business capital of M.P.

Indore is not only known for its economy and traditions but for last 5 years it is also known for its cleanliness. In 2016, the annual Swachh Survekshan Survey conducted by the Ministry of Housing and

Urban Affairs ranked Indore at 25th position, which was a below-par performance. This was mainly due to performance of Indore Municipal Corporation (Fig. 1) in context of improper collection and transportation of the MSW, leading to overflowing dumpsites, Garbage Vulnerable Points (GVPs), and secondary storage bins all over the city. But 2017 marked the turn of the tide, as since then Indore has managed to secure the first rank in the Swachh Survekshan for five years consecutively. The factors that were taken into consideration for the ranking were ground confirmation, handling of waste, innovative methodologies, financial stability, recovering solid waste administration cost etc. (Singh, R. 2021)

The Waste Scenario pre-2015

Indore, before being the cleanest city in India, was like any other Indian city in terms of its waste management. The unsegregated waste was dumped in the Devguradia trenching site and open sites in the city. Moreover, the city was characterised by a large number of Garbage Vulnerable Points (GVPs) which attracted stray animals, birds and rodents. Waste management was mainly looked after by *Jagirdaars* (traditional garabge collectors) and private operators, who had poor service quality levels and waste was dumped either in the dustbins across city's streets or in open land. In November 2013, the Madhya Pradesh Pollution Control Board submitted its report to the Madhya Pradesh High Court and suggested increasing the capacity of garbage collection and disposal. The report also noted that the unauthorized burning of the waste in the Devguradia trenching site was causing pollution in the area. It also stated that out of 875 metric tonnes of waste that was collected per day, only 250 metric tones (about 29%) was processed each day at the Devguradia trenching site (DNA, 2013). On 27th October 2015, the Madhya Pradesh High Court directed Indore Municipal Corporation (IMC) to present a comprehensive time-bound programme to manage its waste management issues before 6th November 2015. By December 2015, the IMC had swung into action by initiating door-to-door collection of waste in ward number 42 and 71 and undertaking awareness programmes to encourage segregation of waste into biodegradable and non-biodegradable waste at households. Within three years, post 2016, IMC, owing to its efficient planning, rigorous implementation, and monitoring process, was successful in remediation of 15MT legacy waste, which had been disposed off over a span of 60 years in the Devguradia trenching site. This successful venture helped the IMC reclaim around 40 acres of land which was then turned into a green belt and also helped the city earn the title of a zero-landfill, zero garbage city.

The Implementation Plan

With the advent of the Swachh Bharat Mission in 2014, ULBs were under immense pressure to take appropriate measures to address the sanitation issue in their respective jurisdictions. The IMC formulated an implementation plan that consisted of three simultaneous steps : (i) Door-to-Door collection of waste, (ii) elimination of GVPs, landfills, and open dumpsites, and (iii) Bioremediation of Legacy Waste. These steps were designed not only to address the immediate issues at hand but to also keep possible future issues at bay.

(i) Door-to-Door Collection

Door-to-door collection of waste, one of the important steps to achieving a zero-landfill status, as it prevents crude disposal of waste and also helps to gauge the quantity and quality of waste generated better. Hence, door-to-door collection of waste was introduced in Indore to collect household waste while semi-bulk and bulk generators of waste were covered by bulk collection system.

An identification survey was conducted to understand the volume of waste generated in each ward and accordingly a detailed route plan for collection of waste from all wards and deployment of staff was designed. The pilot project launched in 2 wards was started in December 2015. The project was expanded to all the 85 wards by end of 2016. The waste, segregated at source into 3 types – dry, wet, and domestic hazardous waste, was collected from households in partitioned vehicle. Currently, waste is segregated at source into 6 fractions, namely wet, plastic, non-plastic (dry), sanitary waste, domestic hazardous waste, and e-waste.

By 2016, IMC had ensured the collection of MSW and its transportation to Garbage Transfer Stations (GTSs) and processing sites every day. The city has 10 GTSs with capacities ranging from 150-200MT and a processing site at Devguradia spread over an area of 146 acres with a waste capacity of 254MT daily. Ragpickers and scrap dealers were employed to collect the waste and around 685 vehicles were deployed to transport waste from various sources to GTSs where it's weighed through weighing bridges before being sent to the processing site. Currently, as of 2021, for door to door collection of waste, 650 vehicles of 3.2cum and for bulk waste 100 vehicles of 5cum along with 1100 workers as drivers and another 1100 as helpers have been deployed.

(ii) Initiatives to become a bin free city

The IMC, simultaneous to the door to door project, made efforts to eliminate the GVPs, secondary storage bins and open landfills. A survey

was conducted by IMC to estimate their numbers, and the results exposed the dismal state of waste management in the city. The city has 1380 secondary storage bins, 408 dumpsites and 4753 back lanes. The door to door system helped in curbing crude disposal of waste making the city bin-free by December 2016. M/S Eco Pro Environmental Services was hired in 2017 to conduct a survey to assess the status of these sites, and it was reported that the city was free of GVPs and dumpsites. However, the report identified 171 old dumpsites. These sites later underwent facelift. The IMC has made constant efforts to monitor and prevent them from re-emerging. In 2020, the IMC decided to conduct a quarterly survey to keep a close check and maintain the city's status as a bin free city.

(iii) Bioremediation/ bio-mining of legacy waste

Based on the Solid Waste Management Rules 2016, the IMC sought to determine the feasibility of bioremediation of legacy waste. An action plan consisting of two phases was formulated. The first phase was rolled out to test the waters, the second phase was initiated after having empirical proof to indicate the success of the first phase, which was carried out by M/s A to Z infrastructure from July- December 2016. The second phase was carried out by E-tech projects between 2017-2019. The nine steps undertaken for the bioremediation process were:

Step 1: Identification of an area

The IMC conducted surveys to identify the areas that would be fit to carry out the bioremediation process. For the success of bioremediation, the site needs to have certain geophysical, geochemical and biological characteristics. The right conditions would allow the right microbe to thrive, multiply and eat more contaminants (Vidali, M. 2001).

The Devguradia trenching site was deemed to be fit for bioremediation. The processing facility at Devguradia site was operational since last more than 40 years. However, over the years residential areas have emerged near the site, the closest one being 200m away from the trenching site. Several residents started to raise concerns regarding the health problems that were arising due to the smoke coming from the burning garbage. In 2015, the Madhya Pradesh Pollution Control Board (MPPCB) studied the water sample collected from a tubewell near the trenching site and reported that the water quality in the area was critical and in need of immediate attention. Considering these factors and the geophysical, geochemical and biological characteristics of the site, further surveys were conducted to map out an efficient action plan.

Step 2: Conducting Surveys

Contouring and topological surveys were conducted using Total Station and Differential Geographical Positioning System (DGPS) to determine the quantity of the waste to be bio-remedied. A contour map of the Devguradia site was created and parcels of the site were labelled as location A, B, C and D (Fig. 2). The quantity of waste in each of these four parcels were estimated (Table 1). Out of the 15 lakh cum of the overall quantity of MSW, it was decided that 50,000 cum would be bio-remedied in the first phase.

Fig. 2: Contour Survey Map of Devguradia Trenching Site



Source: "Indore 2021: Remediation of all identified dumpsites no legacy waste (dumpsite)/ Zero landfill city".

TABLE 1: CONTOUR SURVEY RESULTS

Location	Area (sq. m)	Average Height of waste (metre)	Quantity (cum)
A	84650	4.50	3,80,925
B	49186	6.40	2,14,790
C	66493	5.10	3,39,114
D	73089	6.36	4,64,846
		Total	14,99,675
		Rounded-off	15,00,000

Source: "Indore 2021: Remediation of all identified dumpsites no legacy waste/ Zero landfill city".

The success of Door-to-Door collection and segregation of waste at source also facilitated the study of characteristics of MSW generated in the city. The characteristic of MSW in Indore indicated that most of the waste generated in the city was organic waste, while metal and glass waste constituted the minority. Sites having a large content of old decomposed waste won't be suited to undergo bioremediation.

Step 3: Excavation or bio-mining process

Before starting the bioremediation of waste, it is imperative to excavate or bio-mine legacy waste. The waste is excavated by loosening it to make windrows. Loosening the waste exposes the legacy waste to sunlight and air, causing the leachate in the legacy waste to dry up, allowing the waste to decompose without odour later when sprayed with bio-culture. Excavation is done by using JCB excavator, sieving, segregation and baling.

Step 4: Adding Bio-cultures

The dusty top layer usually consists of materials inactive biological state, therefore they were stabilised using herbal or biological culture or sanitisers. Subsequently, composting bio-cultures were introduced to the mix which created biological heat from within the waste, thereby accelerating the decomposition process. The biological heat generated through this further dried up the waste and decomposed aerated waste into carbon dioxide and water vapour, and in doing so reduced the volume of waste by 40% and released entrapped methane.

Step 5: Raking leftover recyclables

Long spike harrows operating in cross directions were used to rake the garbage and remove recyclables from it regularly.

Step 6: Installation of machines for removal and segregation of waste

The recyclables recovered were sent to the Material Recovery facility (MRF) which is located adjacent to the Bioremediation unit. The city has two MRF sites, the one adjacent to the unit is a fully automated MRF installed by Nepra Resource Management Private Limited through the PPP model. A variety of machines were deployed to segregate the waste, all of which were brought by the appointed contractors at their own cost. The second phase made use of trommels and associated machinery. Powerful fans were attached to each trommel at the reject conveyors to blow out the plastic fractions. Machines were used to remove the dust from recovered waste, and after cleaning and washing the recovered recyclables like glass metal, cloth, plastic, etc., were sold to ragpickers and scrap dealers for recycling. Upon the successful execution of the first two phases, the IMC took up the task of bioremediation of 1,00,000 cum waste for its third phase spanning between January 2018 to August 2018. From its previous experience, the IMC concluded that 15-20 times more machinery would be required to tackle this large amount of waste in a short period, hence the IMC deployed 10 Trommels, 15 Horizontal Screens, more than 50 excavators, backhoe loaders on rent with operators with 200 plus workers to execute the work. Daily monitoring of the progress of work was done by a team headed by the Commissioner of Indore Municipal Corporation. The cost for the machines was not borne by the IMC. Apart from machines, the IMC also employed around 200 workers at the bioremediation unit. These workers included *kabaadiwalas* and rag pickers, including women. Keeping the safety and well-being of the workers, the IMC imparted them with training and personal protective equipment.

Step 7: Removal of Inert and plastic waste

After the waste was segregated and the recyclable waste was sent for recycling, inert and plastic wastes were separated from the soil. Stone, bricks and ceramics were sent to the construction and demolition waste plant where they were processed and re-used, or to the cement factory at Manawar or to low lying areas for filling and roads. The inert waste was weighed and sent to a secured scientific landfill within the disposal site. Only 10 per cent of the total waste at the site couldn't undergo bioremediation.

Step 8 & 9: Addition of soil and Construction of Green Belt and plantation

The soil that remains at the site, after the entire process is complete, is highly fertile. The microbes added to the soil during bioremediation

are also commonly used in lawns and gardens, therefore do not pose a threat to the composition and fertility of the soil. This soil was spread over the site allotted for the plantation to develop a green belt. The soil recovered after segregation was transferred to existing gardens or to create new gardens in the region.

CONCLUSION : INDORE'S BIOREMEDIATION PROCESS

The Indore Municipal Corporation's laudable efforts helped transform Indore into a landfill-free city. With the Bioremediation process, Indore was able to clear around 15 lakh metric tonnes of waste in three years and transform the land into a green belt, thereby recovering 40 acres of valuable land. Also, the IMC had comprehensively planned the project. The bioremediation unit, weighbridges, MRF centres, all were located within the site to reduce unnecessary transportation and make the cleanup method easier and economical. Moreover, this ensured that life outside the site was not disrupted by the constant movement of trucks in and out of the site. (The only downside could have been the noise generated from the machinery used in the site.) The wellbeing and safety of the workers was also given consideration and they were equipped with sufficient training and safety gear.

Bioremediation is without a doubt one of the most viable Municipal Waste Management Techniques. It uses safe microbes that pose no threat to workers on-site or those who live nearby instead, it can help in increasing the soil's fertility. Regardless, it has its limitations. The process can only be successfully carried out in sites where the waste has high organic content i.e, sites that also have fresh waste along with legacy waste. Legacy waste that has been left unattended for years at landfill sites and have already reached the maximum microbial degradation cannot undergo bioremediation nor can they always be recycled, therefore they reap no commercial value. Moreover, management of legacy waste should be combined with the integrated waste management facility having adequate capacities for collecting, transporting and disposing of the MSW produced on a day-to-day basis as well as legacy waste trapped in the dumpsites. In Indore, the IMC took initiative to first ensure door to door collection and source segregation of waste to make things easier. Then they addressed the overflowing GVPs and secondary storage bins in the city before finally starting the bioremediation. Even after the bioremediation has been completed, IMC continues to practice door to door collection of waste, 6 types of waste segregation, conducts quarterly surveys to prevent re-emergence of GVPs and secondary storage bins and inculcates good waste management practices among citizens. The three steps together contributed to the success of this venture. Other ULBs who intend

to reproduce the same impact in their city should bear in mind the extensive preparatory work that goes into laying the foundation for a successful bioremediation process and also the continuous monitoring that is required. Regardless, bioremediation is a first good step that ULBs all over the country can use to shrink the heaping mountains of waste.

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Delhi's Persistent Water Woes: Understanding Role of the Delhi Jal Board

MANEESHA PANDEY*

ABSTRACT

Water is an essential natural resource which is not only necessary for human life but also for flora and fauna. It is a known fact that scarcity of water for agriculture and the poor quality of drinking water will result in shortage of food and it will also adversely impact the human health. To make available clean and affordable drinking water and proper sanitation especially in urban areas is a gigantic task that requires appropriate policy designing, planning, sustainable management and effective implementation. Water also forms the part of Sustainable Development Goals (SDGs) 6 that state "Ensure availability and sustainable management of water and sanitation for all". The clean water supply along with providing other amenities to citizens has always remained critical in the Indian context. In Delhi, Delhi Jal Board (DJB) shoulders the responsibility of providing drinking water and sanitation. But the DJB comes across a number of issues and challenges while providing safe drinking water and sanitation which need to be addressed and resolved on an urgent basis.

Keywords: *Drinking water', 'Delhi Jal Board (DJB)', Sanitation, Urban, Planning*

INTRODUCTION

The basic human needs of food, air, water, shelter, clothing along with rights like access to and availability of education, health services, sanitation, pollution-free environment, affordable means of transportation, electricity, etc., are always at the core of governance that is both welfarist and committed to securing basic human rights for its populace. It is the most important frame that enables governments

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particularly democratic ones to reach out to their citizens and in the Indian context such amenities and services are provided by the Union, states and the local governments under the Constitutional provision of the Union, State, and the Concurrent lists respectively. Despite undertaking structural reforms in the economy, the fact remains that governmental plans and policies are still welfarist in nature. As a matter of fact, such an orientation is in sync with the goals and targets set-up under the 17th Sustainable Development Goals (SDGs).

The present paper looks into the water scenario in Delhi and the role of the Delhi Jal Board (DJB) in particular. Water as one of the most vital utility for human is also a natural resource which is used in different economic activities and sectors. It is the lifeline for generating the hydro-electricity and an input for many other industrial and economic activities. There is a potential growth for development of water resources in India, however, the progress on this front has indeed been slow. It is pertinent to mention here that under the Constitution of India water falls in the Concurrent List –included in the Entry 17 of the State List and Entry 56 of the Union List. The Entry 17 under List II of Seventh Schedule provides that “Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List I” and the provision of the Entry 56 of List I of Seventh Schedule provides that “Regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest”¹.

It is a known fact that scarcity of water for agriculture and the poor quality of drinking water will result in shortage of food and it will also adversely impact the human health...Yet for many of the world's poor, one of the greatest environmental threats to health remains lack of access to safe (drinking) water and sanitation. Over one billion people globally lack access to safe drinking water supplies, while 2.6 billion lack adequate sanitation; diseases related to unsafe water, sanitation and hygiene result in an estimated 1.7 million deaths every year²... contaminated water and poor sanitation are linked to transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid, and polio. Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks.³

The water scenario of urban areas is in contrast to the water situation in rural areas. Potable water is one of the major issues in rural areas while urban areas have their own issues like that of supply and demand. The focus of this paper is on water scenario in urban areas. Water as one of the basic need along with housing, electricity etc. for the mounting

population in urban areas puts tremendous pressure on the existing urban resources. Most of the cities' local bodies have found it difficult to manage and provide these amenities or to a great extent failed to meet the demands, resulting in large gaps in provisioning of basic amenities like safe drinking water, sanitation, electricity and healthy living environment. The access to basic sanitation, drinking water and health services by the people living in slums is significantly worse off than the rest of the urban population although they squatter in the vicinity of the planned localities and form the part of the urban population.

In India, the present developmental strategies are entailed under a three-year action plan, which is also part of a seven-year strategy paper and a 15-year vision document. The vision document cannot disregard the development strategies that were identified and adopted in the erstwhile Twelfth Five-Year Plan (2012-17). The Twelfth Plan document has dedicated a chapter on water and it is mentioned that the Indian economy and society face daunting challenges in the water sector. The demands of a rapidly industrialising economy and urbanising society come at a time when the potential for augmenting supply is limited, water tables are falling and water quality issues have increasingly come to the fore. As we drill deeper for water, our groundwater gets contaminated with fluoride and arsenic. Both our rivers and our groundwater are polluted by untreated effluents and sewage is continued to be dumped into them. Climate change poses fresh challenges with its impacts on the hydrologic cycle. More extreme rates of precipitation and evapo-transpiration will exacerbate impacts of floods and droughts. It is no wonder then that conflicts across competing uses and users of water are growing by the day. Meanwhile, water use efficiency in agriculture, which consumes around 80 per cent of our water resources is only around 38 per cent, which compares poorly with 45 per cent in Malaysia and Morocco and 50-60 per cent in Israel, Japan, China and Taiwan. Sanitation and clean drinking water are critical determinants of health and are complementary to each other. Without proper sanitation, the incidence of diarrhoeal diseases due to contaminated drinking water will not come down, and without adequate water supply, improved sanitation is generally not possible. It is, therefore, necessary to adopt a habitation approach to sanitation and to institutionalize the integration of water supply with sanitation in each habitation. The problem of sanitation in urban areas is also very serious since almost all our cities, including even the State capitals and major metros, have a large percentage of the population (45 per cent in Delhi) not connected to the sewer system. Urban development must give top priority to planning for water, toilets and sewerage as an integrated whole taking into account the likely expansion of the urban population.⁴

Demographic and Water Scenario of Delhi

Delhi is a mega-city which attracts migratory population from rural and urban areas as well as the demographic characteristics of Delhi also have the feature of the floating population. As per the Census 2011 in the nine districts of Delhi there are 3,435,999 number of households in which reside 16,787,941 number of persons with the average of five persons per household (Table 1).

The population residing in the nine districts of Delhi have access to water from different sources like tap-water from treated source, tap-water from un-treated source, covered well, un-covered well, hand-pump, tube-well/borehole, spring, river/canal, and tank/pond/lake. The highest percentage of tap-water from treated sources are in Central district (93.1) and around three per cent of households of North and North West districts each gets water from tank/pond/lake. No household in the nine districts of Delhi gets water from spring and river/canal. In all the nine districts, except for North and North West districts, more than 75 per cent of the households have water source within the premises. In Central district 7.7 per cent, in North district 18.6 per cent, in South district 16.8 per cent, in East district eight per cent, in North East district 17.3 per cent, in South West district 13.3 per cent, in New Delhi district 13.8 per cent, in North West district 19.3 per cent and in West district 14.7 per cent households have water sources near premises. And in all the nine districts some percentage of households have water sources away from the premises. Like, in Central district 0.6 per cent, in North district 6.8 per cent, in South district 7.0 per cent, in East district 1.2 per cent, in North East district 5.9 per cent, in South West district six per cent, in New Delhi district 7.2 per cent, in North West district 9.9 per cent and in West district 4.7% households have water sources away from the premises (Table 2.1 and 2.2).

The basic needs of domestic use of water are for drinking, cooking, bathing, washing utensils and clothes. These needs are separated from inevitable use of water for toilet flushing, sewer flushing, water for lawns and gardening, etc. The Union Ministry of Housing and Urban Affairs has fixed the standard for availability/use of water for various basic human needs as shown in Table 3.

Likewise, the National Commission on Urbanization has also suggested minimum norms for use of water. According to the Commission, even in the worst drought conditions and even in the poorest colonies, at least 70 liters of water must be delivered per day to sustain the human life at a minimum standard of hygiene (Table 4).

TABLE 1: POPULATION OF DELHI (CENSUS 2011)

State/district	Area (sq km)	Number of households	Population			Average no. of persons per household
			Persons	Males	Females	
North West	443	736,253	3,656,539	1,960,922	1,695,617	5.0
North	61	180,044	887,978	475,002	412,976	4.9
North East	62	406,125	2,241,624	1,188,425	1,053,199	5.5
East	63	358,937	1,709,346	907,500	801,846	4.8
New Delhi	35	33,208	142,004	77,942	64,062	4.3
Central	21	119,639	582,320	307,821	274,499	4.9
West	130	533,221	2,543,243	1,356,240	1,187,003	4.8
South West	421	494,439	2,292,958	1,246,046	1,046,912	4.6
South	247	574,133	2,731,929	1,467,428	1,264,501	4.8
NCT of Delhi	1,483	3,435,999	16,787,941	8,987,326	7,800,615	4.9

Source: Census of India, 2011. Available at: https://censusindia.gov.in/2011census/PCA/PCA_Highlights/pca_highlights_file/Delhi/DATA_SHEET_PCA_DISTRICTS_NCT_OF_DELHI.pdf

TABLE 2.1: MAIN SOURCE OF DRINKING WATER IN NINE DISTRICTS (IN PER CENT)

Main Source of Drinking Water	Districts								
	Central	North	South	East	North East	South West	New Delhi	North West	West
Tap-water from treated source	93.1	77.3	60.1	91.8	76.6	68.1	91.1	73.1	82.3
Tap-water from un-treated source	3	4.5	10.9	2.4	5.1	7.6	4.2	6.1	4.6
Covered well	0.1	0.1	0.1	0	0	0.1	0.1	0.1	0
Un-covered well	0	0.1	0	0	0	0	0	0	0
Hand-pump	1.2	6.8	6.7	1.5	11.6	2.1	2.2	6.2	4.1
Tube-well/Borehole	2.5	1.3	19	3.5	5.7	15.4	1.3	4.2	6.2
Spring	0	0	0	0	0	0	0	0	0
River/Canal	0	0	0	0	0	0	0	0	0
Tank/Pond/Lake	0	2.9	0.8	0.3	0.4	1.4	0.9	2.7	0.5
Other sources	0.2	6.9	2.3	0.5	0.6	5.3	0.2	7.6	2.3

Source: Census of India 2011. Available at: https://censusindia.gov.in/2011census/HLO/HL_PCA/Houselisting-housing-Delhi.html

TABLE 2.2: LOCATION OF SOURCE OF DRINKING WATER

Location of drinking water	Districts								
	Central	North	South	East	North East	South West	New Delhi	North West	West
Within premises	91.7	74.7	76.1	90.8	76.8	80.7	79	70.8	80.7
Near premises	7.7	18.6	16.8	8	17.3	13.3	13.8	19.3	14.7
Away	0.6	6.8	7	1.2	5.9	6	7.2	9.9	4.7

Source: Census of India 2011. Available at: https://censusindia.gov.in/2011census/HLO/HL_PCA/Houselisting-housing-Delhi.html

TABLE 3: NORMS FOR USE OF WATER FOR DOMESTIC PURPOSE

<i>Purpose</i>	<i>Rural Areas (litres/ capita / day or lpcd)</i>	<i>Urban Areas (lpcd)</i>
Drinking water	5	5
Cooking	3	5
Ablution	6	-
Bathing	15	55
Washing of utensils, clothes & household	11	45
Flushing of toilets/ sewer	-	30
Total Basic Water Requirement (BWR)	40	140

Source: http://117.252.14.242/rbis/india_information/drinking.htm

TABLE 4: RECOMMENDED NORMS FOR WATER SUPPLY

<i>Population</i>	<i>Recommended water supply norm (lpcd)</i>
Less than 20,000	
a. Population served by stand posts	40
b. Population provided with pipe connections	70
20,000 to Less than 100,000	100
100,000 to Less than 1,000,000	100 (with no sewerage system) 135 (with sewerage system)
1,000,000 and above	150
Rural and hills (per elevation difference of 100 m)	40 or one hand-pump for 250 persons within a walking distance of 1.6 km
Rural – additional water for cattle in Desert Development Programme (DDP) areas.	30

Source: http://117.252.14.242/rbis/india_information/drinking.htm

Delhi Jal Board (DJB)

The clean water supply along with providing other amenities to citizens has always remained critical in the Indian context. The increased urbanisation which is a sign of development always poses problems for water management since urban population needs to be serviced with piped water systems available on a 24 × 7 basis and these systems should be accompanied by sewerage systems, which ensure that only cleaned water is returned to rivers or other disposal sites. At present, not a single city in India is in a position to boast of a complete sewerage system. In

India, governments have been able to get treated only 30 per cent of the human waste. Just two cities, Delhi and Mumbai, which generate around 17 per cent of the country's urban sewage, have nearly 40 per cent of the country's installed capacity⁵. As in the case of the metropolis Delhi, the total water requirement is 800 million gallons per day (MGD). Delhi, which is situated on the banks of the Yamuna, gets scarcely 25 per cent of its needs from the river. The balance needs of water are met by releases from Bhakra Dam and Ramganga Dam. This is in addition to a number of tube-wells, which contribute less than 10 per cent of Delhi's water supply. In 2004, only the water supply of 640 MGD was being treated at the water treatment plants of the DJB. A new plant has been constructed at Sonia Vihar with a capacity of 140 MGD and raw water for this plant is to come from the Tehri dam in Uttarakhand via the Upper Ganga Canal (till Muradnagar in UP and then through a 30-km 3,250 mm diameter conduit). Noteworthy feature of this scheme is that the contract for building and operating this plant for 10 years has been given to a private company on the model of Public Private Partnership (PPP).⁶

The development activities and the civic amenities in Delhi are provided by multiple civic agencies and authorities like Delhi Development Authority (DDA), New Delhi Municipal Council (NDMC), Municipal Corporation of Delhi (MCD) and the Cantonment Board along with the DJB which is engaged in the collection, treatment and distribution of water and sanitation of the National Capital Territory of Delhi (NCTD).

Delhi Jal Board was established by the Delhi Water Board Act, 1998 to cater to the need of water in Delhi with the mission of production and distribution of drinking water along with collection, treatment and disposal of domestic sewage in the capital. The Board is supplying filtered water to more than 1.6 lakhs persons of Delhi while ensuring average availability of 50 gallons per capita per day of the same through an efficient network of water treatment plants, booster pumping stations and about 9000 kilometer of water mains and distribution system. The sources of water that the DJB collects are from Yamuna, Bhakhra storage, upper Ganga Canal and the ground water. DJB being engaged in water supply and sanitation, provides bulk water to NDMC and Cantonment Board and collects waste water for treatment and disposal from these areas.

The broad services provided by the DJB are:

1. Supply of potable drinking water;
2. Supply of portable water through tankers whenever needed;

Supply of packaged water, “JAL”, in jars through Jal Suvidha Kendras.* “JAL” certified by the Bureau of Indian standards is put through stringent purification techniques to ensure that the consumers are provided with a hygienic and quality product.⁸

3. Treatment and disposal of sewage;
4. Supply of Biogas/ Sludge Manure/ treated waste water;
5. Testing of water samples; and
6. Technical support for installation of Rain Water Harvesting System through Rain Centres and divisional office.⁷

These services of the Board are in accordance with the Act of 1998 which defines some of the main functions of the Board as—to treat, supply and distribute water for household consumption or other purposes through pipes or by any other means; plan, regulate and manage the exploitation of ground water in consultation with different agencies and promote measures for conservation, recycling and reuse of water; if desired by the government or the Central government, take over and carry out any function related to management and regulation of sewerage or drains of any area of Delhi for better sanitation environment.⁹

The DJB is also active in the field of water conservation. It has constructed three upstream storages on the River Yamuna and its tributaries in time-bound manner are of utmost importance to meet drinking water requirements of Delhi and to reduce dependence on ground water to a great extent. These three projects are namely, Renukaji, Kishau and Lakhwar and Vyasi Dams which have been declared as the National Projects. The ground water extraction in Delhi has been regulated in 2010 by Department of Environment & Forest and Wildlife, Government of National Capital territory of Delhi (GNCTD) under the Environment Protection Act (EPA) 1986 as amended from time-to-time. As per the regulations, prior permission is required to be taken for extraction of ground water from the bore wells and the same is given subject to provision for rain water harvesting, and recycling of waste water for use in horticulture and flushing purposes, etc., in terms of the aforesaid notification. The rain water harvesting has also been promoted by the DJB as 318 installations have this system. There is a dedicated Rain Water Harvesting (RWH) cell in DJB which is

*DJB launched the project of processed packaged drinking water with the brand name “JAL” to make available purified drinking water in 20 Liters jars and cartons of disposable glasses containing (24 x 250 ml) glasses to serve the residents of Delhi.

providing technical assistance to facilitate the public in implementation of Rain Water Harvesting system. More than 240 installations of DJB and Delhi Government buildings has been identified by DJB for implementing RWH. DJB also provides 10 per cent rebate in water bills of its consumers on plots size of 100 square meters and above and penalty is levied in water bills of its consumers on plot size of 500 square meters or more, who do not implement RWH systems and water bills are increased by 1.5 times.¹⁰

The water supply by the DJB is well under the quality assurance measures right from the raw water stage till it reaches at the individual households and the water which is made available from tube-wells and wells, is also tested regularly. DJB maintains periodic data in this regard, by way of collecting and analysing of water from different water supply sources along with preparation of daily water production report so that safe water reaches to every individual. The Board has the responsibility of water supply and sanitation to the citizens of Delhi with legal safeguards provided under the Act of 1998 along with administrative set-up and budgetary provision for service delivery.

But the National Sample Survey Office (NSSO) in a nation-wide survey in 2018 on 'Drinking Water, Sanitation and Housing Condition', found that households in Delhi as in other States and UTs use different methods for treatment of drinking water like electric purifier, boiling, chemically treated with alum, chemically treated with bleach/chlorine tablets, non-electric purifier and filtered water with cloth as they may not be getting satisfactory quality of the drinking water supplied by the Board even though DJB, further confirmed water quality through third party agency namely, National Environmental Engineering Research Institute (NEERI), Ministry of Science & Technology, Government of India annually and take further action accordingly to maintain water quality at every stage as per norms.¹¹ Table 5.1 shows that out of the total households in Delhi, 36.5 per cent of the households treat water with electric purifiers and which is much higher than the value for All-India. Around 48 per cent of the households in Delhi use one or other method for treatment of drinking water. And when it comes to no treatment of drinking water, around 52 per cent of the households in Delhi do not treat water and 65.3 per cent is the value for All-India. Likewise, in Delhi, 22.2 per cent of the total households do not get sufficient drinking water throughout the year and they are dependent on alternate sources of drinking water like bottled water, piped water, public tap/stand pipe, tube well, tanker truck, spring, rain water collection etc. (Table 5.2).

TABLE 5.1: PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY METHOD OF TREATMENT OF DRINKING WATER IN DELHI

<i>Method of treatment of drinking water</i>	<i>Delhi</i>	<i>All-India</i>
Electric purifier	36.5	8.7
Boiling	3.8	7.7
Chemically treated with alum	0	0.4
Chemically treated with bleach/chlorine tablets	0.3	1
Non-electric purifier	7.4	3.5
Filtered with cloth	0.1	11.7
Others	0.1	1.7
Not treated	51.9	65.3
All	100	100

Source: Drinking Water, Sanitation, Hygiene and Housing Condition in India. NSS Report No. 584, page 83.

TABLE 5.2: PERCENTAGE OF HOUSEHOLDS NOT GETTING SUFFICIENT DRINKING WATER THROUGHOUT THE YEAR FROM PRINCIPAL SOURCE OF DRINKING WATER

<i>Source of Drinking Water</i>	<i>Delhi</i>	<i>All-India</i>
bottled water	15.2	1.4
pipd water into dwelling unit	20.5	11.5
pipd water to yard/plot	44.9	12.2
pipd water from neighbours	36.3	15.9
public tap/stand pipe	37.9	17.1
Tube-well	1.7	8
hand pump	21.8	9.3
well (protected)	0	19.3
well (unprotected)	0	22.3
tanker truck (public)	35.4	19.3
tanker truck (private)	27	9.5
spring (protected)	0	15.8
spring (unprotected)	0	33.1
rain water collection	0	63
surface water (tank/pond)	0	30.4
surface water (other surface water)	0	25.1
Others	66.7	22.8
All	22.2	11.3

Source: Drinking Water, Sanitation, Hygiene and Housing Condition in India. NSS Report No. 584, page 74.

The functioning of DJB has been also mentioned in the *Economic Survey of Delhi* for 2019-20 and which states that about 83.42 per cent households now have access to piped water supply. Water production

during summer season is being maintained at 921 MGD consistently. Water is supplied to about 18 million population of Delhi through existing water supply network comprising of 14,697 km long pipelines and more than 110 Underground Reservoirs (UGRs). Besides, a total of 407 new water tankers with stainless steel containers fitted with GPS have been engaged in improving the water tanker supply delivery system in the city. Apart from approximately 450 M.S hired tankers, 250 newly purchased SS tankers are being added to the existing fleet to supplement water supply in water deficit areas of Delhi.¹² Simultaneously, the *NSS Report on Drinking Water, Sanitation, Hygiene and Housing Condition in India, 2018* found that in Delhi, residents of around 5,193 number of households are fetching drinking water from outside premises and the average time taken in a single trip to fetch drinking water from principal source is 19.6 minutes (at the All-India level it takes 12.3 minutes) and the average waiting time required in a single trip at the principal source of drinking water is 10.8 minutes (at the All-India level it takes 5.1 minutes) (Table 6).

TABLE 6: PERCENTAGE OF TIME SPENT ON FETCHING DRINKING WATER FROM PRINCIPAL SOURCE LOCATED OUTSIDE PREMISES

<i>Percentage distribution of households by category of person fetching drinking water</i>	<i>Delhi</i>	<i>All- India</i>
Male- age below 18 years	4.6	2
Male- age 18 years and more	38.6	22.1
Female- age below 18 years	5.4	2.5
Female- age 18 years and more	32.7	69.2
Hired labour	0	1.5
Others	18.6	2.7
All	100	100
Average time taken in a single trip to fetch drinking water from principal source in minutes	19.6	12.3
Average waiting time required in a single trip at the principal source of drinking water in minutes	10.8	5.1
Number of households fetching drinking water from outside premises- Estd.(00)	5193	921579

Source: Drinking Water, Sanitation, Hygiene and Housing Condition in India. NSS Report No. 584. 2018. Table 13.

Issues and Challenges

There are number of issues and challenges with respect to providing safe drinking water and sanitation that are not only relevant for DJB

and Delhi and or any other city but for the urban and rural areas of the country. At the global level, UN have observed and identified that there is a serious lack of institutional and human capacity across the water sector which is constraining progress, particularly in developing countries. These issues and challenges has also been well identified even in the Twelfth Plan document. Like, the growth of cities and industries is inevitable and this growth has massive implications on the use of water and sewage system. In most of the industrialised countries, water use is primarily in the industrial as well as urban areas and the demand from these sectors is also bound to grow in India. This necessitates a 're-allocation' of water from agriculture to industrial/urban use. Unless this is managed in an equitable manner, it is likely to lead to conflict with traditional users in rural areas, especially by the farmers. Such tensions are already in evidence in certain parts of the country. Indian cities and industries will have to reinvent their water trajectory to both secure the water they need and do so in a way that minimises the scope for conflict. Indian cities and industries need to find ways to grow with minimal water and minimal waste.¹³

The urbanisation has led to attract poor people from villages and small towns who reside in slums and unauthorised colonies which are not connected to the city sewage system. Hence, in such a condition it is critical to invest in sewage systems, and equally more critical to invest in building affordable and scalable sewage networks, which require a fresh look at the current technology for sewage and its treatment along with providing accessible and affordable education and health facilities to these people.

In the context of clean water supply, data has been identified as a base for effective policy intervention. The present system of estimating demand and supply of water in cities is rudimentary and leads to poor accounting and poorer planning. Indian cities compute demand by simply multiplying the population (as known) by an estimate of water demand per capita (as understood). This leads to huge variations between cities in terms of how much water needs to be supplied. The guidelines provided by the Central Public Health and Environmental Engineering Organisation (CPHEEO) are used at times by city planners, but these often fail to provide clarity about how much water is needed. For instance, the guidelines differentiate between cities with and without sewerage (70 lpcd to without and 135 lpcd to cities with sewerage system). But these do not indicate how much area must be under a sewerage system before a city qualifies for higher water norms. The guidelines are also not precise—cities could provide additional water to hospitals, schools, airports and institutions which require water in

'considerable quantities'. Also, for example, there is no official accounts for the excreta we generate or the excreta we treat or do not treat. The fact is that we have no way of really estimating the load of sewage in our cities, because of the different ways in which people source water and the different ways in which people dispose sewage. Currently, sewage is measured in the most rudimentary ways: we assume that 80 per cent of the water officially supplied by municipalities is returned as sewage. The collection of data is divided between different departments and agencies. The agencies responsible for collection of the 'physical data' (to use precipitation and stream gauging as examples) are administered by differing Ministries, while the user data come under such diverse classifications as public health and sanitation, irrigation and urban planning. There is a consequential absence of a coherent and internally consistent conceptual framework and protocols for data collection and validation.¹⁴

In Delhi, although DJB maintains periodic quality assurance data by preparing daily water production report right from the raw water stage till it reaches safely at the individual household level, there is no maintenance of data for assessment of requirement of water. As per the *Handbook on Service Level Benchmarking* issued by the Ministry of Urban Development, the data relating to the per capita quantum of water supplied and household level coverage of direct water supply connections serve as performance indicators of water supply services in the city. Thus, for projecting realistic water requirement of a locality, DJB should have locality-wise data on population, availability of water and its per capita consumption. For supplying water in five zones under the Project - Water Tanker Supply Service (WTSS), DJB awarded five contracts (between August and September 2012) for 10 years. As per the agreements, contractors were to provide 130 tankers of 3,000 litre capacity and 255 tankers of 9,000 litre capacity. The requirement for water tankers was initially assessed at the time of awarding of contract. The DJB, however, did not have locality-wise data on actual quantum of water required and supplied to the consumers to project a realistic requirement and regulate allocation of water through tankers.¹⁵

Likewise, the public health implications of unclean water are enormous and unacceptable. It is unacceptable that diarrhoea and other water-borne diseases are one of the most common causes of death among children under age five. The State is focused on the need to invest in water and waste management in human settlements based on a strategy that is both affordable and sustainable.¹⁶

In 2016, the Comptroller and Audit General (CAG) in 2016 with the primary objective to evaluate the functioning of the DJB and to appraise

implementation of different projects in DJB and to assess whether conceptualization and the planning of projects were need based and according to priorities set in long term/master plan; awarding and execution of projects were in accordance with extant rules; whether financial management was efficient; whether the completed projects served the intended purpose; and whether the effective internal control and monitoring mechanism existed in the DJB, found that-

- The capacity utilisation of Sewage Treatment Plants (STPs) was only 66 per cent due to lack of adequate conveyance systems to bring sewage from command areas to the STPs.
- Water treatment plants and allied infrastructure for 150 million of Gallons per day (MGD) were developed at Dwarka, Bawana and Okhla without ensuring availability of the raw water.
- The penalty was withheld for delay in execution of 12 works by contractors was short by Rs 104.20 crore.
- A contractor for one of the work was allowed to change the technology from confined trench to micro-tunnelling method for laying sewer line that resulted in avoidable expenditure of Rs 15.33 crore.
- There were delays in execution of work in 44 out of 53 works ranging from five to 85 months.¹⁷

CONCLUSION

The DJB to provide the supply of water and proper sanitation conditions in Delhi and to meet the increasing demand of water with the concept of quality, should ensure that there is not any political interference at the decision-making, designing of the tariff structure and the financial matter. The *UN Synthesis Report on Water and Sanitation 2018* states that Improving water quality can increase water availability and worsening water pollution must be tackled at source and treated to protect public health and the environment and to increase water availability.¹⁸ At the management level there should not be delay in the implementation of the projects of the DJB, there should be intra and inter-agencies/department coordination with proper monitoring mechanism of the implemented projects.

DJB and other water supply agencies must ensure that for proportion of waste water treated safely, there is a need to enhance monitoring of key parameters of effluent standards that go beyond environmental parameters and address public health; address exposure risks associated

with reuse of waste-water. And to encourage participation of local communities in water and sanitation management, there is a need to define indicators to monitor the extent of participation of communities and to ensure that the participation is effective and all service users have a 'voice.'¹⁹

There should be focus on exploration for the participation of the private sector in improving the water supply and sewage collection not in Delhi but also in other cities as it will significantly help in cost reduction of the local bodies. As waste-water treatment is one of the most expensive component of the water supply, the participation of the private sector will not only lower the financial burden but also help in preventing water from entering in rivers. And last but not the least the different development and civic agencies in Delhi should develop a single integrated plan to meet the water demands of the thirsty Delhi.

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Residential Development and Infrastructural Satisfaction in Peri-Urban Areas of Amritsar

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ASHWANI LUTHRA**

ABSTRACT

Increasing urbanisation has led the cities to sprawl beyond their municipal limits on the rural lands, known as peri-urban areas. The development in the peri-urban areas is characterised by conversion from agricultural land to other land uses. The upcoming new development in the peri-urban results in various changes in socio-economic and physical characteristics. Punjab Urban Planning & Development Authority (PUDA) approved planned, regularised, and unplanned/ unauthorised residential developments in the peri-urban area of the Amritsar metropolis are appraised to assess the level of satisfaction of residents about the basic amenities available within it.

Keywords: Peri-Urban Areas, Residential Development Type, Infrastructure.

INTRODUCTION

The development in the periphery of the city results from sprawl. Such development reflects both the urban as well as rural features. Therefore, the term peri-urban areas is used for the areas which are just beyond the municipal limits of the city. While defining the peri-urban areas, Andrew (1942) has described it as the area having inter-mingling of agricultural characteristics and urban land uses. Sarkar (2013) has referred to it as “complex mosaics of juxtaposed activities previously regarded as incompatible”. The peri-urban areas encounter a unique pattern of land use and are often designated as areas of “mixed land use”. Further, Dikshit (2011) notes that the peri-urban area is a space

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segment lying between the urban complexes on the one hand, and the vast rural countryside, on the other hand. Gajendran (2016) states that the term peri-urban area is not fully explicable because of the complexities and ambiguities involved in it. Thus, the peri-urban area is the zone of transition having the characteristics of both urban and rural areas that keep on changing. Thus Jennifer (2014) has said that theoretically this term is not having a standard definition and it is used in various forms of formal and informal settlements. Except this, the peri-urban areas comprise various salient features such as:

- There is continuous development outside the municipal limits characterised by both rural and urban features.
- The development is in the form of patches indicating the change in land use from agriculture to non-agricultural activities. Sometimes the new physical development is surrounded by agricultural land use.
- The villages in the peri-urban areas are characterised by urban features such as small to large townships, departmental stores, large showrooms, increasing vehicular movement but limited public transport vehicular movement.
- The physical characteristics in the areas do not show as the compatibility between the land uses and the growth looks haphazard and sporadic in nature.
- The residential development is a fusion of both planned and unplanned growth. The residential development that takes place in the peri-urban areas is not affordable for all income groups because the area is characterised by private development which is profit-oriented only.
- Generally, the large mass of land is under residential use with minimum occupancy.
- The pattern of development in the peri-urban is influenced more from the hierarchy of road also.
- The provision of infrastructure is through the private developer largely which affects the cost of the plot/flat in the planned residential site.

BRIEF ABOUT AMRITSAR

Located at 31.63oN 74.87oE at an elevation of 234 meters (Wikipedia, 2018), Amritsar is more than four centuries old important historic city

of North India and is spread over 142.38 Km². Popularly known for its famous Golden Temple, the city has its roots of development in the medieval era. The organic but compact mixed land use development within the Walled City and along the radial roads featured with sporadic sprawl in the outskirts explain the inclusive and exclusive spatial structure of this historic city. Amritsar, being a historic centre for tourism, trade, commerce, and having high connectivity through road, rail and air, attracts nearly 0.1 million tourists each day. Polarization of tourism-related economic activities in the city has led to high immigration and population growth. The population dynamics of Amritsar reveal that its population got doubled in five decades, i.e. from 0.16 million in 1901 to 0.34 million in 1951, which grew by about three times in the next six decades, i.e. during 1951-2011 (Census of India, 2011). A small city was ranked 33rd metropolis of India and 2nd of the State in 2001. The city inhabited an estimated 1.32 million persons in 2018 (Population City, 2018). The increased population of the city has led to increased demand for land to accommodate various activities. But the paucity of urban vacant land (3 per cent as per Amritsar Master Plan, 2031) has resulted in developing the rural lands around its municipal limits. The planned development outside its municipal boundary has come under various provisions of the Acts. But many unplanned residential colonies have also come up in its peri-urban areas, some of which are regularised under the provisions of the new Enactments by the Government of Punjab.

Methodology

The present research paper is an effort to appraise different types of residential developments in the peri-urban areas and the level of satisfaction of their residents for the basic services available in them. For the same, area-level study is conducted to understand the characteristics of the residential development, and the colony level studies (planned, unplanned, and regularised) are organised to assess the level of satisfaction of their inhabitants in the peri-urban area. Both the secondary and primary data/ information is used to analyze different aspects of the study.

Characteristics of Peri-Urban Areas of Amritsar

Amritsar agglomeration consists of 23 outgrowths in different directions around it. The residential development in the peri-urban areas started coming up in the late 1980s. Till 2001, the development was largely unplanned. Thereafter, planned residential colonies started up on the rural lands outside its municipal limit with the approval of the Punjab Urban Development Authority (PUDA) under the provisions

of the Punjab Apartment and Property Regulation Act (PAPRA), 1995. Various policies, provisions and norms have been implemented for the promotion of small as well as mega projects of the Government of Punjab. Further, an Act called the Punjab Laws (Special Provisions) came into existence in 2013 to cover the unplanned development in the planned umbrella through the provisions of basic infrastructure. Hence, due to these legal provisions, the residential development in the peri-urban areas is characterised by three types as viz., PUDA approved planned development, regularised development, and unplanned unauthorised development. About 16 per cent of rural land is developed for features of these developments.

PUDA Approved Planned Development

As a result of proactive housing policies, guidelines of the Punjab government and a simplified approval procedure, as many as 61 planned colonies have come up in the peri-urban areas of Amritsar, the majority of which are concentrated in its northern and eastern directions. These colonies account for 44.3 per cent of the total planned development occurring during 2001-2010. Higher accessibility to transport, commercial, educational and medical facilities along with increased economic activities are the reasons for the preference of the colonizers to bring up planned developments in these directions. Out of 61 colonies, 22 colonies (37 per cent) having an area less than 10 acres area (designated as small colonies) are developed in 182.24 acres area, which accounts for about 20.6 per cent of the total residential area of the peri-urban areas. Also, 17 colonies (27.9 per cent) having an area between 10-25 acres (designated as medium-sized colonies) and 17 colonies having areas between 25-100 acres (designated as large colonies) have been developed on 300 acres, 493.5 acres as during 2001-2015 respectively. After October 6, 2006, five large-sized integrated townships (called mega townships) having 100 acres and above got developed on 783.6 acres area, which accounts for eight per cent of the total planned residential colonies. These townships provide all the basic services and facilities and also reserve five per cent area for the Economically Weaker Section (EWS) class and provision of waste management too. Thus, the peri-urban areas of Amritsar are characterised by different sizes of planned residential colonies. Resultantly, they lack integration of infrastructure as they are developed as individual entities. Also, the colonizers do not develop the approved components of the respective layouts.

A primary survey, conducted for the planned colonies in the peri-urban areas of Amritsar, revealed that the small-sized colonies (less than 10 acres) are growing in higher number but they lack the

required infrastructure. Even the medium and large colonies do not possess sufficient infrastructure. The operation and management of infrastructure in these colonies are based on the contributions made by the residents as per their plot area. Besides, no environmental issues are taken into consideration for waste management as all these colonies are located near the drain or the agricultural land and their sewage is disposed of in their surroundings only. No effort is made to conserve the storm water through rainwater harvesting techniques. While mega townships are good in physical infrastructure provisions but after eleven years of their development, educational and medical facilities are still absent. Their inhabitants have to depend on the mother city to avail these facilities. As these townships are occupied by only the High Income Group and Medium Income Group population, therefore, their mobility is through their private modes only. Only a few colonies are accessible through the public transport system.

Regularised Development

Regularised development is the outcome of the Punjab Laws (Special Provisions) Act, 2013 which has facilitated the unauthorised developers and their plot holders to get their colonies or plots regularised by paying suitable charges/fees. The Act remained operative for one year i.e., from April 17, 2013 to April 16, 2014. During this period, 123 unauthorised colonies developed on 699 acres have been regularised, which account for about 12.6 per cent of the total development of the peri-urban areas of the city. These colonies are developed over an area ranging between one acre to 23 acres individually. The survey conducted for them reveals that infrastructure is absent in all of them. Also, no effort has been made by the government to provide the basic amenities like water supply, sewerage, and adequate roads, etc. to their inhabitants even after their regularization, which is against the commitment by the government under this Act to ensure a better quality of life to the residents.

Unplanned Development

About 1780 acres area is developed as unplanned residential one, accounting for about 52.9 per cent of the total residential development in the peri-urban areas of Amritsar. These colonies are illegally developed by the private colonizers and farmers on the agricultural lands. The development in these areas/colonies is characterised by varying plot sizes, zig-zagging roads, and unplanned or absent social and physical infrastructural provisions. The major issues of these colonies are their inadequate infrastructure and lack of integrated development.

Thus, the peri-urban area of Amritsar has a mix of planned,

unplanned, and regularised development indicating the efforts of the state government to develop the periphery of the city in a planned manner having adequate and quality infrastructure. Analysis of the survey reveals that livability conditions in the planned developments are far from satisfactory as basic infrastructure is either absent or inadequate in them. While the objectives of the policies of the government were to resolve the problem of housing and infrastructure but neither of them is achieved barring a few examples in mega projects.

RESIDENTS' SATISFACTION

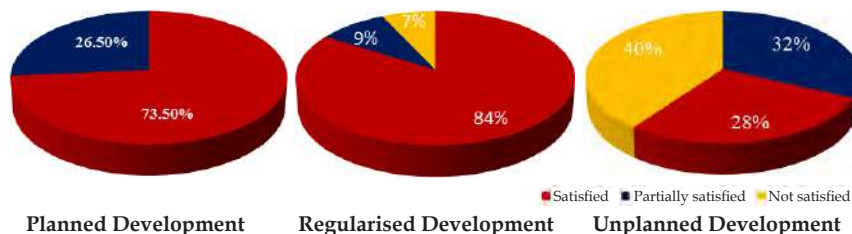
As discussed in the previous section that infrastructural facilities are absent or inadequate not only in the unplanned colonies but also in the planned colonies, it becomes important to examine the inhabitants' satisfaction level for the basic amenities such as water supply, sewerage, solid waste, and electricity. A sample household survey is conducted about the satisfaction level of the inhabitants of the planned, regularised, and unplanned colonies. Following are the results of the investigation:

Water Supply

To test the satisfaction level of the residents for water supply parameters such as the provision of water supply (government or private developers or both), source of water supply (tube well or overhead reservoir), the pressure of water, sizes of pipes, quality of water, and operation and maintenance of water supply system are investigated.

It is clear from Fig. 1, that 73.5 per cent of residents of planned colonies are satisfied with the water supply facilities available within their vicinity. The rest of the residents are partially satisfied with the water provisions in their colonies. It is worth noticing that out of 73.5 per cent, about 17 per cent satisfied inhabitants reside in large and megaproject colonies where the quality and supply of water are managed by the colonizers. Good quality and quantity of water provision and regular maintenance of pipelines, online operation of water supply

Fig. 1: Satisfaction from Water Supply



Source: Field Survey, December 2019 and January 2020.

through the colonizers are the reasons for their satisfaction. About 18 per cent of the respondents from medium size colonies are satisfied due to the availability of their private bore well connections and water through the overhead reservoir too is available in some colonies, otherwise, they have an intermittent water supply for two hours three times a day. About 26.5 per cent of the respondents from small to medium colonies are partially satisfied. Lack of availability of O.H.R within the site and lack of colonizer interest to improve the water supply within the locality are the main reasons behind their partial satisfaction.

The residents of regularised colonies depend upon their individual sources of water supply except for one locality where the water is supplied through the municipal corporation and private connections as well. Individual private connections make them satisfied. About nine per cent of respondents are partially satisfied with the available source of connection. The residents having public sector water supply connections are also partially satisfied because of the intermittent supply of water and low pressure of water. The study also reveals that about seven per cent of the total respondents of regularised localities are not satisfied with the water supply system as no efforts from either the government or the developers are made to provide good quality of water in sufficient quantities.

About 32 per cent of respondents from an unplanned area are satisfied with the quality and quantity of water. Availability of private as well as government connections of water fulfills their water requirements for the whole day. About 28 per cent of residents are partially satisfied as the water pressure is not maintained due to illegal booster pumps installed by the well-to-do residents. There is no action on them for their illegal deeds. About 40 per cent of respondents who have private connections are not satisfied on account of frequent power cuts resulting in the inadequate water supply.

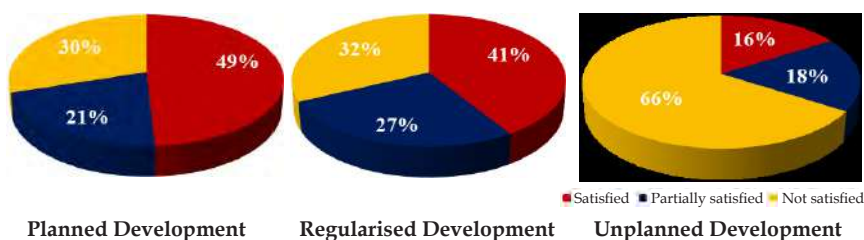
Thus, on an average, about 22.5 per cent and 62 per cent of inhabitants of the peri-urban areas are satisfied and partially satisfied with the water supply system in their respective residential colonies. All the residents of large and megaproject residential colonies are satisfied, whereas about 24 per cent of the residents of regularised and unplanned colonies are not satisfied with the water supply system. Hence, planned development has proved to be a better proposition in terms of provision of the basic and essential commodity, i.e. water. The residents of the small and medium-sized colonies are satisfied not because of the efforts of the colonizers or developers but because of their own arrangements for water supply. A similar situation prevails in regularised or unplanned areas as well.

Sewerage System

With the purpose to assess whether the sewerage system of the residential colonies of the peri-urban areas is properly handled or not, without causing many health and environmental problems, the satisfaction level of the inhabitants has been examined with respect to the period of laying the sewer lines, the hierarchy of pipes, the system of sewerage collection, disposal and treatment, the proportion of the area developed and access of sewer lines. Following are the results of the study:

It is clear from Fig. 2 that about 49 per cent of the respondents of planned colonies are satisfied with the sewerage system of their colonies. There is no problem of choking of the sewer and operation and maintenance of sewer lines is done twice a year by the colonizer. Availability of an online portal to get their problem resolved is another reason for their satisfaction. The treated water is used for horticulture within the township. The residents of medium and large colonies are also satisfied as there is no problem of choking of the sewer and its cleaning is done on a regular basis by the colonizer.

Fig. 2: Satisfaction from Sewerage System



Source: Field Survey, December 2019 and January 2020.

About 21 per cent of the respondents of some of the planned localities are partially satisfied because the absence of main sewer pipe leads to frequent choking of sewer and disposal of untreated sewer in the open despite having a sewerage treatment plant (unoperational) within the site makes it environmentally unpleasant. All the small-sized planned colonies also have underground utility corridors. About 30 per cent of respondents of the small colonies (planned) are not satisfied with the existing sewerage system due to its frequent choking, no efforts from the colonizer to clean the sewer lines regularly, and disposal of the untreated sewer in the surrounding fields.

Conditions are more or less similar in the regularised colonies as well where about 41 per cent of residents are satisfied with the existing

sewer facilities provided to them. The sewer lines are laid by the village panchayat or the residents themselves have laid it. About 27 per cent of the respondents are partially satisfied because of absent sewer lines resulting in dependence on septic tanks for the collection of sewage. About 32 per cent of households are not satisfied because they do not have sewer lines in their localities. The developer collects Rs. 500/- from each household each year, but no sewer line is laid as yet. Hence, the residents laid the sewer lines on their own in their respective streets without giving any regard to the overall gradient in the area. This may lead to the problem of choking in the future. The untreated sewage is disposed of in the vacant plots which may be hazardous in the long run. Also, due to less occupancy in some such colonies, the sewer lines are laid but no connection is given to the plots. They are laid to attract the buyers only.

As expected the conditions are worse in the unplanned colonies as only 18 per cent of inhabitants are satisfied with the sewerage system laid in their localities. The remaining 66 per cent and 16 per cent inhabitants of such colonies are either partially satisfied or unsatisfied respectively as no sewerage system is laid in them. These residents are relying on the septic tanks constructed by themselves on an individual basis and the disposal is done in the vacant plots.

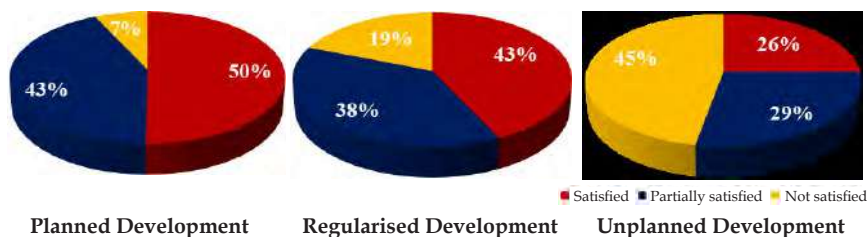
Thus, the sewerage system in 51-82 per cent of the residential colonies in the peri-urban areas of Amritsar is far from satisfactory. Sewer network is laid in some regularised and unplanned colonies just to attract the buyers. It is not working and wherever working, the sewage is disposed of untreated in the surrounding agricultural areas or vacant plots. Only the large and mega residential colonies are performing better in this field.

Solid Waste Management

The residents' satisfaction with solid waste is based on the segregation, collection, transportation, disposal, and treatment mechanism adopted by the colonizer or the public sector agency. Figure 3 reveals that about 50 per cent of the respondents of planned colonies are satisfied with the collection system of solid waste. The residents of megaprojects are fully satisfied with the household level waste segregation, daily collection system, dedicated space allotted for waste disposal, and efficient management of waste by the colonizer. The respondents of large-sized colonies are satisfied with the daily and timely waste collection mechanism managed by the developer. The residents of medium size colonies are satisfied with the waste collection managed by themselves on the monthly payment of Rs. 150/- made to the person engaged for

this activity. About 43 per cent of respondents are partially satisfied due to no role played by the colonizer and irregular collection despite paying monthly charges for managing the solid waste. The residents of small colonies are not satisfied because there is no facility for solid waste collection.

Fig. 3: Satisfaction from Solid Waste Management



Source: Field Survey December 2019 and January 2020.

About 43 per cent of respondents from regularised localities are satisfied on account of the daily collection of solid waste. About 38 per cent and 19 per cent of respondents are partially satisfied and not satisfied due to irregular waste collection and no facility of solid waste collection in their localities respectively. Other important reasons for partial or no satisfaction are the lesser number of houses and longer distance of these sites (10-15 km.) from the city, which makes it uneconomical for a private company to collect the waste. The residents use vacant plots to dump their solid waste.

About 26 per cent of respondents of the unplanned localities are satisfied with the waste due to daily collection. But 29 per cent of respondents are partially satisfied because the collection is not regular and the collection van comes at odd hours on alternate days. About 45 per cent of respondents of the unplanned localities are not satisfied because these colonies are not facilitated with solid waste collection mechanisms. Narrow zig-zag streets and roads constrain the entry of the collection van in many of these colonies. Some residents pay to the rickshaw puller dealing in the collection of waste but that too comes irregularly. Poor waste collection system chokes the drains and makes the unplanned localities hardly livable. In fact, the residents of these colonies are not willing to pay for the collection of solid waste.

Hence, it is clear that inhabitants of the mega and few large projects residents are satisfied with the waste collection mechanism. The analysis reveals that solid waste collection in the residential localities in the peri-urban area of Amritsar is based on monthly contributions in all types of colonies. The residents are satisfied or unsatisfied depending on the

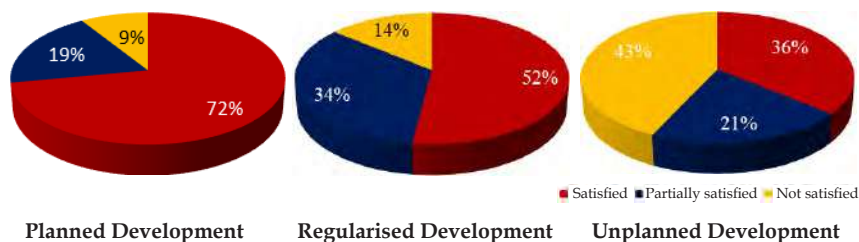
frequency of the solid waste collection van and not on the role played by the developer/colonizer.

Electricity Supply

The electricity is supplied to the peri-urban areas of Amritsar by Punjab State Power Corporation Limited. The satisfaction level of residents from electricity supply includes the supply of electricity, network and conditions of electricity wires, availability of street lights, and the lights in the park. The planned areas have the road and roadside infrastructure developed in the initial stages of their development. All the planned colonies in the peri-urban areas have the underground electricity lines within their utility corridors running along the roads. About 72 per cent of respondents are satisfied with the electricity supply in the planned colonies. The residents of the mega project are 100 percent satisfied because colonizers supply the electricity through their D.G sets during power failure. The condition of electricity lines, street lights, and distribution panels are good. The residents of the large colonies are also satisfied because the residents have their silent generators and invertors as the source of power back-up. There are no hanging wires and the roads and parks are well lighted by the street lights throughout the night. The colonies are also having solar lights as another source of electricity. About 19 per cent of residents from medium-sized colonies are partially satisfied with the facility due to shorter power break-up periods, lack of lights in the parks, lack of maintenance of street lights giving birth to a number of accidents. About nine per cent of residents of small size colonies are not satisfied although these colonies are having underground electricity lines and street lights too. The only reason for their not being satisfied is the location of transformer and hanging wires along with transformers, which may be dangerous for them and their children.

It is clear from Fig. 4 that 52 per cent of respondents of regularised colonies are satisfied with the electricity mechanism due to continued

Fig. 4: Satisfaction from Electricity Supply



Source: Field Survey December 2019 and January 2020.

electricity supply, installation of meters within the locality, right location of the distribution panel, and the availability of street lights within the locality. About 34 per cent of respondents are partially satisfied because they are facing the problem of power breakdown leading to complete darkness of streets and parks resulting in inconvenience during night time and rainy season. Also, hanging wires and the wrong location of distribution panel with regard to the surrounding land uses tend to make the residents less satisfied. About 14 per cent of respondents of the regularised colonies are not satisfied with the electricity mechanism because the street lights are haphazardly erected and some colonies do not have street lights at all.

About 36 per cent of respondents of the unplanned localities are satisfied with the electricity provisions as street lights are provided on the streets and around the parks. Nearly 21 per cent of respondents are partially satisfied because hanging wires and unplanned erection of street lights, and wrong placing of the transformer tend to create inconvenience to them. About 43 per cent of respondents in unplanned areas are not satisfied with the electricity provisions due to frequent power cuts, hanging wires at the height of 4-5 feet, poor condition of the wires and open joints of wires, etc.

Hence, the planned areas, especially the large and megaprojects and few medium planned colonies have the better management of electricity facilities, keeping note of safety and security considerations. Safety and security considerations are compromised in regularised and unplanned localities.

INFERENCES AND CONCLUSION

The magnitude of satisfaction for basic commodities, i.e. water supply, sewerage, solid waste and electricity in different types of colonies in the peri-urban areas of Amritsar clearly reveal that more than 3/4th of the residents of planned colonies are fully satisfied with the water supply facilities (refer Table 1). The remaining are partially satisfied with this facility on account of intermittent supply. No one is unsatisfied with water supply facility.

The residents of mega projects are satisfied because the developer plays an important role and provides water supply 24x7. On the contrary, the residents of small and medium colonies are partially satisfied as their developers/colonizers provide intermittent water supply only. Table 1 clearly depicts that majority (84 per cent) of the residents of regularised colonies are satisfied with their own source of water supply. While only little more than 1/4th of the residents of unplanned colonies are satisfied with the supply of water, 32 per cent

and 40 per cent are partially satisfied or unsatisfied on account of quality and quantity of water in their areas.

TABLE 1: SATISFACTION LEVEL OF RESPONDENTS IN DIFFERENT COLONIES

Type of Development	Satisfaction Level of Residents from Basic Infrastructure											
	Water Supply			Sewerage			Solid Waste			Electricity		
	Satisfied	Partially Satisfied	Not Satisfied	Satisfied	Partially Satisfied	Not Satisfied	Satisfied	Partially Satisfied	Not Satisfied	Satisfied	Partially Satisfied	Not Satisfied
Planned Development	74	26	0	49	21	30	50	43	7	72	19	9
Regularised Development	84	9	7	41	27	32	43	38	19	52	34	14
Unplanned Development	28	32	40	16	18	66	26	29	45	36	21	43

Source: Field Survey, December, 2019 and January, 2020.

Interestingly, more than 50 per cent of the residents of planned as well as regularised colonies are either partially satisfied or not satisfied (jointly) by the provisions of sewerage facilities in their colonies. They are not satisfied on the account of absence of main sewer pipe leading to frequent choking of sewer, no efforts by the colonizer to clean the sewer lines regularly, and disposal of the untreated sewer in the surrounding fields. Majority (84 per cent) of the residents of the unplanned colonies are not satisfied with the sewerage facility because it is not laid in their colonies (refer Table 1). Wherever it is laid, it is not operational. Hence, the untreated sewage accumulates in the open plots or in the adjoining areas of such colonies.

Similar are the conditions for solid waste management where more than fifty per cent of residents are not satisfied with this facility in planned as well as regularised colonies because collection of the waste is not done on a regular basis. About 50 per cent and 43 per cent of the inhabitants of the planned and regularised colonies respectively (refer Table 1) are satisfied as regular solid waste collection is done daily in their respective areas.

About 72 per cent of the inhabitants of planned colonies are satisfied with the electricity provisions. The remaining are partially satisfied or not satisfied on account of irregular supply of electricity and unsafe open connections and location of transformers. About 52 per cent and 36 per cent residents of regularised and unplanned colonies respectively (refer

Table 1) are satisfied with the electricity provisions. But 48 per cent and 64 per cent residents of regularised and unplanned colonies respectively are partially satisfied or not satisfied on account of irregular supply of electricity and unsafe open connections.

Thus, the peri-urban areas of Amritsar are characterised with planned, regularised and unplanned residential developments. The perception that planned residential colonies are provided with good infrastructure to meet the expectations of their inhabitants is proved to be partial in the case of Amritsar peri-urban areas. Except for few mega or large residential projects, the condition of the infrastructure is nearly similar to the regularised colonies. Neither the private developers in planned colonies nor the government in regularised or unplanned development have extended support to improve the quality of life of their residents. Although the government receives charges/ fees from the colonizers of planned colonies or to regularize the colony but still the colonies face infrastructural deficiencies leading to the dis-satisfaction of the residents. The goodness or excellence of infrastructure of mega and large projects is on the account that HIG/ MIG income group own the houses in these localities. They are able to pay monthly charges to avail better infrastructural facilities.

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A Study of Erstwhile Samsthan/ Zamindari Palaces of Telangana and Andhra Pradesh

VASANTA SOBHA TURAGA*

ABSTRACT

Zamindari/Samsthan Palaces built during the 17th – 20th Centuries across India are buildings of historical and architectural significance but are unprotected and lying in neglect and disrepair. Zamindars and Rajas, who were heads of local areas in pre-Independent India, were divested of their positions, privileges and major land holdings after the Independence and abolition of Zamindari systems and political integration of princely states. Interactions with the present generation of Zamindar families/lineage of erstwhile rulers have revealed situations and dilemmas due to changed/changing political, legal, economic, social and cultural conditions, and the challenges, opportunities they face in maintenance and management of the historic properties that they have inherited. As part of the Doctoral research at School of Planning and Architecture, Jawaharlal Nehru Architecture & Fine Arts University, Hyderabad, 27 Samsthans/Zamindari palaces of Telangana and Andhra Pradesh were studied under the research work. This paper presents the findings from the research work, listing out a few of the socio-cultural dilemmas of the owners of the historic properties, affecting the present state of preservation of erstwhile Samsthan/Zamindari Palaces of Telangana and Andhra Pradesh as representing the Unprotected Heritage in India.

Keywords: Unprotected Heritage, Conservation, Management, Inheritance, Social, Culture, Political Integration

INTRODUCTION

“A majority of architectural heritage properties and sites in India still remain unidentified, unclassified, and unprotected, thereby subject to attrition on account of neglect, vandalism and insensitive development”

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– INTACH Charter for the Conservation of Unprotected Architectural Heritage and Sites in India, 2004.

Based on legal status, heritage in India can be categorised into two groups. First category consists of those having a legal/official status and protection viz., the 'Protected Monuments' (under the Central Archaeological Survey of India & State Departments of Archaeology/Heritage) and 'Listed sites' (under Urban Local Bodies). The other category includes all those heritage sites that have no legal, official heritage status, popularly called as 'Unprotected/unlisted monuments and historical sites'. While India has a rich history with innumerable historic structures, only a few thousands are under Central/State Protection and Local Listing and many others remain 'Unprotected/Unlisted' across India.

Zamindari/Samsthan Palaces built during 17th – 20th Centuries across India are one such category, which, in spite of their historical and architectural significance, are mostly 'Unprotected/Unlisted' and lying in neglect and disrepair.

Samsthans/Zamindari palaces of Telangana and Andhra Pradesh were studied as part of the Doctoral research at School of Planning and Architecture, Jawaharlal Nehru Architecture & Fine Arts University, Hyderabad, as representing Unprotected Heritage in India. The Study also included interaction with the present owners, lineage of Zamindars/Rajas who face challenges when handling the responsibility of maintenance and management of their inherited historical palaces and foregoing their Constitutional rights of being private property owners. This paper presents the findings from the research work, listing out a few socio-cultural dilemmas of the owners of historic properties, affecting the present state of preservation of erstwhile Samsthan/Zamindari Palaces of Telangana and Andhra Pradesh

SAMSTHANS/ZAMINDARS- HISTORICAL AND GEOGRAPHICAL CONTEXT

Historical Context

Samsthans/Zamindars, sub-regional authorities in the Princely States and British India, were the ruling/land revenue systems in pre-Independence India that were abolished and merged into the Indian Union. They were the local chieftains, feudal lords between 17th Century and 1947, with varying revenue/judicial powers and had an important role to play in the local, sub-regional, even State-level politics, culture and administration. Zamindars were 'landlords/officials' (Britannica.com), land revenue collection intermediaries of the estates created by

the British through the 1802 Permanent Settlement. Samsthans existed from pre-colonial times as royalty (Donappa, 1969/1987). They were ruling 'little kingdoms', sub-regional units reporting to the emperor (Cohen, 2007). Samsthans or local Kingdoms were 'little kings' (Dirks, 1986) who were '*stripped of political power and turned into zamindars or landed proprietors*', by the British '*in the larger interest of order and security*' (Rajagopal, 2016).

Geographical Context

Samsthans/Zamindars existed across India, Pakistan and Bangladesh, called by different names in different regions such as *Taluqdars*, *Nawabs*, *Desais*, *Jagirdars*, *Rajas* and others. This present study situated in the present States of Telangana and Andhra Pradesh, prior to 1947, were under the rule and administration of the Princely State of Hyderabad, ruled by the Nizams and British territories of Madras Presidency respectively.

Each Samsthan/Zamindari – the geographical region under them, had its Headquarters in a Capital city/town, and the Samsthan/Zamindari was referred to by the Capital city/town. For example, in the States of Telangana and Andhra Pradesh, Gadwal, Nuzvid, Venkatagiri, Vizianagaram and others are all the names of the historic Samsthans/Zamindaris as well as towns and cities of their Headquarters.

RESEARCH METHODOLOGY

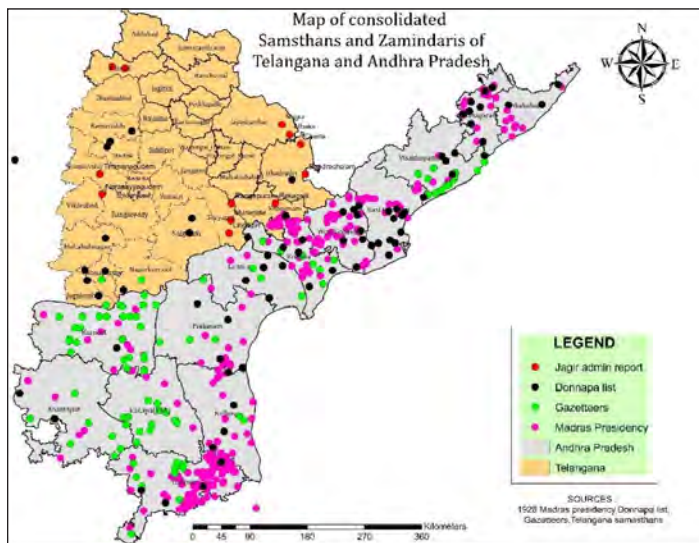
Four Stages of Research Work

The doctoral research work with a focus on state of preservation of historical palaces was conducted in four stages, from listing of land revenue units to identification of buildings/palaces, study of their condition and understanding reasons for the state of preservation, as explained below.

In Stage One, Zamindari/Samasthans towns and villages were listed from various archival records and documents. A total of 603 settlements in Andhra Pradesh and 30 in Telangana were listed and mapped.

In Stage Two, buildings and architecture of the erstwhile Zamindaris/Samasthans were explored and total of 27 case studies were selected based on their historical, architectural significance and distribution. The 27 case studies selected included Forts & Palaces of Samsthans/Zamindaris of Gadwal, Wanaparthy, Kollapur, Domakonda, Narayanpur, Munagala, Rajapeta, Palvancha in Telangana

**Fig. 1: Samsthans and Zamindaris of
Telangana and Andhra Pradesh**



Sources: Author

and Banagapalle, Rayadurg, Srikalahasti, Venkatagiri, Punganur, Chandragiri, Karvetinagar, Gurramkonda, Bobbili, Vizianagaram, Nuzvid, Mylavaram, Amaravati, Challapalli, Pithapuram, Peddapuram, Kasimkota and Muktyala. These consist of big, medium and small Samsthans and Zamindaries, located presently in different development scenarios as part of cities, towns, villages and hinterlands across Telangana and Andhra Pradesh.

In Stage Three, the present use, condition and management of the selected 27 case studies studied. The case study sites presented a wide range of situations – from sites which are totally lost and restored, in use and vacant, used as tourist sites, hotels, converted to schools, colleges or continued to be used by the Zamindar/Raja families as residences, offices and personal museums, a few of them donated/taken over by the Government, many are retained by the family. Statistical distribution of case study findings is listed in the doctoral work with detailed description of each and overlapping situations of the 27 case studies.

In Stage Four, the dimensions of ownership, management has been studied through informal interviews and interaction with present owners and experts in the field to understand the reasons for state of preservation of the erstwhile Zamindari/Samsthan Palaces.

This article presents the findings from Stage Four, outcomes of

**Fig. 2: Banganapalle Samsthan, Kurnool District,
Andhra Pradesh Photo by author**



Sources: Author

**Fig. 3: Mylavaram Zamindari, Krishna District,
Andhra Pradesh Photo by Author**



Sources: Author

the informal interaction with the present owners in maintenance and management of their inherited historical properties.

SOCIO-ECONOMIC CONDITIONS OF ZAMINDARS/ SAMSTHANS IN THE POST-INDEPENDENCE PERIOD

Zamindari Abolition and Land Reforms

“The first decade of Independence witnessed the extensive programmes of land reforms carried out in almost every Indian state. In Uttar Pradesh, a Zamindari

Abolition committee was appointed in 1946 and Zamindari Abolition Act was passed as Act I of 1951 and stripped large landlords of the bulk of their estates/ land-holdings and allowed to keep only their unlet home-farms" (Metcalf, 1967) Soon after, "Constitution of India amended the right to property under Article 19 and 31" (Sareen and Malik, 2021) in the context of " land reform objectives for fixing of limits to the extent of agricultural land that may be owned or occupied by any person (Constitution of India, 4th Amendment). In 1971, the 26th Amendment to Constitution abolished the privy-purse, stopping all privileges and allowances paid to royal families in India.

PRE- AND POST-INDEPENDENCE CHANGES IN SOCIO-ECONOMIC STATUS OF ZAMINDARS AND IMPACT ON HISTORIC PROPERTIES'

Prior to Independence, having many properties, rights and power, Zamindars were a powerful social class during the British period. "Zamindars enjoyed enormous resources not only from land revenue but also from trade and commerce, their possession also constituted a Prangana or Mahal located within the imperial territory" (Nadri, 2000).

Zamindars, who "lived for so long in such splendid isolation, were assured of an ample income" after Zamindari abolition were not "anywhere near so wealthy as they once were nor do they tower over rural society to the same extent. Their formerly unchallenged dominance has been undercut and their unquestioned position disappeared" (Metcalf, 1967). Post-Independence, Zamindars "lost properties which they were enjoying for many years. For several Zamindars, Zamindari was their only source of livelihood. Deprived of power and rights, their social status diminished in course of time" (Rath, 1992).

The changes in the political situation and post-Independence Constitutional Acts relating to Zamindari abolition, land ceiling, rights of ownerships and properties have changed the social, cultural and economic position of Zamindars/Samsthans permanently.

Due to abolition of the Zamindari system and political integration of Princely States into Indian Union, the role and position of Zamindars/Samsthans permanently changed in the post-Independent Indian Democratic Republic, turning the families of nobility/aristocracy to common citizens. The Buildings and establishment – the historic properties of the Zamindaris/Samsthans have borne the brunt of the political change and the changed socio-economic status of Zamindars.

The Zamindari families, having a history of more than two hundred years, have seen ups and downs of the changing political scenario of India during 20th Century. From the 1930s, freedom and national

movements were intertwined with peasant movements that pushed rights of the cultivators over those of the landlords.

"The introduction of various Zamindari Abolition Bills had begun even before the Constitution of India was enacted. Uttar Pradesh, Madhya Pradesh, Bihar, Assam and Bombay introduced Zamindari Abolition Bills. The zamindari system was abolished in Independent India and soon after the Constitution of India amended the right to property under Article 19 and 31 through its First Amendment Act. The major objective of agrarian land reforms was to bring a change in the revenue system that would in turn be favorable to the cultivators" (Sareen & Malik, 2021).

In Hyderabad State and Andhra Pradesh, Committees were appointed on whose recommendations Bills were passed in 1950s *"ensuring largest measure of contentment and prosperity among population in general and the agricultural population in particular and equitable distribution of agricultural wealth, incomes and objectives" (Jatkar, 1980)*

"Zamindars were allowed to keep land in certain places for their personal cultivation. And compensation was paid to the Zamindars by the State on acquiring the land ownership title back from them. After the abolition of Zamindari system many peasants and share croppers acquired the land ownership title" (Sareen & Malik, 2021).

Pre-and-Post Independence Economic Conditions of the Zamindars:

The Zamindari systems, basically being land revenue administration mechanisms with flow of revenue from villages under each Zamindar's control, supported the scale and size of estate and private establishments and properties of the Zamindars. Post-Independence, the land that belonged to Zamindars was seized through various land reforms taken up in the country, leading to reduced revenue flow from villages, land and agriculture. A few of the buildings and establishments remained with the Zamindari families but with reduced size and scale of revenue generating land holdings. The broken link between revenue and expenditure is one of the primary factors affecting the repair and non-maintenance of historic properties.

Pre-and-Post Independence Social Conditions of Zamindars:

During the period around Independence, those Zamindari families that could survive the political turbulence, retained their position in society by adapting themselves into new India, by taking up occupations in politics, industry etc. There were also Zamindars who had lost, sold, given up and abandoned their properties and moved away.

Most of the present generation of owners were born around the time of Independence. On one side, they are holding on to honour,

authority, sentiment and pride of their past, and on the other side, have the next generation move on and adapt to modern, normal life like any other citizens in India. They live with the burden of maintaining and managing their inherited properties located in the old Zamindaris, away from their cities of their present residence, with their wards apparently unable to manage resources even as they do not seem to evince much interest in their old legacy.

Impact on Historic Properties

The Samsthan and Zamindari palaces, which were once built and maintained in glory and grandeur, in pomp and luxury, are now sidelined from the epicentres of today's development. However, located in different development contexts, these historic properties qualify and deserve to be conserved as heritage.

In whatever state of preservation these palace buildings exist, whether in ruins or good condition, in whichever location, in towns or villages, the Zamindari palaces hold social, architectural, aesthetic and antiquity values and constitute a historically significant aspect of local and regional histories across the sub-continent and also as in Telangana and Andhra Pradesh, the present study area.

Most of these being private properties, the condition of the historic properties is an outcome of decisions taken by the Zamindari families, whether of good care or non-maintenance. The following informal survey was conducted to know and understand whether or not the owners of Zamindari/Samsthan palaces are in a position to repair, restore and maintain these historic properties in the changed political and socio-economic situation after Independence,

INTERACTION WITH ZAMINDARI/ SAMSTHAN PALACES' OWNERS

Unprotected historic buildings without legal heritage preservation regulations keep Constitutional 'Right to property' applicable to private owners. With exceptions of well-preserved, restored palaces, owners of historic properties may feel conservation as a loss-making liability, despite having sentiment and pride about their inherited historic properties.

Informal Interviews

Informal interviews were conducted with a few descendents of erstwhile Zamindars/Samsthans, their close relatives and experts in the field, who were willing to talk on personal, property matters to an extent. The

interactions were informal without seeking proof of documentation. Though it was planned to seek written answers to the queries, the families were not too forthcoming. Therefore data was gathered for getting an overall understanding of various aspects and challenges of having the onerous responsibility of carrying legacies and their perspectives on conservation and future of their historic palaces.

Research Questions

Opinions of descendants of Rajas and Zamindars were sought with regard to ownership, maintenance, management, family details, especially the next generation, revenue and expenditure, skills/capacities/aptitude of family members, future plans on conservation and development, including their views on heritage conservation, role of government, sentiments and pride on inherited properties. Among the questions were:

- What are the issues relating to private ownership and management of historic sites?
- How are owners raising funds to maintain their properties? What are the opportunities and challenges?
- What are the ideas, opinions and plans of owners for the future of their properties?
- What is the willingness to conserve, what are their capacities to manage, what resources do they have to repair, restore, maintain and manage?
- What are the levels of openness to invite partnerships and what kind of support is expected from the government?
- What is the consensus of the family members, are there any legal disputes among the joint holders of the property?
- What are the socio-cultural factors and family/personal issues of the erstwhile rulers? How good or bad is their economic status?
- What are the popular occupations of the present and next generations of the Zamindari descendants?
- What are the plans and levels of participation of the next generation and their willingness to preserve their inherited properties for posterity?

The findings from informal interviews and observations from case studies are listed below.

SOCIO-CULTURAL DILEMMAS AND CHALLENGES – OWNERS' PERSPECTIVES

The overall findings from the informal interviews, supported by case studies and literature review, are presented below without mentioning any names, as the queries were answered on the condition of protection of privacy and confidentiality.

Present Owners – Background, age groups, gender and participation in property matters

The present owners of the Samsthan and Zamindari palaces are either direct descendants or adopted from other families. This generation of owners was born during or immediately after Independence and is in the age groups of 50s to 80s.

Though they have inherited movable, immovable properties, lifestyles and traditions of the Zamindari families, most of these present owners have not witnessed the true and high points of Zamindar life and work before Independence. Even during those times from the 1930s to 1947, the Independence movement had picked up momentum, making way for total Independence in 1947 and Zamindaris were in the closing up mode and out of the full-fledged operation.

This generation of owners was educated in free India and grew up as ordinary citizens. Both men and women of Zamindari families take active participation in the social affairs of the estates, but it is only this present generation of owners aged between in 50s and 80s, that participates in property matters.

Domakonda is an exception where the new generation has taken keen interest, and Jatprole is trying to involve and train the next generation.

Occupations

The role and occupation of Zamindars in the 19th – early 20th centuries was that of landlords, managing agricultural lands, villages and collecting revenue. Some of the Zamindars are known to have taken up development of public works and creating landmarks. In most of the cases, the Zamindars have been chief patrons of local temples and religious structures.

Post-Independence, once again, the occupations that children of Zamindars have taken up are of a broad range. It is observed that where the families joined politics, there is greater connect to their own Zamindari palaces, with the descendants becoming public figures,

engaging with people and representing their own constituency in Parliament or Assembly. The Gajapati brothers of Vizianagaram have been long time Union Ministers. Bobbili Zamindar was Chief Minister of Madras State, and the present owner is a Minister in the present AP Government.

Those Zamindars who are into business or continuing in agriculture, are connected better, like Challapalli, Muktyala, owners of KCP cement company.

Then there are Zamindars who donated their properties and moved into modern job sectors. Domakonda Zamindar was a retired civil servant. Wanaparthy Samsthan descendants are educationalists and artists. The next generation has moved on into new jobs of IT and businesses and are less connected to the management.

Sentiment, Pride and Memories

Zamindar families appear to be living in memories, though all of them display a uniform sense of sentiment and pride. A few of the family members who take pride, put tremendous efforts in pooling material and preserving artifacts, creating family trees. Some families who have had a turbulent past, prefer to stay disconnected.

Fig. 4: Interiors of Bobbili Raja's Palace, Vizianagaram District, Andhra Pradesh – Family continues to reside maintaining historic buildings, preserving memories and artifacts



Source: Author

Adoptions

There were adoptions from one Zamindari family to another all through history, mostly within the same caste. Venkatagiri Zamindar had seven sons at a time, who were given in adoption to Zamindaris of Bobbili, Jatprole (Kollapur) and Pithapuram. The present male ward of Wanaparthy Samsthan has been adopted for continuing same caste lineage.

Marriages

Marriages across Zamindaris, not only within Telugu states but from across Zamindaris elsewhere in the country were and are common even today, and caste is secondary sometimes. Maharani Seetadevi, wife of Nuzvid Zamindar, married Maharaja of Baroda. The Wanaparthy Samsthan ruler married a lady, a mother of three girls and later adopted a son from the same community. The present Mysore Wadiyar is married to a Rajasthani princess.

Zamindars were married twice or thrice, either after death of the spouse or when alive. More than one marriage and children from different marriages are among the major causes for disputes over properties, which have affected the condition and fate of properties.

It is said that it matters who is married into the Zamindari families. Spouses who take interest in Zamindari affairs and properties are very supportive for upkeep of properties and traditions. And the new generation spouses have little interest, which is becoming a disadvantage for state of preservation and management.

Migrations

After Independence, some of the families sold or donated properties and shifted from Zamindari towns and villages. The Nizams of Hyderabad moved to London. Palvancha Zamindars moved to the United States. Zamindars of Venkatagiri, Amaravati, Muktyala moved to Chennai, Punganur Zamindars to Bangalore and many others to Hyderabad.

The next generation, children of the present owners, have migrated or are migrating to other foreign countries through marriage or on employment. The non-resident management of historic properties is a big challenge for the owners.

Castes and Communities

All through the historical times, the family lineages were caste and community-based and continue to do so. There are Velama, Reddy,

Kshatriyas, Naidu, Kamma and Brahmin Zamindars. The family links are still maintained across Samsthans and Zamindaris.

Community Networks and Organisations

The present Zamindars are well-connected within their own castes and outside too. Zamindars live and behave as a community, separate from world and network among themselves. Though there is no society or organisation of Zamindars, caste-based associations exist among Kshatriyas, Velamas, Brahmins and others, who stay strong and united, maintaining good relationships.

Inheritance and Divisions of Properties

Samsthans and Zamindaris by law have been properties and positions of inheritance, where the Zamindars were free to pass the mantle to anyone of their choice, be it within the family or somebody from outside.

It is observed that just before Independence, when the process of Zamindari abolition and land acquisition had already begun in 1930s itself and also as seen in the 1928 list of Madras Presidency, bigger and larger Zamindaris were sub-divided into smaller estates, with much lesser *Peshkush*. These estates were registered with the district collectors, to be included in the 1928 List. Where there was clarity in inherited properties and understanding within family members, heritage properties are better preserved. Again quoting the case of Sanivarapupeta in West Godavari, it is said that the Zamindarini two generations back had two sons, who in turn had one and two sons. Brothers in both generations have nominated one single person for managing the affairs of villages and properties they own, which in turn reflects in the state of preservation and maintenance of their properties.

Decisions and Consensus in Joint Properties

Though the details of ownership are not revealed, the buildings and sites are better preserved where there is consensus and unity among joint holders of properties. Bobbili is a case in point. There are examples of hung decisions, when there is disagreement between joint owners, such as Chiran fort in Hyderabad, and the same is said about Challapalli palace, though not from authentic sources.

Donations of Properties to Trusts and Governments

The period during and immediately after post-Independence, was the time when most of the properties were settled by the then Zamindars, including transfer to government and trusts, like with the cases of

Fig. 5: Nuzvid Zamindari Palace, Nuzvidu, Krishna District, Andhra Pradesh- Educational Institute, Krishna University



Source: Author

Fig. 6: Wanaparthy Samasthan Palace, Wanaparthy, Telangana- Government Polytechnic College



Source: Google Earth Image

Fig. 7: Wanaparthy Samasthan Palace, Wanaparthy, Telangana- Government Polytechnic College on Landuse Map



Map Source: Department of Town and Country Planning, Government of Telangana.

Vizianagaram, Nuzvid, Wanaparthy, Gadwal. These places cannot be said to be in good state of maintenance and reflect either uninformed, unskilled maintenance or neglect. Domakonda, which was given to the government for protection, but later restored by the present generation of the family, continues to be a State Monument under Department of Archaeology.

Legal Disputes

Legal disputes were common during the British times, over ownership or *Peshkush* or family disputes. The infamous case of Pithapuram regarding adoption with Venkatagiri, is one of the examples. It is heard that the second wife of Ichchapuram Zamindar in Srikakulam district fought a long battle for property share, but had lost to the first wife.

The topic of legal disputes and court cases of Zamindars makes for a separate study, for mentioning specific examples and conversations with Zamindars also did not yield much information.

Repair, Maintenance and Management

Most of the Zamindars have migrated to bigger cities and are doing non-resident management, with a few exceptions.

Bobbili Zamindars fully operate out of Bobbili, have their own staff and constituency workers for maintenance and also agricultural land

(Fig. 4). They understand very well the costs of repairs and maintenance, and say they smartly manage to make the buildings stay and look good, by taking up tasks of whitewashing or minor repairs by only addressing basic minimum and not pulling out the core issues. For example, they say for events, they just white wash the façades that are visible and that itself costs them an elephantine budget because of the scale and size of the buildings.

In Mylavaram Zamindari, which is said to be less than one percent of the original land under their ownership, within which too the palace complex was divided among three brothers of the previous generation, there are 20 members of maintenance staff on payrolls, of which four are members of residential, live-in personnel (Fig. 2). The staff, including electricians, plumbers to maintain their properties and clerks, altogether cost them about Rupees 10 lakhs annually. They spent about two to three lakhs annually for repair of old buildings or on upgradation of services, which is a constant every year.

Vizianagaram has transferred major chunks of their properties to an educational trust and live in smaller, manageable bungalows. Though the buildings under trusts and government institutions are covered under the institutional expenditures, they are not maintained up to the mark. Many other Zamindaris, like Kollapur, Nuzvid, Amaravati have caretaker families and staff staying on site and taking care of their properties.

Restoration as an exercise is only taken up by Domakonda and Muktyala.

Fig. 8: Venkatagiri Raja's Palace, Venkatagiri, Nellore District, Andhra Pradesh- Family continues to live in Palace preserving buildings, furniture and artifacts



Source: Author

**Fig. 9: Muktyala Palace, Krishna District, Andhra Pradesh-
Repaired and Restored by the Family (Picture and Project by GSV
Suryanarayana Murthy, Kshetra Consultants)**



Photo Source: GSV Suryanarayana Murthy, Kshetra Consultants.

Skills, Capacities and Aptitude of Family Members

Property management is an occupation in itself requiring high levels of alertness and smartness. Heritage properties can be made into assets, turned into profitable ventures, but only when taken up under full skills and capacities. Skills and capacities of the owners in fixing deals, developing and managing properties are essential for any successful adaptation of historic buildings, for operation by their own as family businesses, if not on partnerships. Converting historic properties into profitable ventures, such as heritage hotels in Rajasthan and elsewhere, needs special inclination and attention.

The interviews reveal that the next generation owners have moved on into modern jobs, and are not interested in returning and managing properties. Neither do they have the required skills, patience or prudence to deal with local situations, which are political and administrative in nature. Reverse migration helps in restoring and sprucing up properties, like the case of Chowmahalla and Domakonda, but these are rare cases.

Finances and Economics

Most of the properties do not generate income sufficient to maintain them. Zamindari systems were fed by revenue from land and villages under them. The Zamindars are now able to upkeep these places only with the revenue from other sources. Rents from commercial properties built over in the vacant lands of Zamindaris over the years, are the most common sources of income. If the next generation moves into the job sector totally, it is not possible to allocate required funds for repair and maintenance of these huge properties.

Partnerships with Investors

The scenario of partnerships with investors has not picked up so much

in Telangana and Andhra Pradesh, on the lines of Falaknuma and other heritage hotels. First, the owners have not fully opened up to the idea of sharing of properties. Second, where there is interest, owners are finding difficulty in suitable partners who are ready to invest on a not-so-profitable venture. The state of preservation of these structures also matters for decisions on capital and recurring investment and returns.

Development Options

Extensions and expansions, repairs and upgrade of the old and adding new constructions have been part and parcel of life of Zamindari palaces, a symbol of continuity of residence and use. That way, the present owners of the surviving palaces are aptly aware of conservation and development economics. They very well understand the scope and returns of investment.

Very few Zamindaris have a locational advantage and scenic surroundings having potential for return on investment. Lack of locational potential reduces the development options and is detrimental to long term preservation of these places. Hotels and wedding destinations are the most popular adaptive reuse options across India, these days.

Educational institutions were a safe option at the time of Zamindari abolition. In Telangana and Andhra Pradesh, no palaces are converted into hotels and restaurants in all these years. One of buildings of Bobbili is used as staff quarters. Personal museums exist in Bobbili, Kollapur and Venkatagiri.

Public Access and Tourism

Most of Zamindars allow public to visit certain parts of their palaces, while keeping their own private quarters closed. Tourism and heritage museums are options which generate decent revenue, but not all Zamindars are open to the idea of opening the places for complete public access and crowds.

The present-day Zamindars agree that the situation in Andhra Pradesh and Telangana is not the same as the palaces in Rajasthan and Gujarat having exotic locations for tourism development nor the governments here are doing best to incentivize and promote tourism.

Role and Involvement of Government

The present Zamindari owners are skeptical about getting listed by Heritage status and do not want to be Listed. The previous generation owners had already given away their properties to government, like the cases of Wanaparthy, Gadwal. But the Zamindaris who hung on and

are presently holding on to their properties, do not think giving away to the government is an option at all. The owners are strong and particular that their palaces and buildings are their own private properties and it is they who preserved and maintained for ages. They will not allow government to interfere in any matters.

However, the Zamindars believe it is the responsibility of the government to support them in preserving their rich heritage, without compromising on their absolute ownership. Without taking share of profits, they think government should partner in keeping up their properties, supporting them in doing business and giving financial perks and grants too.

Conservation of Properties

The Zamindars who stuck to their properties are aware of heritage significance and value. They do not think demolition is an option and are looking for various development options for managing these properties in a revenue generating manner. Zamindars are educated, well-travelled across the globe and are aware of how heritage can be developed as an asset and revenue generating resource. However, it is about the locational advantages & disadvantages and skills and capacities of Zamindars which are delaying decisions and actions.

Maintenance is an issue for the non-resident owners, whereas Zamindars using their properties in continuity know the tricks and trades. However they are not well-informed on conservation methods and techniques, and continue to repair using modern materials, damaging properties.

Next Generation Interests

The present generation of owners is into their middle and senior ages. The next generation which has moved into modern fields of occupation, is not interested so much in returning and taking up property management. Domakonda and Chowmahalla are rare exceptions, because of their high profile and aristocratic families. If the next generation shifts into job sectors, and not much effort goes into revenue generation from the palace itself or the feeding agricultural lands, the investment on regular maintenance and management of palaces would not be possible.

Future of Palaces

It is important that the present generation Zamindars take quick decisions for future of their heritage properties. The options that the

Zamindars have before them are to either to donate to government or get into business partnerships with investors or seek support from CSRs and funding agencies.

Resolving the issues of next generation and getting their active participation in property matters would help in working on conservation and development options, which generate revenue and make the projects self-sustainable. The coming home of the next generation is worthwhile and fulfilling option in more than one ways, of not only giving new lease of life to heritage properties, but also keeping the family continuity and inheritance.

CONCLUSION

The study of Samsthan/Zamindari palaces of Telangana and Andhra Pradesh was taken up for Doctoral research work to assess the state of preservation of 'Unprotected' Heritage in India. Unprotected Heritage that has no regulations of preservation provides entitlements of 'Right to Property' to the owners of historic buildings. Pride and sentiment apart, it is challenging for owners of historic properties to repair, restore and maintain their inherited buildings seeming as loss-making liabilities. More so in the case of Samsthan/Zamindar families whose social and economic positions have changed permanently after Independence. Informal interaction with the present generation of erstwhile Zamindars/Rajas and their kith & kin revealed the socio-economic dilemmas of historic building owners in maintenance of their historic properties. The surviving Samsthans and Zamindari palaces under private ownership reflect decisions taken by the last generation and priorities of the present generation of owners. The present generation of Zamindars have wide exposure and are opinionated. They understand fully the implications of declaration of their private properties as heritage, role of governments and partnerships with investors and so act in caution. With delayed time, historic properties suffer and heritage is lost to deterioration and development, and so is the urgency for the government and heritage interest groups to intervene and act.

India needs to develop policies for conservation of Unprotected heritage in India. As on date, only the Central and State Protected heritage have systems and departments for regular conservation and maintenance. For Listed buildings at local levels, the role of ULBs is mostly limited to facilitation for conservation leaving restoration responsibility to the historic buildings owners. Findings from interactions with Zamindari/Samsthan palace owners has revealed the dilemmas that they face and challenging situations that constrain them from taking up the tedious processes of restoration, which may be taken

up as framework for formulation of policies and support systems for conservation of Unprotected Heritage in India.

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Beautiful Facades versus Reality in and around Golden Temple, Amritsar, Punjab

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ABSTRACT

Amritsar, also known as the holy city due to the presence of Golden temple, has a history of about 570 years. The city has experienced various setbacks, like 1947 partition, and 1984 Operation Blue Star, but it has still not lost its glory and history. The redevelopment project namely the Heritage Street project from Town Hall to Golden Temple has been considered as a marvellous wonder for tourists, and pilgrims but its actual reality explains a different scenario altogether. As, behind the façade of stone cut latticework (jallis/ pinjrakari), there are a cluster of shops where no renovation has been done over several years. The aesthetically beautiful re-development project of Heritage Street has been restricted to a stretch of one km approximately. Some of the shopkeepers behind these facades are facing major hardships in terms of business. These older areas need preservation to overcome all the drawbacks. The present article examines a recent development that took place along the approach roads leading to Golden Temple. The authors have tried to evaluate the gaps in terms of infrastructure and facilities as well as other planning issues encountered during the study.

Keywords: Golden Temple, galiara, heritage walk project, façade, tourism, business

INTRODUCTION

Amritsar is a medieval walled city with its heritage and rich history dating back to about 570 years. The history is rich in mixed cultural

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entities of built forms, primary examples from Sikh architecture, British interventions, etc. with numerous public and semi-public spaces, commercial spaces, residential units, etc. Amritsar is known for its Golden Temple also known as Sri Harmandir Sahib and the whole city is built around it. The area around Golden Temple has experienced changes due to various reasons like partition of India and Pakistan in 1947 as well as operation Blue Star in 1984. To decongest the localities surrounding the Golden temple, Galiara scheme was first initiated in 1988 (pressreader.com). The scheme involved acquisition of new structures and areas for re-development and development of heritage street. Millions of rupees were poured, changing and altering the character of the area to the extent that the heritage street looks more or less like the amalgamation of various elements from Pink City, Rajasthan, that views the facades in one shade of sandstone finish only. This article presents the perception of various shopkeepers and how their business has been affected by the upcoming of new heritage street project.

Amritsar

In 1577, Guru Ram Das ji, the fourth Guru of Sikhs founded Amritsar, which means 'The Tank of nectar/ immortality'. (investpunjab.gov.in). Originally, the city was known as *Chak Guru Ram Das* and later as *Ramdaspur*. The Golden Temple formed the nucleus of the city (Gaub, 1983). In the first half of 19th century, 1825, massive double wall of unbaked bricks was constructed by Maharaja Ranjit Singh in Amritsar (Gaub, 1983). According to Ahmad Shah, the fortification was twenty-five yards broad, seven yards high, and the circumference of the walled city was about five miles (Gaub, 1983). By 1849, during the period of annexation of Punjab, the wall started crumbling at places and on the whole it was in a neglected state, as suggested by the British military records (Gaub, 1983).

Located in the North West region of India, Amritsar has now become a major commercial and cultural hub in the heart of Punjab (investpunjab.gov.in). Amritsar served as a gateway for trade in Pakistan and Central Asia (investpunjab.gov.in). According to the 2011 census, the population of Amritsar was 1,132,761 (Wikipedia. n.d). (Refer Figures 1 and 2).

Beautiful Facades

The Heritage Street was constructed to pedestrianise the congested traffic zone and to attract more tourists to the city. It was a kind of

Fig. 1: Map of Punjab



Fig. 2: Map of Amritsar



Source: <https://www.mapsofindia.com/maps/punjab/>

redevelopment project taken for beautification by the Government. The walk-through of Heritage Street is particularly extraordinary amazing attraction for anyone who visits Sri Harmandir Sahib in Amritsar (rediff. com, 2016). The Heritage Street has grandeur and aura of American streetscape with street lamps, benches on the street for tourists to sit, walkway and bollards (See Pictures 1 and 2).

The Heritage Walk project included:

- Façade upliftment — the component of the design and details carved in latticework (*jaali*);
- Restoration of the Town Hall (built during British reign);
- Street Furniture; and
- Public Art- the numerous statues as well as fountains along the Heritage Street.

The Beautification Project

There is a cluster of shops behind the monuments and *jaalis*-like facades which have not been renovated over a while. The livelihood

Pic. 1: Segregated pedestrian, vehicular movement



Pic. 2: Beautification through lighting



Source: Authors

of many people was distributed by the beautification project and the redevelopment projects involved displacement and relocation.

The dead space generated as the result of making the “Pseudo-facades”, makes no sense of urban fabric connecting the two spaces, i.e., the newly designed envelope, viz., existing structures. The infrastructural provisions such as overhead wires, cables, and plumbing pipelines remain the same behind the *pseudo facades*. The Picture 3 shows the reality behind the heritage street. All the vehicles of this area have been redirected as heritage street was objectified to be pedestrianised. The issues of Solid Waste Management (SWM) and problems of stormwater drainage can be seen extensively due to the presence of open drains at some stretches. The conditions of the old structures remained dilapidated. The socio-cultural interactions of typical medieval bazar remain everywhere else except the Heritage Street which follows the western concepts of displays, statues, fountains, dancing statues, sandstone buildings, paved streets quite similar to the examples from European countries losing the sense of belongingness in the new character of heritage street (See Picture 3 and 4).

Objective of the Study

The major objective of this research paper is to understand the basic requirement of the walled city and its infrastructure. The methodology adopted was dividing the study area into three zones (Picture 5), followed by accessing the effect/ impact of the new development on shops and shopkeepers. Also the issues and concerns of existing infrasturure were assessed. A survey tool was designed and primary

Pic. 3: Visible Overhanging Wires



Source: Authors

Pic. 5: Google Earth /Map – Area Identification



Source: Author

This zone has been covered by a Stone latticework — *jallis*, consisting of small access gates in between the shops. This zone is a commercial zone consisting of 35 shops in total, out of which 10 shops have been covered for surveying, interviews, and data collection. This zone lies on the *Fawara* (Fountain) Chowk; hence it is considered important for the study. The shops in this zone mainly consist of Punjabi *Jutti* shop, *phulkari* shop, *rumala* centre, food joints, etc. (Picture 5).

Zone 2, also an old development, lies near the Heritage Walk. This zone is a residential-cum-commercial use (mixed land use), rich in heritage value having no direct connection with the heritage walk directly. It consists of 32 shops in total, out of which 10 shops have been considered. An introvert zone, it consists of old residential houses on the upper floors and commercial areas on the ground floor. The commercial shops mainly consist of old cloth traders, wholesalers in the cloth industry who have been running the business for years at the same place. This business community was not affected by the new development due to the nature of their job.

Zone 3, the new development, has shops which were already present on the road and now have merged with the new development. The new development comprises of an urban fabric which has improved tourism to a larger perspective. It consists of 94 shops out of which 10 have been considered. The new development elicited satisfactory responses from the shopkeepers because of increase in land value of the area. The Ghanta Ghar complex has been constructed to rehabilitate the shop owners of the shops removed from the Golden Temple Complex.

Parameters undertaken for the study area as a whole:

1. Land Acquisition
2. Protest of people before and during the construction
3. Frequency of Municipal Solid Waste collection and MSWM
4. Water logging/ Storm Water Management

Parameters undertaken for studying each zone

Municipal Solid Waste Collection; Ownership; MSWM Water logging and Storm Water Management; Public Toilets; Parking; and Prime reason for the project.

Findings for the study area

The overall scenario of the study area was generated by interviewing people on the new development and it is as follows.

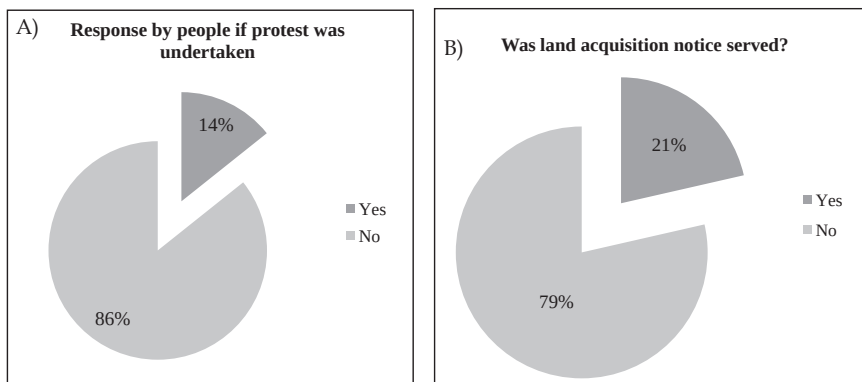
Protest against the Heritage Street

Knowingly or unknowingly the merits and demerits, and failure to forecast the impacts of the project, 86 per cent respondents showed that there was no protest against the development for Heritage Street while 14 per cent respondents stated that they protested against the coming of Heritage Street due to the impact on their business which had been running successfully for decades (Fig. 3a).

Land Acquisition

The project since inception lacked participation of people (the end-user or the people at large). This was confirmed by 79 per cent of respondents stating there was no land acquisition notice served and no community participation was involved (Fig. 3b). It may be due to the timelines of the project coinciding with the upcoming elections in that current year.

Fig. 3. Percentage responses to protest against the Heritage Street and land acquisition

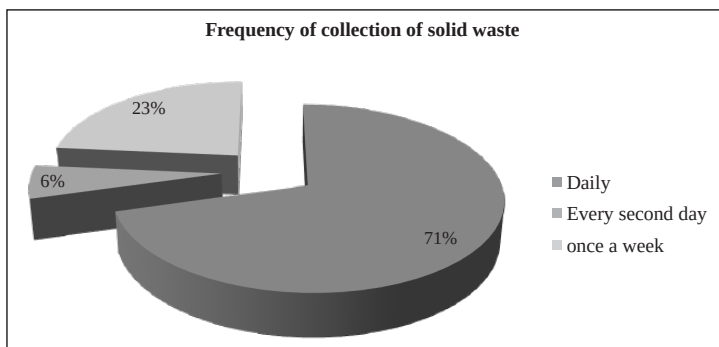


Source: Author

Solid Waste Collection

Seventy one per cent of respondents stated that the frequency of collection of solid waste is daily and they are happy about it. The remaining six per cent stated that it is collected every alternate day and 23 per cent of respondents said that the waste is collected once a week by the municipal corporation (Fig. 4).

Fig. 4: Percentage responses to Solid Waste Collection Frequency

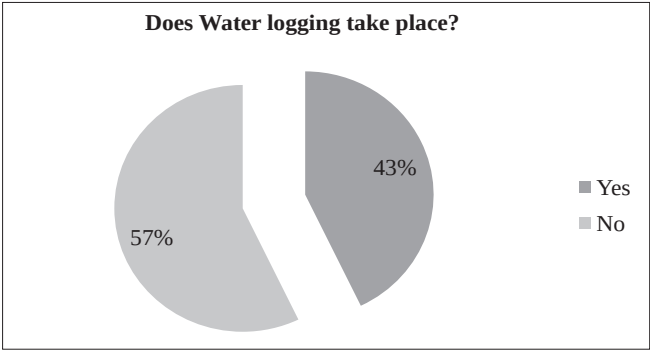


Source: Author

Water Logging

Fifty seven per cent responded that there is no water logging in the area while 43 per cent said water-logging occurs to quite an extent in the area (Fig. 5). The datum lines formed due to water logging in the area can be witnessed at many points along the facades.

Fig. 5: Percentage reponses to water logging in the study area



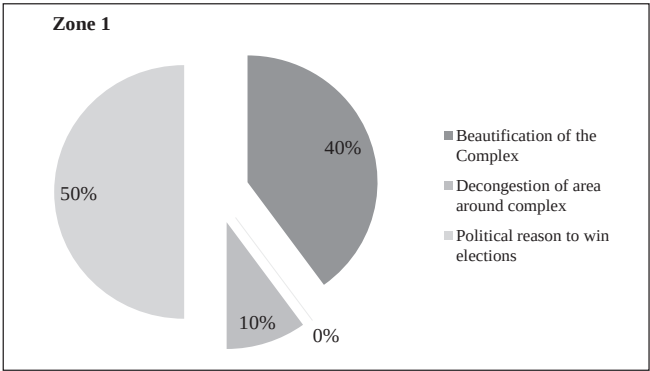
Source: Author

Zone Wise Findings

Zone 1

Zone 1, the old development zone, 50 per cent respondents think that the prime reason for the development project was the political reason to win elections while 40 per cent think the project was done for enhancement and beautification of the complex and 10 per cent of respondents stated that project was conducted to decongest the complex (Fig. 6). Zone 1 occupants are the most affected people due to their shops being hidden behind pseudo facades of stone *jalis*.

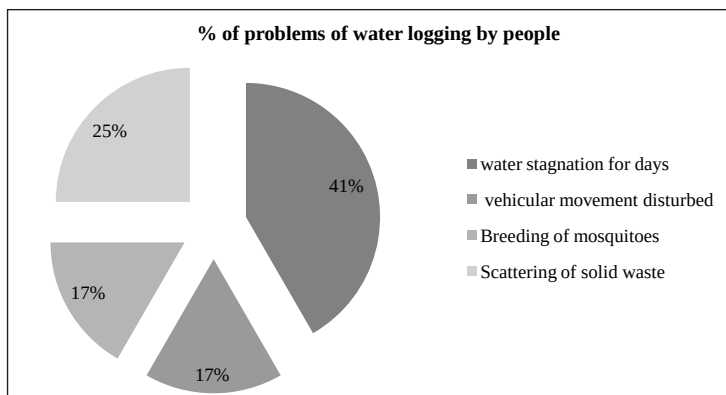
Fig. 6: Percentage response to prime reason for the project



Source: Author

Zone 1 is the most affected area, as it does not have any stormwater management and was not part of the new development. 41 per cent of respondents stated that during the monsoons, water stagnation remains for days in the old zone resulting in many problems like disturbing vehicular movement, breeding of mosquitoes as well as the scattering of solid waste (Fig. 7).

Fig. 7: Percentage responses to water logging

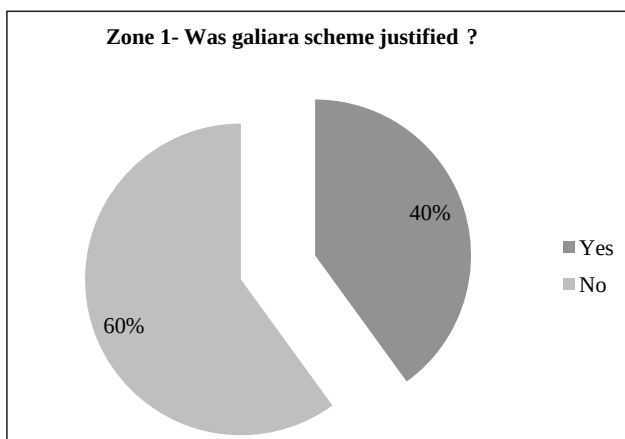


Source: Author

Was Galiara Scheme justified?

Sixty per cent of the respondents do not think in zone 1 that the scheme was justified as their businesses were evicted overnight by shifting their shops behind the façade (Fig. 8). The shop owner/ keepers were doing good business before the heritage project. Their sales went down, by the coming up of a new façade.

Fig. 8: Percentage Responses of Galiara Scheme



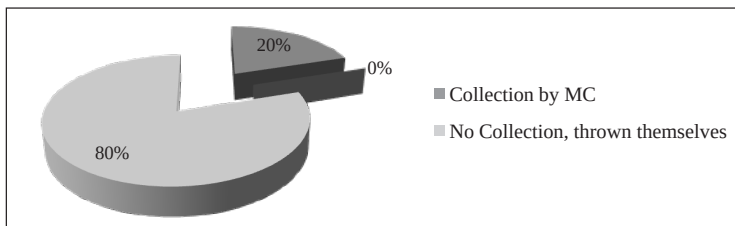
Source: Author

Solid waste collection

Eighty per cent of respondents from zone 1 stated that there is no collection of solid waste and it is thrown in the nearest point thereby increasing more solid waste in this zone (Fig. 9). Piles of garbage heaps

are noticeable in old zone as there is no sanitation and waste collection in this zone.

Fig. 9: Percentage Responses for Solid Waste collection by Municipal Corporation



Source: Author

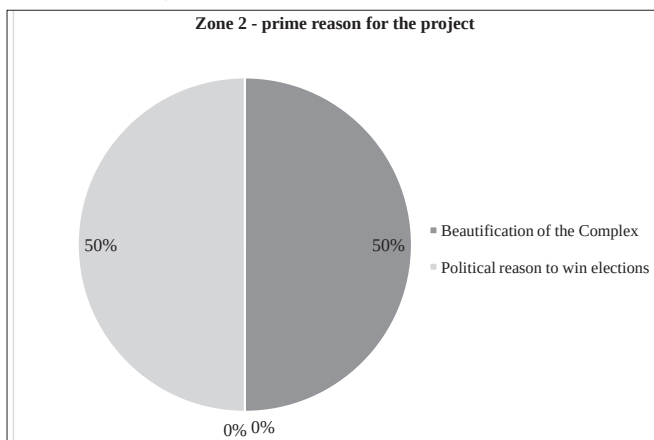
Issues of Zone 1

Issues faced by people, traders, shopkeepers of Zone 1. are: no public toilets available in the area, hence everyone has to travel far for using public toilets; collection of Municipal Solid Waste by Municipal Corporation is nil (or very poor) the shopkeepers make their internal arrangements to handle solid waste; the stormwater drainage and water logging are also the major issues faced by the shopkeepers in Zone 1. Appropriate measures need to be taken care by the authorities to improve Zone 1.

ZONE 2

In Zone 2, 50 per cent respondents stated that both beautifications of the complex and political reason to win the election were the prime objectives for the project to take place (Fig. 10).

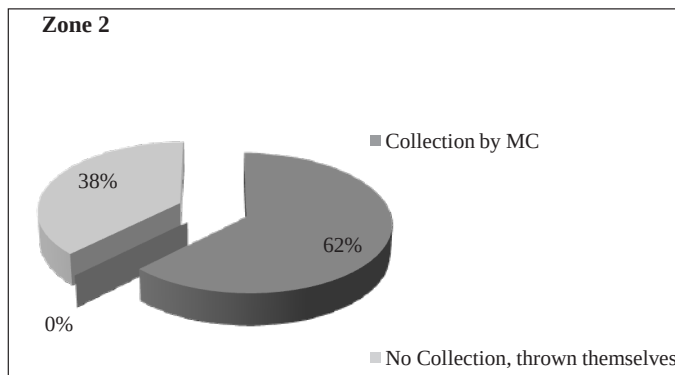
Fig. 10: Percentage Responses to Prime Reason for the project



Source: Author

In Zone 2, 62 per cent respondents stated that solid waste is collected by Municipal Corporation, and 38 per cent respondents stated that it was thrown by the people themselves (Fig. 11).

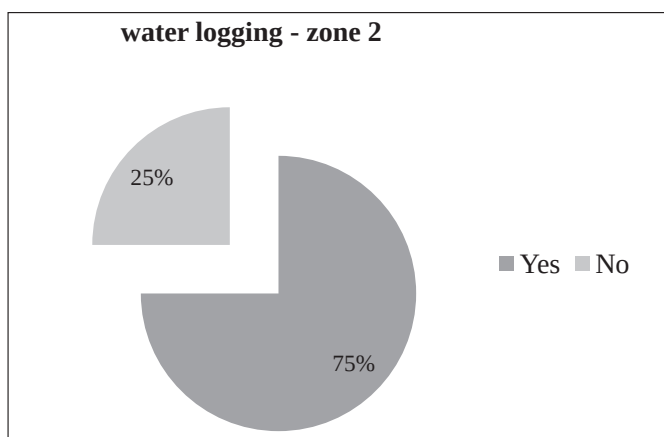
Fig. 11: Percentage Responses to Solid Waste Collection



Source: Author

In Zone 2, water logging is a problem with 75 per cent of people stated that there was a huge problem in monsoon which disturbed their day-to-day activities (Fig. 12).

Fig. 12: Percentage Responses to Water Logging



Source: Authors

In Zone 2, people stated that they were 100 per cent justified that the project was executed.

Issues of Zone 2

In Zone 2, there are no public toilets. Hence, it is a huge problem

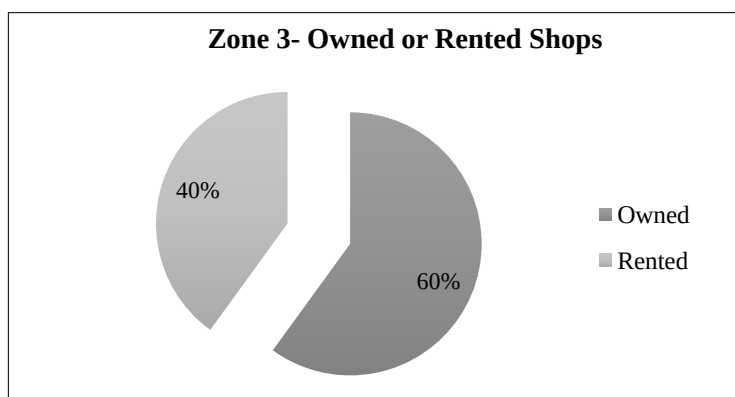
for the shopkeepers and tourists visiting this Zone. Also, there is a problem of stormwater drainage and waterlogging in this zone as well as in Zone 1.

Zone 3

In Zone 3, 60 per cent shops are owned and 40 per cent are on rent (Fig. 13).

This implies that 40 per cent have either moved away or given their shops on rent to other people who are already running shops. It also implies that the majority of the shopkeepers are running their own shops and are the owners.

Fig. 13: Percentage Responses of Shop Owners or on rent



Source: Author

In Zone 3, 60 per cent of respondents said that the reason behind the improvement of the complex was the beautification of the whole complex while 40 per cent responded that there were political reasons to win elections and hence beautification was the main objective behind the vote banks (Fig. 14).

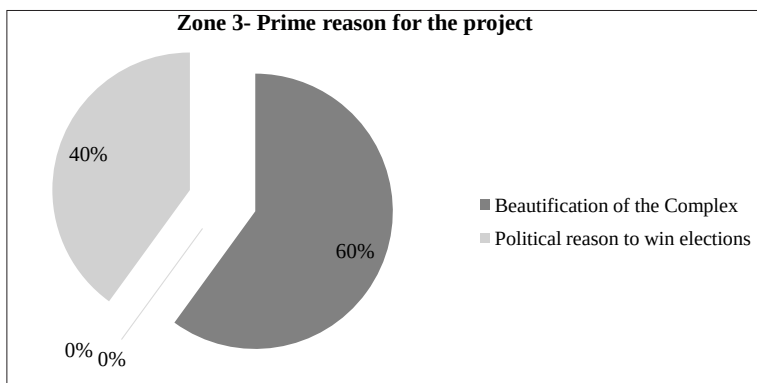
In Zone 3, 70 per cent respondents said that public toilets are available near the Golden temple and there is no difficulty as compared to the other two zones (Fig. 15).

In Zone 3, 79 per cent of shops are owned and 21 per cent of shops have been rented out for the three zones. Hence, this explains that commercial areas have been majorly owned and operated by people.

Zone 3: Response to New Development

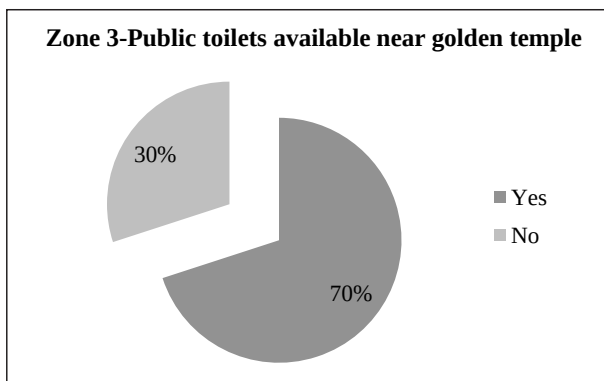
The response of the shopkeepers towards the New Development was

Fig. 14: Percentage Responses to the Prime reasons for the Project



Source: Authors

Fig. 15: Percentage Responses to availability of Public Toilets



Source: Authors

very positive. 79 per cent of the shopkeepers were happy with the development while 21 per cent of the shopkeepers were not happy. The implications for the same has been explained further as a satisfied and non-satisfied response:

Percentage respondents satisfied with these developments from Zone 1, 2 and 3

Satisfied Response - From the 79% of the satisfied response, people either have increased business and profits or the development has not affected their business to much extent. Satisfied response was seen by the shopkeepers of **Zone 3 - New Development Zone** and **Zone 2 - Old Development Zone** explained as 41% of people thought that the new development areas increased walk-in clients for them and profits too. (New Development Zone) 59% of people thought that their business

was not affected much so they were happy too, while for the Zone 2 Old Development, people somewhat had happy responses based upon the fact that their business was not affected much by the new development as it mostly included cloth traders 40-50 years old who had fixed clients and walk-in clientele was very less for them.

Percentage respondents not satisfied with these developments from Zone 1, 2 and 3

Not satisfied Respondents in Zone 3 – was 21 per cent, who were unhappy towards the new development as the displacement has resulted in losses, restricted tourists from visiting old development areas, etc. In Zone 1, the 33 per cent non-satisfactory responses thought that the new development areas resulted in loss of business, 33% shopkeepers faced decreased cliental engagement, 17% thought that this development affected the reputation of their family business, 17% considered both losses in business and decrease in cliental engagement as the reason for high losses. Other problems included that the shops affected by hindrance and deviation - The Gates of the brick *jalli* have been kept so small that they remain unnoticed by tourists and this has resulted in fewer walk-in clients, ultimately affecting the business. Also, no hoardings are allowed outside the gates and there is no provision of signboards for these shops by the authority.

Infrastructure – Public Toilets

Golden Temple attracts huge tourist flow to the extent of about one lakh per day, hence public toilet is one of those infrastructural needs which has to be taken care of urgently. For such a huge complex, only 1 public toilet has been constructed in the Golden Temple Complex, maintained by Sulabh Social Service Organisation (SSSO). One more public toilet was constructed near the *fawara* (fountain) chowk but it never became operational. Hence people end up using toilets of multi-level parking which are in bad shape and always stinking causing problems to pilgrims coming from far-flung areas, Jallianwala Bagh, Food Outlets (Shudh Dhaba, McDonalds, and Subway), and Showrooms.

A) Public Toilet maintained by SSSO

This is the only Public Toilet available in the Golden temple complex near Ghanta Ghar Complex, which is being maintained by the Sulabh Social Service Organisation.

It is majorly used by tourists and shopkeepers of the Ghanta Ghar complex. One of the major drawbacks here is that being the only public toilet, it still has paid access to the people. It may not be

accessible to wheelchair users as the steps act as a barrier with no facility of the ramp.

B) Public Toilet by Municipal Corporation – not in working condition

Another public toilet was constructed by – Municipal Corporation but was found in non-working condition. This toilet is located near the *Fawara* Chowk but never recognised for public use, for which the corporation has no answers.

C) Shopkeepers having no access to toilets

The 75 per cent of the shopkeepers who do not have access to the public toilet end up using the toilets of multi-level Parking, Jallianwala Bagh, Food Outlet (Subway, Shudh Dhaba, and Mcdonalds), or Showrooms. With no specific public toilets, people access the following: Majority of shopkeepers 57 per cent use toilets of multi-level parking, 24 per cent use showroom toilets, and 19 per cent the food outlets such as Shudh Dhaba. Multi-level Parking, being the closest, is the toilet used by majority. While the Jallianwala Bagh toilet is the only one used by tourists and not by shopkeepers. Hence, public toilet is an area of concern, especially in these zones where approximately one lakh tourists visit the holy shrine on daily basis.

Infrastructure – Parking, Encroachment & Bollards

Parking has been found out to be a huge concern. A multi-level parking was constructed for parking 4-wheeled vehicles only that too for tourists. But 2-wheelers were not given any consideration. This has resulted in problems for the shopkeepers. For them, the multi-level car parking is too far away and they end up using 2-wheeled vehicles more often for which there is no dedicated parking and to restrict the vehicular movement upon the Heritage Street, bollards have been implemented on-site which has now resulted in encroachments as people end up parking their vehicles till the point, they are accessible i.e., near the bollards. The authentication of Heritage Street looks disturbed by this situation as we see 2-wheelers parked everywhere around, also disturbing the urban fabric.

In the context of parking facilities for Shopkeepers - 100 per cent of shopkeepers say that there is no parking for them, they park cars in the multilevel parking and 2-wheelers as a part of the encroachment.

Zone 1 – Uneven and unorganised placement of 2 wheelers parked

anywhere, is disturbing this zone. It is also reducing the right of way of the already narrow roads. Hence, this situation is very critical and needs immediate attention.

Zone 2 – This zone experiences a similar kind of problem as seen in Zone 1. Being the residential area, the vehicles are haphazardly parked by the shopkeepers disturbing the lives of people staying there. Again, it reduces the right of way of the already very narrow road.

Zone 3 – This zone does not have directly parked vehicles upon its streets due to the restricted entry due to bollards and barricading.

Bollards and Encroachments

With the development of new area of the Heritage Street, automatic bollards have been implemented to restrict the vehicular movement on Heritage Street. These bollards are beneficial for Heritage Street but have resulted in other problems such as encroachments by the two-wheelers, disturbing the scenario to a larger extent. These have resulted in prioritisation of movement, but have resulted in impacts along the same time. These have resulted in the restriction of movement and often act as a barrier for the tourists, reducing the right of way.

Zone 2 (Old Development) –Fixed Bollards have been found out in some places in this zone resulting in a barrier as they cannot be changed according to the requirement. The street in this zone is too narrow, though fixed bollards have been provided at the exit; entry is unrestricted allowing two-wheelers lined up across the street.

Character of Bazaar

The character of Bazaar includes the urban design and related features of heritage, building, material, design, and the style it follows. These areas are such that they massively need preservation and enhancement to overcome all the drawbacks. The 36 per cent of the area here belongs to the new development area which maintains unity in design and similarity in signboards. The 64 per cent is from the Old Development areas where no character has been maintained as such.

New Development Zone

While the Heritage Street around the Golden temple has been turned into wonders, in fact, the entire 1-km stretch now looks like a huge, open monument a La-European Style destinations such as Rome, Venice, or Florence.

The Amalgamation of Different Styles - The Character of the new development includes the amalgamation of different styles ranging from Rajput Architecture, European Style Architecture. The question here arises in the mind is where is the Built heritage of Punjab, the elements and design principles of architecture of Traditional heritage has been lost in these newly built styles or so-called replicas of the Western world.

The Similarity in signboards - The New Development Zone maintains the similarity in signboards taken as an inspiration from the markets of Jaipur. The question here arises can a state have its form of unique urban design guidelines or form-based codes, especially for the walled cities under which the strict guidelines can guide them better development.

Power Transmission System - Underground Power Transmission System has been followed in the new development zone which is a good initiative.

Provision for Sitting Area - The wooden benches are as per standards. The seater is not bulky and only 400 mm wide.

Old Development Zone

Non-uniformity in design has been experienced in Zone 2 of the old development area whereas Zone 1 has been made with a traditional entry, but not integrated with the functions behind the screen (Pic 6). Zone 1 has no street lighting covering the 36 per cent in the pie, lighting arrangements have been done at the individual level only. While 64 per cent consisting of Zone 2 and 3 have proper lighting arrangements.

Pic 6: Beautiful facade at the front and Reality at back



Source: Field Survey, Feb 2019

CONCLUSION

It is concluded that this project if implemented in an integral way taking in the considerations of Urban Form and Urban Functions could have been a huge success. Public Toilet has been identified as the most basic requirement which is missing in Zone 1 and Zone 2 which are not part of

new development. The old development comprising of Zone 1 and Zone 2 has basic infrastructure issues like collection of MSW, water logging during monsoons, even congestion and parking problems. These are the areas of immediate concern. The authorities should intervene and look in the vicinity of Zone 3 as well, which is not the case in the present scenario. Zone 1 and Zone 2 are total neglect while a lot of money was poured into making heritage street by changing its character and urban design making them European style and aesthetically more like Jaipur in Indian Context. It can also be concluded that according to the scope of the project, Heritage Street will not just be restricted to a stretch but accessible to a larger area in and around, benefitting the shopkeepers as well as tourists. Public participation being the most important should have been taken into consideration while planning and designing Heritage Street considering not just the street but the entire Heritage Zone.

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Public Policies on Manual Scavenging: A Case Study of India

SHIV PRAKASH KATIYAR*

'Has the government kept in mind the point that the wages of the scavengers be (so) fixed that caste feeling may end and that the people belonging to high castes may come forward to do this work'.

– Dr. Ram Manohar Lohia during a debate in Lok Sabha on July 5, 1967

INTRODUCTION

The study analyses the impact of various policy measures promulgated for the removal of practice of manual scavenging in our country. The news about the deplorable death of manual scavengers during cleaning of gutters is common across India. It is worth noting that the practice of manual scavenging persists even after being outlawed in 1993 and 2013. District Magistrates had been submitting false affidavits before the Hon'ble Supreme Court claiming absence of manual scavenging in their district. Although the Government of India claims the country to be free of open defecation and manual scavenging, even then, deaths of manual scavengers are occurring in the gutters. In contravention to it, the Ministry of Social Justice and Empowerment reports the existence of 62334 manual scavengers in the country as on December 31, 2019. These factors prove the existence of a significant number of manual scavengers and manual scavenging which is a pertinent issue.

Scavenging has continuously been an occupation that has been imposed upon certain citizens by the society. This occupation is traditional in nature and ordains Scheduled Castes to clean the night-soil, carry and dispose it manually. This class of citizens are known as manual scavengers. Taking a sympathetic and emotional consideration, this practice is shameful, degrading, dehumanising, disgusting, obnoxious, abhorrent and a blot on humanity. They are

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known by different names in different states but commonly they are known as sweepers and officially as *safai karamcharis*. Manual scavenging is the most inhumane occupation. The practice of manual scavenging exists primarily due to absence of water-borne latrines. Tracing the reasons of continuation of this practice, it is found that it is closely associated with the caste and *jajmani* system, leading to social discrimination in the society. In this occupation, people are forced to carry night-soil in buckets on their heads and remove human excreta manually.

Looking at the composition of *Dalit* communities, it is found that the most disadvantaged castes even among *Dalits* are manual scavengers. They perform socially assigned occupations which are considered ritually 'unclean' and socially degrading. Most of these 'unclean' occupations are associated in one way or another with death, human waste or mensuration. These three universal physiological processes have been culturally shrouded by the densest cultural beliefs of ritual pollution. It is important to stress that many of these occupations are in reality grossly unhygienic for the workers. Amongst the number of unclean occupations, one is related to the death of animals. In most states, villagers still expect the *Dalit* people to dispose carcasses of animals that die in their homes or in the village. They skin the bodies of dead animals, flay and tan and develop cured leather, sometimes even craft them into footwear and drums. The pollution associated with leather is so pervasive that in states such as Andhra Pradesh, Rajasthan, Karnataka, Uttar Pradesh and Maharashtra, even the beating of drums at weddings, funerals and religious festivals is considered polluting and imposed as a social obligation or caste vocation only on *Dalits*. The logic is carried further in rural locations where public announcements are still made in villages by the beating of drums to communicate the news of any death to the relatives of the deceased person, whatever may be the distance. Even this occupation is considered unclean and is the monopoly of *Dalits*, because of the 'polluting' touch of dried and treated animal skin that is stretched on the drums.

Another category of 'unclean' occupations is based on the culturally polluting character of human waste. In the most parts of India, the manual removal of human excreta, often with bare hands, endures as a deeply humiliating vocation despite having been outlawed. This pollution extends in many cases to cleaning of sewage tanks, drainage canals and the sweeping of streets. The beliefs related to the pollution by menstrual blood results in midwifery and the washing of clothes deemed as unclean occupations in states such as Uttar Pradesh, Karnataka, Bihar and Maharashtra.

According to International Labour Organization (ILO), manual scavenging is the removal of human excrement from public streets and dry latrines, cleaning septic tanks, gutters and sewers. This has been considered as a customary and caste-based practice that has been manifested in the form of discrimination and social exclusion in society and public places. One of the significant reasons for the continuation of these practices is because they are unable to find an alternative employment or source of formal income to maintain the livelihood of their family. Looking at the social status, it is found that they are entirely insulated from the mainstream society. They are not even allowed in the houses except for scavenging work. The manual scavengers are ostracised, forbidden from touching anything that belongs to the upper castes and denied access to water facilities or places of worship. Food is not given to them but flung at them maintaining distance. Economically, they are poorest of the poor primarily due to their job being extremely low paid. Due to acute poverty, their children are unable to get proper education. Some of them are enrolled in schools but drop out due to severe discrimination that they face. They are not allowed to sit at the same level as other persons sit. Despite untouchability, female scavengers are often subject to sexual exploitation. Social, economic and cultural marginality is reflected in their status. They are untouchables even among untouchables placing them at the lowest in the caste hierarchy so they are bound to live on the outskirts of the villages which are popularly known as *Bastis*.

There are several constitutional provisions for equal rights and opportunities for everybody including manual scavengers in India. The government has taken numerous policy measures and programmes to support these groups to get rid of this inhumane practice and also to rehabilitate them in other professions. Despite a number of welfare measures as well as the legal provisions, the practice of manual scavenging is still prevalent in various parts of the country. This case study critically analyses the impact of government policy measures, legal provisions as well as efforts made by non-governmental organisations (NGO's) on the people, engaged in this occupation and also offers recommendations for solution of this acute problem.

Objectives

1. To review the policy documents for eradication of manual scavenging India.
2. To study the impact of manual scavenging and suggest solution to this problem.

Methodology

The study uses secondary literature collected from various newspapers, research papers, reports, magazines, journals and websites. The methodology used is content analysis.

Nature of Work of Manual Scavengers

The manual scavenging job is primarily done by women and young girls while men are less involved in this job. These workers face three-fold discrimination on grounds of caste, lowest in the untouchability hierarchy and gender. Due to this three-fold discrimination, they do not command respect or dignity in the society. They spend their whole life in misery and vulnerability.

There are three categories of sanitation workers, i.e., manual scavengers, sewerage workers/septic tank cleaners and sweepers. Despite manual scavenging, these people perform other important duties such as disposing animal carcasses, assisting in child birth, acting as masseurs, informing villagers about death rites, beating drums in funeral processions and other occasions, taking the clothes of the dead persons from the cremation places, assisting in post-mortem as well as cremating unclaimed corpses, castrating animals, cleaning drains, sweeping, disposing animal feces, cleaning safety tanks, rearing pigs, cleaning work prior to weddings and other functions as well as cleaning the leftovers and leaf plates after the wedding/function is over, drum beating and singing songs on the occasions of festivals and fasts, lunar and solar eclipses, pilgrimages, births and marriages and deaths. Despite performing multiple duties, they merely get breads/ rotis and food as wages during festive occasions for the work performed by them.

They work as scavengers, sweepers, rag pickers, coolies. They do other kinds of odd jobs which are not only considered to be unimportant but a sense of wretchedness and filth based on the notion of purity-pollution is attached to them. In this regard, one of the Mumbai-based Safai Kamgar Union leaders said, in the context of the Kargil conflict: Our job is never treated as important. It is always treated as despicable. But our job is as important as the soldiers fighting on the borders. In both the cases it is a question of protection. In the first case, it is the protection of the country and in the second case; it is the protection of the civil society. We fight to maintain the health of the society by maintaining hygiene in the society (Guru, 2000).

Review of Literature

In India, sweepers and scavengers are known by various names. Among

them, *Mehtar* is the most common one which ironically means prince or leader. The head of the ruling family of Chitral State (now in Pakistan) was called '*Mehtar* of Chitral'. Another popular name for this caste is *Bhangi*, which is a derogatory term. Looking at the origin of term, the term *Bhangi* is derived from the Sanskrit word *bhang*, which means hemp; it seems to be an allusion to their drinking habits. Another meaning of *Bhangi* is "broken". This is in the context of description that the scavengers who split bamboos and make mats and baskets in order to earn their livelihood (Singh, 2005).

In India, the *Bhangis* are prevalent in significant numbers so constitute a well-known caste group. Regarding their distribution, it is found that they are not limited to some specific places but they are widely distributed throughout the country. On examination of their social hierarchy among both higher and lower castes in India, they occupy the lowest position in the social hierarchy. Tracing the reasons of their lowest social hierarchy, it is found that it is due to reasons as they are night-soil removers (Shyamlal, 1992).

There are fifteen duties mentioned in the *Naradiyasamhita* including one being to dispose of human excreta for slaves. This fact further reveals that manual scavenging is a historic practice prevalent for a long time. Not only this, there is also mention of this practice in the *Vajasaneyi Samhita* where the *Chandals* and *Paulkasa* had been referred to as slaves responsible for disposal of night-soil or human faeces. Mention of this practice in religious documents is a matter of significance (Srivastava, 1997).

The discrimination faced by manual scavengers is not only limited to them but affects the whole family significantly. Manual scavengers' children face discrimination while interacting with the teachers as well as among their peer group. This is affecting the goal of equity in education. There are other challenges in the achievement of equity in education. The inadequacy of public resources for schooling, greater privatisation of 'quality' education for the elite and the search for non-formal alternatives for the educationally backward are prevalent factors which result in a greater neglect of the socially and economically disadvantaged groups (Nambissan, 1996).

Baruah (2014) finds that laws, though strongly worded and framed with a good intention, cannot bring about a change in the attitude of the people towards the less-fortunate brethren. Instead, it is education which can play a significant role towards the change in the attitude. The need of the hour is to educate the common people about the use of sanitary latrines and to inculcate the habit of hygiene after the use

of such latrines. Thus, there is a need of collective efforts through the promulgation of laws as well as educating the common people about the adverse effects of manual scavenging. With these collective efforts, the dream of the complete eradication of manual scavenging may be realised.

Siddaramu (2013) states that scavengers remain marginalised in the Indian society even today despite the fact that constitutional provisions direct the state to promote their educational and economic interests. They remain marginalised due to the fact that these communities are still engaged in their traditional job. Tracing the reasons for not taking benefits of the government schemes, it has been found that these communities lack the necessary literacy skills in order to take advantage of government reservations in education, employment and also in the job mobility. Due to lack of literacy in this community, they are discriminated even by the Scheduled Castes resulting in the loss of their self-respect. To address the issue of social discrimination among them, the sense of self-respect is to be created among manual scavengers in order to bring them in the mainstream society.

Chanana (1993), in an order to address the issue of equity in education, raises some of the important questions like the educational policy which has incorporated three-fold divisions in the aims and objectives of education at the ideological and implemental level. She reiterates that policies need to be implemented in the true spirit. She further highlights that Scheduled Castes and Scheduled Tribes require not only equity but also need mainstreaming and minorities are not only equal but also require social justice.

Regarding attending schools by the children of manual scavengers, their participation level is very low. About 62 per cent children of manual scavengers did not go to schools due to low socio-economic status in the society (Jan Sahas Social Development Society, 2014). Approximately, 70-80 per cent of their children drop out from school before they reach the 7th standard. There are several reasons including the recent urbanisation. There is a huge migration of manual scavengers from rural to urban areas in search of the work (National Round Table Report, 2012).

Kumar & Ziyauddin (2009) reveal that the life of scavengers, especially of women and children is catastrophic which may be improved by providing good quality teachers and schools. In addition, such schools should not only implement mid-day meal scheme, but should also provide the evening food to these children. By introducing the same, their parents will not face any additional burden of nurturing their children. For the adult members of the scavenger community, education

is essential to train them for alternative ways of living, like women can have training in sewing, packing or to work as anganwadi workers.

Suzuki (2003) states that there is low participation of scavengers in education. So, it is the prime duty of the government to provide suitable infrastructure in order to educate the scavenging community. This will emancipate them from their present heinous occupation of manual scavenging. Education may awaken in them a sense of social consciousness. Thus, the scavengers need to aspire for a better quality of life through better educational opportunities to secure social and economic justice.

Mahatma Gandhi and Ambedkar on Manual Scavenging

The nature of manual scavenging being inhuman had long been recognised by Mahatma Gandhi as early as in 1917. He insisted that the inmates of Sabarmati Ashram, which he had set up and run like a commune, should clean their toilets themselves. He too was of the view that each and every person should do his work himself. Gandhi as President of a Conference of the Untouchables said: I do not want to attain *moksha*. I do not want to be reborn. But if I have to be reborn, I should be born an untouchable, so that I may share their sorrows, sufferings and the affronts levelled at them, in order that I may endeavour to free myself and them from that miserable condition. I therefore prayed that if I should be born again, I should do so not as a *Brahmin*, *Kshatriya*, *Vaishya* or *Shudra*, but as an *Atishudra*. Although Gandhi was very sympathetic to the sufferings of manual scavengers but he never supported protest and advocated change of heart and morality. According to Gandhi, 'The *Bhangi* constitutes the foundation of all services. A *Bhangi* does for society what a mother does for her baby. A mother washes her baby of the dirt and ensures his health. Even so the *Bhangi* protects and safeguards the health of the entire community by maintaining good sanitation practices.'

Gandhi and Ambedkar followed different approaches for the abolition of untouchability and the eradication of the practice of manual scavenging. The former advocated change of heart and morality on the part of the opposed castes while Ambedkar on the other hand was highly critical of the Gandhian approach and he advocated political praxis, agitation and also legal intervention especially by the victims of the caste system. He observed that manual scavenging is hereditary so he demanded the political salvation of the downtrodden section of society by carving out a provision for reservation through political representation in the legislative bodies and also the prevention of discrimination on the basis of abolition of the untouchability Act. He

had said, 'Our society is like a multi-storyed pyramid and there are no stairs or doors for entering into these storeys. One has to die in the storey in which one is born.' According to Dr. Ambedkar, in India a man is not scavenger because of his work, he is a scavenger because of his birth, irrespective of the question whether he scavenges or not. According to Ambedkar, birth is the prime reason for a scavenger to continue his/her work.

Ram Manohar Lohia was also sincerely dedicated towards addressing the problems of scavengers and therefore he discussed this matter in the Parliament of India. He was of the view that this work of manual scavenging should also be conducted by the upper caste persons. During a debate in the Lok Sabha on 5th July 1967, Dr. Ram Manohar Lohia asked, 'Has the government kept in mind the point that the wages of the scavengers be (so) fixed that caste feeling may end and that the people belonging to high castes may come forward to do this work?'

PART I: STORY OF MANUAL SCAVENGERS

1. Efforts Made for Removal of Manual Scavenging

International Organisations:

International Labour Organisations (ILO) had adopted Forced Labour Convention regarding forced labour in 1930, in order to suppress the use of forced labour in all its forms. ILO observed the issue of forced labour several times. It is worth mentioning that in 2007, the Annual Report of the Committee on the Elimination of Racial Discrimination of the UN expressed serious concern about the deplorable conditions of manual scavengers in India. It stated, 'The Committee notes with concern that very large numbers of *Dalits* are forced to work as manual scavengers.' This note by ILO is a serious concern for the country.

2. Constitutional Provisions: Significant constitutional provisions are:

- (i) Article 14: Equality before law (Right to Equality);
- (ii) Article 16(2): Equality of opportunity in matters of public employment;
- (iii) Article 17: Abolition of untouchability;
- (iv) Article 19(1)(a): Right to practice any profession or to carry on any occupation, trade or business;
- (v) Article 21: Protection of life and personal liberty;
- (vi) Article 23: Prohibition of traffic in human beings and forced labour etc.;

- (vii) Article 41: Right to work, to education and public assistance in certain circumstances;
- (viii) Article 42: Just and humane conditions of work;
- (ix) Article 46: Promotion of educational and economic interests of Scheduled Castes, Scheduled Tribes and other weaker sections;
- (x) Article 47: Duty of the state to raise the level of nutrition and the standard of living and to improve public health; and
- (xi) Article 338: Constitution of a National Commission for Scheduled Caste.

3. Legislative Measures:

- **Protection of Civil Rights (PCR) Act (1955):** The Government of India passed legislation which became the base for different schemes introduced by the Central and state governments for Scheduled Castes, Scheduled Tribes and especially vulnerable groups of Indian society such as scavengers, sweepers, bonded labourers', nomadic and denotified communities for their social and economic development. The Act stresses on drawing effective schemes for the upliftment and development in terms of education, housing, etc. after studying specific and composite problems of these communities to solve them effectively (Ali, 1995).
- **The Scheduled Castes & Scheduled Tribes (Prevention of Atrocities) Act, 1989:** This Act came into force on January 31, 1990 in order to prevent the Scheduled Castes and Scheduled Tribes from atrocities. With respect to the manual scavenging, the Act was further strengthened by making amendment in order to address the issues of this community. The Act notified by the Central Government on January 1, 2016 made it a punishable offence to employ, permit or make any person belonging to SC/ST community for the purpose of manual scavenging. The contravention of the said provision attracts an imprisonment for a term not less than six months and may exceed to five years imprisonment and fine.
- **The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition Act, 1993):** The preamble of the Act states 'Whereas fraternity assuring the dignity of the individual has been enshrined in the Preamble to the Constitution,..... and whereas the dehumanising practice of manual scavenging of human excreta still continues in many parts of the country.....

and where it is necessary to enact a uniform legislation for the whole of India for abolishing manual scavenging by declaring employment of manual scavengers for removal of human excreta an offence and hereby ban further proliferation of dry latrines in the country.' The Act punishes the employment of scavengers or the construction of dry (non-flush) latrines with imprisonment for up to one year and/or a fine of Rs.2000/- . This Act is the first Act outlawing the practice of manual scavenging in the country.

- **National Commission for *Safai Karmacharis* (1994):** Under the provision of the National Commission for *Safai Karmacharis* Act, 1993, the National Commission for *Safai Karmacharis* was constituted on 12th August, 1994 for a period of three years in order to promote and safeguard the interests and rights of *Safai Karmacharis*. The primary objective of the Commission is to study, monitor and evaluate the implementation of the programmes and schemes related to the social and economic rehabilitation of *Safai Karmacharis* and also make recommendations to the Central Government for better coordination and implementation of schemes/ programmes.
- **National *Safai Karmacharis* Finance and Development Corporation (NSKFDC) (1997):** The Corporation, formulated on 24 January 1997 under Section 25 of the Companies Act 1956, was set up by the government to act as an apex institution for all round socio-economic upliftment of *Safai Karmacharis* and their dependents and to extend concessional financial assistance for the establishment of income generating and viable projects. The major objective of the corporation is the promotion of economic development, self-employment and rehabilitation of *Safai Karmacharis*, besides providing training in technical and entrepreneurial skills and extending loans to students from the community to pursue higher education. The target groups of the corporation are scavengers (persons wholly or partially employed in the manual handling of human excreta) and their dependents and *Safai Karmacharis* (persons engaged in or employed for any sanitation work) and their dependents (Thorat, 2009).
- **The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013:** The Act makes it mandatory for municipalities, cantonment boards and railway authorities to construct adequate number of sanitary community latrines within three years of this Act coming into force. If anyone

employs a manual scavenger or constructs an insanitary latrine, he shall be penalised with imprisonment of up to one year or a fine of up to Rs.50, 000/- or both. The penalty for subsequent offences is higher. Every local authority or agency is prohibited from employing a person for hazardous cleaning (manual cleaning without protective gear and other safety precautions) of a sewer or a septic tank. This provision is applicable within a year of the Act coming into force. The penalty for violation is imprisonment for up to two years or a fine of up to Rs. two lakh or both.

- **National Human Rights Commission (NHRC) on Manual Scavenging and Sanitation:** The NHRC protects human rights at the national level and works as a watchdog in the field of human rights. It performs multiple tasks in order to protect human rights of the people. The Commission has been periodically reviewing the steps taken by the state and Central Government for speedy implementation of the provisions of the Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993. On 23 October 1996, NHRC had sent letters to various authorities to make the case for elimination of manual scavenging. On 24 January 1997, the NHRC had written to chief ministers to underline the need to adopt and seriously enforce the Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993 in their jurisdictions. On February 2006, the NHRC had intimated the representatives of the state governments to stop manual scavenging within six months. Furthermore, it organised workshops on the issues to deliberate a sincere discussion to address this issue.
- **A landmark judgement in fight to eradicate manual scavenging (Writ Petition (civil) No.583 of 2003, *Safai Karamchari Andolan & Ors versus Union of India & Ors*):** The Supreme Court announced the judgement of a Public Interest Litigation on 27.3.2014 on eradication of the inhuman practice of manual scavenging. This historic judgement was welcomed by *Safai Karmachari Andolan*. In its judgement, the Supreme Court has deprecated the continuance of manual scavenging in the country in blatant violation of Article 17 of the Constitution of India by which, 'untouchability is abolished and its practice in any form is forbidden'. The Court was emphatic about the duty cast on all states and union territories 'to fully implement (the Law) and to take action against the violators'. In a significant endorsement of concerns raised by *Safai Karmachari Andolan*,

the Supreme Court directed the government to, '*Identify the families of all persons who have died in sewerage work (manholes, septic tanks) since 1993 and award compensation of Rs.10 lakhs for each such death to the family members depending on them*'. The judgement has been given by Supreme Court Bench headed by Chief Justice P Sathasivam.

The Court has been categorical that, if the practice of manual scavenging has to be brought to a close and also to prevent future generations from indulging in such practice, rehabilitation of manual scavengers will need to consider the following:

- (a) Sewer deaths – entering sewer lines without safety gears should be made a crime even in emergency situations. For each such death, compensation of Rs. 10 lakhs should be given to the family of the deceased.
- (b) Railways – should work on a time-bound strategy to end manual scavenging on the tracks.
- (c) Persons released from manual scavenging should not have to cross hurdles to receive what is their legitimate due under the law.
- (d) Provide support for dignified livelihood to *Safai Karamchari* women in accordance with their choice of livelihood schemes.

The Court also stated that rehabilitation must be based on the principles of justice and transformation. The Court also directed the Indian Railways, which is the largest employer of manual scavengers in the country, to take a time-bound strategy to end manual scavenging on the tracks.

National convener of *Safai Karamchari Andolan*, Bezwada Wilson said that, *this is a victory of manual scavengers who have been fighting across the country for their liberation against the denial of central and various state governments repeatedly*. The Court acknowledged the significance of the data provided by the petitioner *Safai Karamchari Andolan* in its 12 years legal battle demonstrating, '*that the practice of manual scavenging continues unabated. Dry latrines continue to exist notwithstanding the fact that the 1993 Act was in force for nearly two decades. States have acted in denial of the 1993 Act and the constitutional mandate to abolish untouchability.*'

4. Commissions/Committees on Manual Scavenging

- **Barve Committee Report (1949):** This is one of the earliest official interventions to look into the working conditions of scavengers ironically mentioned: *Bhangis* were not traditionally

scavengers. However, some of these people look at the dirty work of cleansing the latrines for earning profit. Slowly this developed into a monopoly. Later on, it reached a stage where the *Bhangis* wanted to exploit this monopoly and a sort of customary right was thus developed. By force of habit, the *Bhangi* lost his self-respect to such an extent that he did not consider the dirty work of cleansing latrines as a curse from which he should endeavour to extricate himself.

- **Backward Classes Commission (1953):** Ministry of Home Affairs, Government of India, had constituted this Commission to recommend suitable measures for the welfare of the backward communities including manual scavengers. The Commission suggested several measures and also included that the hand collection and carriage of night-soil should be replaced by mechanical cleaning of latrines with the provisions of sewers, drains, etc. by the local authorities (Ali, 1995).
- **Central Advisory Board for Harijan Welfare (1956):** This board had also reviewed the working and living conditions of scavengers in the country and importantly recommended introducing a Centrally Sponsored Scheme for liberation and rehabilitation of scavengers. The scheme was introduced in the third Five-Year Plan. However, this scheme failed and was discontinued during the fifth Five-Year Plan following the realisation that the practice of scavenging was inextricably linked to the evils of a stratified social structure.
- **The Scavenging Conditions Enquiry Committee (Prof. N. R. Malkani Committee) (1957):** This committee was the first of its kind and was set up on October 12, 1957. It was established in pursuance of the Central Advisory Board for Harijan Welfare with a view to formulate 'a scheme for putting an end to the practice of carrying night-soil in baskets and buckets as head-loads'. The committee had made a comprehensive study of the problems and submitted its report in 1960. It also recognised that 'the best system for disposal of night-soil through mechanised means is the flush out latrines, but unfortunately introduction of this throughout the country requires lot of funds and seems outside the scope of practicability in the foreseeable future'. The committee made a number of recommendations including one of the major recommendations towards the improvement of working and service conditions of scavengers by introduction of mechanical tools such as wheel barrows, scrappers' rubber gloves, boots etc. as well as construction of houses and

infrastructure facilities like water supply, electricity in their localities. One more important suggestion was that scavengers should be paid wages according to Minimum Wages Act and other allowances, benefits and condition of work should be given to them also by the local authorities (Ali, 1995).

- **The Committee on Customary Rights to Scavenging (Prof. N.R. Malkani Committee) (Report) (1965):** This committee was set up to find out the bottlenecks of the *Jagirdari* or *Jajmani* System (customary rights for scavenging) which had been prevalent in various cities and towns. Customary rights are a system in which the private scavengers traditionally served a number of households from generation to generation. The committee had studied the problems associated with this system and suggested measures to introduce organisational and financial resources of the urban local bodies by adopting action programmes for liberation and rehabilitation of private scavengers. The committee observed that scavenging has been a way of life for the family. A fatalistic attitude pervades the whole outlook due to the lack of education and the absence of other openings for employment (Ali, 1995).
- **National Commission on Labour (1968):** This committee had also studied the working and service conditions of sweepers and scavengers for the enforcement of Minimum Wages Act and recommended to the state governments for their implementation. It pointed out that 'in the past the main effort seems to have been to improve the working and living conditions of scavengers and not to address the core problem of converting dry latrines into pour flush latrines in any systematic manner' (Ali, 1995).
- **The Report of Task Force for Tackling the problems of Scavengers (Planning Commission, Government of India) 1990-91:** The task force made several recommendations including a time-bound programme may be launched to convert all dry latrines in the country by the end of eighth plan, elimination of scavenging to be achieved during the eighth plan with an annual outlay of Rs.110 crore by the Government of India, the practice of carrying of night-soil as head-load and its manual handling to be banned by law and legislation so enacted as to prevent construction of new dry latrines in the existing or future buildings (Ali, 1995).
- **Recommendations of the National Advisory Council (NAC):** The NAC, constituted in March, 2010, in its resolution dated

23.10.2010 urged the Central Government to ensure that the practice of manual scavenging is fully abolished latest by the end of the 11th Plan period in coordination with all the Central Government Departments, including Railways and concerned States/Local Governments. The resolution states, inter alia, that this would require:

- (a) New survey in every State and UT, with wide public involvement, of remaining dry latrines and manual scavengers;
- (b) Demolition of dry latrines;
- (c) Psycho-social and livelihood rehabilitation in modern marketable skills of all manual scavengers and their families and formulation of a Centrally Sponsored Scheme by the Ministry of Social Justice & Empowerment to support the rehabilitation initiative;
- (d) Special programme for education, including higher education and computer education of all children of manual scavengers; and
- (e) To amend the law to ensure sharper definition of manual scavenging and accountability of public officials who employ or fail to prevent, manual scavenging.

5. Welfare Schemes for Manual Scavengers

- **Pre-matric Scholarships (PMS) for the children of those engaged in unclean professions (1977-78):** With an objective of assisting the children of scavengers of dry latrines and sweepers irrespective of their religion, the scheme was introduced in 1977-78. Students with disabilities among the target groups were also assisted. The scheme is implemented by state governments and UT administrations. Central assistance is provided to the state governments on a 50:50 per cent matching basis and on a 100 per cent basis to the UT administrations over and above their committed liability. The scheme was last modified with no income ceiling on 25 February 1994. Up to two children of the same parents can get benefits from the scheme if they are pursuing education in classes IX and X. Although no such restriction has been placed on children who are pursuing education up to class VIII. However, an additional/third/subsequent child born after 1 April 1993 will not benefit from the scheme (Thorat, 2009).

- **Integrated Low-Cost Sanitation Scheme (ILCS) (1981):** The Ministry of Home Affairs in 1981 introduced Centrally Sponsored Scheme for Urban Low Cost Sanitation in order to eliminate the dehumanising practice of physically carrying night-soil. This scheme was later implemented by the Ministry of Social Justice and Empowerment. From 1989-90, it came to be operated through Ministry of Urban Development which later on was renamed as Ministry of Housing & Urban Poverty Alleviation since 2003. The scheme envisages conversion of dry latrines into low cost twin pit sanitary latrines in order to liberate scavengers. The scheme has been taken up on a 'whole town basis' and is being operated through the Housing and Urban Development Corporation (HUDCO) by providing a mix of subsidy from the Central Government and loan from the HUDCO.
- **National Scheme of Liberation and Rehabilitation of Scavengers (NSLRS) (1992):** The National Scheme of Liberation and Rehabilitation of Scavengers was launched by the Ministry of Welfare in March 1992 to provide alternate, dignified and viable occupation to the scavengers and their dependents. Under this scheme, the scavengers and their dependents are trained in trades of their aptitude which can provide them alternate employment. During training, the trainees get stipend of up to Rs.500/- per month and tool kit allowance of up to Rs.2000/-. For rehabilitation, there is a prescribed financial package for different trades by which financial assistance up to Rs.50000/- can be provided.
- **Self-Employment Scheme for Rehabilitation of Manual Scavengers (2007)** The scheme was launched in January 2007 for the purpose of initialising self-employment. In this scheme, financial assistance is provided through the state channelising agencies to the manual scavengers and their dependents for undertaking alternative occupations. For the achievement of the target of self-employment, skill training is also provided to the manual scavengers. Thus, the major components of the scheme are skill training and financial assistance (loan and subsidy) for self-employment.

6. Efforts Made by Non-Government Organisations

- ***Harijan Sewak Sangh (1932):*** *Harijan Sewak Sangh*, which is a historic organisation, was founded by Mahatma Gandhi in 1932. Major activities of the Sangh are conducted in the field of education, child development, health care, women's

SCHEME-WISE BENEFICIARIES

Sl. No.	Name of the scheme	Year of launch	Beneficiaries in numbers
1.	Pre-matric scholarships for the children of those engaged in unclean occupations	1977-78	663185 Till 2010-11
2.	Integrated Low-Cost Sanitation Scheme	1981	2.68 lakh Till 1997 (end of eighth plan)
3.	National Scheme of Liberation and Rehabilitation of Scavengers	1992	770338 Till 2004-05
4.	Self-Employment Scheme for Rehabilitation of Manual Scavengers	2007	78941 Till 31.12.2010

Source: Annual Report, Ministry of Social Justice & Empowerment, Government of India 2010-11, p 254-56.

counselling, income generating activities and various other socio-economic activities to secure a status of equality and dignity for those being employed in unclean occupation. The Sangh has established a Vidyalaya in 1963 at Ahmedabad, primarily to impart training under the *Bhangi Mukti* (eradication of night-soil scavenger) programme. The Vidyalaya has also constructed 17500 water seal latrines, 66100 soak pits and has converted 186000 dry latrines to water seal latrines. Similarly, a total of 15530 toilets have been connected with biogas plants. The Institute has constructed 124841 latrines in 3011 villages through 145 NGO's from the year 1989 to March 1997.

- **Sulabh International Social Service Organisation (1970):** Sulabh International Social Service Organisation, formerly known as *Sulabh Shauchalaya Sansthan*, a non-profit voluntary social organisation founded in 1970 by Dr. Bindeshwar Pathak. This organisation is dedicated to the Gandhian ideology of emancipation of scavengers. Sulabh has been working for the removal of untouchability and social discrimination against human scavengers, a section of Indian society condemned to clean and carry human excreta manually. Sulabh is working in the field of cost-effective sanitation, liberation of scavengers, social transformation of society, prevention of environmental pollution and development of non-conventional sources of energy. Furthermore, Sulabh has also established Sulabh International Museum of Toilets in Delhi in 1992 which was inaugurated on March 19, 1994. The museum has a rare

collection of artefacts, pictures and objects detailing the historic evolution of toilets since 2500 BC.

- **Safai Karamchari Andolan (1986):** *Safai Karamchari Andolan* was initiated in 1986 when young people from the *Safai Karamchari* communities in Kolar Gold Fields under the leadership of Mr. Bejwada Wilson pledged to end the scourge of manual scavenging by initiating a campaign which gradually spread to the neighbouring state of Andhra Pradesh and later became a full-fledged national movement. It is serving as a watchdog, pushing legal action to demolish dry toilets across India and preparing manual scavengers to achieve new sources of income. Regarding the nature of the activities, *Safai Karamchari Andolan* is a national movement committed to the total eradication of manual scavenging and the rehabilitation of all scavengers for dignified occupations. The main reason for the continuation of the manual scavenging is due to the presence of dry latrines.
- **Navsarjan Trust, Ahmedabad, Gujarat (1988):** *Navsarjan*, established in 1988 is a grassroots *Dalit* organisation dedicated to ensuring human rights for all. Its mission is to eliminate discrimination based on untouchability practices, ensure equality of status and opportunities for all, regardless of caste, class or gender and to ensure the rule of law. Campaigning for eradication of manual scavenging is one of the major activities of the trust and its impact is in the form of a landmark court victory in 1996, in which the Gujarat government was forced to admit that it employed thousands of Valmikis to do manual scavenging.

PART II: (PERCEPTIONS OF THE CASE WRITER)

Major Factors Responsible for Continuance of Manual Scavenging

Manual scavenging is a hereditary occupation based on the *jajmani* system. It is a caste based custom prevalent in an unequal society. Customs are social construct that are handed down from one generation to its succeeding generation. Due to caste discrimination, these manual scavengers are not accepted in any other occupation by the society. They are economically weak and their income is so low that they cannot think of adopting any other occupation. In these situations, they are bound to take loans from local resources. These manual scavengers are sometimes compelled to become bonded labourers. In some places, they are offered only breads/ *rotis* for performing their work.

One of the most important factors of non-liberation of manual

scavengers from this occupation is their low literacy skills/education. The society attaches a stigma if the children of manual scavengers are educated in the same school along with other children of the society. These children are ill-treated within the school premises in almost every sphere. Due to this, there is a high dropout rate (from schools) of these children. Thus, due to lack of education, these manual scavengers do not dare to leave their occupation in order to be liberated. It is a well-accepted fact that education is a liberating force.

The other important factors for the continuance of this practice are the lack of political will, accountability, gross apathy and wilful negligence in the implementation of acts as well as welfare schemes and also corruption at different levels. The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993 could not find any victim in a relatively long span of 25 years in spite of the continuance of this practice. Parliament did not create an individual right to file a complaint under the Act. Karnataka was the first state to ban the practice as early as the 1970s. Most of the organisations like the railways, municipalities and cantonment boards as well as state governments blatantly deny the practice of manual scavenging in their jurisdiction. These bodies file false affidavits with no hesitation, claiming that no such practices are prevalent in their jurisdiction.

The earlier welfare programmes could not focus on the relevant issues due to which such practices are still prevalent. Earlier, the focus of such programmes was on sanitation ignoring dignity issues. Further, it is mostly women and children who are the victims of this occupation, but such factors were never taken into consideration. The state governments have refused to acknowledge the existing practice of manual scavenging or the existence of dry latrines or the lack of basic civic amenities and many times in public toilets, there is no water supply and many times, the tanks are over flowing when the toilets are not in use at that particular time. This is also the wastage of water, which is also a serious issue.

The Comptroller and Auditor General of India, in its 2003 audit report on the Ministry of Social Justice and Empowerment programme of eradication of manual scavenging observed certain failures and the same were extracted as: The National Scheme of Liberation and Rehabilitation of Scavengers and their Dependents, implemented by the Ministry of Social Justice and Empowerment since 1992 has failed to achieve its objectives even after ten years of implementation involving investments of more than Rs. 600 crore.

Despite all these efforts, the practice is still continued (supporting

document is given annexed data). It is also evidenced by the significant deaths which occurred during cleaning of the septic tanks and gutters. Socio Economic and Caste Census 2011 (SECC 2011) data on manual scavengers released by the Ministry of Rural Development on July 3, 2015, there were 182505 manual scavengers in the rural areas of the country. With regard to the numbers of manual scavengers, the states and Union Territories have uploaded the data of 14812 identified manual scavengers up to December 31, 2019. In addition, the Ministry of Social Justice and Empowerment has conducted a National Survey of Manual Scavengers through NSKFDC in 194 districts in the year 2018-19, identified 47775 manual scavengers up to December 31, 2019. Thus, a total of 62334 manual scavengers have been identified in the National Survey up to December 31, 2019.

Relationship between Swachh Bharat Abhiyan (SBA) and Manual Scavenging

Swachh Bharat Abhiyan is a country wide cleanliness drive launched in 2014 to clean public spaces like streets, roads and others. Mere construction of toilets does not assure the usage of these sanitation facilities. Villagers still prefer to go out into the fields for defecation and some have also dumped the toilets as storage rooms. A report by the World Health Organization (WHO) shows India with distinction of 173 people defecating in the open for every square kilometre, the highest density among the countries.

Building toilets is not the solution, but is rather creating more problems as there is a lack of infrastructure for drainage and disposal of waste. There is no ready mechanism to empty the pit. The new public toilets built under the SBA have generated a large number of more septic tanks and sewers, thus in turn increasing the need for more manual scavengers and septic tank cleaners. There are 816 municipal Sewage Treatment Plants (STPs) across India out of which only 522 work. If there is no sewage system in place, building toilets is only going to encourage this caste-based vocation.

Indian Railways are one of the largest employers of manual scavengers as they do not have a proper system of disposing excreta. Barring a few trains, the Indian Railways do not employ any technology to keep its 80000 toilets and 115000 kilometres of tracks clean. While performing these tasks, manual scavengers are very rarely provided safety equipment. The Tata Institute of Social Sciences in Mumbai conducted a study in Gujarat and discovered that ninety percent of all manual scavengers have not been provided proper equipment to protect them from faecal-borne illnesses. They did not wear gloves,

masks or boots while cleaning human excreta. Manual scavengers are exposed to dangerous infections, including dysentery, malaria, typhoid and tuberculosis, respiratory and skin diseases, anaemia, diarrhoea, vomiting, jaundice and parasitic diseases.

Exhibit 1 makes a comparison of two Acts which were passed by the Parliament of India during a span of two decades. The comparison has been made on the following points: perspective of Act, coverage of dry latrines, sewage, railway track and insanitary latrines, enacted under state or concurrent list, focal points of both the Acts, classification of offence as well as penal provisions.

Exhibit 2 presents the status of latrines as per House-listing and Housing Census 2011 from which night soil is removed by humans. The table presents distribution of 586067 latrines in rural areas and 208323 latrines in urban areas comprising a total of 794390 latrines. This data further reveals that there are 26.22 per cent latrines in urban areas and 73.78 per cent latrines in rural areas from which night-soil is removed by humans. Thus, it is revealed that the presence of latrines from which night-soil is removed by humans is more intensive in rural areas in comparison to urban areas.

Exhibit 3 presents the number of manual scavengers in rural areas as per Humans and House-listing and Housing Census 2011. There are a total of 182505 manual scavengers in rural areas in the country.

CONCLUSION

The study presents the occupation of manual scavengers, its historical context, the tasks performed by them, reasons for the existence of this practice, evaluation of different policies and programmes with the solution of this problem. It is significant to note that the manual scavengers spend their whole life in dire conditions and they face different diseases in their lives due to this occupation. Moreover, their average life is very low. A significant number of manual scavengers die in the gutters during cleaning. They have no place of leisure, recreation and entertainment in their lives. To address this issue, mechanical way of cleaning by way of robotic method may be strictly implemented by the state governments. There is lack of awareness about the use of mask, gloves and boots among the manual scavengers so they may be sensitised about it. The persons employing manual scavengers to clean gutters may also be penalised strictly. In addition, the concerned officials of the Nagar Nigam and Municipality may also be considered responsible if such incidents of deaths take place in their jurisdiction.

It is a fact that over the years, the successive governments have

EXHIBIT 1
EMSCDL¹ ACT OF 1993 AND PEMSR² ACT OF 2013- A COMPARISON

	<i>EMSCDL Act,1993</i>	<i>PEMSR Act,2013</i>
Perspective of Act	Sanitation perspective	Right to dignity perspective
Coverage	Only covers dry latrines	Dry latrines, the sewage, railway track and insanitary latrines
Enacted under	State list	Concurrent list
Focal points	Prohibition of dry latrines	Labour welfare and rehabilitation
Classification of offence	Cognisable	Cognisable and non-bailable
Penal provisions	Up to 1 year of imprisonment and fine up to Rs.2000/-	For insanitary latrines 1 st contravention-up to 1 year imprisonment and fine up to Rs. 50000/- or both Double in case of 2 nd and subsequent offences For septic tanks and sewers 1 st contravention-up to 2 years imprisonment and fine up to Rs. 2 lakh 2 nd / subsequent contravention-5 years and fine up to Rs. 5 lakh, or both.

EXHIBIT 2
LATRINES FROM WHICH NIGHT-SOIL IS REMOVED BY HUMANS AS PER HUMANS AND HOUSE-LISTING AND HOUSING CENSUS 2011

India	<i>No. of latrines serviced manually</i>		
	Rural	Urban	Total
	586067	208323	794390

Source: Government of India (2011), Humans and House-listing and Housing Census 2011, Page 1-2.

EXHIBIT 3
NUMBER OF MANUAL SCAVENGERS IN RURAL AREAS AS PER HUMANS AND HOUSE-LISTING AND HOUSING CENSUS 2011

India	<i>Number of manual scavengers (Rural)</i>
	Number of manual scavengers
	182505

Source: Government of India (2015), Press Information Bureau, Ministry of Social Justice& Empowerment, Date: 15.12.2015, Page 1-2.

taken major steps to address the issue of manual scavengers. A number of policies have been framed to ensure discontinuation of manual scavenging by a particular community. However, it has been found that there are failures of the public policies due to not addressing the relevant issues uniformly. Further, the existing social stratification in the society, caste system, untouchability, *jajmani* system, gender issues and lack of awareness in the society is another challenge to address the issue effectively. Many of these barriers persist even in modern times. The Indian caste system survives in large tracts of rural India despite the sweeping winds of modernity. This issue may be addressed by way of behaviour change in the society. Manual scavengers may be provided preference in skill training and subsequent adoption in any other profession.

In most cases it is also found that lack of sewage network in the country creates the need for manual scavenging so this fact may also be taken into consideration. Introduction of water based flush toilets and bio toilets is a good option but it may not be feasible because this technology is very costly. Manual Scavenging may be introduced in the curriculum in the studies of students in order to bring awareness in the society. The judgement of the Hon'ble Supreme Court may be implemented in its true spirit. This failure is also a lesson for the Government of India to introduce more policy research centres across country to make the better policies in future. Keeping all these factors in view, it is essential to extend them social justice which will be a giant leap towards humanity.

Recommendations

- Construction, maintenance and operation of water-based flush toilets/bio toilets, improvement of sewage systems and Sewage Treatment Plants (STPs);
- Introduction of mechanisation process for cleaning of septic tanks;
- Introduction of efforts to change behaviour of other children towards children of manual scavengers;
- Providing skill training to manual scavengers and their induction in other professions on the basis of skills learnt;
- Better coordination between Centre and states and proper implementation of the schemes; and
- Future programmes and policies should be made after proper studies and research.

Epilogue

The nature of approach adopted by the Government of India to address this issue is Gandhian. This approach desires change of heart and mind of the upper caste persons towards the occupation which could not be realised due to degrading moral values and increasing effect of globalisation, modernisation and liberalisation in the society. Human behaviour plays an important role in addressing such issues. To address this issue, Knowledge, Attitude and Practice (KAP) Theory; a social behaviour change theory is a suitable theory. This theory was developed by Western scholars in the late 1960s. This theory propounds that change of human behaviour is divided into three successive processes: acquisition of knowledge, generation of attitude and formation of behaviour. The theory explains that there is a strong and cohesive relationship among knowledge, attitude and practice. In it, knowledge is the foundation of behaviour change while attitude is the driving force behind behaviour change.

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National Level Events on Urban Development

K.K. PANDEY*

The important events in the urban sector in India in first quarter of 2022 are (i) first ever focus on urban sector in the speech of Union Finance Minister, (ii) Meetings on Bilateral Collaboration on urban issues, (iii) Environment Promotion, (iv) PMSVANidhi, (v) Pradhan Mantri Awas Yojana, (vi) Swachh Bharat Mission 2.0, (vii) Metro rail, (viii) Municipal Bonds.

(i) First ever focus on urban sector in the Union Budget 2022

The first quarter of 2022 included the focus on urbanisation for the first time in the budget speech of Hon'ble Finance Minister with emphasis on role of urban India in economic development and structural transition towards urban majority society by 2047. While laying down the importance of Mega cities and their hinterland to harness the economic potential of the country (for livelihood and demographic dividend/surplus labour from farm sector), the budget also express need to recognize emerging role of tier II and tier III cities to accommodate future expansion of urban areas. Accordingly, a committee of experts is also proposed to seek feedback for policies, capacity building, urban planning, implementation and governance. The ongoing missions and schemes have been earmarked specific amount such as Swachh Bharat (Rs 2,000 crores to Rs 2,300 crores), Atal Mission for Rejuvenation and Urban Transformation (AMRUT)/Smart city (Rs 13,900 to 14,100 crores), Urban Metro (18,978 to 19,130 crores), NCR Transport Company (Rs. 4,472 to 4,710 crores. Further PMAY with target of eight million houses, which also includes urban housing, is allocated Rs 48,000 cores.

The budget indicate specific support to states to promote capacity building of urban local bodies for development of urban areas with appropriate Building Byelaws, Transit Oriented Development (TOD) and Town Planning Schemes (TPS). Further, Five Centres of Excellence are also proposed with endowment funds @ Rs. 250 crores each to promote India specific knowledge in urban planning.

(ii) Bilateral Collaboration

Bilateral collaboration covered initiatives/dialogue with Germany,

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Japan, and EU. The key events include:

- High level discussions were held with the EIB (European Investment Bank) and EU (European Union) delegation on March 11, 2022 on various ongoing urban development projects in India and the possibilities of EIB financing for the priority projects of the Government of India. (March 11, 2022)
- Two day meet was organised on Indo-Japan Joint working Group on Sustainable Urban Development. The meet deliberated on the cooperation for future projects and prioritized commitment, identified new areas of bilateral cooperation in urban development with Japan. The meet specially highlighted the opportunities for Japanese investors in India in the sectors of waste management and capacity building to strengthen future urban development. The meet also discussed collaboration of the Super City initiative of Japan with the Smart Cities Mission of India The meeting was Co-chaired by Secretary MoHUA and the Vice-Minister for Engineering Affairs, Japan (January 10-11, 2022).
- Government to Government (G2G) discussions were held with Germany (German Embassy, GIZ & KfW Country Director) on strengthening the Indo-German urban mobility through strategic partnership. The various bilateral projects & future avenues of cooperation were covered to lead towards sustainable urban development (February 28, 2022)
- Secretary MoHUA announcements for the housing sector the allotment of Rs 48,000 crore under PMAY - 80 lakh households to be identified for the affordable housing scheme in 2022-23. Identify eligible beneficiaries for 60,000 houses under PMAY in rural & urban areas (February 01, 2022).

(iii) Environment Promotion

- Electric vehicles to get a major boost: Centre to introduce a new policy for battery swapping to enable the use of EVs ; Promote a shift to the use of public transport in urban areas, special mobility zones with zero fossil fuel policy to be introduced (February 01, 2022).
- Nintey MLD STP in Nimora of Raipur, Chhattisgarh, likely to be completed in a couple of months will give boost to Circular Economy by promoting 'waste to wealth'. Treatment of water for reuse by consumers.

- Swachh Bharat Urban provides an opportunity to serve nation under Swachhata Startup Challenge 2022 for startups with innovative scientific solutions to reform India's waste management system (March 09, 2022).
- The Eco Mitra Park, a unique environment-friendly intervention aimed at promoting the 3Rs, trash segregation, home composting, recycled items, and other environmental principles, was inaugurated in the South Delhi Municipal Corporation (March 10, 2022).

(iv) PMSVANidhi and Job Creation

- A milestone of 15 lakh scheme linkages has been crossed under SVANidhi Se Samridhhi. Profiling of Street vendors and their families help provide access to 8 Central Government welfare schemes assisting them lead a better life.
- This is a significant step to develop model for convergence and synergy in the urban sector missions and GoI schemes (January 10, 2022).
- GoI is visioning to support women entrepreneurs & professionals in real estate sector in terms of number of women professionals in the sector to make the sector more open and transparent (February 25, 2022).

(v) Pradhan Mantri Awas Yojana

- 'Enabling the Pune of Tomorrow' was organised by NAREDCO drawing attention towards the ongoing infrastructural progress and impending development needs in the city. Secretary MoHUA, inaugurated the seminar which deliberated a city model for wider awareness in the country (March 11, 2022).
- Hon'ble PM's visionary Light House Projects (LHP) has been conceptualized as part of the Global Housing Technology Challenge-India. It's been three years since the journey began on 2nd March 2019 with the inauguration of the Construction Technology India (CTI) Expo-cum-Conference. Light House Projects are being constructed by using cutting-edge new innovative technologies in Chennai, Rajkot, Lucknow, Indore, Agartala & Ranchi. Regular monitoring of progress is being done for the timely completion of the project (March 04, 2022).
- LHP Chennai, modern technology and creative procedures are being employed to build 1,152 disaster-resistant EWS

dwellings. The project is more than 90% complete (March 21, 2022).

- 59th CSMC (Central Sanctioning and Monitoring Committee) meeting of MoHUA on 23rd March 2022, sanctioned 2.02 lakh more houses under PMAY(U). A total of 117.9 lakh houses have been sanctioned so far by Ministry of Housing and Urban Affairs and four others.

(vi) Swachh Bharat Mission 2.0

- As part of Swachh Bharat Mission - Urban 2.0 'National Capacity Building Framework for Garbage Free Cities' was launched on March 02, 2022 at National Conclave on Social Enterprises for Garbage Free Cities, at Raipur, Chhattisgarh. The capacity building is based on three Key Pillars: (i) Capacity Strengthening of State and Municipal Cadres, (ii) Capacity Augmentation through specialized Human Resources, and (iii) Ecosystem Strengthening.
- National Conclave on Social Enterprises for Garbage Free Cities (Encouraging women-led business in waste management - A Swachh Bharat Mission-Urban 2.0 initiative) at Chattisgarh on March 03, 2022.
- Under the recently launched 'Swachh Technology Challenge' around 2,500 entries have been received by the States out of which 3-5 solutions per state will be felicitated. Selected startups from the Challenge will get direct entry into the Swachhata Startup Challenge (January 27, 2022).

(vii) Metro Rail

- The Central Government's financial support for mass transit projects under AMRUT scheme will be leveraged for the formulation of action plans and their implementation for facilitating Transit Oriented Development (TOD) and Town Planning Schemes (TPS), it will give a boost to effective use of Metro for productivity and city life (February 01, 2022).
- As part of Make in India initiative, the Pune Metro is equipped with world-class features for a new riding experience with most energy-efficient & lightest metro with an aluminium body manufactured in India. Ministry of Housing and Urban Affairs (March 28, 2022).
- Country's 1st state-of-art aluminium-body metro flagged off

in Pune on 26th March 2022. The technology-driven metro with new safety and comfort features emerged as an epitome to the model of people first, furthering the vision of Atma Nirbhar Bharat.

- ‘India Water Pitch-Pilot-Scale Startup Conclave’ launched by the Hon’ble Minister MoHUA, Shri Hardeep S. Puri. The first of its kind national conclave aims to revamp the country’s water management by inviting start-ups to solve the urban water problems. The Conclave furthers PM’s vision of Atma Nirbhar and water-secure Bharat. The conclave invites start-ups with breakthrough solutions for urban water problems (March 12, 2022).

(viii) Municipal Bonds

- Vadodara Municipal Corporation has issued Municipal Bond of Rs.100 crore, which has been oversubscribed 10 times and at a coupon rate of 7.15%, total 36 bids were received.
- This is the lowest rate in India in municipal bonds, so far. Rs.1007 crore subscription received in online bidding. MoHUA and team from US Treasury extended necessary support in Debt capacity assessment and bond structuring (March 24, 2022).

Role of Geospatial Technology in Urban Sector

KUSUM LATA*

Lately the focus of the Ministry of Housing and Urban Affairs (MoHUA), Government of India, has increased towards use for Geospatial Technology in all aspects of urban planning and development in Urban Sector. Use of Geospatial Technologies in various urban sector missions since 2015 follows:

Smart City Mission (SCM): For evidence based Smart City Monitoring, Environmental Systems Research Institute (ESRI) India Private Limited prepared and submitted a User Manual for Geographical Management Information System (GMIS) to MoHUA, in December 2020. Smart Cities are using a Geospatial Mobile App for tagging every Smart City project and then the city fills up detail over the Geospatial Management Information System (GMIS) application. There are Geospatial dashboard at different levels - City level, State Level, Central Level and Executive level for handy data available with location and associated pictures. This is being treated as the only source of Truth. The Integrated Command and Control Centre (ICCC) of Smart Cities uses Geographic Information System (GIS) to visualise the locations of the Smart elements in the cities. Few cities like Varanasi, Indore and NDMC are also generating Geospatial analysis and dashboards using the Geospatial data. Smart City Mission has come up with an innovation in the form of Inter Urban Data Exchange (IUDX), which aims at providing Open Data of the Smart Cities to enable the solution providers to use the open data in creating the Application. Varanasi Smart City has gone a step ahead by creating a Kashi Geohub for data and knowledge exchange between different stakeholders like Academia, Research, NGOs, Citizens and Start Ups. Smart City Mission has also created an Urban Observatory to study different Urban Dynamics and problems. Geospatial Technology has been used in big way to experiment with different data sets to understand urban problems and to generate Use cases. A Geospatial Data story competition has been organised recently to encourage the Urban Ecosystem to think about the urban problems by using geospatial data and to come up with innovative solutions.

Swachh Bharat Mission (SBM) : has also used Geospatial technology to track all the SBM projects undertaken in the cities - Landfill Sites,

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Waste Processing Plants of different types, Toilets etc., over the Wards, and Zones of the cities. For this the recently introduced Mobile GIS app. Is to be used with specific Data model and symbols to capture waste management infrastructure created by the cities. All the cities have to upload their Wards and Zones Boundaries on the National Portal with approval of workflow for authentication of the geospatial data created. A GMIS system is under development for tracking the details of the projects.

AMRUT 2.0 Mission: of the MoHUA has vision to provide 100 per cent piped water supply to all the households in Urban India and to provide 100 per cent sanitation in 500 major AMRUT towns and also to provide 24x7 water supply. For this Ministry plans to use Geospatial Technology in a big way to develop a habit of Digitalization of the Water Networks in the City for improving Pipe Water Supply coverage. The Ministry has recently come up with the guidelines of Application of Geospatial Technology for Water and Sanitation Asset Management for 100 per cent Peyjal the Ministry has decided to create a GIS enabled National Portal and track the progress of the project. AMRUT 2.0 also focuses on Urban Reforms, under which it wants the municipalities in the country to become self reliant financially by adopting GIS based Property Tax survey and management.

One of the Sub-schemes in AMRUT 2.0 is GIS based Master Plan. Under AMRUT 1.0 mission 500 AMRUT towns were selected to create GIS based Master Plans, now this has been extended to all towns with population above 50,000. The plans also encourage use of Dynamic Remotely Operated Navigation Equipments (DRONES) for Master plan data creation, with objective to use the GIS based Master Plans as base for all development planning in the cities.

Pradhan Mantri Awas Yojana (PMAY-U): is also using Geo-tagging to capture the Near Real Time information about the housing projects undertaken in different cities.

Thus, geospatial Technology is adopted in a big way for evidence based planning of the missions and for monitoring of the projects for timely completion and maximization of the advantages.

India Smart Cities Awards 2020 Winners

SACHIN CHOWDHRY*

Getting recognition and appreciation for the efforts put in by the people has long been accepted as an effective motivational strategy. This strategy seems to be working effectively in the smart cities programme of the Government of India as well. Smart Cities Mission (SCM) is an ambitious program and necessary for developmental needs of the country and the concerned officials need to be engaged on a continuous basis.

SCM was launched in June, 2015. It aims at urban rejuvenation and has been designed as part of a multi-layer strategy to bring about a paradigm shift in the practice of urban development in the country. Projects developed or in the developmental stage under the Smart Cities Mission are multi-sectoral and mirror the aspirations of the local population.

SCM envisages total investment of more than Rs. 2,00,000/- crore, of which the Central and State Governments proposed to develop projects worth nearly Rs. 93,500/- crore, which is little less than 50 per cent. The work orders have been issued for all such projects. The rest of the investment is proposed to come from the private sector. Totally, by March 2022, a little less than 8,000 projects worth nearly Rs. 2,00,000/- crore have been tendered. More significantly, nearly 3800 projects worth more than Rs. 60,000/- crore have been fully completed and are operational.

In this context, awards through India Smart Cities Awards Contest (ISAC) have been instituted by the government under the Smart Cities Mission, Ministry of Housing and Urban Affairs, Government of India. The idea is to recognize pioneering city strategies, projects and ideas, based on innovation, impact and replicability/scalability; and reward cities, projects and innovative ideas that are promoting sustainable development in urban areas in India, as well as stimulating inclusive, equitable, safe, healthy and collaborative cities, thus enhancing quality of life for all.

The process to select winners is very rigorous, time-bound and transparent. The verifiable indicators along with the framework of

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evaluation are known beforehand to all the eligible entities. There are 6 award categories:

- (i) Project Awards;
- (ii) City Leadership Award;
- (iii) State / UT Award;
- (iv) Innovation award;
- (v) COVID innovation award; and
- (vi) City award.

Evaluation framework contains evaluation in 2 stages along with innovation. Any applicant needs at least 60% score in the first stage to proceed to the second stage. There are 10 themes for project awards along with Innovation awards for projects and COVID-19:

- (i) Governance;
- (ii) Built Environment;
- (iii) Social Aspects;
- (iv) Culture;
- (v) Economy;
- (vi) Urban Environment;
- (vii) Mobility;
- (viii) Sanitation;
- (ix) Water; and
- (x) Sustainable Business Model for ICCC.

The awards for the year 2020 are likely to be given in April, 2022. Though the winners had already been announced in 2021 through virtual conference, the award distribution ceremony had been deferred due to prevailing COVID-19 conditions.

Surat and Indore have been nominated for the best city awards, while Uttar Pradesh has been nominated for the best state award. Indore has been nominated for awards in six categories, while Surat has been nominated for five awards.

Indore got 1st position for projects on Chhappan Dukan, Municipal Waste Management System, Conservation of Heritage and Carbon Credit Financing Mechanism, under the themes of Built Environment, Sanitation, Culture and Economy respectively. Carbon Credit Financing Mechanism has also been identified for Innovative project. Indore has

been a forerunner among the smart cities in the past years and has consistently featured among the top ranked cities in the country. The city is implementing projects worth more than Rs. 5,000/- crores under the Smart Cities Mission.

Surat got 2nd position for projects for Canal Corridor and Dynamic Scheduling Buses; and 3rd position for Conservation through Treated Wastewater and Integrated and Sustainable Water Supply System under the themes of Environment, Urban Mobility, Sanitation and Water respectively.

Uttar Pradesh emerged as the top performer among all Indian states in rankings, followed by Madhya Pradesh and Tamil Nadu. UP has been nominated for the best state award for short listing seven more cities apart from the existing 10 to transform them into smart cities: Ayodhya, Mathura, Meerut, Shahjahanpur, Firozabad, Gorakhpur and Ghaziabad. At the same time, it has shown good physical and financial progress in some cities like Agra, Varanasi, Lucknow and Prayagraj. UP was also able to complete the transfer of state supporting funds to cities. Lucknow and Ghaziabad also issued municipal bonds in 2020.

Similarly, Chandigarh has been identified for UT award. Ahmedabad has been nominated for 1st rank in Smart Cities Leadership Award and Varanasi and Kalyan-dombivali have been nominated as joint winners for COVID Innovation award.

Waste-to-Wealth Initiative in India

AMIT KUMAR SINGH*

Urbanization, a global phenomenon, has several ramifications. The uncontrolled generation of waste by city population coupled with unscientific waste handling by municipalities is causing severe health hazards and urban environment degradation. At present our municipal waste mostly ends up in illegal dumps on streets, in peri-urban areas, open spaces within the cities, wastelands, drains or rivers. As per Ahluwalia and Patel (2018), approximately 80% to 90% of the municipal solid waste in India is dumped in landfills without proper management practices and open burning, leading to air, water, soil pollution.

Looking at the exponential growth in urban population, India is expecting for higher volume of waste generation in future. Hence, there is a dire need for our municipalities and urban managers to rethink, reduce, recycle, refuse and reuse solid waste. In fact improving solid waste management is one of the most effective ways to make cities and human settlements inclusive, safe, resilient and sustainable. But, will a sustainable waste management practice ever be possible in India? Yes it is possible, if we prepare a proper plan of Recycle and Reuse for the disposal of each waste.

Believing in this basic mantra, the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC), virtually launched the 'Waste to Wealth Mission: Swachh Bharat Unnat Bharat' on 17th August 2020. Waste to Wealth Mission, one of its nine missions of PM-STIAC. The basic purpose of this mission is to identify, develop, and deploy technologies to treat waste to generate energy, recycle materials, and extract resources of value. The mission will also work to identify and support the development of modern technologies that promise to create a clean and green environment. The mission will assist and augment the Swachh Bharat and Smart Cities projects by leveraging science, technology, and innovation to create circular economic models that are financially viable for waste management to streamline waste handling in the country.

In recent years, the Central Government, State Governments and various Municipalities have taken several steps in this direction. Two such recent steps have been discussed in this article.

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- i) Gobar-Dhan Bio CNG Plant at Indore)
- ii) Decentralised Waste Management Technology Park at New Delhi

Gobar-Dhan Bio CNG Plant at Indore: On February 19, 2022 Prime Minister Narendra Modi inaugurated a state-of-the-art bio-CNG plant in Indore. It is Asia's largest Gobar-Dhan Bio-CNG Plant and also one of the biggest plants for processing wet municipal waste in the country. This plant will give new strength to India's Swachhta Abhiyan 2.0, under which the country will be made green zone by freeing them from the mountains of garbage. This plant will produce 100 tonnes of organic manure as well as 17 to 18 metric ton per day (MTD) of CNG gas which will run 400 busses every day in Indore city. The Bio CNG Plant is being developed on the PPP model. While inaugurating the plant PM said that "this Plant will prove to be a seminal step in not only reducing the threat of global warming, but also in providing 'green jobs,' to hundreds of youths in the state. It will also increase the income of agriculture and livestock because the plant will be mainly operated from wet waste and cow dung."

Most importantly the Municipal Corporation, Indore does not have to bear any financial burden on the establishment of this plant. The plant will use organic fraction of solid waste as feedstock (wet waste) and in return, the Indore Municipal Corporation (IMC), will get Rs 2.5 crore per annum as premium by Indo Enviro Integrated Solutions Limited (IEISL), New Delhi which is setting up the plant for IMC. IEISL has made 100% capital investment for the project and will also bear the operation and maintenance cost for the entire concession period of 20 years. The state-of-the-art plant is based on zero landfill model, generating zero rejects.

Decentralised Waste Management Technology (DWMT) Park at New Delhi: Under the Waste to Wealth Mission of the Office of the Principal Scientific Adviser to the Government of India, the East Delhi Municipal Corporation (EDMC) has inaugurated the Decentralised Waste Management Technology Park in New Jaffrabad, East Delhi in March, 2022 for onsite processing of fresh Municipal solid waste. The purpose of this project is to make a scalable onsite processing Technology Park with aim of zero waste and zero energy which can be replicated in other parts of the country. This DWMT Park will provide end-to-end solutions for waste management, from semi-automated segregation of municipal solid waste to on-site compaction and treatment of the waste to demonstrate conversion of open dumpsites (dhalaos) to decentralized waste processing sites.

The Decentralised Waste Management technology park covers

around 1000 sqm of area (area currently utilized for open dumping or secondary collection site) with 10 MTD capacity. The other advantages of this park would be: (i) Onsite waste treatment, processing, compaction, and the possibility of conversion to energy, (ii) Reducing secondary waste transportation cost, (iii) Moving towards zero landfill, and (iv) Scaled up/replicated across various cities in India. Government believes that the successful demonstration of this pilot will allow the model to be replicated in cities, towns and villages across India.

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ABOUT CUS

In 1966, Centre for Training and Research in Municipal Administration (CTRMA) was established in IIPA with the support of Ministry of Health and Family Planning, Government of India, the then nodal ministry on urban local bodies. The Centre was created with specific objectives to operate as a knowledge centre and think tank on urban sector issues and an apex institution at national level. CTRMA was rechristened as CUS (Centre for Urban Studies) in 1974-75.

Director General, IIPA is the Director of CUS and chairperson of the Steering Committee. A faculty of CUS is nominated as Coordinator CUS, who becomes the Member-Secretary of the Steering committee. CUS has an interdisciplinary team of faculty members from Economics, Public Administration, Urban Planning and Civil Engineering background. In addition other faculty members of IIPA drawn from environment, disaster management, social development and e-governance background provide their professional input to CUS on case to case basis.

Objectives of CUS

The precise objectives of CUS are :

- (i) Organize suitable training courses for municipal and state officials concerned with Municipal Administration in order to improve the technical and professional character of municipal services;
- (ii) Hold seminars for the elected leaders of urban local authorities for the purpose of facilitating awareness of problems facing the local bodies and encouraging communication between the technical experts and the popular leaders;
- (iii) Arrange special conferences and study groups on contemporary problems of municipal administration,
- (iv) Help other States and regional training and research centres on municipal administration that might be established;
- (v) Promote research on various governmental problems of urban and metropolitan growth in India;
- (vi) Develop an efficient and up-to-date information centres and documentation services in municipal administration in India and abroad; and

- (vii) Provide suitable consultancy service to the various public bodies on municipal administration and to represent India in international conferences.

Outreach

In accordance with its objectives, the Centre during the last 55 years has carried out research, training and advisory services. The Centre has developed and strengthened its national and international outreach and coverage of stakeholders. CUS extends India's urban agenda to (a) Institutions and agencies of Government of India, (b) state government agencies, (c) ULBs (Urban Local Bodies) and para-municipal agencies dealing with specific services, programmes and schemes of Government of India and respective state governments.

Research

Recent Research activities include policy research to Government of India and states and major ULB's, Action research for functionaries at cutting edge level and evaluation of specific scheme and programmes. Research is also used to develop contents for capacity building programmes and disseminate information through a range of publications. CUS also carries out documentation of best practices on specific urban innovations.

Digital Training Initiatives

Since July 2020, CUS started first of its kind digital training programmes in the country to build capacities of middle and senior level urban functionaries through online training. These programmes also tend to seek lessons from Mission Karmayogi launched by the NDA government in September, 2020. Modules developed by CUS include.

- (i) Urban Governance and Administration
- (ii) Urban Finance and Revenue
- (iii) National Urban Livelihood Mission
- (iv) Integrated Urban Water Management System
- (v) Participatory Governance for Urban Management

The above programmes have a duration of 3 to 5 days and cover senior officers from urban local bodies and para-statal/para-municipal agencies dealing with various aspects of urban development.

(Refer CUS at <https://www.iipa.org.in/cms/public/page/centre-for-urban-studies> for its activities details)

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I, Surendra Nath Tripathi, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Dated: February 28, 2022

Sd/-
(Surendra Nath Tripathi)
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NOTES FOR CONTRIBUTORS

This is intended as a guide for authors submitting a manuscript to *NAGARLOK* and as an aid to the preparation of the final copy of accepted articles.

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- Manuscript should be in MS Word format. This should include the name, email ID and the institutional affiliation of the author(s).
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- There should be no line spaces between paragraphs.
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- Single quotation marks should be used to enclose actual quotes from other sources or for technical terms when they are first introduced. On subsequent mention of technical terms, no quotation marks should be used. Excessive use of quotation marks should be avoided.
- Double quotation marks are used to enclose quotes within text which is itself quoted.
- Latin abbreviations such as 'i.e.' or 'e.g.' are acceptable only in expressions within parentheses, as here: 'adjectives which collocate with fare (e.g. wholesome, simple, country) ...' Elsewhere, they should be replaced by their English equivalents, 'that is' or 'for example'. Italic should not be used for such abbreviations or for such common Latin expressions as 'ad hoc', et al., etc.
- Numbers up to 9 and vaguely expressed numbers should be spelled out in words. However, any numbers in a statistical context, precise numbers, units of measurement, and numbers above 100 should be stated in figures.

Table and Figures

- Every table should be given a number and brief title or caption set above the body of the table and source at the bottom.
- Figures are also given a number and a caption, set below the figure.
- Avoid such expressions as 'In the following table ...', 'As can be seen in the figure above ...' In the printed version these elements may need to be repositioned due to constraints of page layout, always after the first mention of the Table or Figure number in the text.
- Source of figures should be given at the end of the table.
- Figures and Charts should be in monotone and in editable format.

Text References

- Page references should be provided when reference is made to a specific passage in a book or article. These appear after the date of publication and are preceded by a colon and a single space: Jefferson (1996: 296 – 299) or Cowie (1999: 79).
- All works cited in the running text must be listed in the reference section at the end of the text.
- The reference section should include only those works that were cited in the text
- Whenever possible, please give the full first names of authors and editors.



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