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EN ROUTE TO CLEANLINESS, VENGURLA

DISCOVER INDIA PROGRAM

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CERTIFICATE

This is to certify that the work incorporated in this report entitled ***"En Route to Cleanliness, Vengurla"*** submitted by the undersigned Research Team was carried out under my mentorship. Such material as has been obtained from other sources has been duly acknowledged.

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ABSTRACT

As a part of FLAME University's Discover India Program, we took up the topic 'En route to Cleanliness, Vengurla'. Studying waste management is critical given the drastic increase in population, industrialization and urbanization. The waste management system was employed in Vengurla MC, by Mr. Kokare, after realizing the pressing need to responsibly dispose waste. Our main aim and objectives were to study the implementation of such a system, the diverging perspectives of different community groups and the scope of this system to be employed in other areas. Using different methodologies of data collection we show the effect of the implementation of the system on the people of Vengurla. Despite the many positive changes brought about by the system, we realized that there were loopholes and gaps. Some residents did not give their waste to the municipal corporation and employed their own ways of composting. Awareness about the reasons behind the implementation of this system and the necessity for it was not properly communicated to the people. Those who spoke highly of Mr. Kokare and the system were directly or indirectly related to the *Nagar Parishad*. The most adversely affected communities were the fishermen and the scheduled caste communities. While a majority of the people interviewed, agreed that the implementation of the waste management system had brought a positive change to the town, they also believed that there was scope for improvement in various spheres.

Keywords: Waste Management, *Nagar Parishad*, Vengurla, Waste segregation, *Swachh Bharat Abhiyan*, Landfill, Composting, Plastic, Source segregation

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CHAPTER 1
INTRODUCTION

1.1 Introduction:

As we move into the era of urbanisation and industrialisation, more and more governments are recognizing the need to tackle major environmental issues and take initiatives towards becoming smarter, cleaner and greener cities. Drawing inspiration from the *Swachh Bharat* Mission, a small town off the west coast of Maharashtra by the name of Vengurla Municipal Council (Vengurla MC) sought to create a '*Swachh* Vengurla'.

Since the initiation of their waste segregation system, management model and new policy, Vengurla MC has been featured in numerous articles by the Government of Maharashtra, UNDP in India, The Times of India, Hindustan Times, The Indian Express and many more. Alongside this Vengurla claims to have taken up a variety of initiatives to make the city open-defecation free, plastic-free and waste-free.

Through our research we hope to understand more about the aims and the implementations of the new policy, as well as the varied perspectives and opinions of the town's citizens regarding the same.

1.2 Historical Overview and Geographical Information

1.2.1 Historical Overview of Waste Management

In the Middle Ages, waste predominantly consisted of soil, stagnant water, household waste and excrement, all of which was carelessly dumped on the streets. Initiatives for clean-ups only arose to get rid of the foul smell and obstructions. Waste was considered more of an inconvenience (Wilson, 2007).

In the 1900s London engaged in what can be considered as one of the first formal waste management systems. Private contractors were hired to collect the waste generated as a by-product of the industrial revolution in the town. They sorted this waste and recovered what they thought could be sold to vendors. (Chelmi, 2015)

In the nineteenth century, London also recognised the first linkages between disease and poor sanitation as conditions brought about by poorly managed waste. Hence the Public Health Act which was passed in the 1840s

required citizens to dump their waste into a 'movable receptacle' (or a modern day dustbin) that would be emptied by the local authorities periodically. Inspired by this, other countries also started making legislation changes that made the local authorities responsible and accountable for waste management (Wilson, 2007).

The mid-twentieth century witnessed a rise in consciousness towards sustainability. Guidelines for a 'sanitary landfill' were officially set out for the first time by the American Society of Civil Engineers (Ward, 2011). In 1970 the United States established the Environmental Protection Agency which later prohibited open dumping (Barabalace, 2003).

India passed the Environmental Protection Act in 1986 which laid out rules such as Municipal Wastes (Management and Handling) Rules, Hazardous Wastes Rules etc. It also launched the Central Rural Sanitation Program the same year. ("Waste Management in India", 2011). It's most recent initiative was the launch of Swachh Bharat Abhiyan in 2014.

Currently, Vengurla MC too is taking steps towards implementing its own waste management system.

1.2.2 Geographical Information of Vengurla MC

Geographical Details	Climate
Geog. Area : 12.98 Sq. Km.	Min .Temp - 10° Celsius
North Latitudes : 15.30	Max. Temp - 42° Celsius
East Longitude : 73.40	Annual Rain Density - 3,075 mm

Table 1: Vengurla MC's geographical area and climate (Iyer, 2017, p.223)

Vengurla MC is a picturesque town located in the *Sindhudurg* district, Maharashtra. It is divided into 8 Talukas, one of which is the Vengurla Taluka. This Taluka has 1 town and 85 villages (Iyer, 2017, p.223). For our research we will be focusing on the cleanliness model Vengurla Municipal Council, aka the town in the Vengurla Taluka.

Vengurla MC is bordering the Arabian Sea on the western coastline of India, located above Goa. It is surrounded by a semicircular range of hills that are

part of the Western Ghats. Due to its location it has a very rich biodiversity, it is also a popular tourist destination due to its natural beauty. (Iyer,2017, p.225)

1.3 Research Question and Aims & Objectives

Research Question: "To study the implementation and scope of the current waste management system of Vengurla, while exploring the community's varying perspectives on the new policy."

1.3.1 Operational Definitions

The contextual meanings of keywords included in our Research Statement are given below:

Implementation: processes and steps undertaken to achieve the desired target

Scope: current and future potential of adopting the same or similar techniques in other places

Waste management system: the system of collection, transportation, segregation, treatment, disposal and processing of solid wastes.

Community: all the members of the society directly or indirectly affected by the waste management system.

Varying perspectives: diverse attitudes and opinions of different sections of the community on the new waste management system

New policy: the new rules and guidelines detailing the steps prescribed and consequences imposed with respect to the waste management system

1.3.2 Aims and Objectives

The various aims and objectives of our Discover India Program research are as follows:

1. To understand the motives behind and steps taken towards implementing the new waste management system in Vengurla
2. To explore the community's perspectives and attitudes on the policy
3. To explore the different aspects of waste management and segregation systems and their scope of implementation in Flame University.

1.4 Research Methodology

1.4.1 Research Design

Our research is an exploratory case study as the primary goal of the study was to gain an in-depth insight into the workings of the new waste management policy in Vengurla MC and attempt to understand the possible issues that might have come up with the implementation of such a policy. We hope to do this by interacting with the community, including individuals who belonged to different socio-economic stratas of the society.

1.4.2 Research Methodology

To fulfil our aims and objectives, we employed a mixture of qualitative and quantitative methods and have used an interpretive approach to our research topic owing to the fact that its is a relatively small scale research. The reason for using a mixed method approach was conjunction of the results generated by the two methods, with quantitative data serving as a tool for generalisability of qualitative data.

Data collection:

Secondary sources were used to aid us in our preliminary research about the topic, provide contextual material and serve as a complement to our primary data. The sources referred to were Government websites, newspaper articles, online available audio visual material (videos of Vengurla MC's waste management system) and e-books.

The most significant primary data for our study was obtained through on-field research using the following data-collection tools:

- Interviews
    - Semi-structured interviews were conducted with certain municipal officers and staff members. We followed a rough structure of predetermined questions and queries for the *Nagar Parishad* officials but kept the interviews semi-structured in order to have flexibility to elicit each respondent's unique perspective on the topic, further, while also avoiding pre-determined answers from them.
    - Unstructured interviews were conducted to interact with groups like long time residents, garbage collectors, fishesellers, shopkeepers, et

cetera with questions that sought to understand their perspectives about the policy. They were unstructured so that the interviews could be a little informal and have a conversational flow in order to make the interviewees feel at ease.

- Questionnaires and schedules: These helped us collect additional quantitative and qualitative data. Mixed questionnaires were used so that closed questions on certain subjects would make it easier for us to analyse the data quantitatively and open ended questions where a deeper approach to the question was required from respondents.Similarly, schedules were designed and administered so as to include responses of people who would find it difficult to read or write the answers.These were conducted as surveys in:
    - Schools: The researchers conducted a self-administered survey in two schools separately with the use of mixed questionnaires. A sample of 38 students from Vengurla High School and 58 students from Patkar Highschool of ages 12- 16 were chosen randomly after contacting the respective school authorities and explaining our purpose.
    - Residential areas: Researchers performed the role of enumerators, surveyed 50 households and asked questions from the set following the sequence and recording the responses.

- Naturalistic observation was employed while conducting surveys and interviews to observe the subjects without any intervention, and to allow us to collect data. Through methods of observation, we were able to collect field notes about processes like waste segregation at a household level, examine factory processes closely, notice the environmental conditions of the areas visited and so on, and observe phenomena that our respondents may not have spoken about.

Sampling methods:

For qualitative research various non-probability sampling techniques were used:

- Purposive sampling: used to ensure representation only from the groups in society significant to our research (garbage collectors, municipal workers, farmers etc.)
- Snowball sampling: used to interact with the longtime residents and other members of the community, who were directly/indirectly involved with the clean-up and waste management processes.
- Residential surveys were taken in all wards of Vengurla MC to ensure opinions and attitudes of residents from all areas of the town could be recorded. To ensure random selection, every third household was surveyed.
- Student surveys were conducted in two schools after students were selected at random by the school authorities.

1.4.3 Limitations

- As amateur researches, except for the pre-field sessions we did not have the expertise, skills and resources. Moreover, it was difficult to carry out an extensive research and gain in-depth knowledge because of our time constraint. There could be scope for more exploration on all factors that are covered.
- Since we were not from Vengurla MC our perspectives, interactions and observations on-field were from an outsider's perspective. As we have not experienced what the localites do everyday, we might not have fully understood the impact and implications of the new policy.
- There was a language barrier since a majority of the Vengurla MC population was Marathi-speaking. While most residents did converse in Hindi, there were a few areas where only Marathi was understood. It was also noticed that the participants tended to give more information when spoken to in Marathi, possibly because it was their mother tongue. A lot of content was also lost in translation from Hindi/Marathi to English.
- Only a relatively small sample size was considered for research and analysis, the views of the few that were interviewed and surveyed may not be representative of the remaining population's views.

- Due to sudden and brief encounters with a few people during the course of our on-field research we were unable to record the names of all participants.

CHAPTER 2
LITERATURE REVEW

2.1 Introduction

As mentioned earlier Vengurla MC is a small town located in the Sindhudurg district of Maharashtra. The town is further divided into 17 wards for administrative ease. As per the 2011 Census, the male is to female ratio was 49:51, and the literacy rates were 91.5% (Census of India, 2011). Though it was initially a Dutch colony, it was under the British Rule that the town's infrastructure and city planning improved drastically, this included the construction of proper roads, a market area, hospitals, parks, commercial buildings, ports and so on (Maharashtra Tourism, 2015). The main sources of income of the citizens are fishing and farming (Iyer, 2017, p.227).

Since the implementation of its new waste management and anti-open-defecation policies a lot of changes have been said to have come about in Vengurla MC (Lopez, 2016). This chapter explores already existing literature on related topics from sources such as newspaper articles, journals, government websites, science websites, online videos and so on.

2.2 Waste Management and Pollution

Waste generation is a natural result of human activity, and is thus inevitable (Bharadwaj, 2015). Most of the objects we interact with are things that we buy, use and ultimately dispose (Leonard, 2007). As per a recent report (Press Trust of India, 2016) over 15,000 tonnes of plastic waste is generated in India each year, 40% of which is left uncollected.

Lesser developed and more populated countries give very little priority to research about of sources of waste, its amount, characteristics and other trends (UNESCAP, 2015, p.170). As per the reports of the 2001 Census, India being a rapidly developing nation encompasses 16.9% of the world's population on just 2.4% of the world's land area (Census of India, 2001). This coupled with our massive pace of industrialization and urbanization implies that we are disposing much more than our land can hold, hence it is vital that we start developing detailed plans and policies to help tackle the problem.

Alongside this, efforts must also be made to study and explore the relatively untapped potential of waste, which can be harnessed by adopting comprehensive waste management and processing mechanisms (Bharadwaj, 2015).

2.2.1 Types of Waste

Waste can be divided into numerous categories and subcategories on the basis of its composition, its origin, decomposition and methods of disposal. The two most basic and common categorizations of waste materials are non-biodegradable and degradable waste.

Non-biodegradable materials are those which when disposed cannot be broken down or naturally dissolved through the action of air, moisture, climate, or soil. On the other hand natural waste and products made from the natural environment can be broken down easily by the action of bacteria and fungi when disposed, and are thus termed as degradable waste. (Gunther, n.d)

Solid waste, which is the focal point of our research refers to any discarded or abandoned material in either solid, liquid, semi-solid or gaseous form. This is generated as a result of industrial, commercial, mining, community and agricultural activities. (Dec.ny.gov, 2017)

Solid waste can be divided into the following four broad categories depending on its source:

1. **Municipal Solid Waste:** The source of Municipal Solid Waste is mainly residential and institutional, thus including waste produced from structures like households, workplaces, hotels, schools, universities, malls and so on. The majority of the elements are food waste, paper, plastic, cloth, metal and glass; other elements included are white goods, electronics, household hazardous waste, and so on. Construction and demolition waste related to the building of such structures is also part of the same. Lastly municipal services waste from street cleaning, recreational areas, wastewater treatment and so on also falls under this category. (UNESCAP, 2015, p.170)
2. **Industrial Solid Waste:** Industrial solid waste is mainly generated from commercial processing, industrial processing and also from construction sites. This would include a broad range of goods varying in toxicity such as paper, packaging materials, waste from food processing, oils, solvents, paints, glass, ceramics, metals, plastics, rubber, wood, steel, concrete, ashes and so on. (UNESCAP, 2015, p.173)
3. **Agricultural Waste and Residues:** The expansion of agricultural production over the past few decades has led to an increase in quantities

of livestock waste, agricultural crop residues and agro-industrial waste. (UNESCAP, 2015, p.172)

4. **Hazardous Waste:** Hazardous waste is generally a by-product of industrial, agricultural and manufacturing processes, nuclear establishments, hospitals and health-care facilities, which is a result of urbanization. This includes chemicals, petrochemicals, petroleum, energy production plants and so on. (UNESCAP, 2015, p.173)

2.2.2 Waste Treatment and Disposal Techniques

When solid waste is brought up most people think it is removed from the system through dumping in landfills and incineration. This can be easily avoided by adopting a thorough system for the same. There are three common management and disposal systems on the basis of form, composition, and quantity: (LeBlanc, 2016)

1. **Thermal treatment:** this is a process through which heat is used to treat waste materials. Its constituent methods include:
    a. **Incineration:** this involves the combustion of waste materials in the presence of oxygen. The residues include ash, flue, gas, water vapour, and carbon dioxide. (LeBlanc, 2016)
    b. **Gasification and Pyrolysis:** in these methods, organic waste is decomposed by exposing the waste to low oxygen levels and high temperature. In pyrolysis no oxygen is used, gasification allows a very low amount of oxygen in the process. Gasification recovers energy and doesn't cause air pollution. (LeBlanc, 2016)
    c. **Open Burning:** Incinerators used in this process release compounds such as hexachlorobenzene, dioxins, carbon monoxide, and so on. It has no pollution control devices and is extremely detrimental to the environment, yet it continues to be used relentlessly. (LeBlanc, 2016)
2. **Dumps and Landfills:**
    a. **Sanitary landfills:** Though costly, this method provides the most common waste disposal solution. The risks of environmental and public health hazards are reduced as a result of the natural buffers between the environment and the landfill. (LeBlanc, 2016)

b. **Controlled dumps:** These are characterised as underdeveloped versions of sanitary landfills, with similar features but less regulation. (LeBlanc, 2016)
c. **Bioreactor landfill**: these landfills use superior microbiological processes to speed up waste decomposition. The landfill is kept moist using the recirculation of leachate to enhance microbial digestion. (LeBlanc, 2016)

3. **Biological Waste Treatment**
   a. **Composting:** This is a common waste treatment method where in organic waste is decomposed through the aerobic process of small invertebrates and microorganisms. Examples of this include static pile composting, vermicomposting, and so on. (LeBlanc, 2016)
   b. **Anaerobic Digestion:** This is similar to composting but instead of aerobic it uses anaerobic digestion, thus using an oxygen and bacteria-free environment to decompose the waste material. (LeBlanc, 2016)

2.2.3 Environmental Impacts of Waste

The rapid economic growth, urbanization and industrialization has led to a considerable increase in the waste generated over the past decade. This is especially prevalent in highly populated cities like Mumbai and Kolkata. Open dumping of the peripheries on such cities results in the deterioration of land resources, and has affected the surface and groundwater supplies. (United Nations, 1995 as cited by UNESCAP, 2015)

Burning waste on the other hand is a major cause of air pollution. The rapid increase in hazardous, industrial, biomedical and nuclear wastes is also a major cause for concern (Burcea. 2015).

The inefficient handling of solid waste poses a major threat to our health and the environment. Alongside the risk of chemical poisoning, congenital malformations, neurological illnesses, uneasiness and vomiting, we are also faced with the threat of biomagnification and bioaccumulation. (Alam and Ahmade, 2013, p.165-168).

2.2.4 Pollution

Pollution has been an adjunct to mankind ever since people first came together as clusters and stayed in one place for a long time. It can be defined as the act of contaminating the environment with pollutants that have an anthropogenic source- that is, a source created by human actions. Pollutants are characterized as having undesired effects on or being detrimental to the usefulness of a resource (Pollutant, n.d.).

There are three main types of hazardous pollution:

1. **Air Pollution:**

   Air Pollution refers to the discharge of pollutants into the air. Due to unbridled growth in population and industrialization, discharge of a range of gaseous substances and particulate matter (PM) is increasing exponentially (Ghosh, 2010). This leads to the greenhouse effect which contributes to Earth's climate change.

   Solid waste is also an important source of air pollution and can have adverse effects to human health through inhalation of toxic gases. Methane (a greenhouse gas) is one of the by-products of the anaerobic (incomplete) respiration of decomposing bacteria that live in landfills (Alam and Ahmad, 2013, p.165-168). In fact, according to the United States Environmental Protection Agency, landfills are the third-largest source of human-related methane emissions in the United States (US EPA, n.d.).

2. **Water Pollution**

   The discharge of substances into water bodies such as lakes, streams, rivers, estuaries, oceans or groundwater to the extent where the substances hamper the favorable utilization of the water or the normal functioning of the ecosystem is broadly known as water pollution (Water Pollution, n.d).

   Surface water is mainly polluted by discharge from sewage treatment plants or factories, and other contaminants. This is harmful because runoff can lead to excess nitrates and phosphates in the water which may lead to an algal bloom and thus damage the environment and

biodiversity creating "dead zones" in water bodies. (Harmful algal blooms, 2017)

On the other hand, groundwater contamination occurs when pollutants that are released on the ground make their way down to the groundwater or the aquifers contaminating them. This can occur due to runoff from landfills, wastewater treatment plants, petrol pumps or from over fertilization of soil on agricultural fields.

Landfill leachate is the percolated liquid that drains through the ground on a landfill and mixes with the groundwater (Dictionary.com, n.d.). This is one of the main sources of groundwater and surface water pollution if not properly collected, treated and safely disposed. If waste is arbitrarily dumped in landfills, hazardous wastes like electronic items, discarded batteries, paints and so on can mix with municipal waste and increase the amount of heavy metals and toxicity of the leachate.

Since groundwater is a vital source of water for irrigation, drinking and community uses, leachate poses a great risk to local surface and groundwater systems. Subsequently, ailments like as hepatitis, diarrhoea, abdominal pain, dysentery etc. would be frequent in the communities living off the contaminated water as seen in a recent study conducted in Dhapa, Kolkata in 2015. (Maiti et al., 2016, p.391-399). This can however be avoided by using dense clay deposits and plastic sheeting in sanitary landfills.

3. **Land Pollution**:

Land pollution is the unnecessary overuse of land when non-biodegradable solid or liquid waste is dumped in a particular area. When an excess of waste is generated and its disposal is unplanned and mismanaged, it leads to land pollution, this in turn results in many health hazards and environmental degradation. (Nathanson, 2017)

Due to the dumping of waste such as plastic bags, glass, batteries, agricultural and hazardous chemicals, metals and from other anthropogenic sources, the natural form of the soil can get altered by xenobiotic chemicals, this is known as soil contamination (George et al, 2014). It affects the soil's ability to perform its natural functions, if

contaminated by organic and metallic contaminants the damage is almost irreversible and the soil becomes "functionally dead" (European Commission, 2012). Soil contamination can also be caused by mining, deforestation, oil spills, natural disasters and radioactive waste (Earth Eclipse, 2017). This further leads to groundwater contamination, which along with the earlier mentioned effects also reduces the water's ability to dilute and diffuse nutrients that are essential for plant growth (Scottish Government, 2005).

When the fertility of soil is affected by a change in the soils characteristic quality, it is known as **land degradation**. Along with soil contamination this can be caused by weather conditions such as drought (World Health Organisation, n.d.) Such a phenomenon is inevitable at a landfill as it is defined as an area of land that builds up from deposits of solid refuse (Dictionary.com, n.d.).

Vengurla MC has identified the urgent need to take action and safeguard its citizens and the environment. Through their waste segregation and waste management methods, amongst many other achievements they were able to clear their landfill, and even turn it into a garden ad compost pit (Lopez, 2016). By segregating and properly processing their waste rather than just dumping it, the town has made efforts towards reducing air, water and land pollution.

2.3 Concepts and Illustrations for Successful Implementation

2.3.1 Zero Waste Concept

The term 'Zero Waste' was first coined in 1973 and refers to the retrieval of resources from chemicals. It developed as a full-fledged waste tackling strategy in the 1990s when Canberra, a city in Australia aspired for a system which would ensure no excess waste is dumped into landfills. (Zaman, 2015).

According to the Zero Waste International Alliance (ZWIA) Zero Waste is a goal that is "ethical, economical, efficient and visionary". It guides people to adopt a lifestyle which allows for all waste to be reused and recycled, as well as reducing the toxicity levels of all discarded material and places emphasis on its

conservation and recovery. Finally it aims at eliminating all discharges to land, air or water and thus protecting the environment and all its flora and fauna. (ZW Definition, n.d.).

The effective implementation of the zero waste initiative involves mechanisms such as community participation, industrial support, planning, policy making and awareness, et cetera, to work together at once.

2.3.2 The Role of Community Participation

The threat of solid waste creates increased societal tension with each passing day. Although India has comprehensive solid waste management rules, they have not been implemented efficiently.

An efficient, economical, modern and sustainable waste management mechanism is very difficult to achieve unless the entire community collaboratively works to reach targets set by the authorities (Klundert and Lardinois, n.d.). Each member of the community including NGOs and CBOs have a specific and significant role to play (Brontowiyono, n.d.).

Vengurla MC's model and its involvement of the community will be further explored in later chapters.

A community may also resist changes due to varying belief systems and perceptions. For instance, as per a study (Yadavar, 2017) in India, a possible reason for the failure of the Swachh Bharat Mission to make the country free of open defecation is because of the correlation between caste-purity (and untouchability) with masculinity, and displays of power. In conclusion, new systems only work if efforts are made to raise awareness and educate the community on the possible benefits of each initiative. This will engender a sense of responsibility amongst the people, which in turn will give rise to community efforts, hence aiding in the conservation of resources and problem solving at local levels. (Klundert and Lardinois, n.d.).

2.3.3 UN Guidelines

Waste management techniques that are implemented across the globe are a result of ongoing learning processes in industrial and urban sectors. Issues of waste have previously been dealt with by developing technology and

infrastructure, as well as by formulating policies and legislations. Comprised in this are the guidelines published by the United Nations Environmental Programme (2015) which include the broad provisions of Public Health, Environmental Standards of waste facilities, Resource Recovery, Economy, and Waste Prevention as these are the basic areas countries seeking to adopt a waste management system should look into (Wilson et al., 2015, pp.137-138).

2.3.4 Indian laws w.r.t UN guidelines

A national strategy for waste management can be exceedingly valuable, if it takes account of the country's strengths and weaknesses; this includes, waste composition and available technological and financial resources. The Indian government has implemented rules to control the different types of waste generated from households, mining, forestry, power plants, construction, electrical equipment and agriculture (Vilas, 2015). Listed below are two of the major indian laws, and how they adhere to the UN guidelines:

1. The Plastic Waste Management Rules, 2011 (Amended 2016) as per the Ministry of Environment, Forest and Climate Change (2016, p. 17-21) state a variety of provisions. The provisions include:
    a. Plastic waste which cannot be recycled any further should be used for road construction. This adheres to the UN guideline of Public Health and Resource Recovery.
    b. Waste generators must take steps to reduce the amount of plastic waste. They should ensure segregation at source and prevent littering. For example retailers should not provide customers with plastic carry bags. This adheres to the UN guideline of Waste Prevention.
2. Municipal Solid Waste Rules, 2011, (Amended 2016), as per the Ministry of Environment, Forest and Climate Change (2016, p.51-55) include provisions like:
    a. Waste generators must segregate waste in three separate bins: domestic hazardous waste, biodegradable and non-biodegradable
    b. Waste generators should not burn, throw, or burry the solid waste generated by them in any public place, their premises, or on streets.

This is in line with the UN guidelines of resources recovery and public health

Despite the fact that Solid Waste Management Rules were implemented in Maharashtra nearly two decades ago, the state still faces major difficulties in implementing them. The lack of manpower and lack of awareness coupled with the fact that Maharashtra produces over 26,820 tonnes solid waste per day makes waste management an exceedingly arduous task (Bharadwaj, 2015).

Hence it is the government's responsibility to build policies in accordance with the local situation and also make sure they are duly implemented at all levels; national or regional.

2.3.5 Swachh Bharat Abhiyan

Like most developing nations, India lags behind with respect to basic sanitation, cleanliness and hygiene facilities (Sharma, 2016). To counter problems related to waste management, sanitation, open defecation, and more related issues the government launched the Swachh Bharat Abhiyan, spearheaded by Prime Minister Narendra Modi on October 2nd, 2014 which aims to achieve a 'Clean India' by October 2nd 2019. **(**"Swachh Bharat Abhiyan"**,** n.d.)

Out of Swachh Bharat Abhiyan Gramin, and Swachh Bharat Abhiyan Urban, Vengurla MC falls under Swachh Bharat Urban.

2.3.6 Places in India to take inspiration from

Like Vengurla MC, many other cities have initiated the implementation of various methods to increase cleanliness and hygiene standards. It is interesting to note the different ways in which different cities have tried to implement Swachh Bharat Abhiyan.

Since the implementation of the mission, 25 cities have agreed to make an effort to segregate waste (Barnagarwala, 2016). Some of the most recognized efforts have been mentioned below:

1. **Deolali Pravara in Ahmednagar**

   This town has 13 open space compost pits to treat wet waste which constitute about 60% of the total waste generated there. Hence if

implemented well the municipal corporation will only have to deal with 40 percent of the total garbage. (Barnagarwala, 2016).

2. **Umred in Nagpur**

   Like Vengurla, Umred has been remarkably successful in achieving 100% segregation of waste at the household level. They made efforts to educate people on the importance of such a system which contributed to it greatly. Umred used to generate 13 metric tonnes of waste none of which was processed. Now all the wet waste is processed. (Barnagarwala, 2016).

3. **Bobbili in Andhra Pradesh**

   Bobbili began its efforts to attain cleanliness prior to the launch of the Swachh Bharat Movement in 2010 through solid waste management. The small town has managed to attain 100% door-to-door collection and segregation, both wet and dry waste are further processed. Bobbili also brings livestock into the picture as a part of the solution, for example, pigs are given leftover food waste from hotel establishments. (Ghosh, n.d.).

The success stories that emerge out of them have been limited to small towns and urban societies. This may be because strategies like compost pits and biogas plants that can easily be implemented in small cities would be much harder to implement in big cities due to the sheer volume of waste that is generated. Pune, for example, generated an astounding total of 1600-1700 tons of waste per day in 2016 (Pune Municipal Corporation, n.d.).

2.3.7 Places Abroad To Take Inspiration From:

Environmental sustainability has become increasingly important as more and more climatic changes related to global warming and environmental degradation are occuring (Attah, 2010). The social, economic and industrial developments of a country cause increased pressure on the environment and necessitate a need to create waste management policies.

1. **Switzerland**

   Switzerland efficiently implements its environmental policies due to the support of government funding and active public participation. They

adopted a federal waste disposal strategy under which only waste that is treated should be recycled or deposited in landfills in an environmentally suitable way. (Swiss Environmental Law, 2013)

2. **Curutiba, Brazil**

In Curutiba, Brazil, due to the lack of funds to initiate anything the residents took action themselves by executing a policy called 'Green Exchange.' It created currencies to reward people who segregated their waste into organic and non-organic disposable bags and brought it to the waste stations, they could then trade these for fresh groceries. (Kennedy,2015 as cited by Ternova and McCallion, n.d.)

2.4.1 The Situation of Vengurla

The Vengurla MC waste management system was implemented in 2015, as a realisation of the difficulties of irresponsibly managed waste. The lack of efforts made to collect and dispose waste led to a situation where waste piled up on the streets as stated in the video '*Swachtecha Dipstamb*' published on 25th December, 2016.

As stated in Times India and *Hindustan* Times, Mr. Kokare, the newly appointed Chief Officer of Vengurla MC had decided to take the initiative and lead everyone in order to clean the town and execute a waste management system. Steps like spreading awareness, banning plastic and segregating waste so that it could be recycled were introduced. In addition, aversion of open defecation was also concentrated on.

For the system to function funds were obtained from the government and UNDP.

Vengurla MC has gained recognition at both national and international levels. Two years after the implementation, Vengurla has seen drastic changes. The landfill has been transformed into a garden and compost site and Vengurla MC is claimed to be clean.

2.4.2 Gaps in Literature

The cleanliness drive in Vengurla has been a fairly recent phenomenon due to which there is lack of information with regard to its implementation and success or

failure. The greatest literature gap experienced has been information exclusively specific to Vengurla MC. One of the primary aims of our research is to resolve this. Nevertheless, efforts have been made to pre-equip the project with concepts and information essential to grasp a full understanding of the research that we will be conducting. The literature gaps have provided us with areas of further explorations.

Observing the recognition of Vengurla as a '*Swachh*' city and its association with UNDP there is little information about their relationship. It still remains a question as to whether *Swachh Bharat Abhiyan* or other sustainable city models and stories directly inspired the cleanliness drive.

Our secondary sources informed us of how Vengurla MC segregates its waste into 23 different categories. However, we were unable to tell what these categories are and why these categories are chosen specifically. Besides from finding out about the intricate processes and mechanism that are employed to tackle the different kinds of waste, we could not find the kind of waste that poses most challenges- like hazardous materials and waste from construction sites and how it is dealt with in Vengurla MC. also, there was no information about the waste composition of Vengurla MC.

Vengurla has a total of 8 ports.There is lack of information about the number of ports harboured by Vengurla MC. This information will be necessary in finding out if it has to deal with waste and materials that sail through the sea into the town. If so, how are these foreign materials regulated and how the waste generated from them is processed.

While watching an audio visual about the waste processing in Vengurla, it was observed that during the process, particulate matter was released in open air. The ways in which the municipal corporation deals with this are not mentioned anywhere.

One of the major achievements of Vengurla has been the clearing of the landfill. there is less or no information provided about the processes that went behind the clearing the landfill.

After understanding what the prevalent Solid Waste Management system in Vengurla MC is, more information about the methods that led to drastic changes such as effect on climate and natural conditions are needed.

Through the study about the UN guidelines and Indian legislation that have attempted to bring about positive changes in SWM, it is important to study the legislative actions taken by Vengurla for the implementation of such a strategy. These have not been looked upon yet.

Chances of success of any municipal initiative are purposeless without community participation. The study of community efforts and participation to make the SWM are necessary.

There is no prior research about whether or not Vengurla MC inspired other villages or towns around it to take responsibility for their waste, engage with them in any way or were indifferent.

We were unable to find information about the changes that were brought about on the livelihood of the people. Similarly, we are unaware about the working conditions in the waste processing units, the socio-economic background of these workers, effect on small scale businesses and whether or not there are any rag pickers after the waste segregation system was employed.

Moreover, there is no insight about the resistance to change or oppositions that might have been made by various community groups regarding this new policy. The impact on the floating population and how it contributes to making the system work has not been studied.

We do not know if Vengurla has been consistent in its zero waste efforts. Success or failure of the initiative will only be realised on field. We are curious as to what measures has Vengurla adopted for long term functioning of the Vengurla Pattern.

CHAPTER 3
VENGURLA'S NEW MODEL

3.1 Introduction

The primary objective was to study the implementation and the scope of the existing waste management system employed in Vengurla MC which led to its recognition on various platforms. In order to know more about the system, the first on field interview conducted was with Mr. Ramdas Kokare, who initiated the whole process. Mr. Kokare had a lot of prior experience in the area of waste management. He was previously the chief officer in *Dapoli* (Maharashtra) where, within a span of fifteen days since assuming office, he claimed to have banned all types of plastic carry bags. He joined the Vengurla *Nagar Parishad* in April 2015 keeping the same goal in mind.

According to him, environmental awareness and solid waste management were imperative in today's world and that the irresponsible management of solid waste contributes to 4% of the total greenhouse gas emissions. He believed that many cities and villages were facing the same situation and that, "it (the mismanagement of solid waste) is not a local problem but a global one". He mentioned that "as urbanization and modernization increases, management of solid waste decreases."

In addition, Mr. Kokare said that before turning the plan into reality, he did extensive research. He went to the Indian Institute of Technology (*Powai*) and met experts and attended their lectures and workshops in order to gain more knowledge about solid waste management processes. When they were unable to give him a concrete solution he used the internet and Google to find mechanisms that would help him. He also claimed to have invented a 'Thermocol Waste Management Plan', where in thermocol and plastic can be used in the construction of roads.

In order to get machinery to aid in the management and processing of waste, the *Nagar Parishad* approached the United Nations Development Program (UNDP) for support. Through this they sanctioned a ₹ 12.33 lakh funding for a 'plastic crusher machine' and other activities related to the new model. He claimed that the Vengurla MC model was the, "first solid waste management success story".

The solid waste management system was also backed by the Government of Maharashtra. The total project cost was just one crore, however Mr Kokare received ₹ 4.5 crore from the government through various awards for being a clean and open

defecation free city. Vengurla MC also received approximately 70 lakhs as a result of corporate social responsibility (CSR) funding.

3.2 Aims and Objectives of the New Cleanliness Model

Mr. Ramdas Kokare had joined the Vengurla MC *Nagar Parishad* with two goals in mind: to eliminate plastic and to start source segregation in the area. He had envisioned a system that would not need landfills so that the village would be free from foul smell and other hazardous elements.

To achieve his goal of creating a clean and landfill-free city, he decided that a strict policy needed to be employed. Plastic was banned in just eight to ten days after he joined and a fine of ₹ 500 was introduced for those who continued to sell plastic bags. Due to a ban on plastic carry bags, the amount of plastic reduced from one ton to sixty kilograms, all of which was recycled in the making of roads.

Furthermore, post the implementation of the source-segregation rules, if households failed to segregate their waste or did it incorrectly, their garbage was not collected. A system of strict surveillance was also used of make sure the *Nagar Parishad* employees did their work properly.

As a part of the implementation, the landfill was converted into a garden, compost site and waste processing unit. When we visited the garden we noticed that there was a shed with samples of twenty - seven types of waste that Mr. Kokare hoped to segregate it as. As mentioned in the previous chapter, the garden now also served as a major tourist attraction in Vengurla MC.

Mr. Vilas Thumbre, a member of the municipality, stated that when the working plan of the system was introduced to the members of the *Nagar Parishad,* they were skeptical about its success. Initially, citizens were asked to give their unsegregated waste to the *Nagar Parishad* which would otherwise be thrown on the streets. Then campaigns about source segregation began. He stated that Mr. Kokare and other members including himself visited every household to inform residents about segregation and ask them to segregate their waste into various categories as per their properties. This was broadly divided into wet and dry. They also educated the residents about the benefits of segregated waste such as reusability.

However, some people resisted this change. They said that source segregation was not possible since it was time consuming. When Mr. Thumbre was questioned about this, he only concentrated on those who segregated waste and paid little attention to further questions regarding those who acted otherwise.

As a part of this initiative a *Swachhata* Committee (also called *Swachhata doot*) composing of the area's residents was also appointed by the *Nagar Parishad* in 2015. Two groups of 15 members each were assigned to each of the town's 17 wards. Their role will be further elaborated in later sections.

The stated monthly profit of the *Nagar Parishad* as a result of the new system was estimated to be around one lakh rupees.

3.3 The *Nagar Parishad*'s Future Plans

Though many initiatives had already been taken, many more were continuously being planned. For example, one of the 'soon-to-be-implemented' plans of the *Nagar Parishad*, called the 'One Teach Ten' initiative, encouraged each citizen to teach ten others about segregation. It aimed to remove the mental block many citizens may have with respect to the model. Mr. Kokare also told us that the *Nagar Parishad* had recognised the problems residents were facing with just one dustbin. As a response, they had planned to distribute a second dustbin soon.

The eventual future goal of Mr. Kokare was to facilitate and implement a system where waste can be segregated into 27 categories from the household level itself. These have been further elaborated in the next chapter. He said that people can help this movement by making efforts to understand and distinguish between all these categories.

Mr. Kokare had stated that this initiative was lead entirely by the *Nagar Parishad* with the only external help from UNDP's and the Maharashtra Government's funding. He also said that no NGOs had offered any help so far, but that they would greatly welcome it.

According to Mr. Kokare, Vengurla MC currently had a sixty to seventy percent literacy rate in terms of awareness regarding waste management. His aim was to improve the rate to a hundred percent so that everyone could understand the importance of what was being done.

Though the plan was reported as successful within Vengurla by Mr. Kokare, he was aiming to start campaigns that would help make the floating population also more aware. Alongside this he also proposed a sewage treatment plan. However this was opposed by a lot of *Nagar Parishad* members. A decentralized sewage treatment and repairing of old sewages was being planned instead.

Mr. Kokare also aspired to open a training center at the compost site. It would provide audio visual content, a library and a gallery of the progress and process of the town with respect to waste management.

3.4 Applicability of the Vengurla Model

Mr. Kokare stated that just 10 months post the implementation of the model about a hundred other villages started adopting the same model. Some municipals such as those of Maharashtra, Madhya Pradesh, *Mapusa* (Goa) and *Verna* (Gujarat) had also started adopting it. He believed that most people did not know that waste could be segregated into more than just two categories.

The *Nagar Parishad* had organized a two day solid waste management project workshop for around twenty municipal corporations in Vengurla. They were thoroughly educated about the segregation system and treatment of waste at their waste processing site. Vengurla MC also helped nearby villages dispose their waste on a daily basis.

Ramdas Kokare believed that this model could be replicated in big cities like Mumbai, Pune and Delhi as it is sustainable. He emphasized that collective efforts are needed for a project of this kind to work.

CHAPTER 4
IMPLEMENTATION

4.1 Solid waste management

As mentioned in the previous chapter, Mr. Kokare claimed to have implemented the first solid waste management success story in Vengurla MC. Since this is one of the key components of the research, efforts were made to find out more about the specific implementation in the region, and the steps taken to spread awareness on the same.

4.1.1 Spreading of Awareness

The first step towards the implementation of Vengurla MC's Cleanliness Model was to spread awareness and educate the people of the area. In his interview, Mr. Kokare had said that "In a small town like Vengurla MC, it is rather difficult to spread awareness regarding the importance of cleanliness". Thus various techniques and awareness programs like the distribution of flyers and pamphlets were adopted to educate people about source segregation.

The project was first initiated in September 2015 when Mr. Kokare and other members of *Nagar Parishad* started taking rounds of the city from 6:30 am to persuade residents to segregate waste into various categories. This was done by highlighting the health and ecological benefits of segregation, the importance of source segregation and discouraging open defecation. Thus the residents started to gain more knowledge on the scope of waste processing and recycling. The *Nagar Parishad* started with just a few complexes and later made source-segregation compulsory in the rest of Vengurla MC as well. For this a bucket was given to each household for segregation. Route maps were created for four garbage collection trucks that took rounds of Vengurla MC and followed a schedule to collect waste twice a day. A fine of ₹ 500 was imposed on those who failed to segregate their waste. According to Mr. Kokare "It was a really responsive phase…people started throwing lesser waste on the roads and it became more convenient for the cleaners…(since) now they just have to collect the buckets/dustbins directly...gradually as more people got involved the Vengurla Municipal Corporation started being noticed and rewarded."

As a part of this initiative a *Swachhata* Committee (also called *Swachhata doot*) ,composing of the area's residents, was also appointed by the *Nagar Parishad* in 2015. The members of the committee worked within their assigned wards in Vengurla MC. They were responsible for further strengthening the new policy by conducting door-to-door awareness campaigns, making reports and ensuring garbage was not thrown on the streets.

According to him another primary focus was to educate school students about the need for such a program. We were shown a letter format that was given to each student, it was a pledge stating, 'We will not throw garbage here and there; we will not dirty our surroundings'. The students had to write their names on this format and post the letters to their parents. Mr. Kokare described this as an "emotional thing" that was result oriented and that letters from their children were bound to have some effect on the parents.

During our research however we found out that the system was not as ideal as it seemed. As is later discussed, there were people who were unaware of the system and many could not justify its importance. A lot of people also reported that it was only applied in selected areas. The floating population especially were more or less unaware of such an initiative. Mr. Kokare also admitted this by saying that because they are not regular visitors of Vengurla MC, "I don't think the floating population would know about this (new policy)…so whatever campaign we have cannot reach them." He justified this by stating, "They may not understand advertisements...or fully grasp the concept" and hence the residents and not the floating population were targeted.

4.1.2 Types of segregation

As mentioned earlier, the campaigns started with educating residents about source segregation. At the time of our research, residents were required to segregate their waste into wet and dry by putting it in dustbins, buckets or even bags . This would be collected later by the garbage trucks and collectors and then further segregated at a factory level for processing.

A, then, 'soon to be implemented' mechanism as detailed in their public notice titled '*Saptapadi Swachhatechi*' (7 Steps to Cleanliness) urged residents to segregate their waste for the daily collection system in the following order:

Day of the Week	**Waste Collected**
Everyday	Wet, diapers, sanitary napkins, leaves and branches, coconut shells, hair, metal, chicken waste, animal carcasses
Monday	Paper, rubber, thermocol
Tuesday	Plastic, plastic bottles
Wednesday	Glass bottles, other glass items
Thursday	Cardboard, boxboard
Friday	Plastic, cloth, shoes, slippers
Saturday	Electrical tubes, E-waste, mobiles, batteries, T.V. and PC parts

Table 2: Day-wise waste collection plan in Vengurla

When asked about hazardous waste, Mr. Kokare said that there were only two types of hazardous waste in Vengurla MC. They are diapers and sanitary napkins. He explained that about 30 to 40 Kgs of diapers, and 10 to 15 kgs of sanitary napkins were being collected daily. These were sent to a nearby biomedical agency called Govind for proper incineration (this was stated as the only processing option for this waste since it is also non-biodegradable). However, believing that Vengurla MC should me more self-sufficient, he had an incinerator installed in the town.

4.1.3 Collection

Before the implementation of the new waste management system and policy, there were twenty five permanent laborers, ten contractual laborers, and five drivers who had been hired by the *Nagar Parishad* for collecting waste. After the implementation of the new model in 2015, four additional vehicles were

bought and twenty more workers were employed on a contractual basis to overlook the compost project in the garden and factory area.

These four vehicles along with one tempo/tractor were appointed for the collection of segregated waste. Each of the four vehicles had two collectors and one driver assigned to them. As mentioned earlier, in order to collect from all 1000-1200 households of Vengurla MC, the *Nagar Parishad* had divided the region into four parts. Each truck had been assigned a particular route and schedule that had to be strictly followed. The trucks were tracked using a mobile tracking GPS system to ensure they visited all areas.

Mr. Kokare told us that the collectors were under strict instructions to not skip houses. This was cross-verified by either him or a member of the *Nagar Parishad* every month. He stated that, “We check if all the houses were covered, and ask everybody if their houses are being skipped”. He also told us that the collectors were not supposed to accept the waste until it is segregated. “When people make mistakes in segregating the waste our workers are supposed to not accept it..(they should) inform them about the correct way of segregating”.

As mentioned earlier a lot of effort was put on segregation at a household level, however in terms of public dustbins the emphasis was comparatively less. When asked about the same, Mr. Kokare told us that only the market area was relatively more populated and hence had public dustbins. He did not want to install more public dustbins as he believed they would be used to dump household waste.

4.1.4 Waste Processing and Recycling at Vengurla

During our pre-field research we had found out that UNDP had funded a “plastic crusher machine” among other waste management activities in Vengurla MC. This and the other processing units are present on the land that used to be a huge landfill but is now a garden.

The plastic crusher was used to process light plastic items such as wrappers and bottles. Mr. Kokare and Mr. Thumbre told us that every day, up to 180 kg of light plastic and thermocol was first washed, dried and then crushed.

This was then heated with bitumen to make tar and the mixture was used to pave roads. The plastic and thermocol supposedly made the roads sturdier and more resistant to bad weather. As the maintenance costs are reduced, this helped them save up to ₹ 10,000 per stretch. About 1 tonne of plastic was used to make a one kilometer long road. This was roughly 1 million carry bags. A few auto drivers told us that these newly constructed plastic roads were much smoother and easier to drive on.

When asked about harmful fumes and particulate matter, Mr. Kokare told us that, "The mixing of bitumen and plastic takes place in a closed chamber so there is no release of harmful fumes in open air". The workers were given masks as a precaution. Mr. Kokare was inspired to make the plastic roads in Vengurla MC after reading the success stories of Mr. Ahmed Khan from Bangalore and Mr. Vasudevan from Madurai who first implemented the idea.

The plastic shredder was maintained on a regular basis and was also used for crushing big branches, leaves and coconut shells. This was because smaller pieces hastened the process of composting. This and all other wet waste was put in the biogas plant in the garden's vicinity. Due to the release of methane the plant produced thirty units of electricity per tonne of waste. This was used to power the rest of the machines. Mr. Kokare said that this also helped reduce the electricity bill from ₹ 50 to 60 thousand to ₹ 12 to 16 thousand per month.

Dry waste such as cloth, paper, and cardboard were also crushed and made into briquettes. These were then sold as alternative fuels to cement factories who used them for their boilers.

Mr. Thumbre informed us that there were nine permanent and twenty one contractual workers in the factories, Mr. Kokare also told us that the contractual workers in the waste processing units are residents of Vengurla MC's neighbouring villages. They were trained on how to operate the machines before they start working.

4.2 Initiatives to curb open defecation

Alongside the new waste management system, Mr. Kokare sought to completely eradicate open defecation in Vengurla MC. For this many public toilets were built. Measures were also taken to construct at least one toilet in each household of town. Those who did not have the space for the construction of a private toilet could use the newly constructed nearby ones.During the time of our research, there were 52 public toilets in Vengurla MC.

Another measure take by Mr. Kokare and the *Nagar Parishad* was to take rounds of the city early in the morning to stop such acts and to spread awareness about it. There was also an arrangement, wherein if a person was spotted openly defecating, the employees would play the *dholak* (drum) and call out the person. This was done with the intention of making the perpetrator feel embarrassed and not indulge in the act again.

The bio-toilet was a new initiative, taken by the *Nagar Parishad*, that was inaugurated during the time of our visit. The idea behind it was to recycle all human waste collected in toilets by converting it into manure. This is done by the introduction of bacteria, which are saprophytes. In order to attract more people to them these toilets had been painted. Mr. Kokare believed this would encourage people to use them and make them feel more comfortable. This idea was brought into action with the help of Mr. Ajit Parab who is an architect from Vengurla MC. They were scheduled to construct more of these in the coming year.

The first award Vengurla MC received was for stopping open defecation in their jurisdiction. Mr. Kokare said that, “The award we received for being ‘An Open Defecation Free City’, helped us strengthen the initiative.”

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CHAPTER 5
COMMUNITY PERSPECTIVES & OBSERVATIONS

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The backbone of the implementation of a cleanliness model like Vengurla MC's depends on the efforts put forth by its community. The purpose of this research was to gain insights into the perspectives and opinions of the citizens regarding the same. In order to explore the changes and progress of waste management system, we conducted surveys in various residential areas and schools across Vengurla MC. An analysis of the same is elaborated below. This chapter also covers the community's outlook regarding the impact of the model on an organisational as well as an individual level.

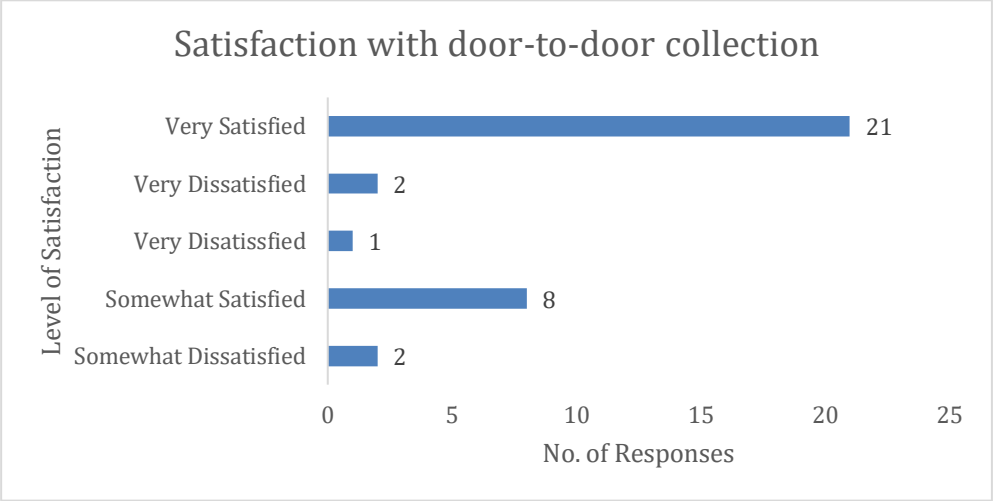
5.1 Overview of Resident's Survey Results

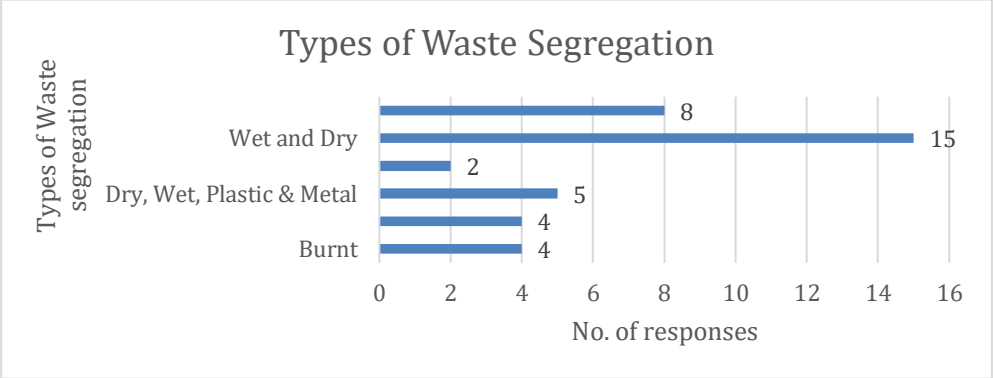
We conducted surveys covering most areas of Vengurla including the market area, Mhada, Manek Chowk, Anandwadi, Bandar port and Dhaboswada. Our aim was to assess the residents' views of the newly implemented waste management system. Almost all respondents believed that waste segregation was important as it helped reduce pollution, improved cleanliness and health, and encouraged the reusing and recycling of objects. Not all respondents were satisfied with the door-to-door waste collection system. Their primary complaint was that the trucks only collected source sorted waste. Moreover, there were incidents of the trucks not coming on some days for the collection.

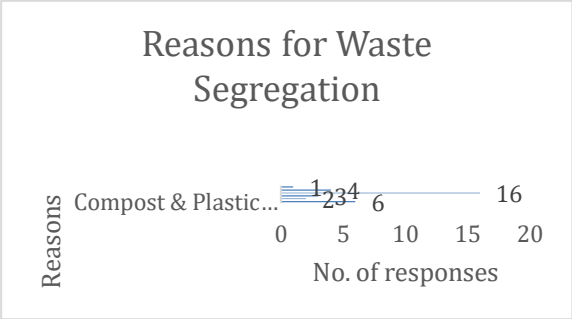
While almost all residents of Vengurla MC owned a private toilet, the shortage of public toilets was a common complaint of the people. This shortage was especially apparent for women and construction workers. The latter come from outside and are forced to openly defecate and publicly urinate.

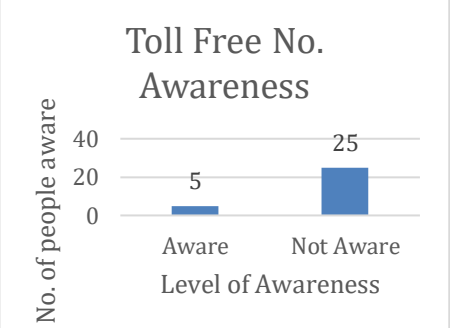
The municipal corporation had claimed to provide a toll free number in case of any doubts or further information. Almost everyone was unaware of this. While most claimed they hadn't faced any problems yet, some residents had directly complained to the head office after which the reported problem was taken care of.

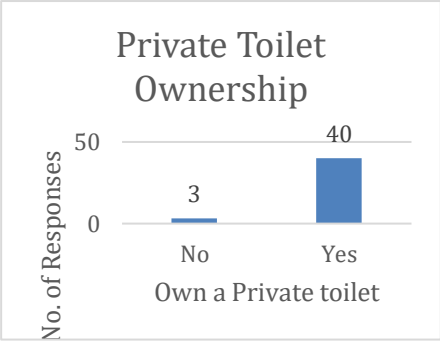
5.1.1 Key Resident's Survey Results

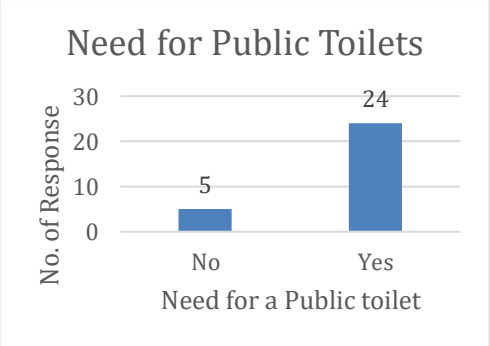












5.1.2 Specific Focus

Below are a few interesting details that could not be captured in the survey answers of some of the residential areas.

Anandwadi

This was a schedule caste dominated complex and had a population of around five hundred people. Lying towards the outskirts of Vengurla MC, the area had its own functional cremation ground which was constructed back in 1998. The wood and fuel for all cremation purposes is funded by their own trust as nothing is provided by the *Nagar Parishad*. Since, most of the waste collectors and some municipal workers came from this area, any problem with waste collection was easily rectified. In spite of the trucks and waste collectors coming there regularly, houses closer to the cemetery and in the interior sections, were neglected. Hence, more than often, the waste which is not collected was burnt in the cemetery. The issue of open sewage, however, was resolved. It had been covered up with the construction of a footpath a few months prior.

Mhada and Nagar Vanchalay

A majority of residents we interviewed in these areas were happy with the waste segregation scheme.

Bandar Port and Dhaboswada

The residents of this area were mainly from the fisherman population. It was also Vengurla's only port (inactive). The primary complaint reported by the residents here was about the poor sewage system. Mr. Kokare claimed the sewage water percolated into the soil, near Dhaboswada, hence did not flow into the ocean. However, on further exploration we found out, that a run off of sewage waste directly goes into the sea. This place within Dhaboswada was, in fact, very close to the site where ecotourism was conducted. Moreover the Bandar Port jetty was extensively damaged and almost inaccessible. In an interview with one of the fishermen we met there, he claimed that the municipality was flawed and corrupt. No action was taken by the *Nagar Parishad*, in spite of the innumerable persistent complaints about their poor living conditions and the sewage system. This is

contrary to one of the results of the survey which stated that the *Nagar Parishad* responded to problems frequently.

St. Luke's Hospital

Originally a large hospital covering many acres of land, St. Luke's Hospital was now a sort of ruin. The hospital had shut down around six years ago when the head doctor and owner died without an heir. The hospital workers continued to stay there since the legal owner of the land was not clearly known to anyone. When we visited, there were many people living in that area. When we visited the hospital's structure was in shambles with weed and rust almost everywhere. In interviews with the residents we found out that they cleaned the place once a year. Though they were given dustbins for waste segregation from the municipal corporation, the garbage trucks stopped visiting there after the first few months; hence the residents were forced to take care of their waste in their own way. Most residents resorted to burning their waste. All houses had a toilet and there were no public toilets in the area.

5.2 Overview of Student's Surveys and Observations

5.2.1 Overview of Results

We conducted a survey on hundred school students from classes 8, 9 and 10. Age of students ranged from 12 years to 16 years. The surveys were conducted in two schools – Patkar High School and Vengurla High School. A majority of the students believed that waste segregation was important. The main reasons given were:-

1. Improper waste segregation and treatment could lead to illnesses. E-waste has a negative impact on health. Waste accumulation would mean an increase in mosquito numbers and consequently vector borne diseases.

2. Proper waste segregation increases the number of items that could be recycled and reused.

3. Waste accumulation, especially of non-biodegradable wastes like plastic, is harmful to the environment.

Most students segregated their waste at home and in school. We asked them about the different categories they segregate their waste into. Most students segregated waste into wet and dry at home. In school, a separate dustbin for paper is also kept.

Waste management and segregation was taught in environmental science, science and community service classes. While subjects taught and ways of creating awareness are similar in both schools, Vengurla High School starts teaching their students about waste management from the 5th grade onwards while Patkar high school starts this 8th grade onwards. The subjects are mandatory. Apart from this, awareness was also spread via programs and other school activities.

'*Swachhata Divas*' or the day of cleanliness is celebrated by Patkar High School. They organised activities like drives to clean roads and improve their surroundings. Mr. Kokare also visited the school and showed the students a video on the importance of waste management. The principal was also very vocal about supporting the program. In Vengurla High School, cleanliness drives and essay writing competitions were conducted. People from the *Nagar Parishad* visited the school to educate students about waste management. Workshops, poster events and tree planting drives were also organised.

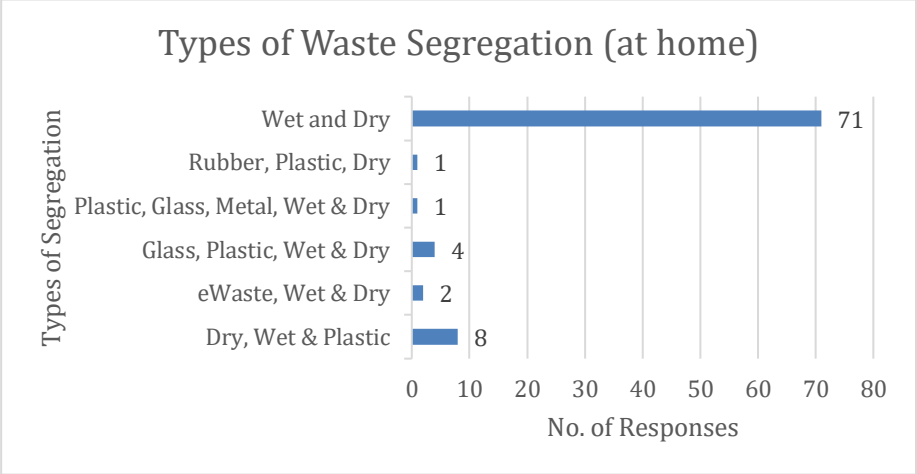
Another school by the name of *Purna Prathmik Shala* informed us that they conducted skits for small children. Two students were also appointed as 'cleanliness monitors' to ensure all students followed rules and each student was encouraged to write letters to their parents on 'Cleanliness'.

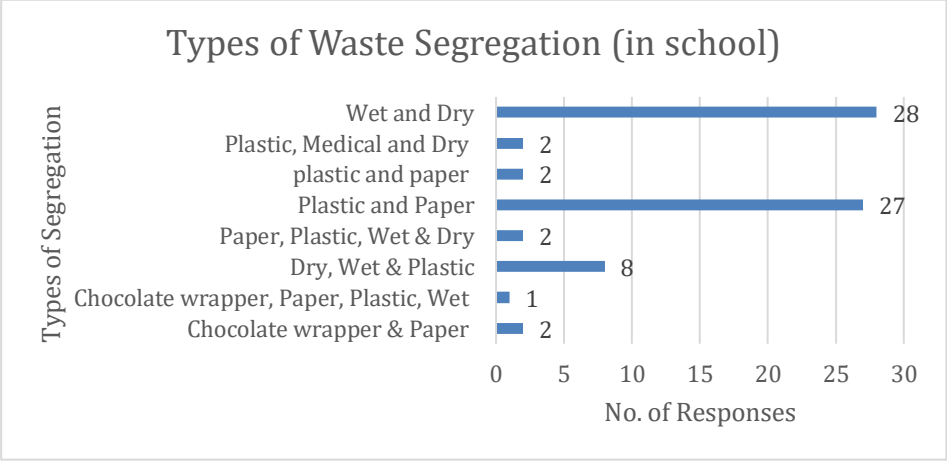
The students were asked if they were happy with the waste management system currently employed and if they would like to improve anything. All students agreed that even though the new system had brought about visible positive changes and their surrounding had become cleaner, there were areas it could improve in. Students have suggested that source segregation should be enforced and waste should be collected from all household including those that are

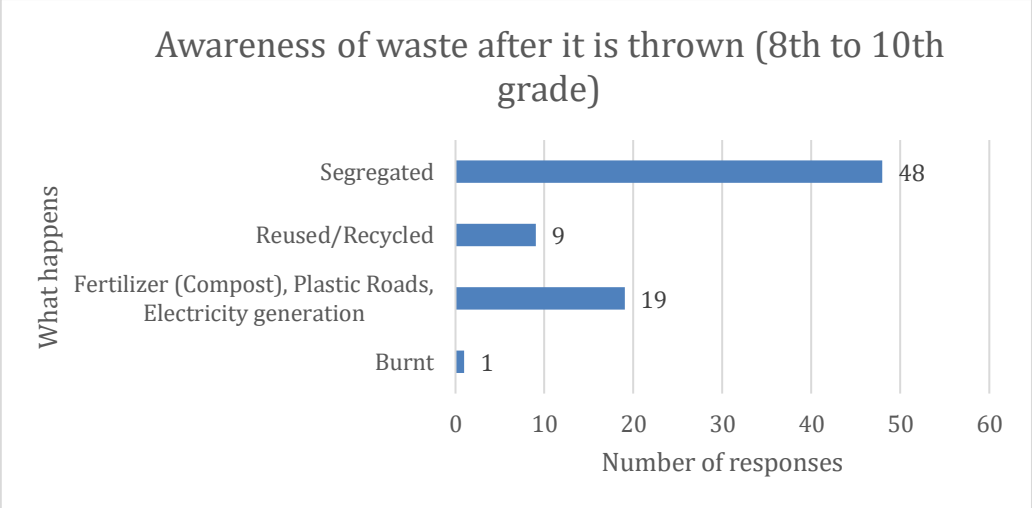
not on the main road. Public dustbins for dry and wet waste should also be placed everywhere.

A concerned school authority figure who did not want to disclose their name told us that before the implementation of the waste management system, Mr. Kokare had met with all schools and informed them about the strict guidelines. While Vengurla MC has become cleaner, the problem of sewage still remains. This particular school had an open sewer running behind it. Despite multiple complaints, no action had been taken by the municipal corporations. If windows are shut to combat the stink, the classrooms suffer from ventilation and sunlight problems.

5.2.2 Key Student Survey Results







5.3 Visiting Vengurla's Popular Hospitals

5.3.1 Sanjivani Hospital

Sanjivani hospital was one of the two major hospitals in Vengurla MC. It was a private hospital that was founded in 2008. We interviewed Dr. Ubale Daru (resident of Vengurla MC since 12 years) , the main doctor in the facility. We aimed to find out more about waste management at hospitals, how they dealt with hazardous waste and whether there had been any changes in the number of reported ailments since the implementation of the new model.

Dr. Daru told us that the hospital segregated their waste into wet, dry and medical. A *Nagar Parishad* truck would come to collect wet and dry waste every day, while medical waste was sent to a nearby biochemical enterprise. Though he appreciated Vengurla MC's new system, he stated that a lot more awareness needed to be spread. He said that, "This is the drawback of the municipal council; they need to educate them (the citizens). Education system is not there, there is no supporting backbone." He also told us that many people threw their garbage out on the roads at night post 9:30 pm. This is proof that they were not aware of the importance of segregation.

Dr. Daru also said that in their hospital, the reports of environmental and water borne diseases such as malaria, dengue and leptospirosis had drastically

reduced in the past few months. For example, there was only one case of malaria in the previous four months, and none of leptospirosis in the previous two years.

5.3.2 *Gramin* Hospital

The *Gramin* Hospital is Vengurla MC's most frequented public hospital. While we were unable to arrange a meeting with the doctors due to their busy schedules, we interviewed the hospital's supervisor and one of the nurses, Ms. Kanekar. Similar to *Sanjivani* Hospital, they reported a decrease in the number of cases of environmental and water borne disease and leptospirosis. The hospital's waste was also similarly segregated into wet, dry and biomedical and the municipal truck was regular and punctual. They were very appreciative of the initiative. They told us that they had held various health-related awareness programs, one of which was attended by Mr. Kokare.

Their recurrent complaint was the poor sanitation facilities for construction workers. The construction work had recently boomed in Vengurla MC and areas like *Camp* did not have proper sanitation facilities for the workers. They told us that these construction workers were the primary contributors to the waste and open defecation cases in Vengurla MC.

Upon inquiring about the cases of disagreement and disobedience in the town, with respect to the waste management system, both interviewees became very defensive. They stated that, "Nobody knows better than us if it (waste segregation) is happening or not. So what I'm saying is concrete and a 100% true." They commented by comparing the municipal's work two years ago, "They were in a sleeping mode, now they are in an active mode…This has changed...all because of Mr. Kokare."

5.4 Tourism in Vengurla

We wanted to find out whether the new model had attracted more tourists to the area, we tried to gain insights by visiting a few hotels and popular tourist destinations. Overall, no major changes were reported since the implementation of the new model.

5.4.1 Hotels

We conducted interviews of the managers of three hotels in Vengurla namely, Myboli Hotel, Gazali Hotel and Golven Resort. We found that the major kinds of waste generated included left over food, plastic, broken glass, bones and tissue paper. All three hotels segregated their waste into wet and dry. The managers also agreed that this was a positive step towards overall cleanliness. The waste from Myboli Hotel and Gazali Hotel was collected by the garbage trucks, however since Golven Resort falls outside of the Vengurla MC jurisdiction collection does not take place there. They thus bury most of their waste under soil and sell plastic to local collectors. Golven Resort is on Sagareshwar beach and the staff make sure the surrounding area is cleaned regularly.

The hotels unanimously agreed that making guests segregate their own waste did not make much sense since waste generation in each rooms was minimal and usually only consisted of tissue paper and bottles. Hence, guests were only provided with one wastebasket in the room and the hotel staff did the segregation themselves.

Gazali Hotel and Golven Resort are both located slightly away from the main city, and claimed that there was no substantial increase in the number of guests they received after the implementation of the cleanliness drive. On the other hand, Myboli Hotel which is located in the heart of the city reported a slight increase in the number of guests, followed by a subsequent decrease post the introduction of GST. They did not attribute the temporary increase to the new model since this was around holiday season.

5.4.2 The Lighthouse

The lighthouse of Vengurla MC which has been there since the 1960s, is considered to be one of the top tourist destinations. On visiting the lighthouse, we interacted with one of the two lighthouse keepers, Mr. Anand who had been working there for four years. There is one more lighthouse on a nearby island, however we could not got there as a boat was only sent every 15 days, for Mr. Anand and the other lighthouse keeper to switch. Mr. Anand said that despite being a beautiful tourist destination, the lighthouse was rarely visited as it is very

far from the main city and the road up the mountain is very rocky. This also made it impossible for garbage trucks to come there, however this isn't much of a problem as only 1-3 people live there at a time.

Mr. Anand told us that he had not noticed any major changes in the visitation since the implementation of the new policy and that the number of guests is extremely erratic; in fact sometimes there were no visitors for months together.

5.4.3 Mandavi Mangrove Ecotourism

The Mandavi Mangrove Ecotourism Project had started in the previous year when UNDP approached a group of 10 women who belong to families involved in fishing business. They (UNDP) were very interested in the area's biodiversity and thus took this initiative that was set in the backwaters of the river flowing through the area. This was a ₹5,98,000 investment for the UNDP as they provided the women with two boats, life jackets and so on, they also bear all maintenance costs for the boats. The women said that various officials helped them learn the botanical names and features of the trees and birds present there, and also made arrangement for English-language classes for them.

As a part of this 'one of a kind' nature safari, the women used boats to take guests through the mangroves. They took up to five rides per day and charged ₹100 per person. They also reported that so far they have had the maximum number of guests in April.

Upon our visit, we noticed a lot of plastic and dry flowers lying in the water, especially near the docks. We asked the women about this and they said that after the implementation of the cleanliness drive, the amount of plastic has considerably reduced. Earlier there used to be a lot of plastic in the water, which used to choke the roots of the mangroves, however, the situation has been much better since the implementation of the drive. The women said that that they generally try to prevent tourists from littering as much as possible, yet many still throw flowers into the river as a sacred act. People also celebrate Ganesh Chaturthi in the river, hence clay from the idols tends to stick to the ground. Since

this is located in Dhaboswada, where the sewage system is extremely bad, a lot of run-off ends up in the river as well.

5.5 Interactions in the Market

While many of the vendors reported that the cleanliness drive had improved the situation of the area, others were extremely unhappy with the implementation. Additionally, though Mr. Kokare said that public dustbins had been installed in the market, none were noticed by us.

Despite the ban on plastic, we noticed that it was still used to a fair an extent in the market. It was observed that many shoppers also kept them inside their cloth bags. The fish sellers stated that they still use plastic to sell their daily catch. This was because of its slimy surface and strong smell. Customers also prefered to purchase fish in plastic bags.

A vendor who requested to keep their identity a secret claimed that the new cloth bags used in the market were actually made of Virgin Polypropylene, a type of plastic. He had even burnt a small portion of the bag to further prove his point. He claimed that the authorities were also aware of this but no preventive measures were taken.

5.6 Conversing with Fishermen

During our pre-field work we had decided to talk to the fishermen of Vengurla, especially since it is one of the main occupation and source of income in that region. We had hoped to find out whether the new system has affected them in any way.

Our hotel was near the Sagareshwar Beach (the closest beach to Vengurla MC) in Ubadanda. This helped us to easily interact with some fishermen there. The fishermen said that for many generation, their livelihood depended on the catching and selling of fish. They earned ₹ 2000-3000 per day by selling fish in the Vengurla MC market. However they had been facing trouble since the demolishment of the fish market a few months prior. Since the contractor’s budget for constructing a new market had not been approved, they were forced to sell their fish on a roadside. The road was filled with dirt, plastic waste, rotting organic waste and stagnant water despite the implementation of the cleanliness drive.

Some of the fishermen interviewed, lived just outside the Vengurla MC vicinity and were unaware of the new policy implemented despite visiting the fish market every day. They explained that, each day, they usually caught fish before sunrise and sometimes even as early as 2am. The fish are sold in the morning and the afternoon by the wives of the fishermen. The price of the fish was decided according to the catch for that day. The main fish caught were Mackerel (*Bangada),* Pomfret *(Paplet),* Ribbon fish (*Bala)* and Prawns *(Kolmbi)* along with crabs and squids. They reported that the number of fish caught in recent years had decreased and attributed this to new businesses and big boats in the area. However, no changes in the variety of species caught in the past year, were noticed.

The fishing nets were primarily made of nylon. These nets were regularly purchases depending on the season of fishing as well as the size of the fish being caught. They had to be frequently replaced as dolphins often tore them. They were also contaminated by poisonous fish. Old nets were sold to a collector after which its disposal was unknown. We noticed many torn and discarded nets along with other broken fishing material near the seashore.

5.7 Meeting the Farmers

We interviewed farmers with the assumption that they used the fertilizer produced at the compost site. These were cheaper than the commercial fertilizers that were traded in the market. However, the farmers did not use this. The reasons provided were that the organic fertilizer did not give quick results and that they were able to afford the commercial fertilizer. Moreover, the higher prices of commercial fertilizer as compared to the organic fertilizer do not play an important role as the latter lacked the proportion of nutrients required for the crops grown.

They said that using the manure for plantation crops rather than agricultural crops would probably yield better results. However this was not used at the Fruit Research Centre either.

5.8 The Municipal Workers

5.8.1 Waste Collectors

For our research we were able to interact with the waste collectors from Trucks no. 1, 2, and 3, as well as their respective drivers.

We spoke to Mrs. Saijal Suchin Jadhav. She and her co-worker had been long term employees (10 years and 20 years respectively) of the *Nagar Parishad*. Mrs. Jadhav said that as part of the program they were given gloves and masks to wear during collection. She recalled that many houses resisted the new model in the initial 2-3 months, however now most citizens comply. They send a notice to people who do not segregate their waste but are more understanding and helpful towards people who may not understand the system fully, for example senior citizens. She said that her salary had increased since the implementation of the new policy and that she was happy with her job.

Mr. Mohammed Jadhav who was also a collector from a different truck was asked about the nature of his job. He said that he had been working for the past four years under this department, however gloves and masks had not been provided to him. He collected all the waste, even if it had not been segregated since he believed that the garbage would pile up and cause more problems later. However he stated that over 90% of the houses he goes to segregated their waste. His salary had increased as well.

We also ran into Mr.Yuvraj Yadav, a garbage collector while surveying the residents at Camp. He was with another female garbage collector and the garbage truck driver. They told us that the system was not actually as it seems. The workers needed permission from their superiors for sick leaves. Mr. Yadav had been employed on contract basis for five years and his female co-worker for ten years. They also said that despite what the officials claim, they only earned ₹ 197 per day, a salary they are extremely unsatisfied with. This was highly inconsistent with the salaries previously stated to us by the *Nagar Parishad.* These were ₹ 350-400 per day for contract workers and a monthly salary of above ₹ 15,000 for permanent and senior employees.

When Mr. Kokare was asked more about the basis on which permanent and contractual workers were chosen, he stated that, 'Those who have been here since the beginning are considered permanent; it is on a first come first serve basis'. When asked to further elaborate on the same, he claimed not to have a say in the existing 'structure'.

5.8.2 *Nagar Parishad* Office Cleaner

We met Mr. Suresh, a sweeper of the municipal offices at the *Nagar Parishad*. He had previously worked as a road sweeper. He worked alongside both permanent and contractual employees at his present job, who he believed were all well paid. He told us that permanent benefits were given by succession, and that he was permanently employed. He was content with his work and salary. He fully supported Mr. Kokare and the new policy. In fact, when informed about the negative feedback received from other residents he disregarded it and continued to praise the waste management system. When asked about his opinion on the plastic ban, he agreed that the initiative was beneficial. He reasoned that, "It's good that plastic is banned It looks bad and flies everywhere." He told us that there were eight public toilet cleaners but as is further discussed in the next section there was only one. He also believed that holidays must not be taken for his kind of work and that it would be best if few leaves are taken. He believed that taking holidays would only lead to the accumulation of dirt everywhere.

5.8.3 Vengurla's Public Toilet Cleaner

Along with Mr. Suresh, we had also met Mr. Dilip, the public toilet cleaner of Vengurla. He said he was the sole cleaner and that he cleaned all fifty two of Vengurla's public toilets. He worked from 6am to 2pm every day (except Sunday). He said that the previous generations of his family had also been doing the same work. He started working in 1999.

He said that he was permanently employed and earned ₹ 770 on a daily basis. He was provided with cleaning agents and other cleaning appliances to use on the toilets which are often extremely dirty due to heavy usage. He was also given a mask but preferred not to wear it since he found it suffocating.

Mr. Dilip told us that the major difficulty he faced was that he sometimes had to manually remove clogged sanitary napkins from the toilets. He had been assured medical facilities when required but had not fallen ill for the past 18 years. However, it was also very difficult to take leave. Though a back-up had been assigned, no one liked to do the job he did and they refused to do it. Like Mr. Suresh, he also believed that jobs like his did not deserve any holidays.

When we asked Mr. Kokare about his working conditions and whether there was a need to hire more people for the job, he said that one man was enough.

5.8.4 Factory Workers

We interacted with three newly appointed workers at the waste processing unit. They were all women and were in charge of sorting the waste and running the machines. Work was divided amongst themselves autonomously. They demonstrated their work to us with the plastic shredder machine. They worked for twelve hours a day. When asked about the work and health conditions, they said that they had not yet encountered any health issues caused by their line of work. Even though gloves and masks were provided to them by the *Nagar Parishad*, we noticed that they were not being utilised. When asked about this, they said that they wear gloves only while dealing with wet waste and rarely ever use their mask.

5.9 Construction Workers

Our aim behind interviewing the construction workers was to know if they had proper sanitation facilities since most of them were hired on the basis of contracts and were not permanent residents of the Vengurla MC area. We visited three construction sites. Two were in Meena Park area and one was in Bharadiwada. All workers whom we interviewed were on contracts.

One of the sites in Meena Park did not provide a toilet for the laborers. They had been working there for the past five to six days and said that they had no option but to defecate in the open, in the nearby barren land. Moreover, we asked them about how they disposed their waste as we noticed they cooked on the construction site itself. They said that they collected all the waste, piled it and burnt it as no one came to collect it. They

burnt the plastic too. The waste generated from construction activity was left at the site and someone else came and collected it, the details of which they did not know.

The construction site in Bharadiwada provided a sanitation facility to the workers but it was built on someone else's land which was five to six minutes away from the construction site. Most workers found that inconvenient and were unwilling to walk the full distance just to use the toilet.

The workers who did have sanitation facilities were responsible for maintaining and cleaning the toilets by themselves.

5.10 Other people interviewed:

5.10.1 Atul Hule

Atul Hule is a civil engineer who advised the government and local people under the tourist department of Vengurla MC. He had been a resident for the past 15 years and gave us information widely contradictory to a lot of what has already been mentioned before. He firmly held the opinion that Vengurla MC had always been a clean city, and that the problem of road blockages due to poor waste disposal never existed. He stated that the only major changes in the region were those of clearing up the landfill, and the implementation of the waste segregation system.

The major problem, he believed, that needed more attention was that of the poor drainage systems. He even claimed to have advised the government a plan-of-action to better the system but they paid him no heed. He said that, "If they (the municipality) take my suggestions, they will not be able to misuse the funds". He was aware that the cloth bags aren't pure cloth but did not believe any harmful fumes were being emitted upon its burning.

5.10.2 Ganesh Yadav

Ganesh Yadav is a contractor residing outside Vengurla MC who travels to the town every day for work, we met him at the construction site of the new Fire Station. Mr. Ganesh helped provide us an outsider's perspective on the waste management of Vengurla. He was a strong supporter of Narendra Modi and the

Swachh Bharat Abhiyan and believed Mr. Kokare's waste management system was praiseworthy. Mr. Ganesh believed that Vengurla's model would not work in large cities like Mumbai and Pune since the power and accountability is decentralised, which causes situations to remain static.

He was a supporter of Kokare's work and gave more insights into the work Mr. Kokare did including the process of converting the landfill into a garden, reading up about various processing units and constructing the plastic road. With relation to this we asked him what he thinks of the harmful fumes that release when plastic is melted to form tar. Initially he did not accept that harmful fumes might be released, however later explained that there are always trade-offs when attempting to do something that is beneficial for society. He gave the metaphor of a classic producer-worker situation in a steel factory wherein the producer gets things done at the cost of his workers.

He reassured us that there haven't been many cases of fires in the town because of burning of waste in the last 2-3 years.

5.10.3 UNDP Project Manager

To find out more about the biodiversity of the Vengurla MC area, we interviewed Mr. Rohit Savant, a project manager at UNDP. He was part of the team that started the Mandavi Mangrove Ecotourism for the purpose of marine conservation and the involvement of local people. He talked to us mainly about the importance of directing community efforts, and the various steps that had been taken by UNDP for biodiversity conservation in the Sindhudurg district. Of these, only one initiative is specific to the Vengurla MC area, that is the nature safari in Dhaboswada. Though he was not aware of the details of the new policy and cleanliness drive, he knew something along the same lines was happening in the region. He said that a major possible benefit of the system is that less plastic would flow into the ocean, and hence the Olive Ridley Sea Turtles which often mistake them for jellyfish would not be exposed to them. This could potentially cause an increase in the number of turtles in and around the area, which come to the shore at the time of nesting. He said this was extremely relevant as the species

has been listed on Schedule - I of the Indian Wildlife (Protection) Act, 1972, and has been listed as "vulnerable" as per the IUCN Red List.

5.11 Outside of the MC jurisdiction

5.11.1 Beaches

In our interview with Ramdas Kokare he had stated that all of the beaches in Vengurla (including the Sagareshwar beach which is where we stayed) were outside Vengurla MC and thus outside of the municipality's jurisdiction. Hence the new policies and drives did not include the beaches or the residents living on/close to them. He still, however, talked about the negative implications of the same and said that few efforts had been made by the council. For example, the beach was cleaned every 1-2 months. He did not state any mechanisms or assigned people who undertook this.

During our visit we observed a variety of waste items on the Sagareshwar Beach including slippers, alcohol bottles, food packets, water bottles, discarded fishing nets and cigarette packets. Many statues of gods and flower garlands were also kept on the seashore. In the early morning we also saw many men openly defecate near the water.

5.11.2 Other Nearby Areas

Mr. Kokare told us that the new cleanliness model was only applied in the Vengurla MC area and not the nearby areas. However, he claimed that, they accepted waste from whoever gives it. The waste collecting trucks only go to various regions within the *Nagar Parishad's* jurisdiction. While on field we observed that there were many areas that the trucks passed by without collecting the waste despite it being on the main road. This may be because even though they are nearby they do not come under the Vengurla MC area.

An example of this was the area in which we stayed, Ubadanda. It is just 2 minutes away from the main road, and had one of the major hotels in Vengurla (Golven Resort), yet waste was not collected from there. We observed that the area had a couple of residents who disposed their waste outside their house. On

the way to the Sagareshwar Beach we also found a meter long burning pit made of concrete. From the leftover items and soot it could be inferred that all sorts of waste (organic, inorganic and plastic) had been thrown and burnt together.

5.11.2 The Case of Parabwada

Parabwada is a small village comprising of about 293 families situated very close to Vengurla MC, yet outside of its jurisdiction. As a result no garbage trucks would come there for waste collection. Their *Gram Panchayat* has put in efforts of their own to keep the village clean. As informed by a *Gram Sevak,* Mr. Bhagti Rajesh, the *Panchayat* followed in the footsteps of the Vengurla Cleanliness model. They distributed dustbins to the residents of the village and also provided public dustbins. The usage of plastic was banned in all shops. Since the village had only four shops, very little amount of plastic waste was generated. The wet waste generated was used by the residents of village, mostly farmers, as manure or compost for their farms and gardens. Mr. Rajesh also claimed that Parabwada, was the first village in the whole of Sindhudurg to receive an 'Open Dedication Free Award'. The village had about seven public toilets that the people initially came together to build but were later on funded by the *Gram Panchayat.* The toilets were maintained by the residents.

Within the boundaries of the village, a *Zila Parishad's Purna Prathmik Shala* was also present. The principal of the school informed us that the school segregated its waste into wet and dry. We were also shown the in-house compost pit they had for the disposal of waste. When asked about the dry waste she said that the amount of plastic waste is very little and they usually burn it. We observed that the school toilets were in a good condition. The school also organised activities like skits, writing competitions, and so on to encourage segregation of waste and educate the children about waste management.

We also interacted with an employee of a nearby 'Prathmik Upkendra' (Primary Clinic), situated within the vicinity of Parabwada. The waste generated there mostly consisted of syringes and materials used for dressing of wounds and other medical procedures. The dressings were usually incinerated while the

syringes and other plastic materials were collected by another employee at least once in a fortnight.

5.12 Patterns in Observation

From the above observations, a certain pattern can be noticed. In terms of location, we noted that the major complaints and issues were raised from the areas near the periphery of Vengurla MC. While Anandwadi and Camp (Construction site) borders the east side of Vengurla MC, Bandar Port and Dhaboswada borders it towards the ocean (refer map). Like most parts of Bandar port, the interiors of Anandwadi were also largely ignored by the Nagar Parishad. The proximity to the sea forces Dhaboswada and Bandar port to experience the negative effects of open sewage, open defecation and widens the gap of seclusion. Anandwadi remains comparatively better connected since a lot of garbage collectors and municipal employees come from this area. However, it was interesting to note that, the responses from Mhada colony were predominantly positive despite its geographical location.

The recycling of waste to create manure, primarily for the use of farmers, backfired as the organic compost was not good enough to be used by them. Fish Sellers were shifted to a dirty and relatively congested area despite it being right next to the Nagar Parishad office.

CHAPTER 6
DISCUSSION & CONCLUSION

6.1 Limitations in On-Field Research:

- We were originally hoping to find out more about the changes that came about in the livelihood, biodiversity and economy of the area. Though we visited and talked to various people who would be able to tell us more, most of the results were inconclusive as the participants either did not know, or did not notice any major changes in the listed categories over the previous one and a half years.
- Expansive previous research on certain aspects such as biodiversity, waste management, etc. for the Vengurla MC area was not available. As a result some of the data collected in these respects could not be compared to data of past years.
- Mr. Ramdas Kokare referred us to the architect of the bio-toilets, Ajit Parab. However we were unable to get through to him to find out more about the bacteria used and the idea.
- We were unable to follow-up on the collectors of the fishnets were, and how they finally dispose off the nets. This would have been helpful in finding ways to reuse or dispose such material.
- We were also hoping to meet members of the *Swachhta* Committee to find out about the nature of their present work. However this had been disbanded by the time we went on field
- While conducting the surveys at schools, due to the student's ongoing exams, we were unable to facilitate their process of filling the forms or take individual interviews. As a result, some of the questions were not answered, or were irrelevant to the question. Due to this certain answers had to be eliminated from the analysis. In Patkar high school the class teacher discussed and narrated possible answers to a few students, as a result of which certain answers may be biased.
- Some of the information provided by the different members of the *Nagar Parishad* was contradictory, for example Mr. Ramdas Kokare provided statistics about the number of waste collection trucks, while Mr. Thumbre stated twice the number for the same.
- Some claims and information provided to us by our interviewees are difficult to verify.
- Though the number of men and women surveyed were almost the same, it was observed during data analysis that most of the participants were housewives. Hence the research did not take into consideration other occupations in the area.

6.2 Scope for Further Research

- The vendor at the market showed us that the so-called cloth bags had a major plastic component in them. Further field research can be done on the exact components of these bags, where they are produced, and whether their production and distribution started post the implementation of the new policy.
- A comparison of the waste management system implementation in *Dapoli* and Vengurla MC can be conducted. Both were implemented by Mr. Kokare and were very similar in nature. This would serve as an interesting area to find out more about the implementation styles as well as its success.
- The farmers and agricultural workers of the Vengurla MC area claimed that the manure created at the factory is not useful for their plants since it does not show immediate effects. Further research can be done on how effective the manure thus produced is. The time taken to improve soil quality and fertility as well as its effect on agricultural crops in comparison to plantation crops like banana and mango can also be studied.
- Possible ways in which the citizens of Vengurla MC can package fish without the use of plastic or cloth bags can be further explored by taking into consideration the area, the available resources and the willingness of the people to stop using plastic.
- Various possible sewage system solutions and architecture can be researched on and designed keeping in mind the map of Vengurla and its specific sewage problem
- The area can be re-visited after a few years to gain more conclusive results on the changes in the society and ecology of the area, as well as the success of implementation. For example, the effect on sea creatures can be further assessed by looking at the turnout of the next sea turtle nesting festival.
- Most of the factory workers interviewed (including the manager) were very newly employed, a later visit will help get a perspective from more long term employees of the factory and garden area.

6.3 Conclusion

As a part of FLAME University's Discover in India Program, we initially set out to study the implementation of as well as changes brought about in various aspect, by the new waste management system of Vengurla. We came across the town's cleanliness model due to the media coverage it had received in the past year since its implementation. After doing more extensive readings and pre-field research we were able to gain a better insight on Vengurla MC's solid waste management system. This helped us structure the aims and objects of our research (Refer to Chapter 1, Section 1.3) and was used as a guideline during our field work. However, the unavailability of conclusive data about the changes taking place in the span of two years, became our biggest research gap. Moreover, discrepancies between our pre field research data and onfield observations geared us to take up a new tangent that led us to restructure our research question.

We started out by meeting various members of the *Nagar Parishad.* They gave us an in-depth viewpoint on the new policies of Vengurla. They also detailed the steps undertaken by the municipality to achieve these.

We also wanted to find out about the community's perspective and feedback on Vengurla MC's new waste management system. We sought to gain these insights by conducting surveys and informal interviews with various individuals and groups in the town. This included talking to residents, vendors, fishermen, municipal employees, waste collectors, toilet cleaners among others.

After returning from field and assessing the data collected, we were able to draw various noteworthy conclusions regarding the new system in Vengurla MC:

Though the Nargar Parishad claimed to have implemented the system successfully all over Vengurla, we found that this was only partially true. There were very few households where waste was segregated and collected properly. This mainly consisted of houses close to the main road and ones belonging to relatively well-off and educated families. These were the citizens who understood the need for the model and had only positive views about the new policy. This wasn't the case when one looked deeper into the localities, like the narrow alleys near the market area, the majority of Bandar port and the forgotten part of society that lived in St. Lukes hospital. In such areas, people struggled

with basic sanitation, claiming they hadn't seen proper garbage collection in their neighbourhood in months. These residents could not understand why such a system of proper waste disposal or source segregation was necessary and were, thus, forced out of the loop of the *Nagar Parishad'*s initiatives to create cleaner and healthier town.

Some citizens who only praised Mr. Kokare's work were either directly or indirectly associated with the *Nagar Parishad*. Members of the municipality like Mr. Thumbre spoke very highly of the system and denied any possibility of error on the municipality's side. He blamed any gap in implementation on the mind-set of the citizens alone. Mr. Suresh, the office cleaner, also had only positive thing to say about it. The Gramin hospital staff continued to maintain that "100% waste segregation" takes place in all areas within Vengurla MC. Even family members of the waste collectors (such as the Jadhavs in Anandwadi) said that the system functioned perfectly. This attitude is likely to prevent the formation of any constructive dialogue about the short-comings of the model amongst the members of the *Nagar Parishad*.

Through our subsequent interactions with the waste collectors and residents of other areas in the town we found that the claims of the *Nagar Parishad* were far from the truth. Waste segregation had been made compulsory and a fine was also loosely imposed for not abiding by it. However, there were many households which did not follow the policies either claiming it to be too much of a hassle for them or believing it was not their job to segregate waste. Their line of reasoning was that 'since they had paid taxes, the collectors should segregate their waste'. When the waste collectors from two of the four garbage trucks were asked about how they handle such situations, some said they strictly denied the collection of mixed waste from the citizens to prevent them from giving un-segregated waste while the others weren't as rigid. However, this usually had the opposite effect on residents. If the trucks refused to collect mixed waste, it would often end up being dumped on the streets after dark or it would be burnt in their backyards as a means of disposal. Other areas adopted their own mechanisms of 'composting' which involved dumping mixed wastes near trees. For example, some Daboswada residents threw all of their waste into a nearby pit and then incinerated it. This was with the assumption that the ash produced from the burnt mixed waste would be good for the soil. The residents were not aware of the ill-effects of burning plastic and that the ash of incinerated mixed waste would actually do more harm than good to the soil and plants. The households of

Anandwadi from where the waste were not collected resorted to using their cremation ground to burn mixed waste on a larger scale

It is perhaps due to these reasons that some of the waste collectors were of the opinion that even mixed waste should be collected and weren't as rigid with their collection policy. Some stated that if not collected initially, the waste would eventually pile up and cause them more inconvenience. Collecting the waste on the other hand would keep it from accumulating overtime and from being disposed off by non-eco-friendly methods.

Another significant observation was that many citizens were extremely afraid to give us negative feedback about the model. While some refused to be recorded or give their names, many just refused to talk to us about the cleanliness model. We were often met with scepticism from the residents and shopkeepers who asked us multiple times if this will "go up to the officials" or not. Fear was common amongst anyone who held any opinion other than that of praise for the *Nagar Parishad*. This may also be one of the reasons all of the content available on the internet is in line with the same ideal picture that the municipal workers propagate.

We also observed that all the waste collectors and the toilet cleaner belonged to scheduled caste. A majority of the collectors interviewed had the common surname of Jadhav, a community that lived in Anandwadi. Many of the people surveyed in the area also admitted to having close family members who were employees of the Nagar Parishad. The toilet cleaner Mr. Dilip mentioned that he believed he deserved to do the work as it had been passed down the generations of his family. Moreover he claimed that no one else would like to do a job like his. Thus he was fine with cleaning all fifty two public toilets in Vengurla MC by himself.

Another interesting point to be noted was that the *Nagar Parishad* seemed to take no efforts whatsoever to expand their model to nearby towns or even the areas that were at the periphery of their jurisdiction lines. No awareness drives were aimed as educating the floating population or the fishing communities that lived right outside the town's jurisdictions even when their livelihood required them to come to the city daily.

It is to be kept in mind that the majority of the individuals interviewed and interacted with viewed the changes brought about the system in a positive light. There were discrepancies in the claims made by Mr. Kokare and the *Nagar Parishad* and what

was observed onfield. However, it was agreed that the attempt to clean up Vengurla was a much needed one.

In the end many gaps (Chapter 6, section 6.1) as well as possibilities for further research (Chapter 6, Section 6.2) were identified. All in all the project helped us gain a lot of hands on experience, and taught us how to apply our theoretical knowledge practically. We were also able observe how the implementation of policies work in a real life setting while being able to personally witness and understand its effect on the community.

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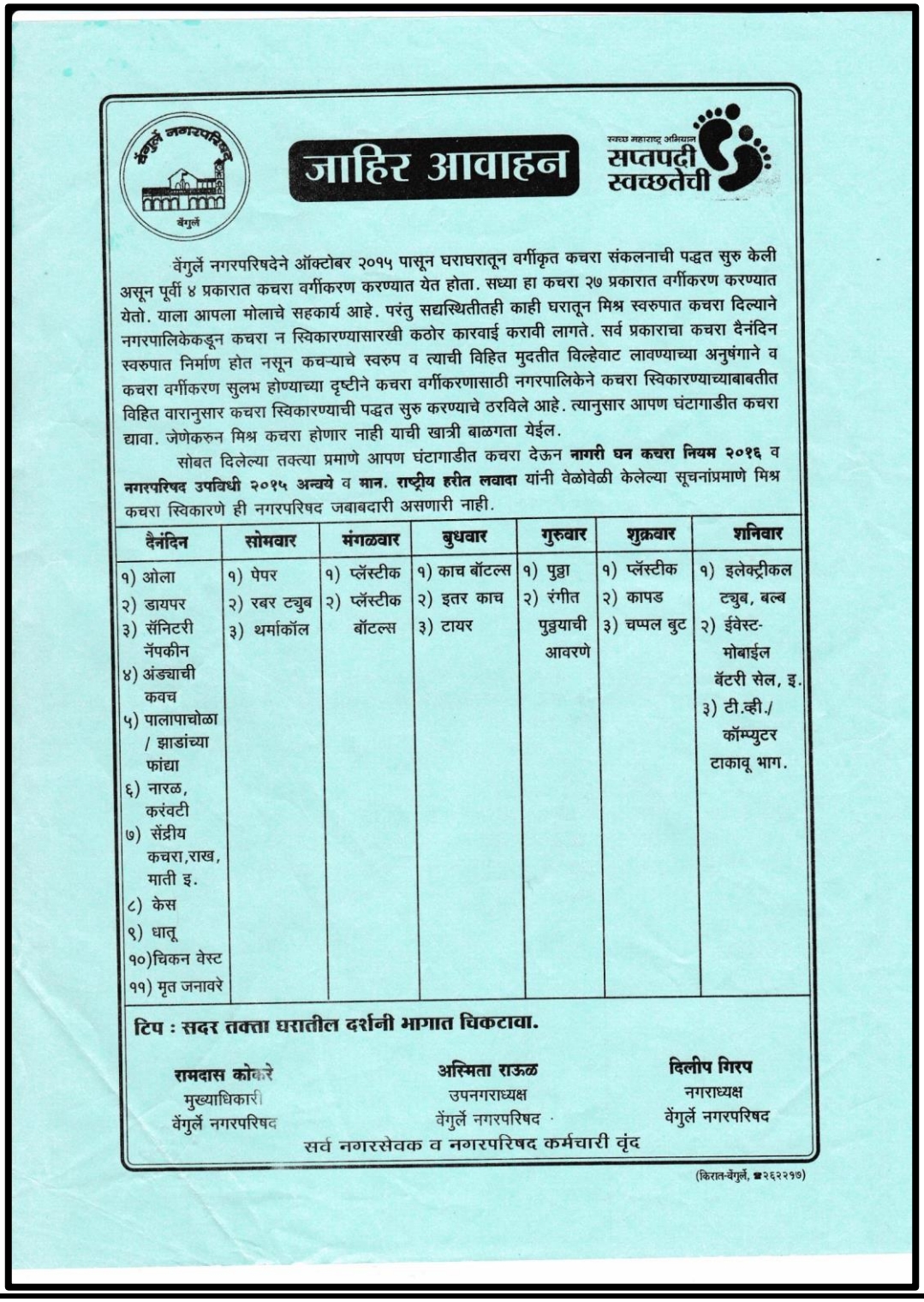
APPENDIX

1. Survey Questions:

Respondent	Survey Quesions
Residents	1. Name 2. Age 3. Gender: Female/Male 4. Occupation 5. Number of people in the household 6. How long have you been living in Vengurla? 7. Do you think waste segregation is important? 8. Why or why not? 9. How many types of waste do you segregate at home, please specify 10. How satisfied are you with the efficiency of everyday door-to-door garbage collection? 11. Does your household have a private toilet? If not, what facilities do you use? 12. Do you think the town needs more accessible public toilets? 13. Are you aware that there are toll free numbers that you can contact when you have grievances regarding any waste related issue? If yes, have you ever contacted them and was the process productive? 14. Did the municipal council provide the household with any aid to ease the process of transition into 100% waste segregation? (free dustbins, awareness hand-outs, etc.). If yes please mention 15. Overall, the imposition of new laws in Vengurla and the transition it went through in terms of its waste management has had a.. Positive Impact/Negative Impact/Both
Students	1. Age 2. Grade 3. Do you think segregating our waste is important? Why or why not? 4. Do you practice waste segregation at home? If yes, what are the types? 5. Do you practice waste segregation at school?If yes, what are the different types? 6. Do you know what happens to your waste after you throw it in the dustbin? 7. Is there anything about Vengurla's rules and system of waste management and cleanliness that you would like to change to make Vengurla better? 8. If yes, please talk about it briefly 9. In school, are there any subjects that teach you about the environment and/or waste management? If yes, a) What grades are they taught in?

	b) Are they mandatory or optional? 10. Are any activities or workshops or drives conducted in school regarding the environment/cleanliness/waste management? Describe them briefly. 11. As a result of the new policies and rules in Vengurla regarding cleanliness and waste management, did you notice any positive or negative changes in your home/neighbourhood/surroundings?

2. Scans of Documents given by the *Nagar Parishad*:
   a. '*Saptapadi Swacchatechi*'Public Notice on daily waste collection



वेंगुर्ले नगरपरिषद

जाहिर आवाहन

स्वच्छ महाराष्ट्र अभियान
सप्तपदी स्वच्छतेची

वेंगुर्ले नगरपरिषदेने ऑक्टोबर २०१५ पासून घराघरातून वर्गीकृत कचरा संकलनाची पद्धत सुरु केली असून पूर्वी ४ प्रकारात कचरा वर्गीकरण करण्यात येत होता. सध्या हा कचरा २७ प्रकारात वर्गीकरण करण्यात येतो. याला आपला मोलाचे सहकार्य आहे. परंतु सद्यस्थितीतही काही घरातून मिश्र स्वरुपात कचरा दिल्याने नगरपालिकेकडून कचरा न स्विकारण्यासारखी कठोर कारवाई करावी लागते. सर्व प्रकाराचा कचरा दैनंदिन स्वरुपात निर्माण होत नसून कचऱ्याचे स्वरुप व त्याची विहित मुदतीत विल्हेवाट लावण्याच्या अनुषंगाने व कचरा वर्गीकरण सुलभ होण्याच्या दृष्टीने कचरा वर्गीकरणासाठी नगरपालिकेने कचरा स्विकारण्याच्याबाबतीत विहित वारानुसार कचरा स्विकारण्याची पद्धत सुरु करण्याचे ठरविले आहे. त्यानुसार आपण घंटागाडीत कचरा द्यावा. जेणेकरुन मिश्र कचरा होणार नाही याची खात्री बाळगता येईल.

सोबत दिलेल्या तक्त्या प्रमाणे आपण घंटागाडीत कचरा देऊन **नागरी घन कचरा नियम २०१६** व **नगरपरिषद उपविधी २०१५ अन्वये** व **मान. राष्ट्रीय हरीत लवादा** यांनी वेळोवेळी केलेल्या सूचनांप्रमाणे मिश्र कचरा स्विकारणे ही नगरपरिषद जबाबदारी असणारी नाही.

दैनंदिन	सोमवार	मंगळवार	बुधवार	गुरुवार	शुक्रवार	शनिवार
१) ओला २) डायपर ३) सॅनिटरी नॅपकीन ४) अंड्याची कवच ५) पालापाचोळा / झाडांच्या फांद्या ६) नारळ, करंवटी ७) सेंद्रीय कचरा,राख, माती इ. ८) केस ९) धातू १०)चिकन वेस्ट ११) मृत जनावरे	१) पेपर २) रबर ट्युब ३) थर्माकॉल	१) प्लॅस्टीक २) प्लॅस्टीक बॉटल्स	१) काच बॉटल्स २) इतर काच ३) टायर	१) पुठ्ठा २) रंगीत पुठ्ठयाची आवरणे	१) प्लॅस्टीक २) कापड ३) चप्पल बुट	१) इलेक्ट्रीकल ट्युब, बल्ब २) ईवेस्ट- मोबाईल बॅटरी सेल, इ. ३) टी.व्ही./ कॉम्प्युटर टाकावू भाग.

टिप : सदर तक्ता घरातील दर्शनी भागात चिकटावा.

रामदास कोकरे
मुख्याधिकारी
वेंगुर्ले नगरपरिषद

अस्मिता राऊळ
उपनगराध्यक्ष
वेंगुर्ले नगरपरिषद

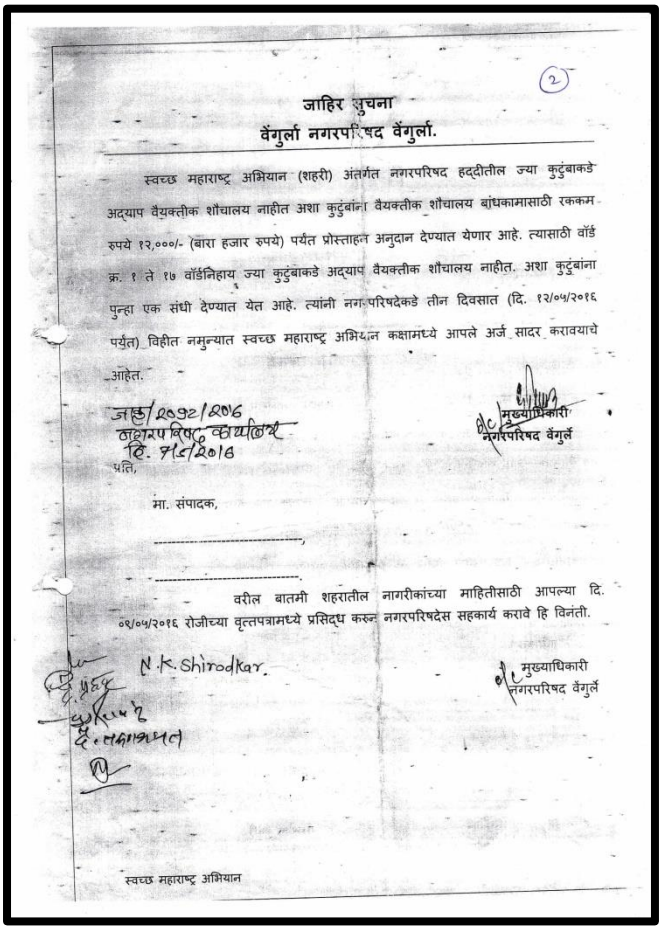
दिलीप गिरप
नगराध्यक्ष
वेंगुर्ले नगरपरिषद

सर्व नगरसेवक व नगरपरिषद कर्मचारी वृंद

(किरात-वेंगुर्ले, ☎२६२२१७)

schedule:

b. Draft of letters students post to their parents on the importance of segregation and cleanliness:



जाहिर सुचना
वेंगुर्ला नगरपरिषद वेंगुर्ला.

स्वच्छ महाराष्ट्र अभियान (शहरी) अंतर्गत नगरपरिषद हद्दीतील ज्या कुटुंबाकडे अद्याप वैयक्तीक शौचालय नाहीत अशा कुटुंबांना वैयक्तीक शौचालय बांधकामासाठी रककम रुपये १२,०००/- (बारा हजार रुपये) पर्यंत प्रोस्ताहन अनुदान देण्यात येणार आहे. त्यासाठी वॉर्ड क्र. १ ते १७ वॉर्डनिहाय ज्या कुटुंबाकडे अद्याप वैयक्तीक शौचालय नाहीत. अशा कुटुंबांना पुन्हा एक संधी देण्यात येत आहे. त्यांनी नगरपरिषदेकडे तीन दिवसात (दि. १२/०५/२०१६ पर्यंत) विहीत नमुन्यात स्वच्छ महाराष्ट्र अभियान कक्षामध्ये आपले अर्ज सादर करावयाचे आहेत.

जाहि/2092/2016
तहारप निषद वेंगुर्ले
दि. 9/5/2016

मुख्याधिकारी
नगरपरिषद वेंगुर्ले

प्रति,

मा. संपादक,

---,

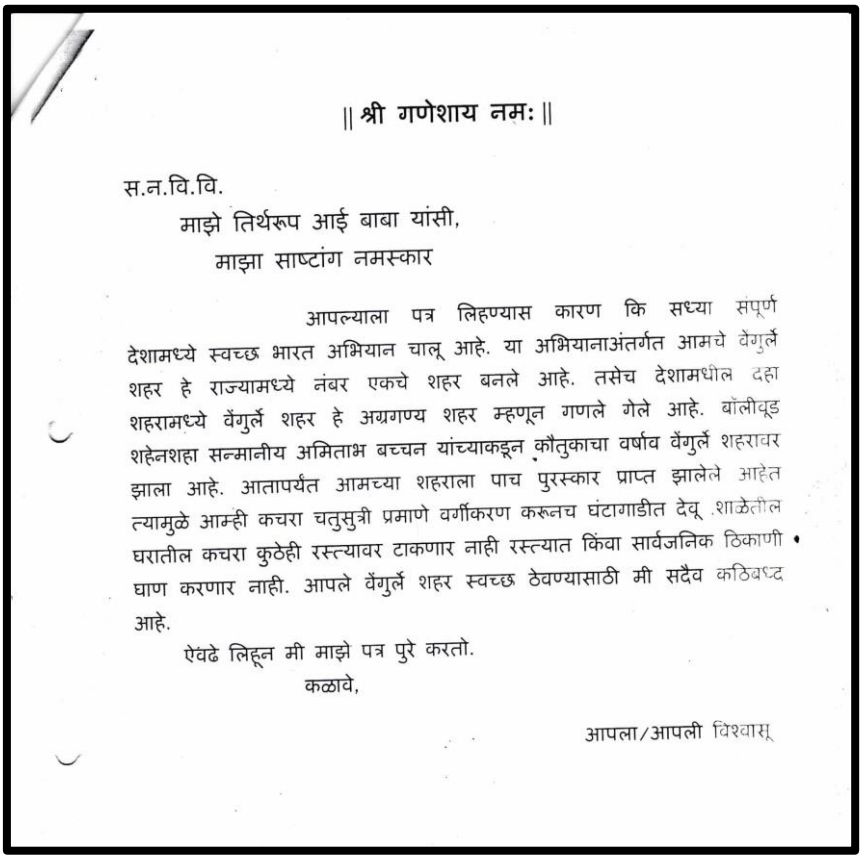
---.

वरील बातमी शहरातील नागरीकांच्या माहितीसाठी आपल्या दि. ०९/०५/२०१६ रोजीच्या वृत्तपत्रामध्ये प्रसिद्ध करुन नगरपरिषदेस सहकार्य करावे हि विनंती.

N.K. Shirodkar

मुख्याधिकारी
नगरपरिषद वेंगुर्ले

स्वच्छ महाराष्ट्र अभियान



|| श्री गणेशाय नमः ||

स.न.वि.वि.

माझे तिर्थरूप आई बाबा यांसी,

माझा साष्टांग नमस्कार

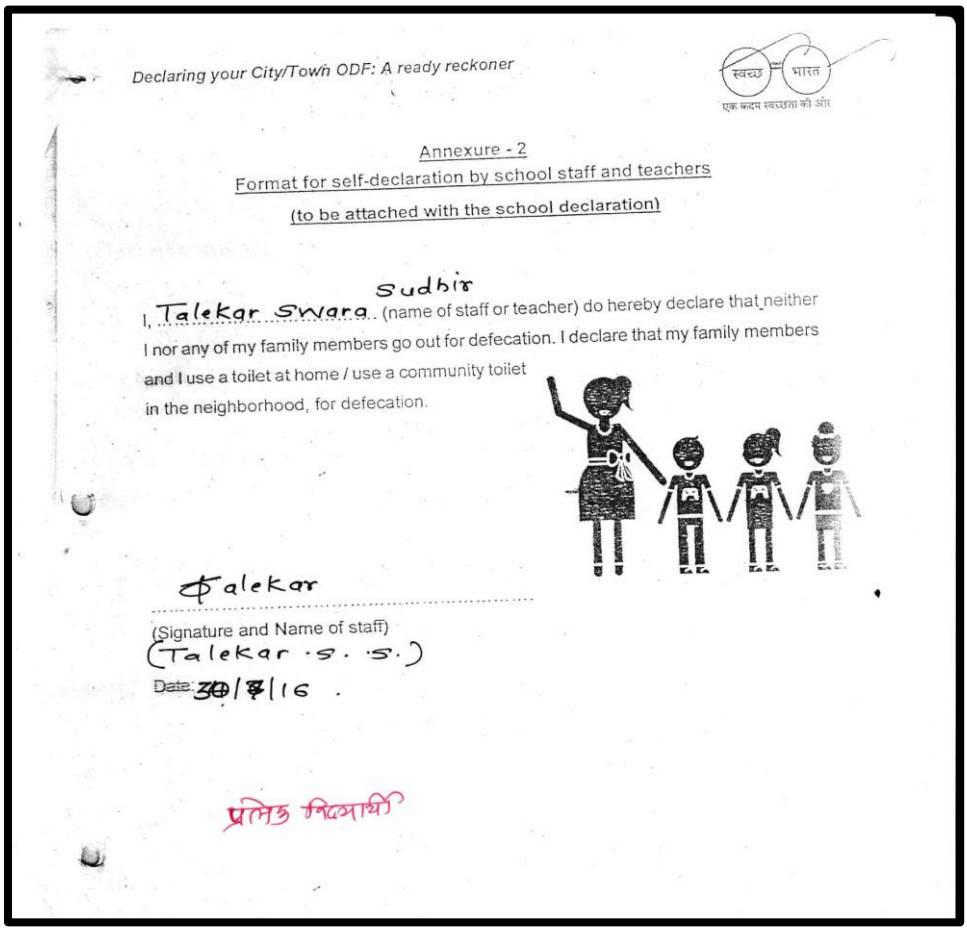
आपल्याला पत्र लिहण्यास कारण कि सध्या सपूर्ण देशामध्ये स्वच्छ भारत अभियान चालू आहे. या अभियानाअंतर्गत आमचे वेंगुर्ले शहर हे राज्यामध्ये नंबर एकचे शहर बनले आहे. तसेच देशामधील दहा शहरामध्ये वेंगुर्ले शहर हे अग्रगण्य शहर म्हणून गणले गेले आहे. बॉलीवूड शहेनशहा सन्मानीय अमिताभ बच्चन यांच्याकडून कौतुकाचा वर्षाव वेंगुर्ले शहरावर झाला आहे. आतापर्यंत आमच्या शहराला पाच पुरस्कार प्राप्त झालेले आहेत त्यामुळे आम्ही कचरा चतुसुत्री प्रमाणे वर्गीकरण करूनच घंटागाडीत देवू शाळेतील घरातील कचरा कुठेही रस्त्यावर टाकणार नाही रस्त्यात किंवा सार्वजनिक ठिकाणी घाण करणार नाही. आपले वेंगुर्ले शहर स्वच्छ ठेवण्यासाठी मी सदैव कटिबध्द आहे.

ऐवढे लिहून मी माझे पत्र पुरे करतो.

कळावे,

आपला/आपली विश्वास्

c. Declaration against open defecation:



Declaring your City/Town ODF: A ready reckoner

स्वच्छ भारत
एक कदम स्वच्छता की ओर

Annexure - 2

Format for self-declaration by school staff and teachers

(to be attached with the school declaration)

I, Talekar Swara Sudhir (name of staff or teacher) do hereby declare that neither I nor any of my family members go out for defecation. I declare that my family members and I use a toilet at home / use a community toilet in the neighborhood, for defecation.

Talekar

(Signature and Name of staff)

(Talekar S. S.)

Date: 30/8/16

प्रलेख विद्यार्थी

3. Transcriptions:

Note: Only excerpts from the main transcriptions have been included. The researcher (interviewer) is referred to as **Res** (**Res1, Res2**, …in case of multiple interviewers)

Excerpt of transcription no. 1

Name of interviewee: Mr. Ramdas Kokare (Key: **Kok**)

Date of interview: 12th October 2017

Place of interview: Garden / Compost site

Kok: I am from Karnal (3:20), district Solapur…I did my service in the police department from 2006 – 2010…After my journey as Chief Officer in Dapoli, within 15 days… banned all types of plastic carry bags and…generating electricity from biogas…door-to-door collection and similar things. And with this innovative idea, I joined Vengurla in the month of April 2015. Within 8-10 days, plastic was banned here…amount of plastic reduced from 1 tonne to 60 kgs. These 60 kgs were used for plastic road development and since last year we developed 12-15 kms road at Vengurla. You will notice some yellow boards on the roads, that is a plastic waste road...We made an Open-Defecation Free city by constructing more than 230 individual household toilets. We started campaigns about at source segregation… in four basic categories: wet, plastic, dry and glass & metal…there should be an improvement…so waste should be segregated into 27 different categories.

Res1: So daily only wet waste is collected? And the rest of the waste is collected after how many days?

Kok: No. Now we are trying to collect the waste segregated into 27 categories. We noticed that if all we allot some days it will be better for sustainability. They will not mix any other material in that waste.

Res2: What happens to hazardous waste?

Kok: There are two things in hazardous waste: sanitary napkins and diapers. We are collecting them separately…about 10-15 kgs of sanitary napkins and 30-40 kgs diapers…each day. This is sent to a biomedical agency for incineration. But now we are developing a mechanism here. We have got one incinerator for sanitary napkins but we are still waiting for an incinerator for diapers. Then we will dispose that out of here.

~

Res1: What was your personal inspiration or motivation to do all this?

Kok: …as urbanization and modernization goes up. Management of solid waste goes down. And that's why we have to study more and… make our dumping grounds free from landfills and free from fire, free from bad smell …I want to finish all these things

Res1: Was this related to the Swachh Bharat mission or was this your own initiative?

Kok: I started my work since 2010. But Swachh Bharat mission give me boost, give me strength. As my thinking is going on in this aspect, Swachh Bharat gave me more boost

~

Res2: Can you give us some more types of waste? We only know four categories.

Kok: Paper, cardboard, coconut shell, glass, broken glass, sanitary napkin, diaper, rubber, tyre, tubes, electric tubes, bulbs, and e-waste, batteries, mobile batteries, wires, tv, material, computer waste material, and clothes, hairs, dead animals, chicken waste, mixed organic waste, mixed with soil and ash, leaves and branches, and wet waste, that is in hotel kitchen , food, all these things.

~

Res1: So all the workers are from nearby villages and not from this town itself? So Vengurla is a town and also does the segregation for nearby villages.

Res2: Does the waste from there come here?

Kok: Nearby villages, willingly send their waste. And one Pingoli gram panchayat 20 kms away. They are sending waste daily...collecting waste from all beaches uptil the cleaning campaign.

~

Res1: We saw that you have received an award from UNDP for being open – defecation free. So specific to that you said that individual's washrooms has been built. Public toilets were built to tackle this?

Kok: Public toilets…32 – 35 were built…private toilets are not in all of the, just where public toilets are available. But all people are connected to toilets, either public or to private.

Res2: What is your exact association with the UNDP? We could not find that clearly.

Kok: I approached UNDP for purchasing plastic crusher machine and then they got too much impressed with Vengurla model and its first solid waste success story.

Res1: Who maintains the public toilets?

Kok: We have employed one person to clean it. It is his day to day activity to clean it.

~

Excerpt of transcription no. 2

Name of interviewee: Mr. Ramdas Kokare (Key: **Kok**)

0Date of interview: 12th October 2017

Place of interview: Garden / Compost site

Kok:. We banned the plastic carry bag, but there are some products that still need plastic, like wrappers, etc, and we collect all the plastic waste separately, and we have to process it. I researched about plastic-crushing machine, and we brought it. In this plastic-crushing machine, we crush plastic and thermocol, and we utilise it for road development. Likewise, for composting, if there are big branches, leaves, coconut shells, if we crush them, there is ease in composting. It fastens the activity of composting…a biogas is an old technology. If we put all of our food waste in un-aerobic environment, there is an emission of methane gas, and all that methane we use to power our generator. We run machines installed here by biogas…We applied to UNDP for funding, and they sanctioned a 12.33 lakhs funding for a machine and for all these activities…But there were some questions because some waste remains behind, and I was wondering what to do with this waste. I studied more and more about it, and asked many experts about waste processing but nobody was able to give me practical knowledge or a solution. Then I studied further and I developed such a view to reduce all waste, to finish all waste, and to also utilize waste as a recycling tool, and with this aspect, I self-studied and I developed such technology.

Res1: So what was the source of your knowledge? You said that you gained this knowledge from somewhere, so which source did you gain your knowledge from?

Kok: Google… I only took information about the plastic-crusher and also the technology for shredding used in composting, how it accelerates the process for composting. There is no requirement for knowledge about that, just have to apply your mind…We searched for such machines online.

Res1: Since we are talking about the plastic-crusher, there's a follow-up question; the plastic that is being crushed is used for road development. When this plastic is being crushed, it's being combined with coal and 1000 degree Celsius; what is the reaction on the plastic?

Kok: See, plastic, thermocol and bitumen are all petro-chemical products. If we heat plastic in Bitumen it becomes a homogeneous product. It melts plastic and turns into bitumen or it becomes a part of bitumen then. That's why it becomes a homogeneous material…there is one closed drum, and in it, we put plastic particles with crushed stones, and on one side there is a mixing of bitumen and plastic. So the mixing of bitumen, plastic and the stones happens in a closed chamber so there is no release of harmful fumes in open air. The gases are mixed into the bitumen…there are some gases that pass, but there is a study on it, and it shows that all these activities are not harmful.

Res1: Which study is that?

Kok: Ahmed Khan from Bangalore and Vasudevan Sir from Madurai, and they studied it and the conducted many tests to see if it was harmful…available on Google. But when we are considering the disposal of plastic, it is less harmful than other practices, in comparison to them.

Res1: You had also said that you went to many experts regarding this. So can you tell who these experts were, where they came from, and what they were studying?

Kok: There is a department in IIT Powai. There are many experts, I can't recall their names, but they could not explain how to completely dispose of plastic... there are a lot of activities going on regarding workshops and such things. They go on during the whole year, and so I attended the seminars and asked a lot of questions, but they were unable to give a solution. Then I went to Google to do my own research and applied my mind. Thermocol waste management is my own invention. Thermocol is non-degradable and a petro-chemical product. That's why I applied my mind and did it.

Kok: We got 4.5 crore worth of awards; 1 crore for open-defecation free city, 1 crore for clean city, and 2.5 crore for recognition of first clean city in Maharashtra.

Res1: So for what has all of this money been used for?

Kok: For the award we got for being an open-defecation free city, we strengthened the initiative; for example, installation of more public toilets, monetary incentives to use them, clean the drainage line, etc… we will repair the old ones as well.

Res1: So sir, you said that for the public toilets, there's only one cleaner for them, who cleans all 52 toilets. So when the number of toilets increases, how much more manpower will you need?

Kok: 2 people only… they do not need more people, they will be very comfortable.

Res1: And with the installation of more public toilets, what all areas are you targeting to install them in?

Kok: There are 2 things; one, we have our own land to build our public toilets on, and second is the demand of people. If people don't have private toilets, we give them access to our public toilets….There were people who used it before as well as now, and that's why we need more toilets. And have you seen our public toilets at the Hospital naka? The newly-opened one? The color painted, bio-toilet? ...Very interesting concept…It was inaugurated the day you came, and the models we used earlier as compared to our newer, more innovative models are both very different. And there's a view that we changed, we made it more attractive by adding the paintings so people feel more comfortable using them, and if more people are comfortable using the toilets, the more people will use them and Vengurla will become very clean. We plan on making around 5-6 bio-toilets this year… An architect, Ajit Parab,… helped develop and implement this technology.

Res1: And you had said you wanted to start a campaign? Any particular groups, teachers, etc. that you are focusing on?

Kok: I have already started it…through schools, self-help groups, teachers, and our swacchata groups**.** We are targeting whole schools…all work starts from very early in the morning; before office and after office…We've distributed dustbins for around 1000 households, and in 2 days the distribution should be complete…They will have more dustbins within 2 days, the process has started.

Res2: So, about the awareness that you're trying to spread, are you only telling them about wet and dry waste segregation, or anything else as well? Are you also informing them as to why this segregation is important?

Kok: What happens is, if people make mistakes in segregating, our workers don't accept the waste, telling them that it's wrong and tells them the correct way of segregating. If they cried about the segregation and even our workers did, this miracle would not be possible. So even if they do it wrong, our workers take it and sort it right there, and then

send them a notice later. Yes, we are telling them, and we also invite them to visit the waste processing unit. We also tell them about what happens to the waste after it is collected and brought here…but I don't think the floating population would know about this, yes. Because they come one day, then they don't come the other day, so whatever campaign we have cannot reach them…see the problem with people is f their garbage is not taken, it means that they do not have the habit of segregating their waste. They are neglecting it. So when their waste is not taken because of this, they talk badly about the campaign.

Res4: But as their opinion stands, that even though lots has been, more has to be done as well, what is your take on it? Do you also agree to that?

Kok: Yes, there might be things left to do. They may not understand advertisements, and so they may not know what's going on. Even if they do know what's going on, but they may not have fully grasped the concept. We have also sent pamphlets to all houses, but they must have neglected it at that time. Look at how many advertisements take place, but it does not register in everybody's minds. See, we distributed the pamphlets to every house in Vengurla, made announcements, so I think we reached people even at the end of Vengurla. But I think there may be some mechanism lacking or communication lacking.

~

Res4: Have you gone and asked an NGO for help yourself?

Kok: The NGOs here don't show much interest; for me to ask them even they need to show interest… Till now, not a single NGO has come forward to help us, so even NGOs should help us out a little. If an NGO can even help out for 15 days, it'll be of great help.

~

Res4: You had also said that the impact of Vengurla has been felt in many places, and a lot of cities are using the model used in Vengurla, around 100 municipalities are using the model. Where are these municipalities?

Kok: Maharashtra.. Mhapsa in Goa Goa, MP,..Verna Municipality District.Gujarat

~

Res4: We had asked you earlier what hazardous waste is there and you had said mostly sanitary napkins and diapers. So are things like chemicals, petroleum, etc., not considered hazardous waste?

Kok: No, they won't be…also that doesn't happen here because the industrial area isn't here. Only industry here is cashew nuts, and there are no petrochemicals there.

Res4: But u had said that in the plastic shredder, there are many petrochemicals are used with plastic. They are petrochemical products, and the release carbon monoxide gases.

Kok: But it's a very minor amount of gas, so it doesn't cause much harm… staff use masks and gloves.

~

Res4: You had also said that whatever sanitary napkins and diapers come here, they are transported to a biomedical agency for processing. Where is it?

Kok: Govind, its nearby, but its closed now, and we are going to open another one, I will show it to you. Till then, sanitary napkins and diapers will come here. Next week, after Diwali, we will dispose of it here…They incinerate it. There is no other alternative other than incineration…We tried to search for other alternatives, but this method presented itself as our best option to us. When bury it, it can't decompose and it pollutes our soil as well, and that is very harmful.

Res4: So the plastic shredder that is there, do you clean the remaining plastic in it that is there or do you just leave it and put in more plastic?

Kok: If It gets dirty, they wash it and then sun-dry it, and then use it.

~

Res4: What are the materials used in the making of the cloth carry bags? How are these bags so cheap?

Kok: In the making of the bag, we reuse old cloth and non-woven material…Because they're synthetic.

Res1: Because he told us it is PP plastic and he burnt it in front of us, and the moment it burnt, we saw this shiny texture coming from it, which looked exactly like plastic. So could it be that some people are actually selling plastic bags in the name of cloth bags?

Kok: No no, not possible. I have to see this material that you are talking about. I will examine it.

~

Res4: The garbage collectors that are there, they told us that some of the jobs are contractual and some are permanent. So what jobs are made contractual and permanent and why?

Kok: Permanent job people get permanent benefits. Contract workers get daily wages… Permanent workers are those that enrolled with us earlier only. Contract workers are hired only on a requirement basis. We pay them around 7-8 thousand per month.

Res4: What is the salary of the permanent workers?

Kok: Around 20,000- 25,000 for one month. Waste collectors are contract workers.

Res1: The man who cleans the washrooms; is he a permanent worker?

Kok: Yes. his salary is 20,000 monthly

Res4: But the jobs here require a bit of technical knowledge, such as operating the machine, etc. what about that?

Kok: We train them… our office gives all the newcomers training.

Res4: But since the workers are contractual, you will have to keep teaching each new worker right?

Kok: No, because they live here, so they get biogas, food and shelter for free.

Res3: Is there a time limit to be considered permanent?

Kok: No, nothing like that, those who were there from the beginning are considered permanent. Its on a first come first serve basis.

Res3: But don't you think that those who have been working here for 10 years deserve a permanent position?

Kok: That is not in my hands, because there is already a structure in place; we have to follow that.

~

Res4: In public areas, we saw lots of bathrooms, but very little dustbins

Kok: Oh. There is one problem…If we put dustbins, it will be only for the floating population. We make the city litter-free, cleaning out all the litter, but we keep dustbins only in the market area and other populated areas. But people put their household waste also in them, so we had to spread awareness about the use of public dustbins a lot. That's why we haven't put dustbins everywhere…The problem is, we educate our population but not the floating population. But awareness can go far with them. We're going to start a cleaning campaign for them. See, they are putting their waste in one bucket, mixing it. But the collectors then separate it

~

Res4: Is the beach cleaned also frequently?

Kok: No, maybe once every month, or 2 months. And motivated organizations can also come and join hands with the cleaning campaign.

Res4: We also wanted to know about biodiversity for our project. Do you know anyone who might be an expert?

Kok: There's no expert here exactly, but I will see if I can arrange something. I can invite one forest officer also. He may know.

Res1: Did u observe recently if there's any sewage problem here?

Kok: I saw the nala, and took action to control the pollution there. I collected data about who releases that sewage in that nala. Last month.

Res2: So you saw all the garbage and dirty water in the open sewage? Nothing gets dumped in the sea?

Kok: Nothing. It gets absorbed in the sewage plant.. Its gets filtered through the soil, which is a great filter medium

Res4: So the sewage line that is there, where does it end?

Kok: In an open area. In vengurla only, but away from seas and water channels.

Everyone: where is it?

~

Kok: It is done like this. You can notice that. The people who do not segregate give their waste in one bin only. If there is a disabled person, then we help them. We can notice those who need our help, and good people who can do it themselves always do it. No, we give them strict instructions to not skip houses, and in a period of one month, we cross-verify if all the houses were covered, and we also ask everybody if their houses are being skipped. So I cannot go around the whole city to see if it's happening, but I try to make sure I do how much ever I can within my means, and so do everybody else.

Excerpt of transcription no.3
Name of interviewee: Mr.Villas Thumri, *Nagar Parishad* Staff (Key: **Vil)**,
Date of interview: 9th October 2017
place of interview: Municipal corporation

Vil: So when it all began as an official I did not think that all this is possible. When Ramdas sir said we will start the system of segregation we directly started with four-way segregation which we all thought was not possible. I used to go to every house with sir. Initially we were just asking them to give us all the waste they had and threw on the streets. This trash was not segregated. Further on we divided the state in four portions and started convincing people to give us their waste by segregation it in four sections which is dry, wet, plastic and glass. And it was a really responsive phase as since we went house to house they started throwing lesser or no waste on the roads. It was more convenient for the cleaners too since initially they had to pick all the foul smelling waste from the roads which was not the case anymore. They got it in buckets and directly put it in the truck. The project started in September 2015. Whatever waste that we collected we started processing it. We used to take rounds around the city at around 6:30 making people are about the health and ecological effects of OD. People really started being involved and gradually the Vengurla Municipal Corporation started being noticed and rewarded. Now we've come to a point where we expect the citizens to segregate their waste in 27 portions, We've also split the plan of collecting in days. We collect the waste that can't be stored such as wet waste every day. Whereas what can be stored like newspapers, glasses etc. on specific days so that there is no scope of it being mixed. ..It was tough initially but people are gradually doing it. We initially made it compulsory only in complexes and moved bit by bit. And we educated them about how if the garbage they give is segregated we can process and reuse it but if it is mixed we cannot do anything about it. We have

also discovered how there is a market for what we do. We earn ten lakh rupees by just segregation waste annually.

Res 1: How do you use this profit?

Vil: It's used in various schemes and projects.We create biogas through wet waste. We generate electricity through the plant. It's a huge project and the electricity bill goes up to 50-60 thousand rupees per month. So the same project now uses electricity which bills up to around 12,000 to 16,000 a nominal fee. So we save that much money through our biogas plant. We sell plastic too and a lot of companies buy from us. There is a chain: collecting waste, processing it and reusing it. So in this cycle there is a lot of expense obviously. We also collect cleanliness taxes.

Res 1: So did people revolt against this system? if so on what reasons did they?

Vil: They said it's not possible we do not have the time. So we showed a lady how she can get work done while she is working in the kitchen. We explained to people how much time it takes for us to segregate the mixed waste. We showed the entire society how all this works. We initially requested and showed people how to do things. Some people gave a positive response. We then declared that we will charge a fine to people who do not follow these norms. So we earn some revenue through that too. So in 2016 we had to start up this way and now the foundation is laid we do not need to put additional efforts but just run this efficiently.

Res 1: Are any rag pickers appointed?

Vil: None

Res 1: So how do you work that part?

Vil: We've divided Vengurla and four sections and four garbage trucks accordingly. So every truck is responsible to collect garbage from 1,000-1,200 houses. Now there are a few people who don't give us their waste. Like outside the bounds of our functioning. So they either burn their garbage or make compost in their own area. But whatever plastic waste they have or newspapers we ask them to give it to us. Because you can't bury it or burn it. So we go there once a week. So whatever was sustainable for us we did it.

Res 1: So whatever waste is generated by the farmers, do they give it to you?

Vil: No they don't give it to us since they just bury it under the ground or use it for compost. We just collect what they want to give.

Res 1: Do you collect the waste from other towns and cities around?

Vil: Yes, it was a problem for them. So we offered help. They rented a truck specifically for this. So it's beneficial both way. They get rid of their waste and we process it and re use it. We generate electricity through their wet waste so it's our profit. Plastic also is re used well so it's our profit. We get the beaches cleaned too.

Res 1: Are all these workers from Vengurla?

Vil: Yes, most of them. They are either temporary or permanent.

Res 1: The 3 workers in the factory have been trained by the authority?

Vil: Yeah we just employed them initially and gradually taught them how to use the machine. If they encounter any problems our experts take care of it.

Res 1: The workers there might be encountering a lot of problems right? Since they spend their day around waste?

Vil: Absolutely not because the processing is so frequent. There is no smell there whatsoever. Many popular celebrities have visited that place. We celebrated our head's birthday there. So we are very proud of the place overall. It's a zero waste land. You won't find a place like this in Maharashtra.

Res 1: So there was only one landfill here?

Vil: Yes, only one and we are proud that people are trying to research on this. When you really want to do something you can and our corporation has proved it. We are proud, our sir is proud, and we feel this should exist.

Res 1: You mentioned you have problems appointing workers. That you need more manpower. so what steps are you taking to solve that.

Vil: We have around nine permanent workers and 21 temporary workers. So we outsource people.

Res 1: How many public toilet cleaners do you have?

Vil: Only one. He works from four in the morning to eight and cleans the toilets. If there is any maintenance issue. He reports to the Nagar Pallika. We are renovating the public toilets with better technology like bio toilets.

Res 1: Why are they called bio toilets?

Vil: Whatever human waste is collected in the toilets is turned into manure.

Res 1: Where is it?

Vil: It's at the hospital naka. We'll show you the place. So since the suction tanks are really time consuming we came up with this idea. It does not leave any bad smell and there are plants all around.

Excerpt of transcription no.4

Name of interviewee: Anonymous, School staff (Key: **Sch)**
Date of interview: 9th October 2017
Place of interview: *Purna prathmik* School

Sch: See it's a problem for our students and one of the parents also complained about mosquitos. If we shut the windows, it's still a problem since there's no air ventilation or sunlight. If no action is taken related to this issue, all the students might face health problems.
On the label of cleanliness, they shouldn't dismiss this. The sewage is behind the school, right? Rather than just cleaning the upfront portions they should do something about these inner sections.
~
Sch: Mr. Kokare held meetings with the schools eight days prior to inform us about the strict guidelines. He asked us to inform the neighboring houses and the students. Since some of the students are really small, they don't get it. Did you go to the *Nagar Parishad* yet?
Res 1: Yes, we did but they only told us the good Res 2e of things.
Sch: You should tell them about this sewage issue. It will really help the situation since you are tourists. If we tell them, no action will be taken.

Res 2: Are there any other places you'd suggest for us to visit where the segregation and garbage collection is not working well?
Sch: You should check the hospital *naka.*
~
Res 1: How do students here learn about segregation?
Sch: They perform skits. We've appointed two leaders per standard to monitor if other students of the batch follow the rules. We also encouraged students to write letters to their parents on the topic 'Cleanliness'. The school took initiatives like these to help students understand cleanliness. They also sing songs related to cleanliness.
Res 1: Does the waste collection van come here on time everyday?
Sch: Ramdas Kokare has given a number on which we can call him if we face any issues regarding this.
Res 1: So did you ever feel the need to complaint?
Sch: No not to the extent of complaining but the van does not show up sometimes. They do take rounds every day but as far as the timing goes, they are not always on time. For house-holds the time is fixed where as for schools it's not.
Res 2: Is this a government school?
Sch: Yes.
Res 3: We saw the different bins for different categories of waste outside
Sch: Yes, we have different bins. We had posters too but they got spoilt due to rains.

Excerpt of transcription no._5

Name of interviewee*:* Unknown, *Nagar Parishad* Employees (Key: **Man 1, Man 2, Man 3**)
Date of interview: 13th october 2017
Place of interview: *Nagar parishad*

~
Man 1: The drive was initiated in 2015. We brought together a committee. In that committee, there was a *Swachata* group. Each ward had two group. In total there were 17 wards. There were 2 groups in each of the 17 *Swachata* wards. Outside people we brought together. They weren't from *Nagar Pallika.*

~

Man 1: Using GPS, we can find out where the vehicle is and where it is picking up garbage from.

Man 2: We can find out how much time a vehicle is taking. If it was taking a long time then we knew that something was going wrong. The work needs to be done in around 6-7 kilometers.

~

Man 1: First of all it is important that peoples' mentality changes. Now peoples'; mentality has completely changed and they are separating the waste properly.

Man 2: The rule that the government made in 2016, we applied in 2015. This is our success. We are experiencing the benefit of the work that Mr. Ramdas has done. We are one step ahead.

~

Man 1: They think that it is impossible, but it is possible. Why it is possible is that when we people start segregating waste, the problem of mixing lessens. This is why they ask for daily wages.

~

Man 3: The work that you see here, this work has been implemented since 2014. Since 2011, even the workers who were employed didn't have much awareness. Those who choose government jobs and come here don't have much interest in making a name for themselves. Initially the Madam who worked here knew about it but didn't work on it. We didn't know, the general public didn't know. When Kokare Sir came, he started working. When Modi Sir came, he started working on this. When Modi Sir came, he said that toilets have to be made. So these two activities started happening side by side. In regard to the toilets, we had a target- the people who didn't have access to toilets should have toilets soon. We made the toilets and achieved this target. The trust of people increased when Mr. Kokare joined forces and worked with the chairman. He did this and we received our money. We managed to reach ahead because people took the initiative to attain cleanliness and follow rules.

Res1: So the Swachh Bharat was happening parallel to the cleanliness drive in Vengurla?

Man 3: Yes it was.

Man 2: The old Swachata Committee is not active currently. People are actively and properly segregating their wastes and everyone is keeping clean so the Committee isn't required.

Excerpt from Transcription no.5

Name of interviewee: Saijal Sachin Jadhav, Waste Collector (Key: **Sai**)
Date of interview: 10th October 2017
Place of interview: Municipal corporation

Res 1: For how long have you worked here?
Sai: Him for 20 years, and me for 10 years.
Res 1: How long have you been in Vengurla for?
Sai: I was first in Bombay, then I got married. For two years I was involved in work.
Res 1: Okay so you were in Vengurla since the beginning. Okay.
What time do you get the vehicle out in the morning?
Sai: We leave at 7:15.
Sai: Morning 7:00 to 12:00 and 3:00 to 6:00 in the evening. That's how it is. In the morning from 7:00 to 12:00 we collect house garbage. Then we collect street garbage from 3:00 to 6:00.
Res 1: these gloves have been given to you?
Sai: Yes, masks were given too.
We wear the gloves on one hand because the plastic bag slips. That's why we wear it only on one hand.
Res 1: The houses from which you collect the garbage, do they separate the wastes beforehand?
Sai: For 2-3 months they didn't do that but now they do.
Res 1: So they separate the wastes and give it, it isn't necessary for you to do it?
Sai: No there's isn't a need for us to do it. Some people don't do it.
Sai: That's how it happens.
Res 2: The people who don't do it, you take their garbage even then?
Sai: The problem is that we take the garbage. Problem meaning, they do not understand.
Res 1: Oh so what you mean is that when you go to collect garbage, they themselves say that they won't give you the garbage?

Sai: They say but we say that it will be good for you if you give the garbage properly. They
separate the wastes in 2 days and then they give. If they haven't segregated the wastes, we tell them to segregate the waste and we will come and collect it tomorrow. If it's wet garbage, then we collect it.

Res 1: Oh so that's how you do it.

Sai: Yes, and they do it and we collect it the next day.

Res 1: So where all do you go? The area's names?

Sai: First we go to Daboli Naka, second we go to Bhutnak Guli, third we go to Madgar Galli,
Gawde Galli, Girab Galli.

Res 2: And before this you were linked to the municipality?

Sai: Yes, both of us were.

Res 2: And your new job became sorting wastes.

Sai: Yes, it's been just the two of us.

Res 1: So since the program has been implemented, has it been explained to you? how to collect waste?

Sai: For the first 8 – 10 days, we had Sir behind us. And then we learned. We were explained
everything.

Res 1: Does it ever happen that there are checkups to see whether the collection is happening
properly?

Sai: Yes, they come, they come in between. Sir comes, staff people come.

Res 1: And how much is collected in one day?

Sai: Wet waste is 120 kgs. Plastic, if collected since 12 in the afternoon, reached about 30 kgs.

Res 1: So right now we spoke to some residents and they said that for glass there are different days. Wet waste is collected every day.

Sai: Wet waste is collected every day. One day, there is collection of bottles, and then another day for collection of paper, plastic, thermacol. It has been segregated, we haven't started yet but it will start now.

Res 1: So you haven't started yet? For now, you are collecting as wet and dry waste.

Sai: Yes. Sir has said that from next month we will have to start collecting on different days. In one-day plastic, paper on another day, thermacol on another day etc. Besides, they've given paper.

Res 1: Yes, that's what we saw. Does your Sir say something along the lines of that if it isn't segregated then don't collect?

Sai: Yes, he has said that. He said to collect it only if it is separate.

Res 1: So what is your salary?

Sai: Our salary has increased. It was little initially. It was less two years ago. Now it has increased.

Res 2: Are you happy with your work?

Sai: Yes, we are happy. This work is good work for us.

Res 2: Do you separate in your own houses?

Res 1: What we mean is, where you live, are there any trucks like this that come to collect wastes?

Sai: Vehicle No.3 and vehicle No. 2 come there. Ours is Vehicle No. 4 and No. 3. He lives far away, on the other side. We start from 7 to 12. Everyone segregates waste.

Res 2: Because the person we had met, he said that it isn't our work and they only should do it.

Sai: They say that only but then we explain to them that look at our condition, and then they give.

Excerpt of transcription no. 6

Name of interviewee: Mr. Suresh, Cleaner (Key: **Sur)**
Date of interview: 10th October 2017
Place of interview: *Nagar Parishad* office

Res: What's your occupation?

Sur: I work as a cleaner

Res: Cleaner of the entire office?

Sur: Yes, that and other small works like making the fishermen and women sit in a line

Res: Why is that your work as a government worker?

Sur: Because the place where they sit is owned by the *Nagar Palika* only. So I just make sure they settle down in a line so that it's easy for the market to function. The cleaning there happens every day.

Res: So talking about Vengurla's cleanliness, what is your opinion on the segregation system?

Sur: Before Ramdas sir came the machinery wasn't there. Now plastic is banned but initially it was all over the place.

Res: There is drainage near *Kubalwada.* What is the issue with that and the garbage there?

Sur: Our sir walks around at 7 am and looks around to make sure every narrow lane is also cleaned. He educates everyone about not throwing waste and explains that trucks will come to pick up the waste. How many times will he inform them?

Res: Have you been to *Kubalwada*?

Sur: Yes, the thing is it takes time to pick the waste up since we segregate it on ground level.

Res: Are you satisfied with your wages?

Sur: I'm happy and content.

Res: Are you a permanent worker or on contract? What about the other workers?

Sur: I am permanent. Some are permanent and some are not. Usually those whose parents worked initially are now appointed as permanent workers and those whose parents were not, are given the job on contract basis.

Res: Are you aware as to why the segregation takes place?

Sur: Yes. For good.

Res: Why is plastic bad?

Sur: It looks bad and flies anywhere that's why.

Res: So is it just because it looks bad that this is happening?

Sur: No it's so that no one gets sick

Res: Any changes that have taken place at your home since waste segregation has been implemented?

Sur: Yes, definitely. We segregate waste and send it over and receive benefits of staying in a clean place

Res: Did you have any health issues prior to the start of this system?

Sur: Not any illness as such but there was heaps of waste everywhere. We had to pick up waste that had gathered from 8-10 days. It used to stink. Everyone used to just throw their

waste on the road. Now, if any cow dies in this area, we go to the dump yard and dig in a deep hole and bury it. So nobody faces a problem. Fruits and and vegetables grow on the same land so it's great.

Res: Have you seen the construction of the road? Do you know about the plastic usage?

Sur: Yes, a bit. I just know it's mixed to make the roads tighter

Res: Do you get holidays?

Sur: If we take holidays every place will get dirty. So it's better to work.

Excerpt of transcription no. 7

Name of interviewee: Mr. Dilip Dhimbarwadkar, Toilet Cleaner (Key: **Dil)**

Date of interview: 10th October 2017

Place of interview: *Nagar Parishad* office

Res: Since when have you been working?

Dil: Since March 1999

Res: So since then you've been cleaning all the washrooms? How many?

Dil: 52 public toilets. Except for that, I clean places like the stadiums, swimming pools and if any individual asks me to, I clean their private toilets.

Res: Why are you the sole worker? And no one else is appointed?

Dil: There was one worker appointed but he said that he will work solo. Since then they have not appointed anyone else. So I didn't have a problem. I have a bike I get up early in the morning and clean toilets.

Res: How many times do you clean in a day?

Dil: Once. I get up at 6 and finish it by 2pm then I go clean personally for anyone who wants their toilets cleaned.

Res: Are you happy with the salary?

Dil: Yes, I'm happy. I get around 770 a day.

Res: What all problems do you face in your job? Did you face any health problems in your work?

Dil: The ladies throw sanitary pads in the washrooms. They block the outlet of toilets and I have to manually remove them. That's the only problem. Except for that, we're provided with everything else. No. I've been working since almost 18 years now but never faced a health problem.

Res: What is your opinion on the segregation system?

Dil: I don't know, I don't work for that section

Res: But in general, how does it work at your place?

Dil: I do segregate my waste like sir has asked us to. Then the pick up van takes it.

Res: Do you use masks while cleaning?

Dil: No I feel really suffocated if I use masks. My mother used to work here till 1997. Around that time, *'bhangi mukhti*' happened and prior to that, the manual scavenging was still legal. At that time, masks were used but after that I've stopped.

Res: Are you on contract basis or a permanent worker?

Dil: I'm a permanent worker. I'm actually replacing my mother's job since she passed away.

Res: So why are you the only worker here?

Dil: Whenever there is a holiday and I ask someone to help me out by taking my job for the day they don't do it. And it's dirty. Even if the head appoints someone to clean toilets they say no to it.

Res: Why do you think no one does it?

Dil: That is something only they can answer. See I'm not a *Bhangi;* I'm a *Chamar*. My caste is higher than a *Bhangi*. But I see it just as a job that fills my stomach so I do it.

Res: So do you have a health insurance?

Dil: No but I get medical help.

Res: As in the government arranges for medical services if you fall ill?

Dil: Yes, they do

Res: Do you have any idea of how much the cleaners get paid?

Dil: No, but like I told you I get 770 a day so I need to work for it

Res: Do you work from Monday to Sunday? How many holidays do you take in a year?

Dil: No, Sundays I have an off. See, my work is not one in which you can take a holiday

Excerpt of transcription no. 8

Name of interviewee: Anonymous, buyer (Key: **Man**)
Date of interview: 9th October 2017
Place of interview: Market place

Res 1: So that's not a cloth bag?
Man: That is 100% and purest Polypropylene.
(Res 2 asks shopkeeper if it's a cloth bag. Man 2 replied 'Yes')
Man: He is unaware that that is plastic.
Res 2: So they have made something that looks like cloth and feels like cloth but is plastic?
Man: That is the magic of the technology.
Res 2: Sir so how are you aware?
Man: It is 100% virgin PP.
Res 2: And they're doing this because cloth bags are more expensive?
Man: Yes, see the cost of making a cloth bag of this size is minimum 30 rupees. Minimum. But the cost of manufacturing these in the factory is less than 10 rupees.
Res 2: So do you think that the authorities are aware of the fact that these are all Polypropylene bags?
Man: Yes, everyone is aware. Oh but no, not the shopkeepers.
Res 2: But the authorities know for a fact that these are plastic?
Man: Yes. But here, Mr. Kokare is helpless. The government has allowed something that is above 50 microns so Mr. Kokare cannot force these people to stop selling these bags.

Man: And whenever we say that plastic is banned, they bring it in the market in this way, making fools of people. It's simple. Now you saw that this cloth bag was 5 rupees. So he must have earned 1 or 2 rupees. So in 3 rupees do you think that making this cloth bag is possible? Stitching itself will cost more than that.

Res 2: He must have made 2 rupees profit.

Man: Correct. So this is Polypropylene. (Turns to shop seller to ask for a lighter). I mean, there is no reason for testing it but still.

(Burns bag)

Man: Have you ever seen cloth burning like this? Look here, plastic.

Excerpt of transcription no.9

Name of interviewee: Dr.Ubale Daru, Doctor (Key: **Uba)**

Date of interview: 9th October 2017

Place of interview: Sanjivani hospital (private)

Uba: Waste is divided into 3 categories. Red, yellow and blue. Hospital is registered with Maharashtra Pollution control act. There's a biomedical hazardous waste management system in Kudal and they collect waste every 48 hrs.from the hospital. There is no role of municipality when it comes to hospitals. They do take part to collect waste like rice and other dry waste. So, 2 vehicles come daily, one from the MC to collect normal waste and dry boxes and food waste (wet waste like rice and fruit parts). The 2nd comes from biomedical waste management system.

Res 1: And the biomedical waste vehicle coming has nothing to do with the MC?

Uba: No, because that is by the Maharashtra pollution control from a medical board in Ratnagiri. Every hospital has to be registered to that board to receive biomedical waste certificate. We cannot give our products to the MC because they have no system of processing such waste. Beause such waste include, organs, placenta parts. MC has no control over biomedical waste in hospitals.

Excerpt of transcription no. 10

Name of interviewee: Ms. Shweta Hule, Eco-tourism guide (key:**shw**)
Date of interview: 12th October 2017
Place of interview: Backwaters of Vengurla

Shw: When this project started various officials used to teach us how to recognize various trees by analyzing the leaves, the flowers and their color, how fruits grow on them. They also taught us how to recognize birds. Not just once, they came down a couple of times to teach us. They taught us via laptops. We get five rides a day. On days with high tides we don't do any rides at all.

Upa: When we came here yesterday we noticed there was a lot of waste lying around the stairs. There was plastic and some dried out flowers. So how do you usually keep the place?

Shw: We actually never row our boat from there. Yesterday was the first ever day we went

there. If you noticed, we get our boat from the other side and we don't and don't let anyone litter that place. Talking about the flowers, people see the acting of dropping flowers in the water body as a sacred thing. No matter how much you convince them, they'll drop it in the water body…What you saw was actually a lot of soil. People come near the water body to celebrate Ganesh Visarjan. So the clay from the Ganesh idols just sticks to the ground.

Upa: Has UNDP helped you financially?

Shw: Yes, they gave us two boats, life jackets and an amount of five lakh ninety eight thousand rupees. They also arranged an English-speaking course for us. The UNDP has only sponsored it all.

Excerpt of transcription no. 11

Name of interviewee: Atul Hule, Civil Engineer (key:**atu**)
Date of interview: 14th October 2017
Place of interview: Mr.Hule's office

Res: Do you think Mr. Ramdas and his team have been able to successfully carry out disposing.

Atu: yes, it has run successfully but, still there are some problems, there are some issues where no attention has been given, especially old Vengurla market. That area has to be cleaned. There are some old houses that don't have proper drainage systems. Their drainage system need to be improved.

Excerpt of transcription no.12

Name of interviewee: Rohit Sawant, UNDP Project Manager at Sindhudurg (Key: **UND**)
Date of interview: 13th October 2017
Place of interview: Mermaid Resort

Res2- Part of our research is to the effect of the model or the clean up on the Ecology. Anything, the bird population or any statistics. Any animals that are directly affected by garbage or are there any impacts, etc.

UND- In 2012, that was the time this coast is known for turtle nesting. Turtles come down and nest on all these beaches around 32 beaches they nest on. It's a good examples because their favourite food is jellyfish and all the jellyfish look like plastic bags. So all the run offs into the sea has this plastic in it and the turtles her confused and end up eating it and dying. With the help of the locals, we have appointed turtle point persons or kasao mitra (marathi). They have put of their own interest and that they've been staying there since their forefathers, they know the coastal stretch like no one else. They know the current patterns and tide timings by heart. So, the turtles nesting on the beach the locals devour on the eggs. The forest department wildlife act of 1972 (WPA) , under that there are a list of scheduled animals based on the conservation status and how endangered a particular species is. In India we have 4 kinds of turtles, out of which the olive ridley turtle come and nest along these beaches. The schedule 1 of the forest act says that all these species, are protected under the WPA schedule 1 so no locals or tourists can use them for wrong purposes and they are protected under that elite status. When we involve the locals it is important because they can report the nesting to the forest department. So they keep a log of it and the forest guards, will gel with the community and the record building starts.

Excerpt of transcription no. 13

Name of interviewee: Mr. Ganesh Yadav, Contractor (**Gan**)
Date of interview: 10th October 2017
Place of interview: Fire Station

Gan: they have made the road in front of me only. The main road is made of plastic. The take tar. 80 % of plastic, tar will have more power than 80%, so it becomes more than 100%
to rather 110% so the mixture will be usable for the tar and the plastic won't come outside.
Res: now a general question is that, if you burn plastic with a lighter it gives out fumes which will be harmful for us, but when it comes to constructing roads and they mix this plastic with the tar.
Gan: yes, this is one nice thing because if you mix the tar with plastic the flames and fumes don't come out
Res: but how is it not possible, because the tar is so hot and you have to melt the plastic in that, since you have to mix it
Gan: plastic is another thing, but if you put it in hot things, it will become watery and the flames don't come out.
Res: there is no gas coming out? But it is burning right?
Gan: no it's not burning; if it burns the flames will come out
Int 2: so its melting and not burning.
Gan: it is melting not burning, if it melts the flames and fumes will come out.
Res: melting would be at what degree?
Gan: 1000 degree
Res: which is good enough for the plastic to burn
Gan: no, it will not burn
Int 2: there will be no fumes?
Gan: no no fumes. No fire will be there, nothing will be there.
Int 3: so there will be no fire?
Gan: so let me tell you, the tar that we use is boiled, that is not boiled at all. If we boil it, it

will get bubbles like water. But when we put it on fire, that’s when it will burn. When we mix the tar with plastic, it gets mixed. When it melts into that, it doesn’t burn. the content of the tar is higher plastic is very less. For example: In a glass if we take tar, and little bit plastic the quantity of the plastic will remain less than that of the tar and if we crush it like this.

GLOSSARY

American Society of Civil Engineers: It is a professional body originated in 1852, headquartered in Reston, Virginia to represent members of the civil engineering profession worldwide.

Anthropogenic source: Source created by human actions.

Bioaccumulation: It is the build-up of substances such as chemicals or pesticides in an organism.

Biomagnification: It is an increase in concentration of a substance in tissues of organisms. The higher the organism is in the food chain, the more the concentration of the substance.

Bio-toilet: Also known as composting toilet, bio-toilet is a type of waterless toilet or micro-flush toilet system that uses a predominantly aerobic process to treat human excreta by composting or managed aerobic decomposition.

Briquettes: Blocks formed by coal dust, paper, cardboard, wood chips etc. They are used for generating steam and heating. Especially used in factories.

Camp Hexachlorobenzene: It is a fully chlorinated industrial hydrocarbon chemical which is also an environmental pollutant.

Carbon monoxide: It is a colorless, odorless and flammable gas generated by incomplete combustion of carbon.

Central Rural Sanitation Program (CRSP): It was India's first initiative for rural sanitation launched in 1986.

Corporate social responsibility (CSR): CSR refers to an institution or corporation's initiatives to monitor and assume responsibility for the kind of impact they make on the social wellbeing and environment.

Dead zone: It is a place or period where no life exists or no activity occurs.

Dioxins: These are extremely toxic compounds released by some manufacturing processes.

Environmental Protection Act in 1986: The drive for this act was to apply decisions of the United Nations Conference on the Human Environments. The decisions aim to protect and improve human environment and avert the threats to living beings

Environmental Protection Agency: President Richard Nixon proposed the establishment of the agency in order to protect human health and environment by writing and imposing rules and regulation on the basis of laws passed by Congress.

Fertilisers (commercial): Most commonly used chemical fertilisers, essential for quick growth of agricultural output by most commercial farmers.

Floating population: A group of people who have settled in a particular place for a specific period of time, for different reasons, but are not usually considered counted as a part of the official census count.

Functionally dead: It is an irreversibly damaged condition of the soil caused by organic and metallic contaminants

Greenhouse Gas Emissions: Discharge or release of greenhouse gas.A greenhouse gas is a gaseous compound that exists in the atmosphere. It can absorb infrared radiation, therefore has the capacity to trap and hold heat in the atmosphere. As a result, greenhouse gases can increase the overall temperature in the atmosphere.

GST: Goods and Service Tax (implemented from July 1 2017)

Incinerator: A tool/instrument used for burning waste till the point where the substance burning is converted into ash due to the high temperature. This process of doing this is called incineration.

Indian Wildlife (Protection) Act, 1972 is enacted by the Indian parliament to protect plants and animal species.

IUCN: It stands for International Union for Conservation of Nature

Landfill leachate: It is the percolated liquid that drains through the ground on a landfill and mixes with the groundwater.

Leptospirosis: It is a bacterial disease that is triggered by the urinal waste of unhealthy animals.

Movable receptacle: A synonym for now what is called a dustbin.

Nagar Parishad: The Municipal Corporation in Vengurla

Nagar Vanchalay: library

Organic fertilisers: usually made out of manure, slurry etc. these are natural fertilisers used for growing an organic agricultural output. They usually take a longer time to grow the output.

Particulate matter: It includes all the liquid and solid particles released in the air most of which are hazardous.

Plastic Crusher/ Shredder Machine: Plastic Crusher is a machinery equipment used for crushing plastic waste so that the waste is suitable for being processed and re-used.

Plastic roads: Plastic roads are roads which are made with either plastic being the core component in the mix used for building the road or a minor element mixed with the tar by melting it.

Prathmik Upkendra: It is a clinic where basic treatment is given.

Public Health Act: The Public Health Act was introduced to fight filthy urban living conditions, which led to numerous public health threats, including the spread of diseases like typhus and cholera.

Purna Prathmik Shada (Zila Parishad): It is a Primary school that does not come under the Vengurla Municipal council's jurisdiction.

Purna Prathmik Shada (MC): It is a Primary school under the Vengurla Municipal council's jurisdiction.

Red list: A list of threatened species. They deal with carefully evaluating the species that are over the edge.

Sanitary landfill: A site where waste is kept away from the environment until the time it is not hazardous.

Saprophytes: They are microorganisms that usually survive on other dead organisms.

Soil contamination: It is alteration in the natural form of the soil due to xenobiotic chemicals.

Swachh Bharat Mission: A program launched by the Prime Minister of India on 2nd October 2014, to achieve universal sanitation coverage and improve level of cleanliness throughout the nation.

Swachhata Diva: Day of cleanliness celebrated by Patkar High School

Swachhta Doot: Residents of various areas in Vengurla MC, who are members of the swachhta Committee. Their primary responsibility is to ensure that everyone in their locality segregates their waste, check whether the collection vans are coming and prevent people from defecating openly.

UNDP: The United Nations Development Programme is one of the most important functioning bodies of the UN. Their aim is to assist nations through whatever means be it financial technical or anything that uplifts that nation's potential to develop.


प्लॅस्टिक कचरा
कागद कचरा


नगरपरिषद, वेंगुर्ला


वेंगुर्ले नगरपरिषद
ओला कचरा
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