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Review on Current Management Practices and Environment Status of Pirana Dump Site, Ahmedabad

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Abstract: Ahmedabad is a big city with a population of six millions of people and the rate of population is increasing day by day. This phenomenon has led to the exponential growth in consumption. The population growth is largely responsible for the growing solid waste at the Pirana dumping site, which is being managed by Ahmedabad Municipal Corporation (AMC). Various type of waste from large- and small-scale industries are collected at the Pirana dumping site in Ahmedabad by AMC. The large amount of waste at the Pirana site has increased the toxic gases such as carbon dioxide, carbon monoxide, sulfur dioxide, methane and nitrogen dioxide due to the combustion. Although most of the waste is recycled in some ways, the rapid rise in dumping site causing the spreading of pollution has led the increment in temperature. This has led to affect the health of the people living around the dumping side.¹ (Wanwari et al., 2018). Moreover, water pollution of Sabarmati River has become a major problem due to contaminated waste emanating from the surrounding factories. To overcome aforementioned issues, AMC, through its waste management techniques, collecting waste across the city using various methods. The present study has been done on this issue keeping in view the existing management practices and environmental conditions of Ahmedabad.

Keyword: Pirana dumping, municipal solid wastes, solid waste management

I. INTRODUCTION

Ahmedabad is currently the fifth largest city in India in terms of new area growth (according to new figures from UAE 2020) and is the largest city in Gujarat. The total area of the city increased from 174 Sq. Km. to 464 Km. in 2011 with density of 12,000 /sq. km. The city plays a strong and significant role in providing commercial resources and market access for the economies of the neighboring cities.² (Menon, Singh, and Chhablani. 2016). In recent times more attention has been paid by the government to control this problem in a safe and healthy way.

The population of the city is 65 lacs and the city generate more than 4000 TDP waste including 400 MT of construction and demolition debris as waste. All garbage and waste is collected, transported and disposed of as per the rules of Municipal Solid Waste (MSW). Most of the MSW collected from Ahmedabad city is being dumped on Pirana LFS, which is 84 acres in size. The site is accepting waste since 1981.³ (Sheath, Patel. 2016). The AMC currently has a total waste collection of more than 2,600 MT per day, of which only 700 MT is treated and the rest dumped untreated and in non-segregated form at Pirana site. Out of 84 acres of land, 65 acres of land is used on this site according to the MSW. The height of MSW varies from 5 to 27 meters and is over spilling beyond its capacity. Under the Environment Protection Act 1986, the MoEF, Government of India issued a notification on the 25th September 2000 which stated that all cities and towns should undertake MSWM as prescribed by the rules. This is known as the "Municipal Solid Waste (Management and Handling) Rules 2000".⁴ (Gods will and Somtochukwu. 2017). Due to such an initiative, ULB was well received in this undertaking responsibility of the MSW. Almost, 4000 metric tons of solid waste is been generated from the city on a daily basis.⁵ (Singh et al., 2008).

This waste generated follows the conventional cycle of collection, transportation, treatment and disposal as prescribed by the guidelines and rules. According to official figures from the AMC, more than 60% is collected from MSW municipal bins and street cleaning which is carried out by 11,000 street sweepers throughout the city.

The municipality had begun door to door collection from residential units with the help of contractors since 2009. Clamming to have 100% coverage in door to door collection the project has received great success and appreciation collecting about 1500 MT of waste on a daily basis. Apart from the domestic mixed waste the municipality also has identified special categories of waste like Hotel and Restaurants waste, Car- Cass, Construction demolition waste etc.

¹ Wanwari et al., "Scenario of Landfilling in India."

² Menon, Singh, and Chhablani, "Study of the Treatment and Reuse of Solid Waste by Ahmedabad Municipal Corporation."

³ Sheath, Patel, and Shah, *Solid Waste Management*, 28–29.

⁴ Godswill and Somtochukwu, "Industrial Waste Management: Brief Survey And Advice To Cottage, Small And Medium Scale Industries In Uganda."

⁵ Singh et al., "Assessment of the Impact of Landfill on Groundwater Quality," 311–12.

One special type is municipal solid waste (MSW). It differs from other types of MSW in that it is a solid waste that does not accumulate in proper recycling. It includes any solid or liquid household or commercial refuse, debris or waste. Without limiting the above generality, it includes soft drink bottles (both plastic and metal), glass, metal, cigarette buttons, small pieces of paper, fabric, chip and confectionery wrappers, fast-food packaging, bottle caps, other bottles, plastic straw, wood, food, abandoned vehicles, abandoned vehicle parts, construction or demolition materials, garden debris and clippings, and sand or rocks. Similarly,⁶(Sharholly et al.,2007). Any other material, substance or object in the place where its shape, size, volume or nature is deposited in a place where it is deposited in a messy or harmful manner has a very heavy impact on the environment. The release of water from chemical factories around the dumping site into the waters of the Sabarmati River has a toxic effect on the atmosphere. To overcome these challenges, local body of Ahmedabad is working constantly and has took lot of steps in various sectors.⁷(Pujara., 2019).

II. CURRENT SOLID WASTE MANAGEMENT SYSTEM OF CITY

A. Sweeping of roads by AMC employees⁸(solid intragreted review on the solid systems).

- 1) More than 13000 AMC's own street sweepers are moving every day on 1484 km of roads within Ahmedabad.
- 2) The street sweeper is provided with a handrail and 6 bins for cleaning the activity with other hand tools like jade.
- 3) Timing: - Morning 6:30 a.m. to 11:30 a.m. & 3 p.m. to 6 p.m. on all roads of the city.
- 4) Daily 365 days.

B. Scrubbing of roads by mechanized sweeping machines

- 1) 30 trucks / tractors mounted & 20 self-rides road vacuum sweeping machines are helping AMC to keep city a dust free city.
- 2) Municipality of Ahmedabad has given this work on based on O&M model for 5 years. AMC is paying the agency on shift basic vehicles and TPM. The working is controlled by GPS, RFID readers and Tags.

C. Domestic waste collection by door to dump system

- 1) Special focus on separating waste in two ways, dry and wet waste at source has been initiated by AMC.
- 2) AMC started new door to door/gate waste collection through covered light commercial vehicles, with closed body having different compartments with tipping agreement for collection of segregated waste from citizens.

D. Waste collection from open spots

- 1) For the collection and appropriate transportation of waste accumulated at open spots in various areas of the city, 650 liter and 1150 liter something capacity galvanized trolleys numbering 550 has been placed for its effective operation.
- 2) AMC has hired a consultant for the effective implementation of e-Waste (Management and Handling) Rules, 2011 in the city. ECS Environment Pvt. Ltd. has been selected for the waste management operations for over 20 years. AMC has issued a letter for the same on September 16, 2015.
- 3) Ahmedabad is the India's first city to initiate a City-wide e-wastes project.⁹(Solid waste...)

E. Lifting of community bins / containers

- 1) The 757 location is known as the waste collection point where 805 closed body 8 cubic meters M.S. community storage bins were provided.
- 2) AMC ensures that these containers are at least being lifted 600 TPD waste is collected once a day According to this system.
- 3) The work was commissioned by Service Dell, AMC. But Lifters and containers and 5 years are provided on O&M basis. Where payments are made to the AMC agency on a trip basis and beyond Variable km. The system is being monitored by GPS, RFID Readers and Tags.

⁶ Sharholly et al., "Municipal Solid Waste Management in Indian Cities – A Review."

⁷ Pujara, "Spatial Segregation and Social Discrimination in the Context of Pirana Landfill Site for Waste Pickers Community," 1547–48.

⁸ "SWM_INTRODUCTION.Pdf."

⁹ "SWM_INTRODUCTION.Pdf."

F. Hotels' and Restaurants' Kitchen Waste

- 1) Tenders for storage of kitchen waste from various inefficient units and disposal in closed body vehicles at the places of disposal at the places indicated by the Solid Waste Management Department for seven years using their own vehicles, equipment and manpower. Units include hotels / restaurants / dining halls and wedding venues / wad / halls / canteens / malls and educational campuses with large government / semi-government / private units / institutions / food and beverage facilities.
- 2) The AMC has commissioned three agencies to collect food waste from such units and charge hotel units on a monthly basis so there is no cost to the AMC in this system.
- 3) 80 TPD separated food waste is collected from more than 1000 units of hotels and restaurants. It is given to the composting plant for treatment.

G. Bio-medical waste

- 1) Ahmedabad AMC has contracted 4 agencies accredited by GPCB for daily collection, transportation and disposal of bio-medical waste from 5 municipal hospitals, 3 referral hospitals, and 69 urban health centers and beyond.¹⁰(s.w.m, introductions.)

H. Carcass / animal Waste

- 1) Four hydraulic based vehicles and personnel have been deployed to collect the carcasses of dead animals like cows, lions, buffaloes, donkeys, dogs, rats, etc.
- 2) The facility is available for 365 days of the year from 7 a.m. to 11 p.m. (Telephone numbers 07932984152 and 079-25352911).
- 3) To collect animal waste, about 8 TPD from the city are under this system.

I. Flower waste

- 1) The city has the ancient Sabarmati River. "Kales" is motivated to deliver flower waste and other such holistic materials instead of being thrown into the river by citizens to reduce pollution and maintain cleanliness.
- 2) Kales are seen on the 8 bridges of Sabarmati River by AMC at present. Instead, employees are sitting with bags to collect such flower waste daily and then delivered to a decentralized compost plant for treatment.

III. CURRENT ENVIRONMENTAL STATUS

Landfills of India are under crisis and unfortunately, relevant authorities are only reminded of the crisis when some serious accident associated with landfills takes place. The collapse of a 30-year-old dumpster in Ghazipur on September 1, which resulted in the deaths of two people, was a catastrophe waiting to happen because a 80-foot-high [80 m] garbage mountain could not withstand the debris. Landfills in other metros like Kolkata and Mumbai have long exhausted their capabilities to require in waste and Pirana in Ahmedabad is another addition thereto list. Spreading over a vicinity of 84 hectares, the Pirana landfill has been the city's major dumping yard since 1982. As per the 2018 report, day by day Ahmedabad generated 3500 metric tonnes of waste as compared to 4500 metric tonnes in 2017. Of this, 950 metric tons or but one third of the entire waste, is recycled and rest is eliminate at the landfill. The landfill is characterized by 3/75-foot-high massive mounds of garbage, each weighing 68 lakh something metric tonnes.¹¹("Nearing 35 Years, Landfill). As shown in (Fig 1).



Fig. 1 Pirana Landfill site

¹⁰ "SWM_INTRODUCTION.Pdf."

¹¹ "Nearing 35 Years, Ahmedabad's Pirana Landfill Is Infamous for Its Garbage Mountains and Frequent Fires | Landfill Crisis."

The stench from Pirana has been an eternal companion for residents, even those who stay two or three kilometers removed from the landfill site as shown in (Fig. 2). Ever since the landfill began operating within the 1980s, all of the city’s waste, unsegregated and sometimes hazardous in nature are just dumped within the landfills. The report pointed that if the disposal of waste to the present site keeps continues, it’ll be very hazardous to the environment likewise on the mankind.¹²(Ferronato and torretta. 2019)

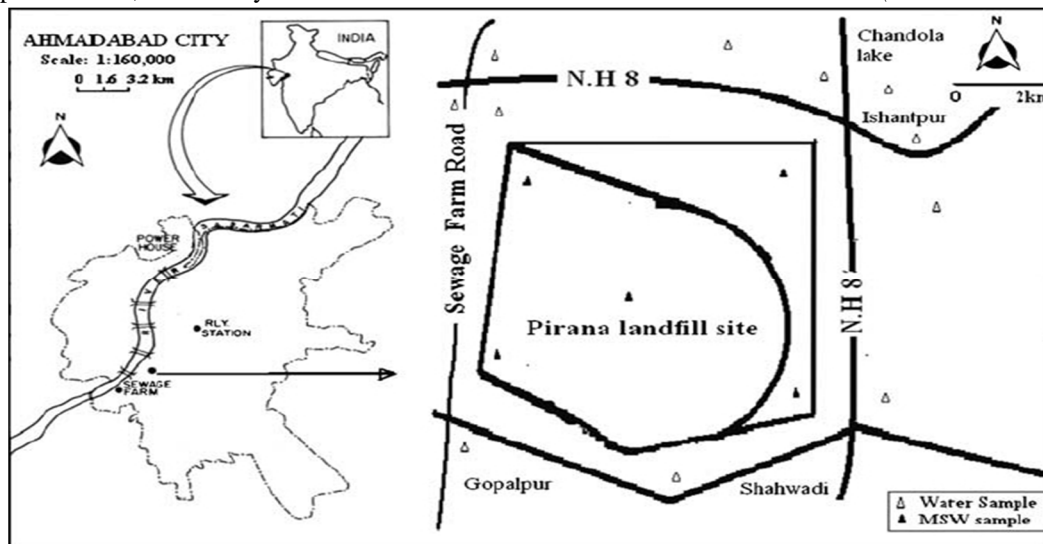


Fig. 2: Pirana landfill site map¹³(Pirana landfill site location)

It took almost three days for Ahmedabad Fire and Emergency Services (AFES) to catch the April 2017 fire as frequent at Pirana and it takes thousands of liters of water to place down a hearth as water penetrates slowly through the thick garbage mountains and operations can not be stopped unless the hearth dies down completely. Materials mostly found within the Pirana landfill are rubber, plastics, synthetics and discarded parts of mobile phones, electronics and other non-biodegradable items as shown in (Fig. 3). Further, trapped methane gas below the rubbish dump adds fuel to the hearth, in creating it sintensi

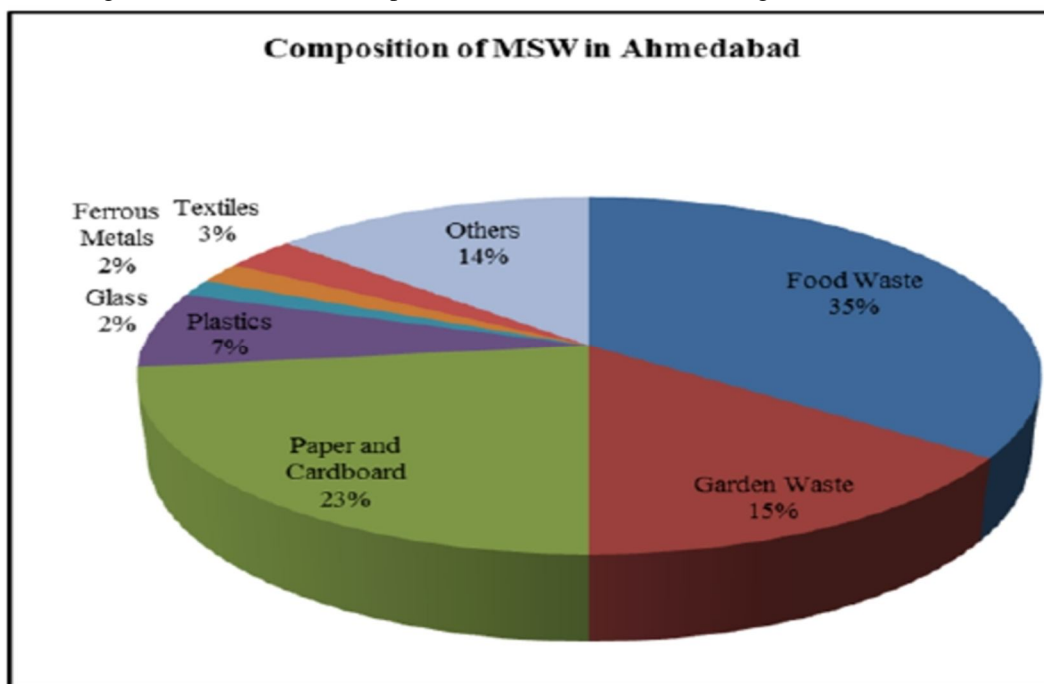


Fig. 3 Composition of MSW in Ahmedabad¹⁴(ayub and khan. 2011).

¹² Ferronato and Torretta, "Waste Mismanagement in Developing Countries."

¹³ "Fig. 2 A Layout of Pirana Landfill Site with Its Location in Ahmedabad..."

The garbage shaped mountains make the occurrence of fires more frequent and difficult to place out. Because of lack of space within the landfill, the rubbish isn't displayed evenly and is dumped near the present garbage mountains. The fumes emerging out of the fireplace are severely toxic in nature. Methane and carbonic acid gas are the most gases in these toxic fumes.¹⁵(Garg and Bhargava. 2013). Daily visitors at Pirana dumping site, still because the residents who have made the landfill site their home for several years are the worst sufferers as toxic fumes as cardiac and lung disease are common among Pirana residents.

The landfill belongs to the old class of landfills which come with none methodology of treating garbage and are just large swathes of areas where garbage is dumped. When fires escape, it becomes very difficult to house them and therefore the resulting pollution is extremely damaging for the environment.

While Pirana is usually recognized as a stinking dump across Ahmedabad, for the 300 odd families which reside in and around the landfill, it's their sole source of income. Rag pickers, garbage collectors and even metal smiths have made their target Pirana, collecting garbage from the landfills. Living on meagre Rs. 150 to Rs. 200 daily, many of Pirana's residents struggle with daily walks across Garbage Mountains, only to bring out trash that they'll sell and earn a livelihood.

Many of Pirana's residents, a number of whom are immigrants from Bangladesh are staying here for 20 years. They collect discarded items in unhealthy conditions and sell them outside. The Solid Waste Management Rules of 2016 state that there should be a minimum gap of 500 meters between a landfill and a residential area, however the presence of so many makeshift houses inside the landfill are breaking rules. In context to this, government is aware and trying very hard to solve the issues pertaining to Pirana landfill as reported. According to 2018 report, more than 48000 liters of water is required at Pirana landfill site, the city's largest dumpsite, every day. This comes to more than 17.5 million liters of water a year which is enough to sustain 1.16 lakh people for a day or a family of four for 80 years.¹⁶(Pirana landfill. 2018). However, if the 17.5 million liters of water were diverted to citizen nagar residents, who live right behind the Pirana dumpsite, it would be enough to meet the standard water requirements for 324 days, almost a year, as reported. Eight tankers of water are needed daily to manage the constant fires that erupt in Pirana landfill and keep the dust from rising. The fires are more frequent in summer months. Over the past decade a slew of projects have been announced to get eliminate of the mounds- waste processing, a nature park, waste-to-electricity project-but everyday 4200 tonnes of waste keep getting added to them. Vadodara Municipal Corporation (VMC) may have shown how out of the water wastage predicament. Officials at the VMC informed that using the "Renerzyme treatment" would end in lower water usage on the dump. According to sources, this treatment requires a liter of water instead of ten liters and controls the fire within a short period of time, thereby reducing the water requirement. In a proposal cleared by the standing committee of the VMC in 2018, this treatment is being used at the Jambuva landfill to mitigate, fires, smoke and stench from the garbage site.¹⁷(m.mewada & A.padhiar. 2020)

The 2019 research reported the increasing pollution in Ahmedabad due to constantly smouldering garbage hills at Pirana. However, government stated that it might finally be cleared in a year. The National Green Tribunal ordered Ahmedabad Municipal Corporation to clear the legacy waste at the location within a year. AMC was directed to show "substantial progress" in six months.¹⁸(mt.pirana might. 2019). The NGT bench observed that the removal of waste needed to be conducted on a war footing and asked the concerned authorities to decide the timeline. NGT had in July 2019 directed the Gujarat government to deposit rs 75 crore in an escrow account for clearing the waste at the site. The tribunal also directed the state pollution control board to ensure that petcock and furnace oil were not used in violation of law by any other industry. However, the AMC submitted to the court that they need already allocated rs 50 crore exclusively for the aim, and were able to allot more if needed. AMC officials started work long back and have removed solid waste of 1.60 lakh metric tonnes, clearing four acres of land till august 2019.

In 2020, first time that a deadline is given to clear the Pirana dumping site. This would be done before August 15, 2022 as per report. The move is an element of AMC's Pirana Dumpsite Remediation project. In 2019, AMC's budget proposal had dedicated an estimated Rs 300 crore for the project, for capping the dumpsite. The AMC claimed that so far, the removal of 5 lakh MT (metric tonne) from the dumping site has been completed and an estimated 8 acre of land has been reclaimed. In the financial year 2020-'21, another 20 lakh MT of garbage is expected to be cleared.

¹⁴ Ayub and Khan, "Landfill Practice in India: A Review."

¹⁵ Garg and Bhargava, "Effect of Methane Generation Potential and Rate Constant on the Generation of Methane from Municipal Solid Waste Landfill Site."

¹⁶ Mar 31, 2018, and its, "Pirana Landfill Worsens Ahmedabad's Water Crisis as 48,000 Liter Water Wasted Daily to Contain Waste."

¹⁷ Mewada, Albert, and Padhiar, "Municipal Solid Waste Management System in Vadodara City."

¹⁸ Aug 27, 2019, and its, "Mt Pirana Might Be Gone in a Yr."

IV. CONCLUDING REMARKS

The following observations were created throughout a review of current management practices and also the surroundings of the piranha lowland site:

- A. Solid Waste is being disposed & accumulated at piranha marketing web site having total space of regarding eighty four acres for an extended back. Sixty five acres of land is accumulated with plenty of garbage having 15-20-meter height at numerous locations.
- B. Details of the Bin wise lifter vehicle and Bin locations are provided in the computer program. A GPS device is put in in every Bin Lifter automotive. RFID reader's ar put in at ward offices, transfer stations, and dump web site weighbridges. One supervisor for every zone is deployed by the contractor for effective watching from eight am to six pm.
- C. The pollution is rising in Ahmedabad thanks to perpetually smouldering garbage hills at piranha. Daily guests to piranha, and since residents UN agency have created their home a dump for many years ar those UN agency ar most suffering from the cytotoxic fumes like lungs and, internal organ un wellness ar common among Pirana residents.
- D. .AMC has declared associate degree interest within the choice of an organization of qualified and competent professionals to arrange for the project report, construction and tender closure science of Pirana.
- E. A point is ready to clear the piranha dump. This would be done before August 15, 2022 as per report.

V. ACKNOWLEDGEMENT

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REFERENCES

- [1] Ayub, Sohail, and Afzal Husain Khan. "Landfill Practice in India: A Review," 2011, 10.
- [2] Ferronato, Navarro, and Vincenzo Torretta. "Waste Mismanagement in Developing Countries: A Review of Global Issues." *International Journal of Environmental Research and Public Health* 16, no. 6 (January 2019): 1060. <https://doi.org/10.3390/ijerph16061060>.
- [3] ResearchGate. "Fig. 2 A Layout of Pirana Landfill Site with Its Location in Ahmadabad..." Accessed October 15, 2020. https://www.researchgate.net/figure/A-layout-of-Pirana-landfill-site-with-its-location-in-Ahmadabad-city-and-India-including_fig1_5946148.
- [4] Garg, Shikha, and Dr. Akshey Bhargava. "Effect of Methane Generation Potential and Rate Constant on the Generation of Methane from Municipal Solid Waste Landfill Site: A Case Study." *Int. J. of Environment and Waste Management* 12 (January 1, 2013): 397–405. <https://doi.org/10.1504/IJEW.2013.056626>.
- [5] Menon, Sheeba, Kinjal Singh, and Anjali Chhablani. "Study of the Treatment and Reuse of Solid Waste by Ahmedabad Municipal Corporation" 1, no. 4 (2015): 4.
- [6] Mewada, Mitu, Susy Albert, and Ameer Padhiar. "Municipal Solid Waste Management System in Vadodara City: Current Scenario," February 19, 2020. <https://doi.org/10.9790/2402-1402024550>.
- [7] Sharholly, Mufeed, Kafeel Ahmad, Gauhar Mahmood, and R Trivedi. "Municipal Solid Waste Management in Indian Cities – A Review." *Waste Management (New York, N.Y.)* 28 (February 1, 2008): 459–67. <https://doi.org/10.1016/j.wasman.2007.02.008>.
- [8] Wanwari, Swati, Indu Thakur, Virendra Kumar Vijay, and Pooja Ghosh. "Scenario of Landfilling in India: Problems, Challenges, and Recommendations," 2018. https://doi.org/10.1007/978-3-319-58538-3_167-1.
- [9] Pujara, Maitri Vinod Kumar. "Spatial Segregation and Social Discrimination in the Context of Pirana Landfill Site for Waste Pickers Community" 10, no. 1 (2019): 12.
- [10] Sheath, Jil, Kinara Patel, and Dipsha Shah. *Solid Waste Management: A Case Study of Ahmedabad*, 2016.
- [11] Singh, Umesh Kumar, Manish Kumar, Rita Chauhan, Pawan Kumar Jha, Al. Raman than, and V. Subramanian. "Assessment of the Impact of Landfill on Groundwater Quality: A Case Study of the Pirana Site in Western India." *Environmental Monitoring and Assessment* 141, no. 1–3 (June 2008): 309–21. <https://doi.org/10.1007/s10661-007-9897-6>.
- [12] Godswill, Awuchi Chinaza, and Igwe Victory Somtochukwu. "Industrial Waste Management: Brief Survey and Advice to Cottage, Small and Medium Scale Industries in Uganda" 3, no. 1 (2017): 18.

NON-PUBLISHED WORK

- [1] Aug 27, Ahmedabad Mirror / Updated:, 2019, and 06:15 Its. "Mt Pirana Might Be Gone in a Yr." *Ahmedabad Mirror*. Accessed October 16, 2020. <https://ahmedabadmirror.indiatimes.com/ahmedabad/others/mt-pirana-might-be-gone-in-a-yr/articleshow/70849913.cms>.
- [2] Mar 31, Brendan Dhahi Brendan Dhahi / Updated:, 2018, and 02:00 Its. "Pirana Landfill Worsens Ahmedabad's Water Crisis as 48,000 Liter Water Wasted Daily to Contain Waste." *Ahmedabad Mirror*. Accessed October 16, 2020. <https://ahmedabadmirror.indiatimes.com/ahmedabad/cover-story/pirana-landfill-worsens-ahmedabads-water-crisis-as-48000-litre-water-wasted-daily-to-contain-waste/articleshow/63550693.cms>.
- [3] NDTV-Dettol Banega Swasth Swachh India. "Nearing 35 Years, Ahmedabad's Pirana Landfill Is Infamous for Its Garbage Mountains and Frequent Fires | Landfill Crisis," September 14, 2017. <https://swachhindia.ndtv.com/nearing-35-years-ahmedabads-pirana-landfill-is-infamous-for-its-garbage-mountains-and-frequent-fires-11855/>.
- [4] "SWM_INTRODUCTION.Pdf," n.d.



LINKS

- [1] [Integrated Solid Waste Management System of Ahmedabad City Report 2020.](#)
- [2] [NDTV-Dettol Banega Swasth Swachh India. "Nearing 35 Years, Ahmedabad's Pirana Landfill Is Infamous for Its Garbage Mountains and Frequent Fires | Landfill Crisis,"](https://swachhindia.ndtv.com/nearing-35-years-ahmedabads-pirana-landfill-is-infamous-for-its-garbage-mountains-and-frequent-fires-11855/) September 14, 2017. <https://swachhindia.ndtv.com/nearing-35-years-ahmedabads-pirana-landfill-is-infamous-for-its-garbage-mountains-and-frequent-fires-11855/>
- [3] <https://ahmedabadmirror.indiatimes.com/ahmedabad/cover-story/pirana-landfill-worsens-ahmedabads-water-crisis-as-48000-litre-water-wasted-daily-to-contain-waste/article-show/63550693.cms>
- [4] [https://ahmedabadmirror.indiatimes.com/ahmedabad/others/mt-pirana-might-be-gone-in-a-yr.](https://ahmedabadmirror.indiatimes.com/ahmedabad/others/mt-pirana-might-be-gone-in-a-yr)



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