

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
EASTERN ZONE BENCH AT KOLKATA
ORIGINAL APPLICATION NO. ____ OF 2024

IN THE MATTER OF:

PRAMEYA FOUNDATION APPLICANT

VERSUS

STATE OF WEST BENGAL AND ORS. RESPONDENTS

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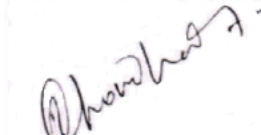
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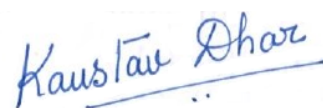
THROUGH



RITWICK DUTTA



RAHUL CHOUDHARY



KAUSTAV DHAR

ADVOCATES

COUNSELS FOR THE APPLICANT

N-73, LGF, Greater Kailash – 1,

New Delhi – 110048

Mobile: +91 9312407881

Email: litigation@dclawchamber.com

PLACE: KOLKATA/DELHI

DATE: 11.09.2024

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
EASTERN ZONE BENCH AT KOLKATA
ORIGINAL APPLICATION NO. ____ OF 2024**

IN THE MATTER OF:

PRAMEYA FOUNDATION APPLICANT

VERSUS

STATE OF WEST BENGAL AND ORS. RESPONDENTS

SYNOPSIS

The Applicant herein is filing the present Application under Sections 14, 15 read with Section 20 of the National Green Tribunal Act, 2010 raising a 'substantial question relating to the environment' as defined under Section 2(m) of the Act, regarding the continuous illegal dumping and burning of untreated and unsegregated municipal solid wastes and plastic wastes by Naihati Municipality along the banks/floodplains of Hoogly River in Garifa, Naihati, District North 24 Parganas of West Bengal. That such persistent and indiscriminate dumping and burning of wastes is going on in complete violation of the following:

- i. River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016 (hereafter referred as "**Ganga Order, 2016**");
- ii. Solid Waste Management Rules, 2016 (hereafter referred as "**SWM Rules, 2016**");
- iii. Municipal Solid Waste Management Manual, 2016 (hereafter referred as "**SWM Manual, 2016**");
- iv. Naihati Municipality Solid Waste Management Bye-Laws, 2023 (hereafter referred as "**SWM Bye-Laws, 2023**"); and
- v. Plastic Waste Management Rules, 2016 (hereafter referred as "**PWM Rules, 2016**").

That the illegal dumping is taking place at the Garifa area, Naihati town, in North 24 Parganas District of West Bengal which falls under Naihati Municipality. It is to be noted that the dumping area (22°53'55.15"N,

88°24'34.01"E), approximately admeasuring 15 acres i.e., 6.2 hectares in size, is situated on the banks/floodplains of Hooghly River, where the Naihati Municipality is not only dumping a substantial volume of untreated and unsegregated municipal solid and plastic waste on the banks/floodplains of the Hooghly River but also openly burning the same in complete violation of law and order and specific directions passed by this Hon'ble Tribunal. That the Applicant herein in this regard raises the following issues:

- a) Dumping of unsegregated solid and plastic wastes alongside the banks/floodplains of Hooghly River, a tributary of River Ganga is in violation of Para 6(2) & 6(4) of the Ganga Order, 2016 which has been issued under Environment (Protection) Act, 1986 which categorically prohibits the discharge, whether direct or indirect, of any untreated or treated trade effluent, industrial waste, biomedical waste, or other hazardous substances into the River Ganga or its tributaries, or onto their banks;
- b) The dumping and burning of unsegregated solid and plastic wastes by the Naihati Municipality alongside the banks/floodplains of Hooghly River is in violation of Rule 4 and Rule 15 of the SWM Rules, 2016 which specifically prohibits the dumping and burning of solid waste on open public places or water bodies. Further, Schedule I(A)(vii) of the SWM Rules, 2016 categorically laid down the siting criteria which specifically mandates that no dumping shall take place within a minimum distance of 100 meters from any River body and 200 meters from residential areas and public parks;
- c) That Schedule I(A)(iv) of the SWM Rules, 2016 mandates that dumping site must be established in accordance with the guidelines issued by the Ministry of Housing and Urban Affairs. That Table No. 4.1, under Chapter 4, Paragraph No. 4.5.1 of SWM Manual, 2016 provides detailed regulations concerning the location of dumping sites wherein it is

explicitly stated that any landfill facility must be situated at least 100 meters away from any river body and 200 meters from residential areas and public parks and no sanitary landfill site is permitted in a flood prone area. In this regard, the Applicant contends that Naihati Municipality is dumping waste on the flood-prone banks of the Hooghly River.

- d) The Naihati Municipality, in exercise of powers conferred by Rule 15(e) of the SWM Rules, 2016, formulated the Naihati Municipality Solid Waste Management Bye-Laws, 2023. Despite establishing these regulations aimed at improving waste management within its jurisdiction, the municipality itself is not adhering to them. Rule 14(i)(f) and Rule 14(ii) of the SWM Bye-Laws, 2023 explicitly prohibit the dumping of unsegregated waste and the open burning of municipal solid wastes;
- e) That Rule 6 and Rule 8 of the PWM Rules, 2016 delineate the obligations of various authorities including local bodies, State Pollution Control Boards and waste generators to ensure proper scientific management and processing of all generated plastic waste. Nevertheless, there is blatant disregard for these regulations as evidenced by the rampant dumping of plastic waste by Naihati Municipality along the banks/floodplains of Hooghly River, posing significant environmental and public health risks.

Specific Directions passed by this Hon'ble Tribunal prohibiting dumping and burning of wastes on the banks of River Ganga:

- i. The Naihati Municipality is openly dumping and burning unsegregated wastes in complete violation of specific directions passed by this Hon'ble Tribunal in **Almitra H. Patel & Anr. Vs. Union of India & Ors. (2016 SCC OnLine NGT 4216)** vide order dated 22.12.2016 which completely prohibits open burning of waste on lands, including at landfill sites.

"19. We specifically direct that there shall be complete prohibition on open burning of waste on lands, including at landfill sites. For each such incident or default, violators including the project proponent, concessionaire, ULB, any person or body responsible for such burning, shall be liable to pay environmental compensation of Rs. 5,000/- (Rs. Five Thousand only) in case of simple burning, while Rs. 25,000/- (Rs. Twenty Five Thousand only) in case of bulk waste burning. Environmental compensation shall be recovered as arrears of land revenue by the competent authority in accordance with law."

- ii. Furthermore, this Hon'ble Tribunal in **Indian Council for Environmental Action vs. National Ganga River Basin Authority & Ors. (Original Application No. 10 of 2015)** wherein Hon'ble Tribunal had issued strict directions with respect to control of pollution in the Ganga and its tributaries:

"V. DIRECTIONS IN RELATION TO MUNICIPAL SOLID WASTE

A. There shall be complete prohibition on use of plastic, i.e., plastic carry bags/plastic plates, glasses, spoons, packages and allied items in all the cities/towns falling on the river Ganga and/or its tributaries in Segment 'A' of Phase-1. Under no circumstances, plastic carry bags of any thickness whatsoever would be permitted. The procurement, storing and sale of such plastic bags, plates, glasses, spoons, etc. are hereby prohibited.

[...]

There shall be prohibition on throwing of any municipal waste, construction and demolition and other wastes into river Ganga and its tributaries and even on banks thereof. Any person/body, if found violating this condition, shall be liable to pay environmental compensation at the rate of Rs. 5000 per event. The authorities concerned shall bring it to the notice of all concerned, widely publicise the same and place sign boards at the relevant sites."

- iii. That this Hon'ble Tribunal in **M.C. Mehta vs. Union of India & Ors. (Original Application No. 200 of 2014)** vide order 25.09.2023 has highlighted the key issues relating to river Ganga and its tributaries in the State of West Bengal with regard to solid waste and direct the District Magistrates of all the Districts (mainstream and tributaries) in the State of West Bengal to submit their own separate reports on the issues for prevention and control of pollution of river Ganga in their respective areas:

"7. Municipal Solid waste and legacy waste disposal – there are numerous sources of solid waste generation like domestic waste (household), plastic, electronic waste, non-hazardous medical instruments, industrial waste, and packaging waste etc. This solid waste either end up in a legacy site or find their way into the rivers (through drains/khals/canals). At many Ghats (especially crematorium/puja) there are heaps of organic/degradable waste lying to be washed away by the Ganga River.

8. In the earlier order, we had taken note of Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016 and the set up existing under that order at the Center, State and District level. At the district level, District Magistrate is the Ex-Officio Chairman of the District Ganga Protection Committee which have been entrusted with certain vital responsibilities for preventing pollution in Ganga at the District level. Hence, at this stage, we direct the District Magistrates of all the Districts (mainstream and tributaries) from where mainstream of river Ganga as also its tributaries flow in the State of West Bengal to submit their own separate reports on the issues noted above in respect of steps which have been taken by respective District Ganga Protection Committee for prevention and control of pollution of river Ganga in their respective areas."

Unregulated Disposal and Open Burning of Wastes are Detrimental to the Ecology and Human Health:

It is pertinent to note that the dumping area admeasuring 15.2 acres is located along the banks/floodplains of River Hooghly which is also a floodplain zone. Further, the residential habitation and school is as near as 100 meters and the Naihati Golal Para Park is located just 50 meters away from the dumping area. That such dumping area located in such close proximity to river Hooghly and human habitation clearly imposes grave threat to the ecology and human health. Furthermore, the unsustainable approach of dumping or burning waste in an open space, near communities on the city edge, along the banks/floodplains of the river is an unacceptable garbage disposal strategy. Despite a complete ban on open burning of waste, several cities still use old-generation or poorly managed facilities and informal uncontrolled dumping or open-air waste burning. Moreover, this approach poses several sustainability problems, including resource depletion, environmental pollution, and public health problems, such as the spread of communicable diseases. Several studies say that open burning of MSW emits pollutants into the atmosphere thereby increasing the incidences of nose and throat infections and inflammation, inhalation difficulties, bacterial infections, anemia, reduced immunity, allergies, and asthma. Further, it is crucial to note that the proximity of these dumping activities to the River Hooghly not only increases the risk of water contamination, but also generates leachate in fragile eco-system during monsoon thereby causing contamination of groundwater. Furthermore, these unsegregated wastes and burnt waste residues, containing plastics, bio-medical wastes, organic materials, and other non-biodegradable components, not only litters the riverbanks but also gets washed into the river Hooghly during high tides and rainfall, when the water level rises and wash away all the trash from the shores contributing to large scale water pollution and thereby significantly affecting aquatic life. It is also crucial to note that the river water quality is severely affected by the presence of landfill surface leachate runoff.

It is pertinent to note that the SWM Rules, 2016, PWM Rules, 2016 and the Bye-Laws of 2023 lists out several responsibilities of Urban Local Bodies/Municipalities to scientifically manage waste disposal and prevent any sort of pollution. However, in the present scenario, it is the ULB's/Municipalities i.e., the Naihati Municipality themselves are causing such large scale pollution. Hence, it is a clear case where the '**Protector is himself the Destroyer**' i.e., the guardian who is entrusted with the duty to safeguard has become the devourer causing the supreme degradation of the ecology and environment.

Hence, the present Original Application.

LIST OF DATES

| | |
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| 18.03.2016 | Plastic Waste Management Rules, 2016 were notified vide G.S.R. 320(E) on 18.03.2016 by the Ministry of Environment, Forest & Climate Change in exercise of powers conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986. The Rules provide for duties and responsibilities of waste generators, local bodies, Central Pollution Control Board, State Pollution Control Boards, District Magistrate and Union Ministries for effective management of plastic waste. |
| 08.04.2016 | Solid Waste Management Rules, 2016 were notified vide S.O. 1357(E) on 08.04.2016 by the Ministry of Environment, Forest & Climate Change in exercise of powers conferred by Sections 3, 6 and 25 of the Environment (Protection) Act, 1986. The Rules provide for duties and responsibilities of waste generators, local bodies, Central Pollution Control Board, State Pollution Control Boards, District Magistrate and Union Ministries for effective management of municipal solid waste. |
| 07.10.2016 | River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016 issued by Ministry of Water Resources, River Development, and Ganga Rejuvenation vide |

| | |
|-------------|---|
| | <p>S.O. 3187(E) under the Environment (Protection) Act, 1986 which provides for measures to be undertaken for rejuvenation, protection and management of River Ganga.</p> <p>Para 6 of the Order reads as follows:</p> <p style="text-align: center;"><i>"6.Prevention, control and abatement of environmental pollution in River Ganga and its tributaries. - (1) No person shall discharge, directly or indirectly, any untreated or treated sewage or sewage sludge into the River Ganga or its Tributaries or its banks.</i></p> <p style="text-align: center;"><i>[...]</i></p> <p style="text-align: center;"><i>(2) No person shall discharge, directly or indirectly, any untreated or treated trade effluent and industrial waste, bio medical waste, or other hazardous substance into the River Ganga or its tributaries or on their banks.</i></p> <p style="text-align: center;"><i>[...]</i></p> <p style="text-align: center;"><i>(4) No person shall do any act or carry on any project or process or activity which, notwithstanding whether such act has been mentioned in this Order or not, has the effect of causing pollution in the River Ganga."</i></p> |
| 2016 | <p>The Ministry of Urban Development and the Central Public Health and Environmental Engineering Organisation (CPHEEO) under the Swachh Bharat Mission came up with a Manual in 2016 titled "Municipal Solid Waste Management Manual" which provides detailed regulations concerning the location of landfill sites. That according to Table No. 4.1, under Chapter 4, Paragraph No. 4.5.1 of this Manual, it is explicitly required that any dumping site must be situated at least 100 meters away from any river body and 200 meters from residential areas and public parks.</p> |
| 2023 | <p>In exercise of power conferred by clause (e) of Rule 15 of the Solid Waste Management Rules, 2016 published under the notification of the Government of India in the Ministry of</p> |

| | |
|-------------------|--|
| | <p>Environment, Forest and climate Change vide S.O. 1357 (E), dated the 8th April,2016 read with provisions under the West Bengal Municipality Act,1993 (West Ben. Act XXII of 1993) the Naihati Municipality hereby makes the bye-laws. These bye-laws may be called as Naihati Municipality Solid Waste management Bye-Laws, 2023 They shall come into force on the date of their Notification. These bye-laws shall apply to every domestic, institutional commercial and other non-residential solid waste generators within the Urban Local Body (ULB) area of Naihati Municipality except industrial waste, hazardous waste, hazardous chemicals, biomedical waste, e-waste, lead acid batteries and radio –active waste, as those are covered under separate rules made under separate of 2016 made under the Environment (Protection) Act, 2016.</p> |
| 11.09.2024 | Hence, the present Original Application. |

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
EASTERN ZONE BENCH AT KOLKATA
ORIGINAL APPLICATION NO. ____ OF 2024**

IN THE MATTER OF:

PRAMEYA FOUNDATION

Through its authorised signatory

Mr. Sabyasachi Chowdhury, Treasurer

5, A.P.C Avenue, Ground Floor,

Purba Sinthee (E), Dum Dum,

Kolkata – 700030

Email: prameya.foundation@gmail.com Ph: +91 9874019450

.... APPLICANT

VERSUS

1. STATE OF WEST BENGAL

Through the Chief Secretary,

Department of Environment,

5th Floor, Pranisampad Bhawan,

Block LB-II, Salt Lake, Sector-III,

Bidhannagar, Kolkata – 700106.

Email: cs-westbengal@nic.in Ph: 033 2253 5130

**2. MINISTRY OF ENVIRONMENT FOREST AND CLIMATE CHANGE,
GOVT. OF INDIA**

Through the Secretary

Ministry of Environment, Forests and Climate Change,

Indira Paryavaran Bhavan, Jor Bagh Road,

New Delhi – 110003

Email: secy-moef@nic.in Ph: +91 11 2469 5262

3. MINISTRY OF HOUSING AND URBAN AFFAIRS, GOVT. OF INDIA

Through the Secretary,

Nirman Bhawan, C-Wing, Rajpath Area,

Central Secretariat, New Delhi, Delhi 110011

Email ID: secyurban@nic.in Ph.: +91 11 2306 2377

**4. URBAN DEVELOPMENT AND MUNICIPAL AFFAIRS
DEPARTMENT, GOVT. OF WEST BENGAL**

Through the Secretary

Nagarayan Bhavan, Block-DF-8,

Sector-I, Salt Lake City, 6, 2nd Avenue,

DF Block, Sector 1, Bidhannagar, Kolkata – 700064.

Email: secy.ma-wb@gov.in Ph: 033 2337 8723

5. CENTRAL POLLUTION CONTROL BOARD

Through the Member Secretary,

Parivesh Bhawan, CBD-cum-Office Complex,

East Arjun Nagar, Delhi -110 032.

Email: mccb.cpcb@nic.in Ph: +91-11-22391025

6. WEST BENGAL POLLUTION CONTROL BOARD

Through its Member Secretary,

Paribesh Bhawan, 10A, Block-LA,

Sector-III, Bidhannagar,

Kolkata – 700106

Email: ms@wbpcb.gov.in Ph: 033 233 58213

7. NATIONAL MISSION FOR CLEAN GANGA

Through its Director General,

1st Floor, Major Dhyan Chand National Stadium,

India Gate, New Delhi - 110002

Email ID: dg@nmcg.nic.in Ph.: +91-11-2307 2900

8. NAIHATI MUNICIPALITY

Through the Executive Officer

1 No. RBC Road, Near Naihati, Railway Station,

P.S. Naihati, North 24 Pgs, Naihati - 743165.

Email: eonaihati22@gmail.com Ph: 033 2581 2098

9. DISTRICT MAGISTRATE, HOOGHLY

New Administrative Building (2nd Floor),

P.O – Chinsurah, District: Hooghly – 712101

Email: dm-hoog@nic.in Ph: 033 2680 2040

.... RESPONDENTS

MOST RESPECTFULLY SHOWETH:

- I. The address of the Applicant's counsel is as given below for the service of notices of this Application.
- II. The addresses of the Respondents are as given above for purpose of service of notices of this Application.
- III. The Applicant herein is filing the present Application under Sections 14, 15 read with Section 20 of the National Green Tribunal Act, 2010 raising a 'substantial question relating to the environment' as defined under Section 2(m) of the Act, regarding the continuous illegal dumping and burning of untreated and unsegregated municipal solid wastes and plastic wastes by Naihati Municipality along the banks/floodplains of the Hoogly River in Garifa, Naihati, District North 24 Parganas of West Bengal. That such persistent and indiscriminate dumping and burning of wastes is in complete violation of the following:
 - i. River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016;
 - ii. Solid Waste Management Rules, 2016;
 - iii. Municipal Solid Waste Management Manual, 2016;
 - iv. Naihati Municipality Solid Waste Management Bye-Laws, 2023; and
 - v. Plastic Waste Management Rules, 2016.
- IV. That the illegal dumping is taking place at the Garifa area, Naihati town, in North 24 Parganas District of West Bengal which falls under Naihati Municipality. It is to be noted that the dumping area (22°53'55.15"N, 88°24'34.01"E), approximately admeasuring 15 acres i.e., 6.2 hectares in size, is situated on the banks/floodplains of Hooghly River, where the Naihati Municipality is not only dumping a substantial volume of untreated and unsegregated municipal solid and plastic waste on the banks/floodplains of the Hoogly River but also openly burning the same in complete violation of specific directions passed by this Hon'ble

Tribunal. That the Applicant herein in this regard raises the following issues:

- a. Dumping solid and plastic wastes along the banks/floodplains of Hooghly River violates Para 6(2) & 6(4) of the Ganga Order, 2016, which prohibits any discharge of untreated or treated waste into the river or its banks;
 - b. Naihati Municipality's dumping and burning of solid and plastic wastes by Hooghly River in violation of Rule 4 and 15 of SWM Rules, 2016 which prohibits such actions on open public spaces or water bodies. Also, Schedule I(A)(vii) mandates that no waste dumping shall take place within 100 meters from rivers and 200 meters from residential areas, and parks;
 - c. That the Table No. 4.1, Chapter 4, Paragraph No. 4.5.1 of the SWM Manual, 2016 dumping of waste is prohibited on the banks of river and also prohibits waste dumping in flood-prone areas;
 - d. Naihati Municipality's Solid Waste Management Bye-Laws, 2023, established under Rule 15(e) of SWM Rules, 2016, aim to enhance waste management. However, the municipality is not following its own regulations. Rule 14(i)(f) and Rule 14(ii) prohibit unsegregated waste dumping and open burning of municipal solid wastes;
 - e. Naihati Municipality's dumping of plastic waste along the Hooghly River banks/floodplains disregards Rule 6 and Rule 8 of PWM Rules, 2016 which outlines the responsibilities for local bodies, State Pollution Control Boards, and waste generators to ensure proper plastic waste management. This negligence poses environmental and public health risks.
- V. That the dumping of unsegregated wastes and burning the same poses crucial sustainability problems, including resource depletion, environmental pollution, and public health problems, such as the spread

of communicable diseases. Several studies say that open burning of MSW emits pollutants into the atmosphere thereby increasing the incidences of nose and throat infections and inflammation, inhalation difficulties, bacterial infections, anemia, reduced immunity, allergies, and asthma. Further, it is crucial to note that the proximity of these dumping activities to the River Hooghly not only increases the risk of water contamination, but also generates leachate in fragile eco-system during monsoon thereby causing contamination of groundwater. Furthermore, these unsegregated wastes and burnt waste residues, containing plastics, bio-medical wastes, organic materials, and other non-biodegradable components, not only litters the riverbanks but also gets washed into the river Hooghly during high tides and rainfall, when the water level rises and wash away all the trash from the shores contributing to large scale water pollution and thereby significantly affecting aquatic life.

ARRAY OF PARTIES:

1. That the Applicant is an organization is been actively working on climate change, environmental conservation, rural development and community empowerment at two of the most vulnerable areas of West Bengal which are prone to climate change i.e., the coastal regions of Sundarbans and the Eastern Himalayan Belts, Darjeeling. Recently, the Applicant has established community-led environment protection committees in various forest villages in the Singalila Ridge which is a north-south mountain ridge running from north-western West Bengal through Sikkim in the Indian part of the Himalayas. The organization is much concerned about the escalating municipal solid waste and plastic waste pollution both in the oceans and mountains and hence had undertaken the 'Clean and Heal Sandakphu Trail' program in 2018 where the members of the organization trekked almost 60 km and collected more than 150 kgs of plastic waste scattered across the Singalila Ridge. The Applicant is an official partner of

the UN Decade for Ecosystem Restoration a Joint initiative of Food and Agriculture Organization and UN Environment Programme and the UN Decade of Ocean Science for Sustainable Development (2021-2030).

2. That over the past 7 years, the Applicant organization has been involved in restoring and conserving the mangrove ecosystem in the Jharkhali region of Sundarbans whereby 100 women were mobilized from the local community of the Sundarbans in creating a Mangrove Action Committee. As part of this Committee, a Mangrove Nursery was established which subsequently supplied 2,00,000 Mangrove saplings to be planted along the village's mud embankment, restoring a barren area of about 5.11 acres. This also secured 2km of the mud embankment-thus, providing additional protection for the village against cyclones and rising seas. The Applicant organization were able to conserve about 31 acres of Mangrove Forest by creating community awareness and by implementing village-level policies. This benefited 350 families directly which is around 1500 people in the village of Tridipnagar in Sundarbans. The Applicant Organisation has authorised its Treasurer, Sabyasachi Chowdhury to represent the Applicant Organization before this Hon'ble Tribunal vide authorization letter dated 09.09.2024.

Copy of the Authorization Letter dated 09.09.2024 is annexed herewith as **ANNEXURE A/1.**

3. The Respondent No. 1, State of West Bengal represented by the Chief Secretary, is responsible for overall supervision of environment in the State and responsible for effective implementation of the legislations relating to environment. Respondent No. 2, Ministry of Environment, Forest & Climate Change, represented by Secretary, responsible for overall supervision of the environment in the country and responsible for effective implementation of the legislations relating to environment. Respondent No. 3 is Ministry of Housing and Urban Affairs, Govt. of India,

represented by Secretary, is responsible under Rule 6 of Solid Waste Management Rules, 2016 for improving solid waste management practices and execution of solid waste management projects and also to take periodic review of the measures taken by the States and local bodies for improving solid waste management practices. Respondent No. 4, Urban Development and Municipal Affairs Department, Govt. Of West Bengal represented by Secretary, is responsible under Solid Waste Management Rules, 2016 for effective solid waste management strategy and provision of land for setting up processing facilities. Respondent No. 5, Central Pollution Control Board, represented by its Member Secretary, responsible for overall supervision of pollution issues in the country and is responsible under Rule 14 of the Solid Waste Management Rules, 2016 for implementation of the rules and adherence to prescribed standards by local authorities. Respondent No. 6, West Bengal Pollution Control Board, represented by its Member Secretary, is responsible for overall supervision of pollution issues in the State and is also responsible under Rule 16 of the Solid Waste Management Rules, 2016 to enforce the rules in the State of West Bengal through local bodies. Respondent No. 7 is National Mission for Clean Ganga, represented by the Director General, responsible for effective abatement of pollution and rejuvenation of the river Ganga and its tributaries. Respondent No. 8, Naihati Municipality, represented by Executive Officer, responsible under Rule 15 of Solid Waste Management Rules, 2016. Respondent No. 9, District Magistrate Hooghly, is responsible for provision of land for setting up processing facilities and reviewing performance of local bodies on waste management under Rule 12 of Solid Waste Management Rules, 2016.

FACTS LEADING TO THE FILING OF THE PRESENT PETITION:

4. The Applicant herein is filing the present Application under Sections 14, 15 read with Section 20 of the National Green Tribunal Act, 2010 raising a 'substantial question relating to the environment' as defined under

Section 2(m) of the Act, regarding the continuous illegal dumping and burning of untreated and unsegregated municipal solid wastes and plastic wastes by Naihati Municipality along the banks/floodplains of the Hoogly River in Garifa, Naihati, District North 24 Parganas of West Bengal. That such persistent and indiscriminate dumping and burning of wastes is in complete violation of the following:

- i. River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016;
- ii. Solid Waste Management Rules, 2016;
- iii. Municipal Solid Waste Management Manual, 2016;
- iv. Naihati Municipality Solid Waste Management Bye-Laws, 2023; and
- v. Plastic Waste Management Rules, 2016.

BRIEF DESCRIPTION OF THE LANDFILL SITE:

5. That the illegal dumping is taking place at the Garifa area, Naihati town, in North 24 Parganas District of West Bengal which falls under Naihati Municipality. That the Naihati Municipality is persistently in an unscientific manner dumping and burning untreated and unsegregated municipal solid wastes and plastic wastes along the banks/floodplains of the Hoogly River. It is to be noted that the dumping area (22°53'55.15"N, 88°24'34.01"E), approximately admeasuring 15 acres i.e., 6.2 hectares in size, is situated on the banks/floodplains of Hooghly River, where the Naihati Municipality is dumping a substantial volume of untreated and unsegregated municipal solid and plastic waste in complete violation of specific directions passed by this Hon'ble Tribunal.
6. The Applicant herein submits that the Hooghly River is a tributary of the Ganges River in West Bengal. It is known as the Bhagirathi-Hoogly, or Kati-Ganga River in North 24 Parganas District of West Bengal. The Hooghly River is approximately 260 kilometres long which flows through

a heavily industrialized area of West Bengal, and eventually into the Bay of Bengal. The upper reaches of the river, often called Bhagirathi is fed by Farakka feeder canal, while at its lower reaches, the flow is enhanced by the rivers Haldi, Ajay, Damodar and Rupnarayan. This Hon'ble Tribunal in the matter titled **M.C. Mehta vs. Union of India (O.A. No. 200 of 2014)** have bifurcated the River Ganga into Phases and Segments and dealt with it accordingly:

| <u>Phases</u> | <u>Region its passing through</u> |
|----------------------|---|
| Phase-I | Segment-A - Gaumukh to Haridwar. |
| | Segment B - Haridwar to Kanpur. |
| Phase-II | Kanpur to Uttar Pradesh Border. |
| Phase-III | Uttar Pradesh Border to Jharkhand Border (via Bihar). |
| Phase-IV | Jharkhand Border to Bay of Bengal (via West Bengal). |

7. That this Hon'ble Tribunal in **M.C. Mehta vs. Union of India & Ors. (Original Application No. 200 of 2014)** vide order 25.09.2023 has highlighted the key issues relating to river Ganga and its tributaries in the State of West Bengal with regard to solid waste and direct the District Magistrates of all the Districts (mainstream and tributaries) in the State of West Bengal to submit their own separate reports on the issues for prevention and control of pollution of river Ganga in their respective areas:

"7. Municipal Solid waste and legacy waste disposal – there are numerous sources of solid waste generation like domestic waste (household), plastic, electronic waste, non-hazardous medical instruments, industrial waste, and packaging waste etc. This solid waste either end up in a legacy site or find their way into the rivers (through drains/khals/canals). At many Ghats (especially crematorium/puja) there are heaps of

organic/degradable waste lying to be washed away by the Ganga River.

8. In the earlier order, we had taken note of Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016 and the set up existing under that order at the Center, State and District level. At the district level, District Magistrate is the Ex-Officio Chairman of the District Ganga Protection Committee which have been entrusted with certain vital responsibilities for preventing pollution in Ganga at the District level. Hence, at this stage, we direct the District Magistrates of all the Districts (mainstream and tributaries) from where mainstream of river Ganga as also its tributaries flow in the State of West Bengal to submit their own separate reports on the issues noted above in respect of steps which have been taken by respective District Ganga Protection Committee for prevention and control of pollution of river Ganga in their respective areas."

8. The issue here pertains to the Segment IV i.e., Bhagirathi-Hooghly River. Despite significant intervention and specific directions passed by this Hon'ble Tribunal in **M.C. Mehta (Supra)**, there reality in ground starkly a complete different picture. That persistent unscientific dumping and burning of untreated and unsegregated municipal solid wastes and plastic wastes along the banks/floodplains of the Hooghly River in Garifa area of Naihati town, District North 24 Parganas of West Bengal are witnessed over the last 3-5 years. In this regard, it is submitted that the Applicant has collected the geographical coordinates of the impugned dumping area. Thereafter, using remote sensing, GIS technique and Google Earth time-series satellite data analysis, the Applicant conducted mapping work and marked the impugned dumping area of 6.2 ha with red lines. Subsequently, the Applicant meticulously conducted a comparative analysis of the satellite imagery captured in 2018 and 2024. The imagery from 2018 vividly depicts lush greenery flourishing along the banks/floodplains of the Hooghly River at Garifa, Naihati. However, upon comparing it with the image from 2024, a startling revelation emerges.

The once green area has been entirely stripped away, replaced by expansive mounds of unsegregated waste thereby casting a grim shadow over the ecological integrity of the Hooghly River basin.

Copy of the Google Earth Images of 2018 and 2024 taken by the Applicant of the banks of the Hooghly River at Garifa, Naihati are annexed herewith as **ANNEXURE A/2.**

ILLEGAL DUMPING ON THE BANKS/FLOODPLAINS OF HOOGLHY RIVER IN VIOLATION OF THE GANGA ORDER, 2016:

9. That Ministry of Water Resources, River Development, and Ganga Rejuvenation issued the Ganga Authorities Order, on 07.10.2016 under Environment (Protection) Act, 1986 which provides for measures to be undertaken for rejuvenation, protection and management of River Ganga. The Order requires that all endeavours have to be made by the State Governments to ensure that ecological flow of River Ganga is maintained at all times. That Para 3(q) of the Notification gives the definition of 'Offensive Matter':

"3. Definitions -

(q)"offensive matter" consists of solid waste which includes animal carcasses, kitchen or stable refuse, dung, dirt, putrid or putrefying substances and filth of any kind which is not included in the sewage;

10. It is pertinent to note that the Naihati Municipality is engaged in the continuous dumping of 'Offensive Matter' along the banks/floodplains of Hooghly River in violation of Para 6(2) and 6(4) of the Notification. That Para 6 of the Order, which requires measures required to be undertaken to ensure control of pollution in River Ganga and its tributaries reads as follows:

"6.Prevention, control and abatement of environmental pollution in River Ganga and its tributaries. - (1) No person shall discharge, directly or indirectly, any untreated or treated

sewage or sewage sludge into the River Ganga or its Tributaries or its banks.

[...]

(2) No person shall discharge, directly or indirectly, any untreated or treated trade effluent and industrial waste, bio medical waste, or other hazardous substance into the River Ganga or its tributaries or on their banks.

[...]

(4) No person shall do any act or carry on any project or process or activity which, notwithstanding whether such act has been mentioned in this Order or not, has the effect of causing pollution in the River Ganga.”

11. That in violation of the Order issued by the MoEF&CC under Environment (Protection) Act, 1986, dumping of waste and open burning of the wastes are being undertaken in Hooghly River (a tributary of Ganga). The images taken by the Applicant shows heaps of wastes are lying alongside the banks/floodplains of Hooghly River and are being openly burnt in complete violation of the law and order and specific directions passed by this Hon'ble Tribunal.

Copy of the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016 is annexed herewith as **ANNEXURE A/3.**

Copy of the images taken by the Applicant shows heaps of wastes are being dumped alongside the banks/floodplains of Hooghly River and are being openly burnt are annexed herewith as **ANNEXURE A/4.**

ILLEGAL DUMPING AND BURNING OF UNSEGREGATED MUNICIPAL SOLID WASTES IN VIOLATION OF SWM RULES, 2016 AND SPECIFIC DIRECTIONS PASSED BY THIS HO'BLE TRIBUNAL:

12. It is of utmost significance to emphasize that the ongoing illegal disposal practices flagrantly violate the provisions stipulated in the Solid Waste Management Rules of 2016. This violation extends beyond the mere act of unauthorized waste disposal; the situation is exacerbated by the

additional and grievous concern of open burning of municipal solid and plastic waste. This reckless burning not only intensifies the environmental impact but also intensifies the scenario by causing substantial air pollution. The burning of such diverse waste materials contributes to air pollution, posing a serious threat by clogging the air with pollutants, thereby endangering the respiratory health and overall well-being of the community and surrounding areas. That it is apprehended the water percolating through landfill sites will produce leachate during rains, containing undesirable toxic chemicals which will gradually lead to contamination of groundwater thereby causing serious threat to the ecology.

13. That the egregious act of illegal and unscientific dumping and burning of unsegregated wastes are in complete violation of the following provisions of the Solid Waste Management Rules of 2016. The solid wastes contains domestic wastes, and unsegregated plastics wastes from residential houses, commercial establishments, shopkeepers, laboratories, butcher houses, laboratories, and even contains sanitary wastes like diapers and sanitary pads. The SWM Rules, 2016 mandates segregation of wastes by waste generators and further prohibits the burning of wastes in public places.

"Rule 3(44) Segregation - means sorting and separate storage of various components of solid waste namely biodegradable wastes including agriculture and dairy waste, non-biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste and non-recyclable inert waste, domestic hazardous wastes, and construction and demolition wastes;"

14. That improper waste management along the banks/floodplains of the Hoogly River in Garifa, Naihati, District North 24 Parganas of West Bengal is taking place because the Naihati Municipality has miserably failed in their duty to ensure compliance with the Solid Waste Management Rules, 2016. There is no proper mechanism for collection and segregation of

waste into biodegradable and non-biodegradable waste due to which there is no segregation/treatment of domestic solid waste in the banks/floodplains of Hooghly River area. That in addition, there is total lack of scientific waste treatment facilities or waste deposition centres, due to which solid waste is being dumped directly on the banks/floodplains of River Hooghly without any scientific management. That the following table brings-out clearly the Authorities that are made responsible under the Solid Waste Management Rules, 2016 along with their corresponding duties and their violation:

| Authority responsible | Responsibility for waste management | Non-compliance with the provisions |
|--|---|--|
| Waste generators | <p>Rule 4 (1) (a) of Solid Waste Management Rules, 2016- segregate and store the waste generated by them in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes.</p> <p>Rule 4 (2) - No waste generator shall throw, burn or burry the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.</p> | Segregation of waste is not being done and the non-segregated waste is being dumped at the banks/floodplains of River Hooghly. |
| Ministry of Urban Development | Rule 6 (1) (a)- take periodic review of the measures taken by the States and local bodies for improving solid waste management practices and execution of solid waste management projects. | The Ministry of Urban Development has failed to take steps to ensure that solid waste management practices are in place. |
| Secretary-in-charge, Urban Development | <p>Rule 11 (1) (a)- Prepare a state policy and solid waste management strategy for the State or the Union Territory.</p> <p>Rule 11 (1) (e)- Direct the town planning department of the State to ensure that master plan of every</p> | The Naihati Municipality is unscientifically dumping and burning wastes |

| | | |
|----------------------------------|---|---|
| | <p>city in the State or Union Territory provisions for setting up of solid waste processing and disposal facilities.</p> <p>Rule 11 (1) (f)- Ensure identification and allocation of suitable land to the local bodies within one year for setting up of processing and disposal facilities for solid wastes.</p> | <p>alongside River Hooghly in complete violation of the Solid Waste Management Rules, 2016.</p> |
| District Magistrate | <p>Rule 12 (a) - Facilitate identification and allocation of suitable land within one year from the date of notification of these rules.</p> | <p>No suitable land for a sanitary landfill has been identified and instead banks / floodplains of River Hooghly is chosen as a landfill site.</p> |
| Central Pollution Control Board | <p>Rule 14 (a) - Co-ordinate with the State Pollution Control Board for implementation of Solid Waste Management Rules, 2016 and adherence to the prescribed standards by local authorities.</p> | <p>CPCB has failed in ensuring that the provisions of Solid Waste Management Rules, 2016 are effectively implemented in Hooghly River area at Naihati.</p> |
| Municipal Council (local bodies) | <p>Rule 15 (a) - Prepare a solid waste management plan as per state policy and strategy on solid waste management.</p> <p>Rule 15 (b) - arrange for door to door collection of segregated solid waste.</p> <p>Rule 15 (h) - Setup material recovery facilities or secondary storage facilities.</p> <p>Rule 15 (i) - Establish waste deposition centres for domestic hazardous waste.</p> <p>Rule 15 (zh) - Stop land filling or dumping of mixed waste soon after the timeline as specified in rule 23 for setting up and operationalization of sanitary landfill is over.</p> | <p>The local bodies have failed to undertake any of the responsibilities, as provided under Rule 15 of the Rules. The municipal solid waste collected from the area is being dumped on and at the banks/floodplains of River Hooghly.</p> |

| | | |
|---|---|---|
| State Pollution Control Board | Rule 16 (1) (a) - Enforce the Solid Waste Management Rules, 2016 in the State through local bodies in their respective jurisdiction and review implementation of these rules at least twice a year. | There has been clear violation of the provisions of the Rules, in management of solid waste in Hooghly River at Naihati area. |
| Local Authorities and State Pollution Control Board | Schedule I- Para A (vii) - Provides siting criteria for setting up a sanitary landfill site. | No land has been identified, till date, for setting up a sanitary landfill site, due to which waste is being dumped at or at the banks/floodplains of and in the River Hooghly by the Naihati Municipality. Instead, the Naihati Municipality in complete disregard to the siting criteria dumping unsegregated wastes on the banks/floodplains of Hooghly River. |

15. However, despite such a mandate, the District Magistrate of Hooghly has failed in its statutory duty to review the performance of the Naihati Municipality regard to segregation, processing, treatment and disposal of wastes. As a result, the Naihati Municipality is flagrantly disposing and burning wastes alongside Hooghly River.
16. Furthermore, the Naihati Municipality has egregiously breached the established siting criteria as laid out under Schedule I(A)(vii) of the SWM Rules, 2016 which specifically mandates that no dumping shall take place

within a minimum distance of 100 meters from any River body and 200 meters from residential areas and public parks:

SCHEDULE I

[See Rule 15(w), (zi), 16(1)(b)(e), 16(4)]

SPECIFICATIONS FOR SANITARY LANDFILLS

(A) Criteria for site selection –

(vii) The landfill site shall be 100 meter away from river, 200 meter from a pond, 200 meter from Highways, Habitations, Public Parks and water supply wells and 20 km away from Airports or Airbase. However in a special case, landfill site may be set up within a distance of 10 and 20 km away from the Airport/Airbase after obtaining no objection certificate from the civil aviation authority/ Air force as the case may be. The Landfill site shall not be permitted within the flood plains as recorded for the last 100 years, zone of coastal regulation, wetland, Critical habitat areas, and sensitive eco-fragile areas.

17. That in complete violation of Schedule I(A)(vii) of the SWM Rules, 2016, the dumping area is located alongside the banks/floodplains of Hooghly River. It is also to be noted that the dumping site is located just 100 meters away from Vidya Vikas High School and human habitation and just 50 meters away from Naihati Golal Para Park. The Applicant herein submit that the Naihati Municipality is dumping unsegregated wastes in absolute violation of the SWM Rules, 2016 and the same has been categorically shown in the satellite image taken by the Applicant. This stipulation of SWM Rules, 2016 is designed to safeguard the environment, public health, and the well-being of the community by preventing the potential contamination of water sources and limiting human exposure to pollutants emanating from dumping sites. Despite these clear regulatory requirements, the Naihati Municipality has engaged in the disposal of unsegregated municipal solid waste at a location that fails to comply with these critical distance parameters. The Naihati Municipality's non-compliance aggravates the threat of pollution, increases the risk of

waterborne diseases, and undermines community efforts towards sustainable waste management.

Copy of the Satellite image taken by the Applicant showing that the dumping area is located alongside the Hooghly River and is located just 100 meters away from Vidya Vikas High School and human habitation and just 50 meters away from Naihati Golal Para Park is annexed herewith as **ANNEXURE A/5.**

Copy of the Solid Waste Management Waste Rules, 2016 is annexed herewith as **ANNEXURE A/6.**

18. It is imperative to note that such blatant and unlawful disposal, accompanied by the unscientific dumping and burning of non-segregated waste materials are in complete disregard to the specific directions passed by the Hon'ble National Green Tribunal in the matter **Almitra H. Patel & Anr. Vs. Union of India & Ors. (O.A. No. 199 of 2014)** vide judgment dated 22.012.2016:

"20. We specifically direct that there shall be complete prohibition on open burning of waste on lands, including at landfill sites. For each such incident or default, violators including the project proponent, concessionaire, ULB, any person or body responsible for such burning, shall be liable to pay environmental compensation of Rs. 5,000/- (Rs. Five Thousand only) in case of simple burning, while Rs. 25,000/- (Rs. Twenty-Five Thousand only) in case of bulk waste burning. Environmental compensation shall be recovered as arrears of land revenue by the competent authority in accordance with law.

[...]

24. That any States/UTs, local authorities, concessionaires, facility operators, any stakeholders, generators of waste and any person who violates or fails to comply with the Rules of 2016 in the entire country and the directions contained in this judgment shall be liable for penal action in accordance with Section-15 of the Environment (Protection) Act, 1986 and shall also be

liable to pay environmental compensation in terms of Sections 15 & 17 of the National Green Tribunal Act, 2010 to the extent determined by the Tribunal”.

19. Furthermore, the Humble National Green Tribunal in **Almitra H. Patel and Anr. vs. Union of India & Ors (supra)** vide order dated 04.09.2017 while highlighting the duty of the local authorities in collecting, segregating, transporting and disposing municipal solid waste in accordance with SWM Rules, 2016 stated:

"It has not been prepared for segregation and dumping of waste that would certainly lead to leachates polluting the ground water as well as causing serious prejudice to the environment and health of the people living around the site, which is stated to be as close to population as 200 meters. We think that the administration must ponder over these factors, before passing any further directions.

In the various judgments of the Tribunal we have specifically directed that dealing with collection, transportation and disposal of waste is the primary obligation of the local authorities. They cannot in face of their Constitutional and public law obligations, treat this duty as a business venture to earn profits. It must be ensured that the waste is properly segregated collected, transported and disposed of strictly in accordance with Solid Waste Management Rules, 2016.”

20. That the Hon’ble National Green Tribunal also in the case of **Ajay Sipahiya & Ors. vs. Union of India & Ors. (O.A. 150 of 2014)** clearly stated that waste to be segregated at source in terms of SWM Rules, 2016:

"3. The Corporation shall endeavor that the waste is segregated at source before it is delivered at the site of the Project Proponent in terms of Solid Waste Management Rules, 2016.”

21. That the Applicants submits that the Hon'ble Supreme Court of India in the matter titled of **B. L. Wadehra vs. Union of India & Ors. (1996 (2) SCC 594)** stated that the people have a statutory right to live in a clean city and it is the duty of the Municipal Corporations to ensure waste management and segregation. It was observed:

*"1. Historic city of Delhi — the capital of India — is one of the most polluted cities in the world. The authorities, responsible for pollution control and environment protection, have not been able to provide clean and healthy environment to the residents of Delhi. The ambient air is so much polluted that it is difficult to breathe. More and more Delhites are suffering from respiratory diseases and throat infections. River Yamuna — the main source of drinking water supply — is the free dumping place for untreated sewage and industrial waste. **Apart from air and water pollution, the city is virtually an open dustbin. Garbage strewn all over Delhi is a common sight. The Municipal Corporation of Delhi (the MCD) constituted under the Delhi Municipal Corporation Act, 1957 (Delhi Act) and the New Delhi Municipal Council (the NDMC) constituted under the New Delhi Municipal Council Act, 1994 (New Delhi Act) are wholly remiss in the discharge of their duties under law. It is no doubt correct that rapid industrial development, urbanization and regular flow of persons from rural to urban areas have made major contribution towards environmental degradation but at the same time the authorities — entrusted with the work of pollution control — cannot be permitted to sit back with folded hands on the pretext that they have no financial or other means to control pollution and protect the environment."***

22. The Applicant submits that it is pertinent to note that, this Hon'ble Tribunal **In Re: Compliance of Municipal Solid Waste Management Rules, 2016 and other environmental issues (O.A. 606 of 2018)** vide order dated 01.09.2022 has imposed a heavy environmental compensation of Rs. 3500 crores upon the State of West Bengal in 2022

for causing continuous damage to the environment due to non-management of solid as well as liquid waste:

*"49. In the light of above and considering damage to the recipient environment, we hold that apart from ensuring compliance at the earliest, compensation has to be paid by the State for past violations. The amount of compensation is fixed @ Rs. 2 crore per MLD (at which rate compensation has been levied against Noida and DJB in OA No. 1002/2018, Abhisht Kusum Gupta vs. State of Uttar Pradesh & Ors, referred to in para 48 above for detailed reasons mentioned therein). As noted earlier, **gap in generation and treatment in West Bengal, as per data furnished is 1490 MLD. Thus, under this head, liability of the State of West Bengal is to pay compensation of Rs. 2980 crores, rounded off to Rs. 3000 crore in view of continuing damage. For failure to process solid waste, unprocessed legacy waste being 1.20 crore MT, compensation is assessed @ Rs. 300 per MT (at which approximate rate compensation has been awarded in OA No. 286/2022 against Municipal Corporation, Ludhiana, for the reasons given therein). This works out to Rs. 366 crore but adding 134 crore for continuing addition of unprocessed waste @ 13469.19 TPD, the total amount is rounded off to Rs. 500 crore. Thus, final amount of compensation under the two heads (solid and liquid waste) is assessed at Rs. 3500 crores which may be deposited by the State of West Bengal in a separate ring-fenced account within two months, to be operated as per directions of the Chief Secretary and utilised for restoration measures, including preventing discharge of untreated sewage and solid waste treatment/processing facilities, as per appropriate mechanism for planning and execution that may be evolved, within three months. If violations continue, liability to pay additional compensation may have to be considered. Compliance will be the responsibility of the Chief Secretary."***

ILLEGAL DUMPING OF UNSEGREGATED MUNICIPAL SOLID WASTES ON THE BANKS/FLOODPLAINS OF RIVER HOOGHLY IN VIOLATION OF SWM MANUAL, 2016:

23. Further, the Naihati Municipality has significantly breached the provisions specified in Schedule I(A)(iv) of the SWM Rules, 2016. This schedule mandates that dumping sites must be established in accordance with the guidelines issued by the Ministry of Housing and Urban Affairs:

SCHEDULE I

[See Rule 15(w), (zi), 16(1)(b)(e), 16(4)]

SPECIFICATIONS FOR SANITARY LANDFILLS

(A) Criteria for site selection –

(iv) Landfill sites shall be set up as per the guidelines of the Ministry of Urban Development, Government of India and Central Pollution Control Board."

24. That the Ministry of Urban Development and the Central Public Health and Environmental Engineering Organisation (CPHEEO) under the Swachh Bharat Mission came up with a Manual in 2016 titled "Municipal Solid Waste Management Manual" which provides detailed regulations concerning the location of landfill sites. That according to Table No. 4.1, under Chapter 4, Paragraph No. 4.5.1 of this Manual, it is explicitly required that any dumping site must be situated at least 100 meters away from any river body and 200 meters from residential areas and public parks:

1. Location Criteria

The SWM Rules, 2016 provide the criteria for the location of a sanitary landfill. The Table 4.1 is reproduced hereby:

| Place | Minimum Siting Distance |
|--|---|
| <i>Coastal regulation, wetland, critical habitat areas, sensitive eco-fragile areas, and flood plains as recorded for the last 100 years</i> | <i>Sanitary landfill site not permitted within these identified areas</i> |
| <i>Rivers</i> | <i>100 m away from the flood plain</i> |
| <i>Pond, Lakes, Water Bodies</i> | <i>200 m</i> |

| | |
|---|--|
| <i>Non-meandering water channel (canal, drainage, etc.)</i> | <i>30m</i> |
| <i>Highway or railway line, Water Supply Wells</i> | <i>200 m from centre line</i> |
| <i>Habitation</i> | <i>All landfill facilities: 500 m</i> |
| <i>Earthquake zone</i> | <i>500 m from fault line fracture</i> |
| <i>Flood prone area</i> | <i>Sanitary landfill site not permitted</i> |
| <i>Water Table (highest level)</i> | <i>The bottom liner of the landfill should be above 2 m from the highest water table</i> |
| <i>Airport/Airbase</i> | <i>20 km</i> |

25. That despite these clear guidelines, the Naihati Municipality has not adhered to these critical distance requirements. By setting up a dumping area within these prohibited distances, the municipality not only contravenes specific stipulations of the SWM Rules, 2016 but also overlooks the provisions of the SWM Manual 2016. That as per the SWM Manual 2016, the landfill site in question does not satisfy the locational criteria issued by the Ministry of Urban Development and the same is in blatant violation of the siting criteria issued in the 2016 Manual. The Applicant herein shows the violation of the siting criteria in the table below:

| <u>Place</u> | <u>Siting Criteria</u> | <u>Violation on ground</u> |
|---------------------|--|---|
| Rivers | 100 m away from the flood plain | Dumping site is located alongside the banks / floodplains of Hooghly River |
| Habitation & Parks | All landfill facilities: 500 m | Vidya Vikas High School and human habitation – 100 m Naihati Golal Para Park – 50m |
| Flood prone area | Sanitary landfill site not permitted | The landfill site falls under high vulnerable flood area |

26. The Applicant herein submits that the Naihati Municipality is dumping the wastes on the banks/floodplains of the Hooghly River which is a flood prone area. It is further submitted that National Remote Sensing Centre (NRSC) / Indian Space Research Organisation (ISRO) in collaboration with State remote sensing applications centres has generated database on several thematic information. These databases are hosted on Bhuvan Portal under thematic services. Among these thematic services, Flood Vulnerability Index (FVI) of the country has been computed by integrating all the layers in Spatial Decision Support Systems Environment using Multi-criteria evaluation Technique. The Applicant has put the coordinates of the dumping site (22°53'55.15"N, 88°24'34.01"E) on Flood Vulnerability Index (FVI) map, wherein it shows that the dumping site falls under High Vulnerable areas which are prone to flood. In addition to the above, the site's proximity to the Hooghly River poses a potential risk as regular seasonal water level changes could result in the washing away of wastes thereby causing large scale pollution threatening the aquatic life as well. During periods of high tides, unscientifically disposed of wastes may be flooded and carried away by the river's currents. This not only disperses pollutants downstream but also increases the likelihood of contamination along the riverbanks and surrounding areas. Beyond immediate ecological concerns, the pollution of the Hooghly River can have far-reaching implications for public health and regional development. Waterborne diseases may proliferate as a result of contaminated water sources.

Copy of the Relevant extracts of the Municipal Solid Waste Management Manual, 2016 by Ministry of Urban Development is annexed herewith as **ANNEXURE A/7.**

Copy of the Flood Vulnerability Index Map showing that the dumping site falls under High Vulnerable areas which are prone to flood is annexed herewith as **ANNEXURE A/8.**

VIOLATION OF THE NAIHATI MUNICIPALITY SOLID WASTE

MANAGEMENT BYE-LAWS, 2023:

27. The Naihati Municipality, in exercise of powers conferred by Rule 15(e) of the SWM Rules, 2016, formulated the Naihati Municipality Solid Waste Management Bye-Laws, 2023:

"15. Duties and responsibilities of local authorities and village Panchayats of census and urban agglomerations

–

The local authorities and panchayats shall-

*(e) **frame bye-laws** incorporating the provisions of these rules within one year from the date of notification of these rules and ensure timely implementation;"*

28. Despite establishing these regulations aimed at improving waste management within its jurisdiction, the municipality itself is not adhering to them. That Rule 14(i)(f) and Rule 14(ii) of the Naihati Municipality Solid Waste Management Bye-Laws, 2023 explicitly prohibit the dumping of unsegregated waste and the open burning of municipal solid wastes. The relevant provisions are reproduced herein:

14. Responsibilities of Waste Generators:

i. Prohibition of littering

*(f) Disposal of waste in drain etc.: **No person shall litter in any drain/river/open pond/water bodies.***

[...]

*(ii) Burning of waste: **Disposal by burning of any type of solid waste at public places or at any private or public property is prohibited.**"*

29. However, the Naihati Municipality is actively engaged in both practices in absolute violation of the Bye-Laws. Unsegregated waste continues to be dumped along the banks/floodplains of the Hooghly River, leading to significant environmental degradation. This waste, often containing plastics, organic materials, and other non-biodegradable components, not

only litters the riverbanks but also gets washed into the river during high tides and rainfall, contributing to large scale water pollution and affecting aquatic life. Moreover, the open burning of these wastes exacerbates air pollution problems, releasing harmful pollutants and particulate matter into the atmosphere. Such activities are detrimental to public health, causing respiratory problems and other health issues among the local population.

30. The Applicant herein submits that the Bye-Laws of 2023 outline stringent responsibilities for Naihati Municipality to scientifically manage waste disposal and prevent pollution. However, the Naihati Municipality, entrusted with safeguarding the environment, ironically contributes to large-scale pollution. This stark contradiction characterizes the grievous degradation of ecology by those mandated to protect it. Immediate action is imperative to rectify this detrimental cycle, demanding stringent enforcement of regulations, to restore environmental integrity and ensure a healthier future.

Copy of the Naihati Municipality Solid Waste Management Bye-Laws, 2023 is annexed herewith as **ANNEXURE A/9**.

ILLEGAL DUMPING OF UNSEGREGATED MUNICIPAL SOLID WASTES ON THE BANKS/FLOODPLAINS IN VIOLATION OF PWM RULES,2016:

31. The ongoing illegal disposal practices blatantly violate the PWM Rules, 2016, worsened by open burning of unsegregated plastic waste. This reckless burning intensifies environmental impact and air pollution, endangering community health. Further, the leachate from landfill sites during rains threatens groundwater contamination, posing a serious ecological threat.

32. That the following table brings-out clearly the Authorities that are made responsible under the PWM Rules, 2016 along with their corresponding duties and their violation:

| Authorities responsible | Responsibility for waste management | Non-compliance with the provisions |
|------------------------------------|--|--|
| Waste generators | <p>Rule 8 (1) (a) of PWM Rules – take steps to minimize generation of plastic waste and segregate plastic waste at source in accordance with SWM Rules.</p> <p>Rule 8 (b) – no litter of plastic waste and to ensure segregated storage of waste at source and handover segregated waste to urban local bodies or waste collection agencies.</p> | Segregation of waste is not being done and the non-segregated waste is being dumped at the banks/floodplains of River Hooghly. |
| Local Bodies/Municipal Authorities | Rule 6 of PWM Rules – every local body shall be responsible for development and setting up of infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic wastes either by own or by engaging agencies. | The Naihati Municipality has failed to set up proper infrastructure segregation, collection, storage, transportation, processing and disposal of the plastic wastes and instead dumping unsegregated wastes at the banks/floodplains of River Hooghly. |

33. The Applicant in this regard submit that this Hon'ble Tribunal in **Satish Kumar vs. Union of India and Ors. 2013 SCC OnLine NGT 90** vide order dated 12.12.2013 prohibited open burning of plastics across the country:

"45. Keeping in view the factual and legal aspects of the case in hand there is a need to totally ban unregulated handling and disposal of plastic waste and to issue incidental directions for its regulation and restoration of environment in some measure, if not fully.....Hence the order:

a. All the plastic waste/scrap dealers and/or recyclers including the member of the PWD Association Respondent herein shall be restrained from carrying on their business of segregation of plastic waste and its eventual transfer to recyclers or disposal contrary to and without registration under the provisions of Plastic Waste (Management and Handling) Rules, 2011;

b. There shall be no unregulated open burning of plastic/rubber or such other articles anywhere in India.

c. All the Municipal Authorities within the meaning of Rules 3(j) of the Plastic Waste (Management and Handling) Rules, 2011, shall strictly enforce the provisions of the said rules relating to use, collection, segregation, transportation and disposal of plastic waste and for such purposes shall (i) set up, operationalise and coordinate the waste management systems within their limits (ii) work out and set up systems for the use of plastic waste in road construction and/or in co-incineration plans for generation of energy in accordance with law and lastly (iii) incorporate necessary provisions in their bylaws for enforcement of the said rules."

UNREGULATED DISPOSAL AND OPEN BURNING OF MUNICIPAL SOLID WASTES ARE DETRIMENTAL TO THE ECOLOGY AND HUMAN HEALTH:

34. The landfill site located in such close proximity to river Hooghly and human habitation clearly imposes grave threat to the ecology and human health. Furthermore, the unsustainable approach of dumping or burning waste in an open space, near communities on the city edge, along the banks of the river is an acceptable garbage disposal strategy. Despite a complete ban on open burning of waste, several cities still use old-generation or poorly managed facilities and informal uncontrolled dumping or open-air waste burning. Moreover, this approach poses

several sustainability problems, including resource depletion, environmental pollution, and public health problems, such as the spread of communicable diseases. Several studies say that open burning of MSW emits pollutants into the atmosphere thereby increasing the incidences of nose and throat infections and inflammation, inhalation difficulties, bacterial infections, anemia, reduced immunity, allergies, and asthma. Further, it is crucial to note that the proximity of these dumping activities to the River Hooghly not only increases the risk of water contamination, but also generates leachate in fragile eco-system during monsoon thereby causing contamination of groundwater. Furthermore, these unsegregated wastes and burnt waste residues, containing plastics, bio-medical wastes, organic materials, and other non-biodegradable components, not only litters the riverbanks but also gets washed into the river Hooghly during high tides and rainfall, when the water level rises and wash away all the trash from the shores contributing to large scale water pollution and thereby significantly affecting aquatic life.

35. The Applicant herein submits that a report published by Human Rights Watch in 2017 titled "**As If You're Inhaling Your Death: The Health Risks of Burning Waste**" has given the findings that those living near open burning reported an array of health problems consistent with the frequent and sustained inhalation of smoke from the open burning of waste. These included chronic obstructive pulmonary disease, coughing, throat irritation, skin conditions, and asthma:

"Human Rights Watch found that those living near open burning reported an array of health problems consistent with the frequent and sustained inhalation of smoke from the open burning of waste. These included chronic obstructive pulmonary disease, coughing, throat irritation, skin conditions, and asthma. In many cases, interviewees described a temporal relationship between the burning of waste and their health condition; some developed a condition after the burning started or they moved to an area where burning was taking place. Others said their symptoms

subsided after a municipality stopped burning or they moved away from an area where burning was taking place.

The open burning of waste can cause serious impacts on human health. A range of scientific studies have documented the danger emissions from the open burning of household waste pose to human health. These include exposure to fine particles, dioxins, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbon (PAHs), and polychlorinated biphenyls (PCBs), which have been linked to heart disease, cancer, skin diseases, asthma, and respiratory illnesses.

According to the US Environmental Protection Agency (EPA), open burning of solid waste can increase the risk of heart disease, aggravate respiratory ailments such as asthma and emphysema, and cause rashes, nausea, or headaches among exposed people. It notes that the burning of waste "is particularly dangerous because it releases pollutants at the ground level where they are more readily inhaled or incorporated into the food chain."

A 2012 World Bank report found that open dumping and burning of solid waste can have a significant health impact on local residents and workers, and that "open-burning of waste is particularly discouraged due to severe air pollution associated with low temperature combustion."

Copy of the relevant extracts of the report published by Human Rights Watch in 2017 titled "As If You're Inhaling Your Death: The Health Risks of Burning Waste" is annexed herewith as **Annexure A/10**.

36. The Applicant submits that it is also crucial to note that Landfill leachate is a very harmful liquid for both surface water and groundwater. The runoff produced from the landfill leachate can affect the receptor water quality in a significant way in the rainy months. The strength of leachate within the landfill sites increases during the monsoon month. The increase of leachate temperature may be because of the rigorous reaction/digestion that is taking place due to availability of water that is getting mixed up. The reaction rate of physical, chemical and biological

processes within the landfill may be increased in rainfall month. The behaviour of leachate formation in unlined and old landfills is very complex due to presence of varying age of refuse piles all over the landfill area. The varying degree of compaction of top layer and absence of cover system at some area, generate a condition for easy mixing of atmospheric oxygen and rainfall water into the landfill site. The runoff from landfill is small in volume but the pollutant loading is very high which increases the pollution concentration in rivers. The river water pollution is found high where the drains from landfills meet the river. The water quality of the river is found influenced by the presence of landfill runoff.

37. According to the United Nations Office for Disaster Risk reduction, (UNDRR) Landfills and dumpsites can also cause soil pollution. Leachate from the waste matrix carries different metals, which are then transferred to plants in the soil by different pathways and eventually end up either in water held in the soil or leached to the underground water table or aquifers. Waste in open dumps may become a breeding ground for insects, rodents and other disease vectors. That the epidemiological studies demonstrate that from the human health perspective, cancer and congenital malformation are potential health outcomes associated with exposure to dumpsites. Collapse of sites has become more frequent at solid waste final disposal sites in urban areas, causing casualties.
38. The Applicant in this regard submits that a recent study titled **“Identification of prevalent leachate percolation of Municipal Solid Waste Landfill: A Case Study in India”** states that Landfill leachate forms when waste-inherent water and percolated rainfall transfer are highly toxic, corrosive, acidic, and full of environmental pollutants. The release of leachate from municipal solid waste (MSW) landfill sites poses a severe hazard to human health and aquatic life.

A copy of the study titled Identification of prevalent leachate percolation of Municipal Solid Waste Landfill: A Case Study in India conducted in Delhi's Ghazipur Landfill is annexed herewith as **ANNEXURE A/11**.

**INACTION ON THE PART OF THE NAIHATI MUNICIPALITY IN
BLATANTLY VIOLATING THE SWM RULES, 2016:**

39. Since, there is a persistent large scale pollution in Hooghly River at Naihati, causing progressive environment degradation, hence, the Applicant submits that there is a direct and unequivocal violation of the said provisions and judicial precedents. Most significantly, it is pertinent to note that the SWM Rules, 2016, PWM Rules, 2016 and the Bye-Laws of 2023 lists out several responsibilities of Urban Local Bodies/Municipalities to scientifically manage waste disposal and prevent any sort of pollution. However, in the present scenario, it is the ULB's/Municipalities i.e., the Naihati Municipality themselves are causing such large scale pollution. The Applicant herein submits that in such a scenario the statutory authorities should be held absolutely liable for the inaction and performing their statutory duties vested upon them.
40. The Applicant submits that this Hon'ble Tribunal in the matter titled **Aryavart Foundation vs. M/s Vapi Green Enviro Ltd. & Ors. (O.A. 95 of 2018)** noted the following observations with regard to the failure of the statutory duties of the state machineries:

*"37. ..The SPCB has not shown that it took any stringent action as required which can act as deterrent against violation of pollution norms. Simply issuing notice has not brought about the desired results. No closures have been ordered, nor prosecution launched nor other adequate preventive and remedial measures, including assessment and recovery of damages taken. In this respect, there is failure of GPCB. **We may only observe that even a regulatory authority may be held accountable if it colludes with polluters by being required to pay damages or errant officers being held liable for action, including prosecution. Frequent failures of regulatory bodies need to be remedied for meaningful enforcement of environmental norms.**"*

41. Further, this Hon'ble Tribunal in the matter titled **Threat to life arising out of coal mining in South Garo Hills district Vs. State of Meghalaya & Ors. (O.A. No. 110TH of 2012)** has held:

"...State machinery is also required to compensate for their negligence and failure which may act as deterrent against the officers who neglected their basic duty of protecting the environment or colluded with the polluters and law violators. The polluters as well as colluding officers are to be made accountable not only by prosecution or closure of industry but also by assessing and recovering such damages for loss to the environment as it may not only compensate the environment or victims but also act as deterrent to prevent further damage."

42. The Applicant in this regard submits that the Hon'ble Supreme Court in the matter titled **M.C. Mehta (Stubble Burning & Air Quality) v. Union of India, (2020) 7 SCC 573** in respect of Air pollution held that the every agency is responsible for ensuring compliance with environmental laws and any inaction is clearly tortious and punishable under statutory provisions. The relevant paragraph reads:

"6. Everybody has to be answerable including the top State machinery percolating down to the level of gram panchayat. The very purpose of giving administration power up to the panchayat level is that there has to be proper administration and there is no room for such activities. The action is clearly tortious one and is clearly punishable under statutory provisions, besides the violation of the Court's order. In the circumstances, as widespread stubble burning has taken place, we direct the States of Punjab and Haryana and adjoining State of Uttar Pradesh where there is blatant violation which has taken place, to halt it. We direct the Chief Secretaries of the States of Punjab, Haryana and Uttar Pradesh to be present in this Court on 6-11-2019 including Chief Secretary of the Government of NCT of Delhi".

43. Further, it is pertinent to note that the Hon'ble Supreme Court in **Rajkot Municipal Corporation. vs. Manjulben Jayantilal Nakum, (1997)**

9 SCC 552 elaborated on the principle of Duty to Care on Statutory Authorities by relying in previous English decisions [*Gorris v. Scott*, (1874) LR 9 Exch 125 and *Kilgollan v. William Cooke & Co. Ltd.*, (1956) 1 WLR 527 : (1956) 2 All ER 294 (CA)]. The Hon'ble Court held:

24. Generally, a public authority entrusted with no statutory obligation to exercise a power, does not come under common law duty of care to do so but by conduct the public authority may place itself in such a situation that it attracts the duty of care which calls for exercise of the power. Common illustration is provided by an action in which an authority in the exercise of its functions, if it had created a danger, thereby subjecting itself to a duty of care for the safety of others which must be discharged by an exercise of its statutory power or by giving necessary warnings. It is the conduct of the authority in creating the danger that attracts the duty of care as envisaged in *Sheppard v. Borough of Glossop* [*Sheppard v. Borough of Glossop*, (1921) 3 KB 132 (CA)]. The statute does not by itself give rise to a civil action but it forms the formulation on which the common law can build a cause of action. ...

xxx.....

39. It can be seen that ordinarily the principle of the law of negligence applies to public authorities also. They are liable to damages because by a negligent act or failure to act when they are under a duty to act or for a failure to consider whether to exercise a power conferred on them with the intention that it would be exercised if and when public interest requires it. Where the public authority has decided to exercise a power and has done it negligently a person who has acted in reliance on what the public authority has done, may have no difficulty in proving that the damages which he has suffered have been caused by the negligence. Where the damage has resulted from a negligent failure to act there may be greater difficulty in proving causation and requires examination in greater detail."

44. That the Hon'ble Supreme Court in **NHAI v. Aam Aadmi Lokmanch, (2021) 11 SCC 566** has held that the statutory authorities and government agencies are also liable for the failure to perform the

statutory duty. The Hon'ble Court held that NHAI is liable for the accident since, they failed to maintain the same properly. The relevant para reads as follows:

"67. Having regard to the duty imposed on NHAI by virtue of Sections 4 and 5 of the Highways Act, read with Section 16 of the NHAI Act, there can be no manner of doubt that NHAI was responsible for the maintenance of the highway, including the stretch upon which the accident occurred. The report of the Sub-Divisional Officer clearly shows that inspection reports were furnished to NHAI shortly before the incident, highlighting the deficiencies; also, NHAI's correspondence with Rathod, and the local administration, reveal that it was aware of the danger and likelihood of risk to human life, and the foreseeability of the event that actually occurred later. Further, letters addressed by the local administration and NHAI to Rathod similarly show that it was incumbent upon him to take remedial action. The failure of NHAI to ensure remedial action, and likewise the failure by Rathod to take measures to prevent the accident, prima facie, disclose their liability."

45. Moreover, the Applicants assert that the Naihati Municipality should be subject to stringent fines as a consequence of their egregious violation of legal statutes and specific directions of this Hon'ble Tribunal governing mining activities. That in this regard, this Hon'ble Tribunal in the matter titled **Raja Muzaffar Bhat vs. Union Territory of Jammu and Kashmir (Original Application No. 351 of 2023)** has held:

*"104. Environmental compensation is not a kind of fee which may result in profiteering to violators and after adjusting a nominal amount of environmental compensation, a violator may find it profitable to continue with such violations. **The objective of environmental compensation is that not only the loss and damage already caused, is made to recover and restore but also in future, the said violator may not repeat the kind of violation already committed and others also have a fear of not doing the same else similar liability may be enforced upon them. Unless amount of compensation is more than maximum permissible profit arising from***

violation, the purpose of environmental compensation would always stand defeated.

105. Loss caused to surroundings of the environment, may also include flora-fauna and human beings.

106. It is in this backdrop that in various matters when the issues were considered by Courts and Tribunal and found necessary to impose environmental compensation upon Proponent/Violator of environmental laws, they have followed different mechanisms. Sometimes, Committee's reports confirming violations have been referred but for quantum of compensation, directions have been issued in different ways. In some cases, CPCB Guidelines have been applied while in many other, project cost has been made basis and, in some matters, other modes of computation have been applied.

*107. In fact, **quantum of EC should have nexus with State's efforts for protection and preservation of environment and control of pollution. Compensation regime must be a deterrent to violators and incentivize eco-friendly proponents. No one should get profited by violating environmental laws and community should also not suffer for violation of environmental norms by defaulting proponents.** There is no reason, if beside the aspects noticed above, the computation process also incorporates the elements of inflation, quality of life, and economic prosperity."*

GROUND

46. That the instant Application is being filed on the following grounds amongst others that the Applicant may take up at the time of hearing:
 - A. Because the dumping of unsegregated solid and plastic wastes alongside the banks/floodplains of Hooghly River, a tributary of River Ganga is in violation of Para 6(2) & 6(4) of the of the Ministry of Water Resources, River Development, and Ganga Rejuvenation Notification, 2016 which has been issued under Environment (Protection) Act, 1986 which categorically prohibits the discharge, whether direct or indirect, of any untreated or treated trade effluent, industrial waste, biomedical waste, or other hazardous substances into the River Ganga or its tributaries, or onto their banks;

- B. Because there is continuous illegal dumping and burning of untreated and unsegregated municipal solid wastes and plastic wastes by Naihati Municipality along the banks/floodplains of the Hoogly River in Garifa, Naihati, District North 24 Parganas of West Bengal, in blatant violation of the Solid Waste Management Rules, 2016, Plastic Waste Management Rules, 2016, and the SWM Manual, 2016, which outline siting criteria for the selection of dumping areas;
- C. Because the Naihati Municipality has egregiously breached the siting criteria as laid out under Schedule I(A)(vii) of the SWM Rules, 2016 which specifically mandates that no dumping shall take place within a minimum distance of 100 meters from any River body and 200 meters from residential areas and public parks, however, the unsegregated wastes are dumped in complete disregard to the provisions of SWM Rules, 2016;
- D. Because the Naihati Municipality has significantly breached the provisions specified in Schedule I(A)(iv) of the SWM Rules, 2016 which mandates that dumping sites must be established in accordance with the guidelines issued by the Ministry of Housing and Urban Affairs. That Table No. 4.1, under Chapter 4, Paragraph No. 4.5.1 of Ministry of Urban Development's Municipal Solid Waste Management Manual of 2016 provides detailed regulations concerning the location of dumping sites wherein it is explicitly stated that any landfill facility must be situated at least 100 meters away from any river body and 200 meters from residential areas and public parks;
- E. Because the Table No. 4.1, under Chapter 4, Paragraph No. 4.5.1 of Ministry of Urban Development's Municipal Solid Waste Management Manual of 2016 states that no sanitary landfill site is permitted in a flood prone area and the Applicant in this regard has put the coordinates of the dumping site (22°53'55.15"N, 88°24'34.01"E) on Flood Vulnerability Index (FVI) map, wherein it shows that the

dumping site falls under High Vulnerable areas which are prone to flood;

- F. Because the Naihati Municipality, in exercise of powers conferred by Rule 15(e) of the SWM Rules, 2016, formulated the Naihati Municipality Solid Waste Management Bye-Laws, 2023. Despite establishing these regulations aimed at improving waste management within its jurisdiction, the municipality itself is not adhering to them. Rule 14(i)(f) and Rule 14(ii) of the Naihati Municipality Solid Waste Management Bye-Laws, 2023 explicitly prohibit the dumping of unsegregated waste and the open burning of municipal solid wastes;
- G. Because Rule 4 (1) (a) of Solid Waste Management Rules, 2016 states that the waste generator must segregate and store the waste generated by them in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes, however, Segregation of waste is not being done and the non-segregated wastes are being dumped at the banks/floodplains of River Hooghly;
- H. Because Rule 4 (2) of the SWM Rules, 2016 states that no waste generator shall throw, burn or burry the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies, however, bulk amount of unsegregated wastes are being openly dumped and burnt at open public places on the banks/floodplains of river Hooghly in complete violation of the provisions of SWM Rules, 2016;
- I. Because the Naihati Municipality is openly dumping and burning unsegregated wastes in complete violation of specific directions passed by this Hon'ble Tribunal in **Almitra H. Patel & Anr. Vs. Union of India & Ors. (2016 SCC OnLine NGT 4216)** vide order dated 22.12.2016 which completely prohibits open burning of waste on lands, including at landfill sites.

"19. We specifically direct that there shall be complete prohibition on open burning of waste on lands, including at landfill sites. For each such incident or default, violators including the project proponent, concessionaire, ULB, any person or body responsible for such burning, shall be liable to pay environmental compensation of Rs. 5,000/- (Rs. Five Thousand only) in case of simple burning, while Rs. 25,000/- (Rs. Twenty Five Thousand only) in case of bulk waste burning. Environmental compensation shall be recovered as arrears of land revenue by the competent authority in accordance with law."

- J. Because this Hon'ble Tribunal in **Satish Kumar vs. Union of India and Ors. 2013 SCC OnLine NGT 90** vide order dated 12.12.2013 prohibited open burning of plastics across the country:

"45. Keeping in view the factual and legal aspects of the case in hand there is a need to totally ban unregulated handling and disposal of plastic waste and to issue incidental directions for its regulation and restoration of environment in some measure, if not fully.....Hence the order:

a. All the plastic waste/scrap dealers and/or recyclers including the member of the PWD Association Respondent herein shall be restrained from carrying on their business of segregation of plastic waste and its eventual transfer to recyclers or disposal contrary to and without registration under the provisions of Plastic Waste (Management and Handling) Rules, 2011;

b. There shall be no unregulated open burning of plastic/rubber or such other articles anywhere in India.

c. All the Municipal Authorities within the meaning of Rules 3(j) of the Plastic Waste (Management and Handling) Rules, 2011, shall strictly enforce the provisions of the said rules relating to use, collection, segregation, transportation and disposal of plastic waste and for such purposes shall (i) set up, operationalise and coordinate the waste management systems within their limits (ii) work out and set up

systems for the use of plastic waste in road construction and/or in co-incineration plans for generation of energy in accordance with law and lastly (iii) incorporate necessary provisions in their bylaws for enforcement of the said rules."

- K. Because authorities such as the Ministry of Environment, Forest & Climate Change, Ministry of Urban Development, West Bengal Pollution Control Board, Naihati Municipality, Urban Development and Municipal Affairs, State Government and the local bodies have failed to comply with the provisions of Solid Waste Management Rules, 2016;
- L. Because the SWM Rules, 2016, PWM Rules, 2016 and the Bye-Laws of 2023 lists out several responsibilities of Urban Local Bodies/Municipalities to scientifically manage waste disposal and prevent any sort of pollution. However, in the present scenario, it is the ULB's/Municipalities i.e., the Naihati Municipality themselves are causing such large scale pollution. Hence, it is a clear case where the 'Protector is himself the Eater' i.e., the guardian who is entrusted with the duty to safeguard has become the devourer causing the supreme degradation of the ecology and environment;
- M. Because the Humble National Green Tribunal in **Almitra H. Patel and Anr. vs. Union of India & Ors (supra)** vide order dated 04.09.2017 while highlighting the duty of the local authorities in collecting, segregating, transporting and disposing municipal solid waste in accordance with SWM Rules, 2016 stated:

"It has not been prepared for segregation and dumping of waste that would certainly lead to leachates polluting the ground water as well as causing serious prejudice to the environment and health of the people living around the site, which is stated to be as close to population as 200 meters. We think that the administration must ponder over these factors, before passing any further directions.

In the various judgments of the Tribunal we have specifically directed that dealing with collection, transportation and disposal of waste is the primary obligation of the local authorities. They cannot in face of their Constitutional and public law obligations, treat this duty as a business venture to earn profits. It must be ensured that the waste is properly segregated collected, transported and disposed of strictly in accordance with Solid Waste Management Rules, 2016."

N. Because the Hon'ble Supreme Court in the very recent order dated 02.08.2024 in a matter titled **Ashok Kumar Sinha vs. Union of India (Civil Appeal No. 3367/2020)** states:

*"8. In course of deliberation in this matter, it came to light that there is wide spread use of plastic in the areas which are to be kept free from such pollution potential products. **The dumping of plastic is causing serious environment degradation and also impacting aquatic life in the river banks and the water bodies in the country. Unless concerted effort is made by the responsible authorities with people's cooperation, irrespective of the efforts to target illegal/unauthorized constructions, the desired improvement of the quality of the water in river Ganga/all other rivers and water bodies in the country will remain illusory.**"*

O. Because the Hon'ble Supreme Court in the case of **M.C. Mehta (Stubble Burning & Air Quality) v. Union of India, (2020) 7 SCC 573** had held that the every agency is responsible for ensuring compliance with environmental laws and any inaction is clearly tortious and punishable under statutory provisions. The relevant paragraph reads:

"6. Everybody has to be answerable including the top State machinery percolating down to the level of gram panchayat. The very purpose of giving administration power up to the panchayat level is

that there has to be proper administration and there is no room for such activities. The action is clearly tortious one and is clearly punishable under statutory provisions, besides the violation of the Court's order. In the circumstances, as widespread stubble burning has taken place, we direct the States of Punjab and Haryana and adjoining State of Uttar Pradesh where there is blatant violation which has taken place, to halt it. We direct the Chief Secretaries of the States of Punjab, Haryana and Uttar Pradesh to be present in this Court on 6- 11-2019 including Chief Secretary of the Government of NCT of Delhi."

- P. Because the issue of dumping of waste and discharge of sewage in River Ganga and its upstream tributaries has been an ongoing issue and was also noted by this Hon'ble Tribunal in **Indian Council for Enviro-Legal Action vs. National Ganga River Basin Authority & Ors. (Original Application No. 10 of 2015)** in the following manner:

"68. It is evident from the above details that River Ganga is being highly polluted and major sources of pollution are discharge of treated/untreated trade effluent, treated/untreated sewage and dumping of municipal solid waste and other wastes directly or indirectly into River Ganga. Mentioning of treated or untreated effluents or sewage is necessitated for the reasons that most of the STPs, if installed are not functioning or have been found to be malfunctioning. It may be due to heavy load of sewage and incapacity of the plants. Discharge of untreated sewage directly into River Ganga in segment-A is the main culprit of pollution. Even where the sewage is being treated through the STPs, the STPs do not have the mechanism for treating Coliforms. Similar is the situation with the industrial effluent which is directly discharged into river, untreated or treated, but not meeting the prescribed parameters, because of the ineffective working of the ETPs installed by the industries. There are hardly any CETP in this area and the ones which have been installed again are not performing to their optimum capacity

*and as per the prescribed standards. Indiscriminate dumping of municipal solid waste, construction and demolition waste either directly into River Ganga or on its banks should not be permitted. **The wastes that are dumped on the banks of River Ganga in rainy season or whenever there is higher river flow, gets washed away and pollutes river Ganga.***"

- Q. Because the Hon'ble Supreme Court in the case of **M. C. Mehta v. Union of India & Ors. (Writ Petition (Civil) No. 3727/1985)**, vide Order dated 29.10.2014 had also emphasizes on the religious importance of River Ganga:

"There is no gainsaying that river Ganga has for the people of this country great significance not only in the spiritual or mythological sense but also in material terms for it sustains millions who are settled on its bank or eke out their living by tilling lands that are fertilized by its water. Despite the experience of the past we have not lost hope, for the Central Government appears to be resolute in its efforts to ensure that the Mission of cleaning the holy river is carried forward and accomplished. How far the Government will's renewed zeal make any difference on the ground is for anyone to guess. What is, however, clear is that if the mission has to succeed, all those concerned will have to rededicate themselves to the accomplishment of the cause that will not only cleanse the holy river but comfort millions of souls that are distressed by the fetid in what is believed to be so holy and pure that a dip in its water cleanses all sins."

- R. Because of the negligence of the Respondents a large amount of unsegregated municipal solid wastes are being dumped into the banks/floodplains of Hooghly River thereby worsening the quality of the water. That it is apprehended the water percolating through landfill sites produces leachate during rains, containing undesirable toxic chemicals which not only leads to contamination of groundwater but also gets drained into the Hooghly River and causing serious threat to the ecology;

- S. Because this Hon“ble Tribunal in **Paryavaran Suraksha Samiti & Anr. vs. Union Of India & Ors. (O.A. 593/2017)** in pursuance of Hon“ble Supreme Court judgment in (2017) 5 SCC 326 has held:

*"17. As already noted, prevention of pollution of water is directly linked to access to potable water as well as food safety. Restoration of pristine glory of rivers is also of cultural and ecological significance. This necessitates effective steps to ensure that no pollution is discharged in water bodies. Doing so is a criminal offence under the Water Act and is harmful to the environment and public health. „Precautionary“ principle of environmental law is to be enforced. Thus, the mandate of law is that there must be 100% treatment of sewage as well as trade effluents. This Tribunal has already directed in the case of river Ganga that timelines laid down therein be adhered to for setting up of STPs and till then, interim measures be taken for treatment of sewage. There is no reason why this direction be not followed, so as to control pollution of all the river stretches in the country. The issue of ETPs/CETPs is being dealt with by an appropriate action against polluting industries. **Setting up of STPs and MSW facilities is the responsibility of Local Bodies and in case of their default, of the States. Their failure on the subject has to be adequately monitored. Recovery of compensation on „Polluter Pays“ principle is a part of enforcement strategy but not a substitute for compliance.** It is thus necessary to issue directions to all the States/UTs to enforce the compensation regime, latest with effect from 01.04.2020. We may not be taken to be condoning any past violations. The States/UTs have to enforce recovery of compensation from 01.04.2020 from the defaulting local bodies. On failure of the States/UTs, the States/UTs themselves have to pay the requisite amount of compensation to be deposited with the CPCB for restoration of environment. The Chief Secretaries of all the States may furnish their respective compliance reports as per directions already issued in O.A. No. 606/2018."*

- T. Because the water pollution in India is overwhelmingly an issue of domestic sewage. Polluted water influences the life of present

generation as well as it affects the upcoming generations because of its continuing effects. A study, "**Impact on Human Health Due to Ghaggar Water Pollution**" is published by an International Research Journal of Environmental Science. The study concludes that:

"The water quality of Ghaggar River is gradually deteriorating. It is observed that in general in Ghaggar river basin more waterborne diseases are reported downstream the river. That Ghaggar River gets polluted due to negative human impact from the nearby catchment through disposal of untreated domestic sewage and industrial effluents from villages, towns and cities located on the bank or in the river catchment, resulting into increase in waterborne diseases in villages, towns and cities. The observations also revealed that the epidemics in general are experienced by locals one or two times in a year, and majority of them are waterborne diseases."

- U. Because the international attention towards right to drinking water and sanitation gained prominence especially in the period emerging prior to the **Millennium Development Goals ("MDGs")**. The MDGs as they once stood, contained elaborate provisions on various important facets of human rights. One of the targets therein was to accomplish by 2015 a reduction by half in the total number of people bereft of access to safe drinking water and basic sanitation. With sustainability having emerged as a strong focal point driving international discussions, the world moved towards the Sustainable Development Goals ("SDGs");
- V. Because clean water and sanitation is one of the important constituents of **17 Sustainable Development Goals (SDGs)**. In 2015, world leaders agreed to 17 Global Goals (officially known as the Sustainable Development Goals or SDGs) aiming to create a better world by 2030. That the 6th goal of Sustainable Development

is to ensure availability and sustainable management of water and sanitation for all;

- W. Because Article 25 of the Universal Declaration of Human Rights covers a wide range of rights, including those to adequate food, water, sanitation, clothing, housing and medical care. That the human right to water entitles everyone, without discrimination, to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use;
- X. Because the deliberate nonchalant attitude of the concerned respondents shows alarming state of affairs and rampant violation of Rule of Law which have remained unchecked till date which is very unfortunate and the statutory regulators have erroneously failed to work in the interest of Rule of Law for protection of environment, public health to prevent rampant violations of such nature even without waiting for any judicial intervention;
- Y. Because as held by the Hon'ble Supreme Court in **Indian Council for Enviro Legal Action vs. Union of India (1996) 5 SCC 281** held that:

*"26. **Enactment of a law, but tolerating its infringement, is worse than not enacting a law at all.** The continued infringement of law, over a period of time, is made possible by adoption of such means which are best known to the violators of law. **Continued tolerance of such violations of law not only renders legal provisions nugatory but such tolerance by the enforcement authorities encourages lawlessness and adoption of means which cannot, or ought not to, be tolerated in any civilized society.** Law should not only be meant for the law-abiding but is meant to be obeyed by all for whom it has been enacted. A law is usually enacted because the legislature feels that it is necessary. **It is with a view to protect and preserve the environment and save it for the future generations and to ensure good quality of life that Parliament enacted the anti-pollution laws, namely, the Water Act, Air Act and***

the Environment (Protection) Act, 1986. These Acts and Rules framed and notification issued thereunder contain provisions which prohibit and/or regulate certain activities with a view to protect and preserve the environment. When a law is enacted containing some provisions which prohibit certain types of activities, then, it is of utmost importance that such legal provisions are effectively enforced. If a law is enacted but is not being voluntarily obeyed, then, it has to be enforced. Otherwise, infringement of law, which is actively or passively condoned for personal gain, will be encouraged which will in turn lead to a lawless society. Violation of anti-pollution laws not only adversely affects the existing quality of life but the non-enforcement of the legal provisions often results in ecological imbalance and degradation of environment, the adverse effect of which will have to be borne by the future generations."

- Z. Because it is the duty of every citizen under Article 51-A(g) of the Constitution of India to protect and improve the natural environment including plants, species, forests, lakes, rivers and wildlife, and to have compassion for living creatures. Therefore, the Applicant owing the duty to protect environment has filed the present Application before this Hon'ble Tribunal;
- AA. Because the State is bound under the doctrine of Public Trust to protect and preserve natural resources and take effective remedial action by way of imposition and recovery of penalty and environmental compensation from the defaulters and prosecution and blacklisting of the defaulters/ persons indulging in such illegal and unscientific dumping and burning of municipal solid wastes on the banks/floodplains of river Hooghly;
- BB. Because Article 48-A of the Constitution of India mandates that the State is under a Constitutional obligation to protect and improve the environment and to safeguard the forest and wild life in the country

and despite such mandate the statutory regulators have miserably failed in their duties.

LIMITATION

The Applicant is filing the present Application under Sections 14, 15 and 20 of the National Green Tribunal Act, 2010 to highlight the non-compliance of the provisions of the enactments specified in Schedule I of the Act. That the present Application raises the substantial question relating to the environment arising out of the large scale pollution as well as illegal dumping and burning of municipal solid waste by Naihati Municipality along the banks/floodplains of the Hoogly River in Garifa, Naihati, District North 24 Parganas of West Bengal. It is submitted that every day the statutory norms and Orders of the Hon'ble Tribunal are not complied with, a fresh cause of action is created in light of the Order of this Hon'ble Tribunal dated 7.05.2015 in O.A. 222 of 2014 *Forward Foundation and Ors. v State of Karnataka and Ors.* and the same constitutes a continuing cause of action. Thus, the present Application is being filed within the period of limitation as prescribed under the National Green Tribunal Act, 2010.

PRAYER

In the light of the above facts and circumstances, it is most respectfully prayed that the Hon'ble Tribunal may be pleased to:

- I. Direct the Respondent No. 8, Naihati Municipality to ensure that no unsegregated municipal solid wastes and plastic wastes are dumped and openly burnt on the banks/floodplains of River Hooghly or any other non-designated site in violation of the provisions of Solid Waste Management Rules, 2016, Naihati Municipality Solid Waste Management Bye-Laws, 2023 and Ministry of Water Resources, River Development, and Ganga Rejuvenation Notification, 2016;

- II. Direct the Respondent No. 8, Naihati Municipality to ensure absolute compliance with the provisions of the Rules including segregation at source and proper scientific management and disposal of the wastes;
- III. Initiate necessary action against the erring officials of Respondent No. 8, Naihati Municipality for the persistent damage caused to the environment by unscientifically dumping and burning unsegregated wastes on the banks/floodplains of River Hooghly in complete violation of Rule 15 of SWM Rules;
- IV. Direct the Respondent No. 9, District Magistrate Hooghly to ensure proper implementation of the SWM Rules who has failed to review the performance of Naihati Municipality in violation of Rule 12 of the SWM Rules;
- V. Initiate action against the erring officials of Respondent No. 6, West Bengal Pollution Control Board who has failed to ensure proper enforcement and implementation of SWM Rules, in the State of West Bengal in violation of Rule 16 for their negligence in permitting the Naihati Municipality to dump and burn municipal wastes in an unscientific manner thereby endangering the public and the environment;
- VI. Direct penal action and impose environmental compensation including restitution of environment for the breach of statutory provisions and inter-alia for loss of ecological services foregone and costs to restore the damage done to the environment and ecology upon the Respondent No. 8, Naihati Municipality;

- vii. Pass any other order deemed fit by this Hon'ble Tribunal in the interest of justice, equity and good conscience.

PRAMEYA FOUNDATION

Sabyasachi Chowdhury
Treasurer

APPLICANT

THROUGH

Ritwick Dutta

RITWICK DUTTA

Rahul Choudhary

RAHUL CHOUDHARY

Kaustav Dhar

KAUSTAV DHAR

ADVOCATES

COUNSELS FOR THE APPLICANT

N-73, LOWER GROUND FLOOR,
GREATER KAILASH-I, NEW DELHI-110048
MOBILE NO: +91 9312407881
Email: dclaw160@gmail.com

PLACE: KOLKATA/DELHI

DATE: 11.09.2024

VERIFICATION

I, Sabyasachi Chowdhury, S/o, Somnath Chowdhury, aged about 31 years, office at 5, A.P.C Avenue, Ground Floor, Purba Sinthee (E), Dum Dum, Kolkata – 700030, do hereby verify that the contents of paragraphs 1 to 46 are true to the best of my knowledge and I have not suppressed any material fact.

PRAMEYA FOUNDATION

Sabyasachi Chowdhury
Treasurer

APPLICANT

SL. NO. 420/2024

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
EASTERN ZONE BENCH AT KOLKATA
ORIGINAL APPLICATION NO. ___ OF 2024



IN THE MATTER OF:

PRAMEYA FOUNDATION

.... APPLICANT

VERSUS

STATE OF WEST BENGAL AND ORS.

.... RESPONDENTS

BEFORE THE NOTARY PUBLIC
AT BIDHANNAGAR
DIST.-NORTH 24 PARGANAS

AFFIDAVIT

I, Sabyasachi Chowdhury, S/o, Somnath Chowdhury, aged about 31 years, office at 5, A.P.C Avenue, Ground Floor, Purba Sinthee (E), Dum Dum, Kolkata – 700030, do hereby solemnly affirm and state as under:

1. I am the person authorized by the Applicant Organization in the above titled Original Application and conversant with the facts and circumstances of the case and competent to swear this affidavit.
2. That the contents of the accompanying application are true and correct and nothing material has been concealed therefrom.

PRAMEYA FOUNDATION

Sabyasachi Chowdhury
Treasurer

DEPONENT

VERIFICATION

Verified on this 11th day of Sept, 2024 that the contents of the above-mentioned Affidavit are true and correct and nothing material has been concealed therefrom.

PRAMEYA FOUNDATION

Sabyasachi Chowdhury
Treasurer

DEPONENT

Identified by me

Manoj Basu

Advocate

S. Chaudhuri
S. CHAUDHURI
* NOTARY *
GOVT. OF INDIA
Regn. No.-6584/08
Bidhannagar Court
Dist.-North 24 Pgs

11 SEP 2024

MANOJ BASU
Advocate
Enrolment No.-F-247/2006
Bidhan Nagar Court
Kolkata-700091



Letter of Authorization

This is to authorize Mr. Sabyasachi Chowdhury, Treasurer of Prameya Foundation, to represent Prameya Foundation and sign all documents on its behalf required in relation with the Original Application filed before the Hon'ble National Green Tribunal, Eastern Zonal Bench at Kolkata, against the continuous illegal dumping and burning of untreated and unsegregated municipal solid wastes and plastic wastes by Naihati Municipality along the banks/floodplains of Hoogly River in Garifa, Naihati, District North 24 Parganas of West Bengal in violation of River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016 and Solid Waste Management Rules, 2016.

PRAMEYA FOUNDATION
Mukut Biswas
Managing Trustee

Mukut Biswas
Managing Trustee
Prameya Foundation

t.c.

(Signature)

Place: Kolkata

Date: 09.09.2024



ANNEXURE A/2

COPY OF THE GOOGLE EARTH IMAGES OF 2018 AND 2024 TAKEN BY THE APPLICANT OF THE BANKS OF THE HOOGHLY RIVER AT GARIFA, NAIHATI SHOWS A SIGNIFICANT CHANGE IN THE ENTIRE LANDSCAPE:

2018



2024



t.c.

Signature

| | | |
|--|--|---|
| | | (च) प्रधान सचिव, सार्वजनिक स्वास्थ्य इंजीनियरिंग विभाग, राज्य सरकार (नाम) सदस्य, पदेन |
| | | (छ) अध्यक्ष (नाम) राज्य प्रदूषण नियंत्रण बोर्ड -सदस्य, पदेन |
| | | (झ) (नाम) राज्य में कार्यान्वयन एजेंसी के चीफ ऐक्जीक्यूटिव अधिकारी- सदस्य, पदेन |
| | | (ञ) वनों के प्रधान मुख्य संरक्षक, राज्य सरकार (नाम) -सदस्य, पदेन |
| | | (ट) सरकार (नाम) द्वारा संबंधित क्षेत्रों से पांच विशेषज्ञों से अधिक मनोनीत नहीं किए जाएंगे।-सदस्य |

[फा. सं. स्था.-01/2016-17/111/एनएमसीजी]

संजय कुंडू, संयुक्त सचिव

**MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT, AND GANGA REJUVENATION
NOTIFICATION**

New Delhi, the 7th October, 2016

S.O. 3187(E).—Whereas it is necessary to constitute authorities at Central, State and District levels to take measures for prevention, control and abatement of environmental pollution in River Ganga and to ensure continuous adequate flow of water so as to rejuvenate the River Ganga to its natural and pristine condition and for matters connected therewith or incidental thereto;

And whereas the River Ganga is of unique importance ascribed to reasons that are geographical, historical, socio-cultural and economic giving it the status of a National River;

And whereas the River Ganga has been facing serious threat due to discharge of increasing quantities of sewage, trade effluents and other pollutants on account of rapid urbanisation and industrialisation;

And whereas, the demand for water of River Ganga is growing for irrigation, drinking water supplies, industrial use and hydro-power due to increase in population, urbanisation, industrialisation, infrastructural development and taking into account the need to meet competing demands;

And whereas there is an urgent need-

- (a) to ensure effective abatement of pollution and rejuvenation of the River Ganga by adopting a river basin approach to promote inter-State and inter-sectoral co-ordination for comprehensive planning and management;
- (b) to maintain ecological flows in the River Ganga with the aim of ensuring continuous flows throughout its length so as to restore its ecological integrity that enables it to self rejuvenate;
- (c) for imposing restrictions in areas abutting the River Ganga in which industries, operations or processes, or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards;
- (d) to make provision for inspection of any premises, plants, equipment, machineries, manufacturing or other processes, materials or substances and giving direction to the authorities, officers and persons as may be necessary to take steps, for prevention, control and abatement of environmental pollution in the River Ganga;
- (e) for carrying out and sponsoring investigations and research relating to problems of environmental pollution in the River Ganga and examination of such manufacturing processes, material and substance as are likely to cause environmental pollution;
- (f) for collection and dissemination of information in respect of matters relating to environmental pollution in the River Ganga and preparation of manual, codes or guide relating to the prevention, control and abatement of environmental pollution;

And whereas the State Governments concerned, being equally responsible for Ganga rejuvenation, are required to co-ordinate and implement the river conservation activities at the State level, and to take steps for comprehensive management of the River Ganga in their States;

And whereas it is required to have planning, financing, monitoring and coordinating authorities for strengthening the collective efforts of the Central Government and the State Governments and authorities under this Order for effective abatement of pollution and rejuvenation, protection and management of the River Ganga;

Now, therefore, in exercise of the powers conferred by sub-section (1), read with clauses (i), (ii), (v), (vi), (vii), (viii), (ix), (x), (xii) and (xiii) of sub-section (2) and (3) of section 3 and sections 4,5,9,10,11, 19, 20 and 23 of the Environment (Protection) Act, 1986 (29 of 1986) (hereinafter referred to as the Act) and in supersession of the notifications of the Government of India in the erstwhile Ministry of Environment and Forests numbers S.O.1111(E), dated the 30th September, 2009, S.O. 2493 (E), dated the 30th September, 2009, S.O. 2494 (E), dated the 30th September 2009, S.O. 2495 (E), dated the 30th September 2009, S.O. 287 (E) dated the 8th February, 2010 and in the Ministry of Water Resources, River Development and Ganga Rejuvenation No. S.O. 2539 (E), dated the 29th September 2014, except as respects things done or omitted to be done before such supersession, the Central Government hereby-----

(i)constitutes the authorities by the names mentioned in this Order for the purpose of exercising and performing such of the powers and functions (including the power to issue directions under section 5 of the Act and for taking measures with respect to the matters as mentioned in this Order;

(ii)directs, subject to the supervision and control of the Central Government and the provisions of this Order, such authority or authorities as specified in this Order that shall exercise the powers or perform the functions or take the measures so mentioned in this Order as if such authorities had been empowered by the Act to exercise those powers, perform those functions, or take such measures;

(iii)directs that all its powers and functions (except the power to constitute any authority under sub-section (3) of section 3 and to make rules under the sections 6 and 25 of the Act) under any provision of the Act shall, in relation to River Ganga and matters connected therewith, be exercisable and discharged also by the authorities constituted by this Order and by the officers specified in this Order, subject to such conditions and limitations and to the extent as specified in this Order.

1.Short title and commencement. – (1) This Order may be called the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016.

(2) It shall come into force on the date of its publication in the Official Gazette.

2. Applicability.- This Order shall apply to the States comprising River Ganga Basin, namely, Himanchal Pradesh, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, Haryana, Rajasthan, West Bengal and the National Capital Territory of Delhi and such other States, having major tributaries of the River Ganga as the National Council for Rejuvenation, Protection and Management of River Ganga may decide for the purpose of effective abatement of pollution and rejuvenation, protection and management of the River Ganga.

3.Definitions.- (1) In this Order, unless the context otherwise requires, -

(a) “Act” means the Environment (Protection) Act, 1986 (29 of 1986);

(b) “Basin” means the entire catchment of a water body or water course including the soil, water, vegetation and other natural resources in the area and includes land, water, vegetation and other natural resources on a catchment basis;

(c) “Buffer Area” means an area which extends beyond the flood plain of a stream;

(d) “catchment” or “catchment area” includes the entire land area whose runoff from rain, snow or ice drains into a water body or a water course, before the water course joins River Ganga or its tributaries or discharges water into River Ganga or its tributaries;

(e) “commercial fishing” means large scale fishing for commercial purposes by nets, poisoning, or other modern fishing gear or methods in River Ganga or its tributaries;

(f) Competent authority means “Central Government”

(g) “deforestation” means removal or reduction of forest cover, especially when caused by anthropogenic activities or removal of trees and other vegetation of a forest excluding a planned clearance for scientific management of forest in particular in the catchment area of River Ganga;

(h) “degraded forest” means a forest having loss or reduction of native forest cover or vegetation density in the catchment area abutting River Ganga or its tributaries;

(i) “direction” shall mean direction issued under section 5 of the Act and the expression “direct” shall be construed accordingly;

(j) “District Ganga Committee” means the District Ganga Protection Committee mentioned in paragraph 53;

(k) “engineered diversion” means a structure or device constructed or installed to transfer the water of River Ganga or its tributaries into canals or other engineering structures;

(l) "flood plain" means such area of River Ganga or its tributaries which comes under water on either side of it due to floods corresponding to its greatest flow or with a flood of frequency once in hundred years;

(m) "Ghat" means sloping part at Bank of River Ganga or its tributaries with artificially constructed steps or sloping piece of land used for providing easy human access to water of River Ganga or its tributaries and includes usage of such parts for religious or other related purposes;

(n) "local authority" includes Panchayati raj institutions, municipalities, a district board, cantonment board, town planning authority or Zila Parishad or any other body or authority, by whatever name called, for the time being invested by law, for rendering essential services or with the control and management of civic services, within a specified local area;

(o) "National Mission for Clean Ganga" means the authority mentioned in paragraph 31.

(p) "notification" means a notification published in the Official Gazette and the expression 'notifying' shall be construed accordingly;

(q) "offensive matter" consists of solid waste which includes animal carcasses, kitchen or stable refuse, dung, dirt, putrid or putrefying substances and filth of any kind which is not included in the sewage;

(r) "person" include ----

(i) an individual or group or association of individuals whether incorporated or not;

(ii) a company established under the Companies Act, 2013 (18 of 2013);

(iii) any corporation established by or under any Central or State Act;

(iv) a local authority;

(v) every juridical person not falling within any of the preceding sub-clauses;

(s) "River Bed" means the dried portion of the area of River Ganga or its tributaries and includes the place where the River Ganga or its tributaries run its course when it fills with water and includes the land by the side of River Ganga or its tributaries which retains the water in its natural channel, when there is the greatest flow of water;

(t) "River Bed Farming" includes seasonal agriculture or farming on the River Bed of River Ganga or its tributaries during low flows of water;

(u) "River Ganga" means the entire length of six head-streams in the State of Uttarakhand namely, Rivers Alakananda, Dhaulti Ganga, Nandakini, Pinder, Mandakini and Bhagirathi starting from their originating glaciers up to their respective confluences at Vishnu Prayag, Nand Prayag, Karn Prayag, Rudra Prayag, and Dev Prayag as also the main stem of the river thereafter up to Ganga Sagar including Prayag Raj and includes all its tributaries;

(v) "rubbish" means ashes, broken brick, mortar, broken glass, dust or refuse of any kind and includes filth;

(w) "sand mining" means large scale removal of river sand from the dried channel belt, flood plain or a part of River Ganga or its tributaries;

(x) "sewage effluent" means effluent from any sewerage system or sewage disposal works and includes sewage from open drains;

(y) "sewerage scheme" means any scheme which a local authority may introduce for removal of sewage by flushing with water through underground closed sewers;

(z) "Schedule" means Schedule appended to this Order;

(za) "specified District" means an area of every District abutting the River Ganga, being within a radius of fifteen kilometers of the Ganga River Bank or its tributaries in the States of Himachal Pradesh, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, Haryana, Rajasthan, West Bengal and the National Capital Territory of Delhi and such other States, having major tributaries of the River Ganga as referred to in this Order;

(zb) "State Ganga Committee" means the State Ganga Rejuvenation, Protection and Management Committee constituted under this Order for each of the States mentioned in paragraph 2.

(zc) State Ganga River Conservation Authority means an authority earlier constituted in each State under the Act as follows, namely:-

(i) the Bihar State Ganga River Conservation Authority constituted by the notification of the Government of India in the Ministry of Environment and Forests number S.O287 (E), dated 8th February 2010;

(ii) the Jharkhand State Ganga River Conservation Authority constituted by the notification of the Government of India in the Ministry of Environment and Forests number S.O2495(E), dated 30th September 2009;

- (iii) the Uttarakhand State Ganga River Conservation Authority constituted by the notification of the Government of India in the Ministry of Environment and Forests number S.O 1111 (E), dated 30th September 2009;
- (iv) the Uttar Pradesh State Ganga River Conservation Authority constituted by the notification of the Government of India in the Ministry of Environment and Forests number S.O2493 (E), dated 30th September 2009; and
- (v) the West Bengal State Ganga River Conservation Authority constituted by the notification of the Government of India in the Ministry of Environment and Forests number S.O2494 (E), dated 30th September 2009.

(zd) "stream" includes river, water course (whether flowing or for the time being dry), inland water (whether natural or artificial) and sub-terrain waters;

(ze) "tributaries of River Ganga" means those rivers or streams which flow into River Ganga and includes Yamuna River, Son River, Mahananda River, Kosi River, Gandak River, Ghaghara River and Mahakali River and their tributaries or such other rivers which National Council for Rejuvenation Protection and Management of River Ganga may, by notification, specify for the purposes of this Order.

2. The words and expressions used herein and not defined but defined in the Environment (Protection) Act, 1986 (29 of 1986) shall have the meanings respectively assigned to them in the Act.

4. Principles to be followed for rejuvenation, protection and management of River Ganga. – (1) The following principles shall be followed in taking measures for the rejuvenation, protection and management of River Ganga, namely:-

- (i) the River Ganga shall be managed as a single system;
- (ii) the restoration and maintenance of the chemical, physical, and biological quality of the waters of River Ganga shall be achieved in a time bound manner;
- (iii) the River Ganga shall be managed in an ecologically sustainable manner;
- (iv) the continuity of flow in the River Ganga shall be maintained without altering the natural seasonal variations;
- (v) the longitudinal, lateral and vertical dimensions (connectivities) of River Ganga shall be incorporated into river management processes and practices;
- (vi) the integral relationship between the surface flow and sub-surface water (ground water) shall be restored and maintained;
- (vii) the lost natural vegetation in catchment area shall be regenerated and maintained;
- (viii) the aquatic and riparian biodiversity in River Ganga Basin shall be regenerated and conserved;
- (ix) the bank of River Ganga and its flood plain shall be construction free Zone to reduce pollution sources, pressures and to maintain its natural ground water recharge functions;
- (x) the public participation in rejuvenation, protection and management, revision and enforcement of any regulation, standard, effluent limitation plan, or programme for rejuvenation, protection and management shall be encouraged and made an integral part of processes and practices of

River Ganga rejuvenation, protection and management.

(2) National Mission for Clean Ganga may, having regard to the needs of the people of the country, advances in technology and socio economic conditions of the people and to preserve the rich heritage of national composite culture, specify additional principles in addition to the principles specified under sub-paragraph (1).

5. Ecological flow of water in River Ganga to be maintained. – (1) Every State Government, shall endeavor to ensure that uninterrupted flows of water are maintained at all times in River Ganga as required under clause (iv) of paragraph (4).

(2) Every State Government shall also endeavor to maintain adequate flow of water in River Ganga in different seasons to enable River Ganga to sustain its ecological integrity and to achieve the goal, all concerned authorities shall take suitable actions in a time bound manner.

(3) For the purposes of this paragraph, the average flow of water shall be determined by such Hydrology Observation Stations at such points of the River Ganga, as may be specified by the National Mission for Clean Ganga:

Provided that the average flow of water in River Ganga may, having regard to ecology, be determined by the National Mission for Clean Ganga for different points of River Ganga.

6. Prevention, control and abatement of environmental pollution in River Ganga and its tributaries.- (1) No person shall discharge, directly or indirectly, any untreated or treated sewage or sewage sludge into the River Ganga or its tributaries or its banks:

Provided that where a local authority does not have, on the date of commencement of this Order, sewerage scheme or infrastructure for collection, storage, transportation and disposal of sewage or sewage sludge or such infrastructure is not functional on the said date in an area abutting the River Ganga or its tributaries, every such local authority shall, within a period, specified by National Mission for Clean Ganga from the date of commencement of this Order, develop such infrastructure or make such infrastructure functional, as the case may be, for collection, storage, transportation and disposal of sewage in the territorial area of the local authority.

(2) No person shall discharge, directly or indirectly, any untreated or treated trade effluent and industrial waste, bio-medical waste, or other hazardous substance into the River Ganga or its tributaries or on their banks:

Provided further that where an industry or industrial area management does not have, on the date of commencement of this Order, industrial effluent treatment scheme or infrastructure for collection, storage, transportation and disposal of trade effluents industrial waste, bio-medical waste, or other hazardous substance, etc. or such infrastructure is not functional on the said date in an area abutting the River Ganga or its tributaries, every such industry or industrial area management shall, within a period so specified by the National Mission for Clean Ganga from the date of commencement of this Order, develop such infrastructure or make such infrastructure functional, as the case may be, for collection, storage, transportation and disposal of trade effluent and industrial waste, bio-medical waste, or other hazardous substance in the jurisdiction of the industry or industrial area management.

(3) No person shall construct any structure, whether permanent or temporary for residential or commercial or industrial or any other purposes in the River Ganga, Bank of River Ganga or its tributaries or active flood plain area of River Ganga or its tributaries:

Provided that in exceptional circumstances like natural calamities or religious events at traditional locations, temporary structures can be raised after prior permission of the National Mission for Clean Ganga acting through the State Ganga Committee and the District Ganga Committee:

Provided further that in case any such construction has been completed, before the commencement of this Order, in the River Bank of River Ganga or its tributaries or active flood plain area of River Ganga or its tributaries, the National Mission for Clean Ganga shall review such constructions so as to examine as to whether such constructions are causing interruption in the continuous flow of water or pollution in River Ganga or its tributaries, and if that be so, it shall cause for removing them.

(4) No person shall do any act or carry on any project or process or activity which, notwithstanding whether such act has been mentioned in this Order or not, has the effect of causing pollution in the River Ganga.

(5) It shall be the duty of the National Mission for Clean Ganga, every Specified State Ganga Committee or specified District Ganga Protection Committee, local authority and all other authorities and persons to disseminate widely and bring to public notice, using various means, information captured in reports and the aforesaid measures in the local language in every village, town, city and other areas abutting River Ganga and its tributaries.

7. Emergency measures in case of pollution of River Ganga or its tributaries --- If any poisonous, noxious or polluting matter is present or has entered into the River Ganga due to any accident or other unforeseen act or event, and it is necessary or expedient to take immediate action, the National Mission for Clean Ganga shall take immediate action for carrying out such operations or direct for carrying out such operations by the specified State Ganga Committee or specified District Ganga Committee or local authority or any other authority or Board or Corporation, as it may consider necessary for all or any of the following purposes, namely; -

(a) the manner of removing the matter from River Ganga and disposing it off in such a manner as it may specify, as also, for carrying out such operations as is considered appropriate for mitigation or removal of any pollution caused by such matter;

(b) issuing directions restraining or prohibiting any person concerned from discharging any poisonous, noxious or polluting matter in the River Ganga;

(c) undertaking any additional work or functions as may be necessary to address such emergency.

8. Power to issue directions. - The National Mission for Clean Ganga shall, in the exercise of its powers and performance or its functions under this Order, issue such directions in writing as it may consider necessary for abatement of pollution and rejuvenation, protection and management of the River Ganga to the concerned authority or local authority or other authorities or Board or Corporation or person and they shall be bound to comply with such directions.

9. Ganga safety audit.- Every District Ganga Committee shall cause the Ganga safety audit to be carried out by such Ganga Safety Auditors within such time frame and in accordance with such protocols as may be specified by the

National Mission for Clean Ganga for the area of the River Ganga abutting such district and forward the copy of the report of such safety audit along with remedial action taken thereon to the concerned State Ganga Committee and the National Mission for Clean Ganga, which shall take appropriate action thereon, if required.

10. Pollution in River Ganga and its tributaries to be monitored.- (1) The pollution in River Ganga and its tributaries shall be monitored by the National Mission for Clean Ganga on its own or by directions through various State and Central Government agencies by use of satellite imagery and other remote sensing technologies as well as physical stations, online monitoring and independent agencies at a periodicity to be specified by it.

(2) Notwithstanding the provisions of sub-paragraph (1), the Central Government may assign the function of monitoring of pollution in River Ganga and its tributaries to any other agency or body or direct, having regard to advances in technology, to monitor the aforesaid pollution in River Ganga and its tributaries by adopting any other technique or method, as may be specified in the direction.

11. Constitution of National Council for Rejuvenation, Protection and Management of River Ganga. - With effect from the date of commencement of this Order, there shall be constituted an authority by the name to be called the National Council for Rejuvenation, Protection and Management of River Ganga, (hereinafter in this Order called as the National Ganga Council) for the purposes of the Act and to exercise powers and discharge functions as specified in this Order and the Act.

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| 12. Composition of National Ganga Council.- The National Ganga Council shall consist of the following members, namely:- | |
| (a) Prime Minister | - Chairperson, <i>ex-officio</i> |
| (b) Union Minister for Water Resources, River Development and Ganga Rejuvenation | - Vice-Chairperson, <i>ex-officio</i> |
| (c) Union Minister for Environment, Forests and Climate Change | - Member, <i>ex-officio</i> ; |
| (d) Union Minister for Finance | - Member, <i>ex-officio</i> ; |
| (e) Union Minister for Urban Development | - Member, <i>ex-officio</i> ; |
| (f) Union Minister for Power | - Member, <i>ex-officio</i> ; |
| (g) Union Minister for Science and Technology | - Member, <i>ex-officio</i> ; |
| (h) Union Minister for Rural Development | - Member, <i>ex-officio</i> ; |
| (i) Union Minister for Drinking Water and Sanitation | - Member, <i>ex-officio</i> ; |
| (j) Union Minister for Shipping | - Member, <i>ex-officio</i> ; |
| (k) Union Minister of State for Tourism | - Member, <i>ex-officio</i> ; |
| (l) Vice Chairman, NITI Aayog | - Member, <i>ex-officio</i> ; |
| (m) Chief Minister, Bihar | - Member, <i>ex-officio</i> ; |
| (n) Chief Minister, Jharkhand | - Member, <i>ex-officio</i> ; |
| (o) Chief Minister, Uttarakhand | - Member, <i>ex-officio</i> ; |
| (p) Chief Minister, Uttar Pradesh | - Member, <i>ex-officio</i> ; |
| (q) Chief Minister, West Bengal | - Member, <i>ex-officio</i> ; |
| (r) Secretary, Ministry of Water Resources, River Development and Ganga Rejuvenation | - Member, <i>ex-officio</i> ; |
| (s) Director General, National Mission for Clean Ganga | - Member Secretary, <i>ex-officio</i> . |

(2) The National Ganga Council may co-opt one or more Chief Ministers from the States not represented in the National Ganga Council having major tributaries of River Ganga, which are likely to affect the water quality in the River Ganga, as Member.

(3) The National Ganga Council may also co-opt one or more Union Ministers, if it considers necessary, as Member.

(4) The National Ganga Council may consult experts and expert organisations or institutions in the field of river rejuvenation, river ecology and river management, hydrology, environmental engineering, social mobilisation and other relevant fields.

(5) The Headquarter of the National Ganga Council shall be at New Delhi or at such other place as it may decide.

(6) The National Ganga Council shall have its Secretariat in the National Mission for Clean Ganga.

(7) The Central Government in the Ministry of Water Resources, River Development and Ganga Rejuvenation shall serve as the nodal Ministry.

13. Dissolution of National Ganga River Basin Authority --- (1) On and from the date of constitution of the National Ganga Council in paragraph 11, the National Ganga River Basin Authority constituted by Notification of the Ministry of Water Resources, River Development and Ganga Rejuvenation, number S.O 2539 (E), dated the 29th September 2014 shall stand dissolved.

(2) All things done or omitted to be done or actions taken or any money spent or authorised to be spent by the National Ganga River Basin Authority before such dissolution shall be deemed to have been done or taken under the corresponding provisions of this Order.

14. Superintendence, direction and control of management of River Ganga to vest in National Ganga Council.- The National Ganga Council shall, notwithstanding anything contained in this Order, be overall responsible for the superintendence, direction, development and control of River Ganga and the entire River Basin (including financial and administrative matters) for the protection, prevention, control and abatement of environmental pollution in River Ganga and its rejuvenation to its natural and pristine condition and to ensure continuous adequate flow of water in the River Ganga and for matters connected therewith.

15. Jurisdiction of National Ganga Council.- The jurisdiction of the National Ganga Council shall extend to the areas mentioned in paragraph 2.

16. Meetings of National Ganga Council.- (1) National Ganga Council may regulate its own procedure for transacting its business including its meetings.

(2) The Chairperson of the National Ganga Council shall preside over its meetings and in his absence, its Vice-Chairperson shall, preside over the meetings of the National Ganga Council and conduct its business.

(3) The Vice-Chairperson shall have the power to take decisions necessary for the National Ganga Council to achieve its objectives, in between the conduct of the two meetings of the Council subject to ratification in the next meeting.

(4) The National Ganga Council shall meet at least once every year or more as it may deem necessary.

17. Constitution of Empowered Task Force on River Ganga as authority.- (1) With effect from the date of commencement of this Order, there shall be constituted an authority by the name to be called the Empowered Task Force on River Ganga for the purposes of the Act and to exercise powers and discharge functions as specified in this Order and the Act.

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| (2) The Empowered Task Force on River Ganga shall consist of the following members, namely:- | |
| (a) Union Minister for Water Resources, River Development and Ganga Rejuvenation | - Chairperson, <i>ex-officio</i> ; |
| (b) Union Minister of State for Water Resources, River Development and Ganga Rejuvenation | - Vice-Chairperson, <i>ex-officio</i> ; |
| (c) Secretary in the Ministry of Water Resources, River Development and Ganga Rejuvenation | - Member, <i>ex-officio</i> |
| (d) Secretary in the Ministry of Finance (Department of Expenditure) | - Member, <i>ex-officio</i> ; |
| (e) Chief Executive Officer, Niti Ayog | - Member, <i>ex-officio</i> ; |
| (f) Chief Secretary, State of Uttrakhand | - Member, <i>ex-officio</i> ; |
| (g) Chief Secretary, State of Uttar Pradesh | - Member, <i>ex-officio</i> ; |
| (h) Chief Secretary, State of Bihar | - Member, <i>ex-officio</i> ; |
| (i) Chief Secretary, State of Jharkhand | - Member, <i>ex-officio</i> ; |
| (j) Chief Secretary, State of West Bengal | - Member, <i>ex-officio</i> ; |
| (k) Director General, National Mission for Clean Ganga | - Member-Secretary |

(3) The Empowered Task Force on River Ganga may also co-opt one or more Secretary in the Union Ministries or the Chief Secretary of any other State concerned, if it considers necessary, as member

(4) The Empowered Task Force on River Ganga shall meet at least once every three months or more as it may deem necessary.

(5) The administrative and technical support to the Empowered Task Force on River Ganga shall be provided by the Central Government in the Ministry of Water Resources, River Development and Ganga Rejuvenation which shall be the nodal Ministry for the purposes of such administrative and technical support.

18. Functions and powers of Empowered Task Force on River Ganga. –

(1) The Empowered Task Force on River Ganga shall co-ordinate and advise on matters relating to rejuvenation, protection and management of River Ganga and its tributaries.

(2) In particular and without prejudice to the generality of the provisions of sub-paragraph (1), the functions and powers of the Empowered Task Force on River Ganga may include measures with respect to all or any of the following matters in rejuvenation, protection and management of River Ganga, namely:-

- (a) ensuring that the Ministries, Departments and State Governments concerned have -
 - (i) an action plan with specific activities, milestones, and timelines for achievement of the objective of rejuvenation and protection of River Ganga;
 - (ii) a mechanism for monitoring implementation of its action plans;
- (b) co-ordination amongst the Ministries and Departments and State Governments concerned for implementation of its action plans in a time bound manner;
- (c) to monitor the implementation process, address bottlenecks, suggest and take such decisions as may be necessary to ensure speedy implementation;
- (d) all projects under the ambit of Namami Gange including ongoing projects funded domestically and through external assistance;
- (e) discharge of such other functions or exercise of such powers as may be considered necessary for achievement of the objective of rejuvenation, protection and management of River Ganga or as may be assigned to it by the Central Government or specified by the National Ganga Council;

19. Approval for projects exceeding value of rupees one thousand crore.-

- (1) The Empowered Task Force on River Ganga shall be responsible for the approval of every project exceeding a value of rupees one thousand crore, as amended from time to time.
- (2) The Empowered Task Force on River Ganga may constitute a sub-committee of officials amongst its members for the purpose of sub-paragraph (1)

20. Constitution and Composition of Specified State Ganga Rejuvenation, Protection and Management Committees as authorities.- With effect from the date of commencement of this Order, these shall be constituted, in each State as specified in paragraph 2, an authority to be called the State Ganga Rejuvenation, Protection and Management Committee, which shall consist of a Chairperson and other members as specified in the Schedule to exercise powers and discharge functions as specified in this Order and the Act.

21. Meetings of State Ganga Committee. – (1) Every State Ganga Committee may regulate its own procedure for transacting its business including its meetings.

(2) Every State Ganga Committee shall convene its meetings at least once in every three months' time.

(3) The Chairperson of the State Ganga Committee shall preside over its meetings and in his absence, the said Committee shall elect its Vice-Chairperson who shall, preside over the meetings of the State Ganga Committee and conduct its business.

22. Superintendence, direction and control over Committee.- The superintendence, direction and control of the District Ganga Committees shall, notwithstanding anything contained in this Order, vest in the State Ganga Committee, for the purposes of rejuvenation, protection, prevention, control and abatement of environmental pollution in River Ganga and its tributaries so as to rejuvenate the River Ganga to its natural and pristine condition and ensure continuous and adequate flow of water in River Ganga and for protection and management of River Ganga in the States concerned.

23. Decisions of State Ganga Committee to be binding.- The decision taken at the meetings of the State Ganga Committee shall, notwithstanding anything contained in this Order, be binding upon every District Ganga Committee and every local authority or other authority or Board or person referred to in such decision and they shall comply with the decisions of the State Ganga Committee.

24. Powers, duties and functions of State Ganga Committees.- (1) Every State Ganga Committee shall, subject to the provisions of the Act and rules made or directions issued thereunder, have the power to take all such measures, including those in paragraphs 6, 7 and 8, as it deems necessary or expedient for effective abatement of pollution and conservation

of the River Ganga and for implementing the decisions or directions of the National Ganga Council and National Mission for Clean Ganga.

(2) The State Ganga Committee shall implement various programmes and projects of the National Ganga Council and National Mission for Clean Ganga.

(3) In particular and without prejudice to the generality of the provisions of sub-paragraphs (1) and (2), such measures may include all or any of the following matters, namely:-

(a) coordination and implementation of the conservation activities relating to River Ganga including augmentation of sewerage infrastructure, catchment area treatment, protection of flood plains, creating public awareness and such other measures at the State level and regulation of activities aimed at the prevention, control and abatement of pollution in the River Ganga to maintain its water quality, and to take such other measures relevant to river ecology and management in the State concerned;

(b) implementation of the river basin management plan in the concerned State;

(c) maintenance of minimum ecological flows in the River Ganga in the concerned State and actions thereon;

(d) entry and inspection under section 10 and power to take sample under section 11 of the Act for the purpose of exercising and performing its functions under this Order.

(4) The State Ganga Committee shall undertake all the emergency measures mentioned in paragraph 7.

(5) The State Ganga Committee shall have the powers to issue directions under section 5 of the Act.

(6) The powers and functions of the State Ganga Committee shall be without prejudice to any of the powers conferred upon the State Government under any Central or State Act, being not inconsistent with the provisions of the Act.

25. Monitoring execution of plans and programmes of District Ganga Committees.- Every State Ganga Committee shall monitor the execution of plans, programmes, and projects of all their District Ganga Protection Committees and those of other authorities and submit progress in respect thereof to the National Mission for Clean Ganga.

26. Preparation of consolidated reports of all District Ganga Committees and taking remedial measures in respect thereof.- (1) Every State Ganga Committee shall prepare a consolidated report of all District Ganga Protection Committees, local authorities or other authorities or Board or Corporation or person for every quarter indicating therein in respect of each specified District abutting River Ganga and its tributaries, ----

(a) the status of the plans being executed and measures taken by them and any other activity relating to the health of River Ganga and its tributaries;

(b) the quality of water in River Ganga and its tributaries in each specified District and remedial action in respect thereof;

(c) any interruption of flow in the River Ganga in each specified District and reasons therefor;

(d) remedial measures taken on the complaints made to the District Ganga Committee or local authorities or other authorities;

(e) adverse report as reported by Ganga safety auditors in each specified District;

(f) any other information relevant to the health of River Ganga and its tributaries.

(2) The report referred to in sub-paragraph (1) shall be submitted within one month at the end of each year to the State Ganga Committee and National Mission for Clean Ganga along with remedial action thereof.

27. Conducting of Ganga safety audit and submission of such audit reports by State Ganga Committees.- (1) It shall be the duty of the State Ganga Committees to conduct or causes to be conducted, through the District Ganga Committees, the Ganga safety audit and submit report of the Ganga safety audit to the National Mission for Clean Ganga along with the remedial action taken thereon and also make available the same in public domain and exhibit the same at its website.

(2) The Ganga safety audit shall include such particulars and be done at such intervals (save as otherwise provided in this Order) and in such manner as may be specified, by notification, by the National Mission for Clean Ganga.

28. State Ganga Committee to be nodal agency.- The State Ganga Committee shall be the State-wide nodal agency in the State for the implementation of the provisions of this Order and for effective abatement of pollution and rejuvenation, protection and management of the River Ganga and its tributaries.

29. State Ganga Committees to be bound by direction of National Ganga Council and National Mission for Clean Ganga.- Every State Ganga Committee, without prejudice to the foregoing provisions of this Order, shall, in exercise of its powers or the performance of its functions under this Order, be bound by the decisions or such directions (including those relating to technical and administrative matters) as the National Ganga Council and the National Mission for Clean

Ganga may give in writing to it from time to time for abatement of pollution and rejuvenation, protection and management of the River Ganga.

30. Dissolution of State Ganga River Conservation Authorities and State Executive Committees.- (1) With effect from the date of constitution of the State Ganga Committees, the respective State Ganga River Conservation Authorities and the respective State Executive Committees constituted before the commencement of this Order shall stand dissolved.

(2) All things done or omitted to be done or actions taken or any money spent or authorised to be spent by the authorities and committees under sub-paragraph (1) before such dissolution shall be deemed to have been done or taken under the corresponding provisions of this Order.

31. Constitution of National Mission for Clean Ganga as an authority.-(1) With effect from the date of commencement of this Order, the National Mission for Clean Ganga, a society registered under the Societies Registration Act, 1860 (21 of 1860), shall be an authority constituted under the Act, by the same name for the purposes of the Act and to exercise powers and discharge functions as specified under this Order and the Act and the rules made or directions issued thereunder.

(2) The composition of the National Mission for Clean Ganga shall be as specified in paragraph 35.

32. Area of operation of National Mission for Clean Ganga.- The area of operation of the National Mission for Clean Ganga shall be the areas mentioned in paragraph 2.

33. National Mission for Clean Ganga to be nodal agency.- The National Mission for Clean Ganga shall be the nodal agency for the nationwide implementation of the provisions of this Order and for effective abatement of pollution and rejuvenation, protection and management of the River Ganga and its tributaries.

34. National Mission for Clean Ganga to be an empowered organization.- The National Mission for Clean Ganga shall be an empowered organisation with two tier management having administrative, appraisal and approval powers and duties, functions and powers as specified in this Order.

35. Composition of National Mission for Clean Ganga.- The National Mission for Clean Ganga shall have a two-tier management structure and it shall comprise of the Governing Council and the Executive Committee.

(1) The Governing Council shall consist of the following members, namely:-

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| (a) | Director General of National Mission for Clean Ganga | Chairman, <i>ex-officio</i> |
| (b) | Joint Secretary, Ministry of Water Resources, River Development and Ganga Rejuvenation | Member, <i>ex-officio</i> |
| (c) | Joint Secretary, Ministry of Urban Development | Member, <i>ex-officio</i> |
| (d) | Joint Secretary, Ministry of Environment, Forests and Climate Change | Member, <i>ex-officio</i> |
| (e) | Joint Secretary, Department of Expenditure | Member, <i>ex-officio</i> |
| (f) | Representative of NITI Aayog (not below Joint Secretary) | Member, <i>ex-officio</i> |
| (g) | Chairman, Central Pollution Control Board | Member, <i>ex-officio</i> |
| (h) | Principal Secretary, Urban Development, Government of Bihar | Member, <i>ex-officio</i> |
| (i) | Principal Secretary, Urban Development, Government of Jharkhand | Member, <i>ex-officio</i> |
| (j) | Principal Secretary, Urban Development, Government of Uttar Pradesh | Member, <i>ex-officio</i> |
| (k) | Principal Secretary, Peyjal, Government of Uttarakhand | Member, <i>ex-officio</i> |
| (l) | Principal Secretary, Urban Development, Government of West Bengal | Member, <i>ex-officio</i> |
| (m) | Executive Director(Deputy Director General), National Mission for Clean Ganga | Member, <i>ex-officio</i> |
| (n) | Executive Director (Technical),National Mission for Clean Ganga | Member, <i>ex-officio</i> |

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| (o) | Executive Director (Finance), National Mission for Clean Ganga | Member, <i>ex-officio</i> |
| (p) | Executive Director (Projects), National Mission for Clean Ganga | Member, <i>ex-officio</i> |
| (q) | Executive Director(Administration), National Mission for Clean Ganga | Member- Secretary. |

(2) The Executive Committee constituted out of the Governing Council, shall consist of the following members, namely:-

- (a) Director General, National Mission for Clean Ganga – Chairperson, *ex-officio*;
- (b) Joint Secretary, Department of Expenditure – Member, *ex-officio*;
- (c) Representative of NITI Aayog (not below Joint Secretary) – Member, *ex-officio*;
- (d) Principal Secretary of the State concerned – Member, *ex-officio*;
- (e) Executive Director (Deputy Director General)
National Mission for Clean Ganga – Member, *ex-officio*;
- (f) Executive Director (Finance)
National Mission for Clean Ganga – Member, *ex-officio*;
- (g) Executive Director (Technical)
National Mission for Clean Ganga – Member, *ex-officio*;
- (h) Executive Director (Projects)
National Mission for Clean Ganga – Member, *ex-officio*;
- (i) Executive Director (Administration)
National Mission for Clean Ganga – Member, *ex-officio*;

(3) The Director General, National Mission for Clean Ganga may, if he considers necessary, may associate with the Executive Committee, any other member from the Governing Council.

(4) The Governing Council may constitute a sub-committee from out of its members and also by associating some technical experts for appraisal of the projects.

(5) The representative of the State concerned shall also be one of the members of sub-committee.

(6) Half of the members of the Governing Council shall form the quorum.

36. (1) All approvals up to one thousand crores rupees shall be granted by the Executive Committee and it shall report to the Governing Council at least once in three months.

(2) The Sub-Committee of the Governing Council shall appraise the project only after completion of Third Party Appraisal of the project by technical experts or consortium of recognized institutes or Indian Institutes of Technology, as the case may be.

(3) The Third Party Appraisal shall be for all projects irrespective of their value.

37. Appointment of Director General and Executive Directors of National Mission for Clean Ganga.-

- (1) Director General, National Mission for Clean Ganga shall be appointed by the Central Government who shall be equivalent to the rank of Additional Secretary or Secretary to the Government of India and his terms and conditions of services shall be determined by Central Government.
- (2) The Executive Director (Finance) shall be appointed on deputation from any of the organised accounts services in the Central Government in the rank equivalent to Joint Secretary to Government of India in accordance with the recruitment rules of the said services.
- (3) National Mission for Clean Ganga shall have at least one position for each of the Executive Directors in the rank of Joint Secretary to Government of India.
- (4) One of the Executive Directors shall be designated as Deputy Director General of the National Mission for Clean Ganga and he shall be appointed by the Central Government.
- (5) None of the nominated members of the Executive Committee shall be below the rank of Joint Secretary in Government of India.

38. Duty of National Mission for Clean Ganga.- It shall be the duty of the National Mission for Clean Ganga to -

- (i) follow the principles laid down in paragraph 4

(ii) comply with the decisions and directions of the National Ganga Council and implement the Ganga Basin Management Plan approved by it;

(iii) co-ordinate all activities for rejuvenation and protection of River Ganga in a time bound manner as directed by the National Ganga Council;

(iv) do all other acts or abstain from doing certain act which may be necessary for rejuvenation and protection of River Ganga and its tributaries.

39. Functions of National Mission for Clean Ganga.- (1) Without prejudice to the provisions of this Order, the National Mission for Clean Ganga shall identify or cause to be identified -

- (a) the specific threats to the River Ganga in areas in each village and town of such specified District abutting River Ganga and its tributaries, including sewerage and industrial waste, cremation and burial of corpses and disposal of animal carcasses, and threats from commercial, recreational and religious activities;
- (b) the type of measures required to address such threat in each village and town of all districts abutting River Ganga and its tributaries;
- (c) the specific areas where such remedial actions are required to be taken for rejuvenation and protection of River Ganga and its tributaries.
- (d) the measures which may be necessary for reuse of treated water and enter in to Memorandum of Understanding in this regard with the Ministries of the Central Government like Railways, Power, Petroleum and Natural Gas etc., State Governments, autonomous bodies at the Central and State level, recognized Institutes and organizations which the National Mission for Clean Ganga may deem fit.

(2) The National Mission for Clean Ganga shall make or cause to make the River Ganga Basin Management Plan along with cost, timelines and allocation of responsibilities, among other things, for rejuvenation and protection of River Ganga and its tributaries in each village and town of specified District abutting River Ganga and its tributaries and execute projects there for.

(3) The National Mission for Clean Ganga shall ----

- (a) cause to be determined the magnitude of ecological flows in the River Ganga and its tributaries required to be maintained at different points in different areas at all times with the aim of ensuring water quality and environmentally sustainable rejuvenation, protection and management of River Ganga and its tributaries and notifying the same and take or direct all such measures necessary to maintain adequate ecological flows;
- (b) cause to be identified places where the environmental flow of water of River Ganga has been modified and take measures for correction thereof to maintain the continuous flow of water for rejuvenation, protection and management of River Ganga and its tributaries;
- (c) identify places of discontinuity of water in River Ganga and its tributaries due to engineered diversion of water or storage of water or by any other means and execute plans in respect thereof or take remedial action therefor;
- (d) devise a system to be put in place for continuous monitoring of flow of water and pollution levels in River Ganga and its tributaries;
- (e) take all such measures which may be necessary to give effect to the decisions of the National Ganga Council so as to maintain adequate ecological flows in the River Ganga and tributaries;
- (f) render assistance or cause them to be rendered by any agency for preparation of detailed project reports or execution of projects for abatement of pollution and rejuvenation, protection and management of the River Ganga and its tributaries to the State Governments, the State Ganga Committees, District Ganga Committees or local authorities or any person or body, any authority, Board or Corporation;
- (g) set up or facilitate setting up or designate and direct one or more existing centers to research, develop and disseminate knowledge base and analytical tools on abatement of pollution and rejuvenation, protection and management of River Ganga and its tributaries;
- (h) take any other measures which may be necessary for continuous flow of water and abatement of pollution in River Ganga and its tributaries

(4) The National Mission for Clean Ganga shall take all such other emergency measures as outlined in paragraph 7.

40. Establishment of River Ganga Monitoring Centres at suitable locations along River Ganga and its tributaries.- The National Mission for Clean Ganga may identify the places in the River Ganga Basin and establish at such places or designate any existing laboratory or station or institute as Centres to be called the "River Ganga

Monitoring Centre” for monitoring amongst other things, continuous flow of water and pollution levels as required under this Order and such Centre shall report immediately to the National Mission for Clean Ganga for taking remedial action therefor.

41. Powers of National Mission for Clean Ganga.- (1) The National Mission for Clean Ganga being the national agency charged with the role, responsibility and powers to facilitate the task of rejuvenation, protection and management of River Ganga and its tributaries, under the supervision and direction of the National Ganga Council, shall recommend to the National Ganga Council or Central Government for issuing directions or issue directions itself, to the State Ganga Committees or District Ganga Committees or local authority or any other authority or any person, institution, consortium or agency, as it may decide, for the rejuvenation, protection and management of River Ganga and have the power to take all such measures and discharge such functions as it may deem necessary or expedient for prevention, control and abatement of environmental pollution in River Ganga and its tributaries so as to rejuvenate the River Ganga to its natural and pristine condition and ensure continuous and adequate flow of water in River Ganga and for protection and management of River Ganga and for matters connected therewith.

(2) In particular and without prejudice to the generality of the provisions of sub-paragraph (1), and save as otherwise provided in this Order, such directions may include all or any of the following matters in the management of River Ganga, namely:-

- (a) fulfillment of the functions mentioned in paragraph 55 in accordance with the principles in paragraph 4;
 - (b) formulate, with the approval of the Central Government, the National policy for effective abatement of pollution and rejuvenation, protection and management of River Ganga;
 - (c) enter into memorandum of understanding, with the approval of the Central Government, with any country or foreign agency for effective implementation of the River Ganga Basin Management Plan for rejuvenation, protection, prevention, control and abatement of pollution in the River Ganga and its tributaries;
 - (d) approve, with or without modifications, the River Ganga Basin Management Plan and direct amendments, if any, to be made therein;
 - (e) supervise and review the progress reports, and issue directions to the State Ganga Committees, District Ganga Committees or local authorities and other authorities in the implementation of the River Ganga Basin Management Plan and any other matter connected with affairs of the River Ganga and its tributaries;
 - (f) approve the planning, financing and execution of programmes for abatement of pollution in the River Ganga including augmentation of sewerage and effluent treatment infrastructure, catchment area treatment, protection of flood plains, creating public awareness, conservation of aquatic and riparian life and biodiversity and such other measures for promoting environmentally sustainable river rejuvenation;
 - (g) coordination, monitoring and review of the implementation of various programmes or activities taken up for prevention, control and abatement of pollution and protection and management in the River Ganga and its tributaries;
 - (h) direct any person or authority to take measures for restoration of river ecology and management in the River Ganga Basin States;
 - (i) recommend to the Central Government, for creation of special purpose vehicles (whether as a company under the companies Act, 2013(18 of 2013) or Societies Registration Act, 1860 (21 of 1860) or a Trust under the Indian Trust Act, 1882 (2 of 1882)), as may be considered appropriate, for implementation of this Order and for the purposes of the Act;
 - (j) take such measures as may be necessary for the better co-ordination of policy and action to ensure effective prevention, control and abatement of pollution, rejuvenation and protection and management in the River Ganga and its tributaries;
 - (k) issue such directions to any person or authority, as it may consider necessary, for proper or prompt execution of the projects or cancel such projects or stop release of funds or direct refund of amount already released and assign the same to any other person or authority or Board or Corporation for prompt execution thereof;
 - (l) direct any person or authority to maintain such books of account or other documents, without prejudice to any law for the time being in force, as may be specified by the National Mission for Clean Ganga;
 - (m) take such other measures which may be necessary for achievement of prevention, control and abatement of pollution, rejuvenation and protection and management in the River Ganga and its tributaries;
- (3)The National Mission for Clean Ganga shall have the power to issue directions mentioned under section 5 of the Act.
- (4)The National Mission for Clean Ganga may evolve an appropriate mechanism for implementation of its decisions and the decisions of the National Ganga Council.

42. Giving of prior approval in certain matters.- Every person, the State Ganga Committees, District Ganga Protection Committees, local authorities and other authorities shall obtain prior approval of the National Mission for Clean Ganga, on the following matters, relating to River Ganga and any area abutting River Ganga or its tributaries, if required to implement the decisions of the National Ganga Council, namely:-

- (a) engineered diversion and storage of water in River Ganga without affecting the flow of water downstream of the River Ganga;
- (b) construction of bridges and associated roads and embankments over the River Ganga or at its River Bank or its flood plain area;
- (c) construction of Ghats or extension of any existing Ghat;
- (d) construction of jetties;
- (e) construction of permanent hydraulic structures for storage or diversion or control of waters or channelisation of River Ganga or its tributaries;
- (f) deforestation of hill slopes and notified forest and other eco-sensitive areas;
- (g) any other activity which contravenes the principles laid out in paragraph 4 which the National Mission for Clean Ganga may specify.

43. Financial framework.- (1) The budgetary allocation shall be utilised by the National Mission for Clean Ganga for meeting expenses in connection with the discharge of its functions, objects and purposes and establishment expenditure: Provided that the money received by way of grants, loans and borrowings shall be expended for the specific purpose for which such grants, loans and borrowings have been received.

(2) The National Mission for Clean Ganga shall maintain proper accounts and other relevant records and prepare an annual expenditure statement.

(3) The audit of National Mission for Clean Ganga accounts shall be done by the Comptroller and Auditor-General of India and after completion of annual audit, the audit agency shall furnish annual audit certificate.

(4) The affairs of National Mission for Clean Ganga shall be subject to the control of Central Vigilance Commission and there shall be a Vigilance Officer to look after vigilance related matters.

(5) The annual expenditure statement with the audit report shall be forwarded annually to the Empowered Task Force, and the Central Government for being laid before each House of Parliament.

44. Engagement of legal experts.- The National Mission for Clean Ganga shall have proper legal set up for which it may engage legal experts, consultants and legal firms as may be necessary for advising it on legal matters and providing support for discharging its duties.

45. Scrutiny of reports.- All the reports relating to its activities and reports received from the State Ganga Committees, District Ganga Committees, local authority, Board, Corporation or any person shall be scrutinised by the National Mission for Clean Ganga and placed by it along with its views on the matters mentioned in such report before the National Ganga Council for soliciting its guidance thereon, if required.

46. Consolidated report of Ganga Safety audit.- The National Mission for Clean Ganga shall prepare and submit a consolidated report of the Ganga safety audits of River Ganga to the National Ganga Council along with the remedial action taken thereon and also make available the same in public domain and exhibit the same at its website.

47. Powers of National Mission for Clean Ganga to call for information, conduct inspection, publish reports, etc.-

(1) Where the National Mission for Clean Ganga considers it expedient so to do under section 5 of the Act, it may, by order in writing,-

(a) call upon any State Ganga Committees, District Ganga Protection Committees, local authority, other authority, Board, Corporation or person, who has been allotted any project for execution or connected with such project or utilisation of funds, at any time, to furnish in writing or make public for dissemination such information or explanation relating to such project allotted for execution or executed or utilisation of fund allotted as the National Mission for Clean Ganga may require; or

(b) appoint one or more persons or any authority to make an inquiry in relation to project allotted for execution or executed or utilisation of fund allotted; or

(c) direct any of its officers or employees or the officers or employees of the Central Government or State Government or any other authority to inspect the books of account or other documents of the State Ganga Committees, District Ganga

Committees, local authority, other authority, Board, Corporation or person related to any project allotted for execution or executed or utilisation of funds; or

(d) require any person, officer, State Government or authority to furnish to it any reports, returns, statistics, accounts and other information and such person, officer, State Government or other authority shall be bound to do so.

48. Financing and implementation model.— The National Mission for Clean Ganga shall develop and constantly refine financial models that would improve the performance and sustainability of projects, and which can be adopted by the State Ganga Committees, District Ganga Committees, local authority, other authority or person for abatement of pollution and rejuvenation, protection and management of the River Ganga.

49. Preparation of consolidated reports.— (1) The National Mission for Clean Ganga shall, on the basis of the reports and other information forwarded by the State Ganga Committees, District Ganga Committees, local authorities, other authorities, Board, Corporation or person, prepare a consolidated report every year indicating therein in respect of each specified District abutting River Ganga and its tributaries.—

(a) the status of the plans being executed and measures taken by them and any other activity relating to the health of River Ganga and its tributaries;

(b) the quality of water in River Ganga and its tributaries and remedial action in respect thereof;

(c) any interruption of water in the River Ganga and reasons therefor;

(d) condition of River Bed and flood plains and habitat in the specified District;

(e) remedial measures taken on the complaints received from public by the District Ganga Committee or local authorities;

(f) threats remaining to be addressed by them with remedial action proposed therefor;

(g) report if any as reported by Ganga safety auditors;

(h) all other information relevant about the health of River Ganga and its tributaries.

(2) The National Mission for Clean Ganga shall submit a consolidated report referred to in sub-paragraph (1) after review thereof to the Empowered Task Force along with remedial action thereof.

50. Annual report.— (1) The National Mission for Clean Ganga shall, within three months of the end of every year, prepare an annual report of all work undertaken by it and by the Empowered Task Force on River Ganga, the State Ganga Committees, District Ganga Committees, concerned local authorities, other authorities, Board, Corporation or persons during the immediately preceding year.

(2) The National Mission for Clean Ganga shall include under separate parts in its annual report referred to in sub-paragraph (1), all works undertaken by it and the Empowered Task Force on River Ganga, the State Governments, the State Ganga Committees, District Ganga Committees, concerned local authorities, other authorities, Board, Corporation or person, and forward the said annual report to the National Ganga Council and the Central Government and also make available in public domain and exhibit at its website.

51. Constitution of Committees.— The National Mission for Clean Ganga may, constitute one or more River Ganga Management Committees from amongst its members and such experts in the field of rivers or water as it may consider appropriate for the efficient discharge of its functions under this Order.

52. Soliciting guidance.— In case any difficulty arises in implementing decisions of the National Ganga Council or the provisions of this Order, it shall be duty of the National Mission for Clean Ganga to solicit the guidance of the National Ganga Council and take appropriate action accordingly.

53. Constitution of District Ganga Protection Committees.— (1) The Central Government shall immediately after the commencement of this Order, in consultation with concerned State Ganga Committee, by notification constitute, in every specified District abutting River Ganga and its tributaries in the States mentioned in paragraph 2, the “District Ganga Committees” for the prevention, control and abatement of environmental pollution in the River Ganga.

(2) Every District Ganga Committee in each specified District shall consist of the following members, namely:—

(a) the District Collector in the specified District; - Chairperson, ex-officio;

(b) not more than two nominated representatives from Municipalities and Gram Panchayats of the specified District nominated by the State Government. - Members;

| | |
|--|-----------------------|
| (c) one representative each of the Public Works, Irrigation, Public Health Engineering, and Rural Drinking Water Departments, and State Pollution Control Board working in the specified District abutting River Ganga to be nominated by the District Collector | - Member, ex-officio; |
| (d) two environmentalists associated with River Ganga protection activities and one representative of local industry association in the specified District to be nominated by the District Collector | - Members,; |
| (e) one Divisional Forest Officer of the specified District | - Member, ex-officio |
| (f) one District official to be nominated by the District Collector. | - Member; |

(2) The District Collector shall be the Chairperson of the District Ganga Committee and the Divisional Forest Officer shall be the Convener of the District Ganga Committee.

(3) The District Ganga Committees shall meet at such times and at such places as the Chairperson of that Committee may decide and exercise such powers and functions as may be conferred under this Order:

Provided that at least one meeting of the District Ganga Committee shall be held every three months.

(4) A non ex-officio member may resign his office by giving notice in writing thereof to the Central Government or to the District Collector concerned, as the case may be, and shall cease to be a member on his resignation being accepted by the Government or the District Collector concerned, as the case may be.

54. Superintendence, direction and control of District Ganga Committee.- The superintendence, direction and control of the management of the District Ganga Committee (including financial and administrative matters) shall, notwithstanding anything contained in this Order, vest in the National Mission for Clean Ganga which may be exercised by it either directly or through the State Ganga Committee or any of its officer or any other authority specified by it.

55. Functions and powers of District Ganga Committees.- (1) Every District Ganga Committee shall discharge functions and exercise powers for rejuvenation, protection, restoration and rehabilitation of River Ganga and its tributaries in each specified District as laid out in paragraph 6 and 7 as per the principles specified in paragraph 4.

(2) In particular, and without prejudice to the generality of the provisions of sub-paragraph (1) for rejuvenation and protection and restoration or rehabilitation of degraded areas abutting River Ganga and its tributaries and subject to other provisions of this Order and rules made thereunder, every District Ganga Committee shall have the following powers and functions in relation to River Ganga and its tributaries abutting in the area in specified District, namely:-

(a) identifying activities which may be threats in the area of specified District abutting the River Ganga for protection of River Ganga and its tributaries or its River bed and making a plan for remedial action and take remedial action in respect thereof;

(b) taking remedial action at its own end for protection of River Ganga and its tributaries or its River bed abutting in the specified District (excluding enforcement of the provisions of this Order)

(c) in the event of its inability to take remedial action, reporting (electronically as well as by sending written communication in hard copy) to the National Mission for Clean Ganga and concerned State Government, the State Ganga Committee, as the case may be, for issue of direction for protection of River Ganga and to formulate appropriate management or remedial actions.

(d) taking suitable administrative and other measures, to give effect to the provisions of this Order so as to prevent the environmental pollution in the River Ganga and its tributaries, not being inconsistent with the provisions of this Order, or any law for the time being in force.

(3) In case, the District Ganga Committee is of the opinion that any contravention has been made of any other law for the time being in force or in respect of provisions of this Order, it shall take appropriate action in accordance with the law for the time being in force.

(4) The District Ganga Committee shall take all such emergency measures as specified in paragraph 7.

56. Designation of Nodal Officer.- (1) Every District Ganga Committee shall nominate as Nodal Officer for the purposes of this Order -

(a) the Sarpanch of Gram Sabha of every village in the areas abutting the River Ganga and its tributaries;

(b) in case of an area, not being village abutting the River Ganga, the Chairperson of Municipality Planning Committee or Metropolitan Planning Committee or Chairperson of any local authority, as the Chairperson of the District Ganga Committee.

(2) Every Nodal Officer nominated under sub-paragraph (1) shall take measures to prevent the pollution of River Ganga and its tributaries and take remedial action for protection of River Ganga and its tributaries or their River bed abutting in such village or other area, as the case may be, of which he is the Nodal Officer and in case of his failure to do so, he shall report the violation of this Order to the Chairperson of the District Ganga Committee for remedial action.

(3) After receipt of the report under sub-paragraph (2), the Chairperson of the District Ganga Committee shall take remedial action for protection of River Ganga or its River bed abutting the specified District.

57. Preparation of plans.- (1) Every District Ganga Committee shall prepare its plan for protection of River Ganga and its tributaries and their River bed abutting the specified District and submit the same to the National Mission for Clean Ganga for its approval.

(2) The plan under sub-paragraph (1) shall include the activities to be undertaken by the District Ganga Committee for protection, control and abatement of environmental pollution in River Ganga and its tributaries and their River Bed area abutting the specified District which may be recommended by the State Government, State Ganga Committees, the National Mission for Clean Ganga, any other authority or Board and the expenditure involved for such plan and time within which such activities shall be completed.

58. Preparation of budget and maintenance of accounts.- Every District Ganga Committee shall prepare its budget for every financial year indicating therein the funds required and purposes for which such funds shall be spent and the time limit within which the activity mentioned in the budget shall be completed and submit to concerned State Ganga Committee under intimation to National Mission for Clean Ganga and such Committee shall ensure proper maintenance of accounts as directed by National Mission for Clean Ganga, for audit by the Comptroller and Auditor-General of India or any other agency appointed by the Comptroller and Auditor-General of India and such accounts shall be subject to inspection by National Ganga Council, National Mission for Clean Ganga, State Ganga Committee or any of their appointed entities.

59. Monthly and annual reports.- (1) Every District Ganga Committee shall, submit monthly and annual reports to the National Ganga Council, National Mission for Clean Ganga and State Ganga Committee as directed by National Mission for Clean Ganga within specified timelines.

(2) In addition to the annual report referred to in sub-paragraph (1), the District Ganga Committee shall furnish to the National Mission for Clean Ganga at such time and in such form and manner it may direct to furnish such other returns, statements and other particulars in regard to any proposed or existing programme for the River Ganga Basin Plan for the abutting area in the specified District.

60. Budget allocation.- The National Mission for Clean Ganga shall consolidate and prepare the budget requirement and submit the same to the Ministry of Water Resources, River Development and Ganga Rejuvenation.

61. Direction by Central Government.- Notwithstanding anything contained in this Order, it shall be lawful for the Central Government to issue directions in writing to the Ministries or Departments of the Government of India, or the State Government or the State Ganga Committees, the National Mission for Clean Ganga or District Ganga Committees, or local authority or other authority or statutory bodies or any of its officers or employees, as the case may be, to facilitate or assist in the rejuvenation, protection and management of River Ganga and its tributaries in such manner as it may direct, and such Ministry or Department or Authority or Mission or Board, Committee or Government or statutory body, officer or employee shall be bound to comply with such directions.

62. Making of complaint under section 19 of the Act.- All the authorities constituted under this Order or their officers authorised by such authorities may make complaint before the court under section 19 of the Act for taking cognizance of any offence under the said section.

63. Order to be in addition to other laws.- The provisions of this Order are without prejudice to the discharge of functions by any local authority or other authority or Board or corporation or any person for taking measures for the purposes of effective abatement of pollution and rejuvenation of the River Ganga and its protection and management and any other law for the time being in force.

SCHEDULE

[See paragraph 20]

COMPOSITION OF STATE GANGA COMMITTEES

| Serial No. | Name of the State Ganga Committee | Composition of the State Ganga Committees |
|------------|--|--|
| (1) | (2) | (3) |
| 1. | (Name) State Ganga Protection and Management Committee | (a) Chief Secretary, Government of State of (Name) - Chairperson, ex-officio; |
| | | (b) Principal Secretary, Department of Finance, Government of State of (Name) - Member, ex-officio; |
| | | (c) Principal Secretary, Department of Urban Development and Housing, Government of (Name) - Member, ex-officio; |
| | | (d) Principal Secretary, Department of Environment and Forests, Government of State of (Name) - Member, ex-officio |
| | | (e) Principal Secretary, Department of Water Resources, Government of State of (Name) - Member, ex-officio; |
| | | (f) Principal Secretary, Department of Public Health Engineering, Government of State of (Name) - Member, ex-officio |
| | | (g) Chairman, (Name) State Pollution Control Board - Member, ex-officio; |
| | | (h) Chief Executive Officer of executing agency in the State of (Name) - Member, ex-officio; |
| | | (i) Principal Chief Conservator of Forests, Government of State of (Name) - Member, ex-officio; |
| | | (j) not more than five experts from relevant fields to be nominated by the Government of (Name) - Members |

[F. No. Estt-01/2016-17/111/NMCG]

SANJAY KUNDU, Jt. Secy.

t.c.



ANNEXURE A/4

COPY OF THE IMAGES TAKEN BY THE APPLICANT SHOWING HEAPS OF WASTES ARE BEING DUMPED ALONGSIDE THE BANKS/FLOODPLAINS OF HOOGLHY RIVER AND ARE BEING OPENLY BURNT.

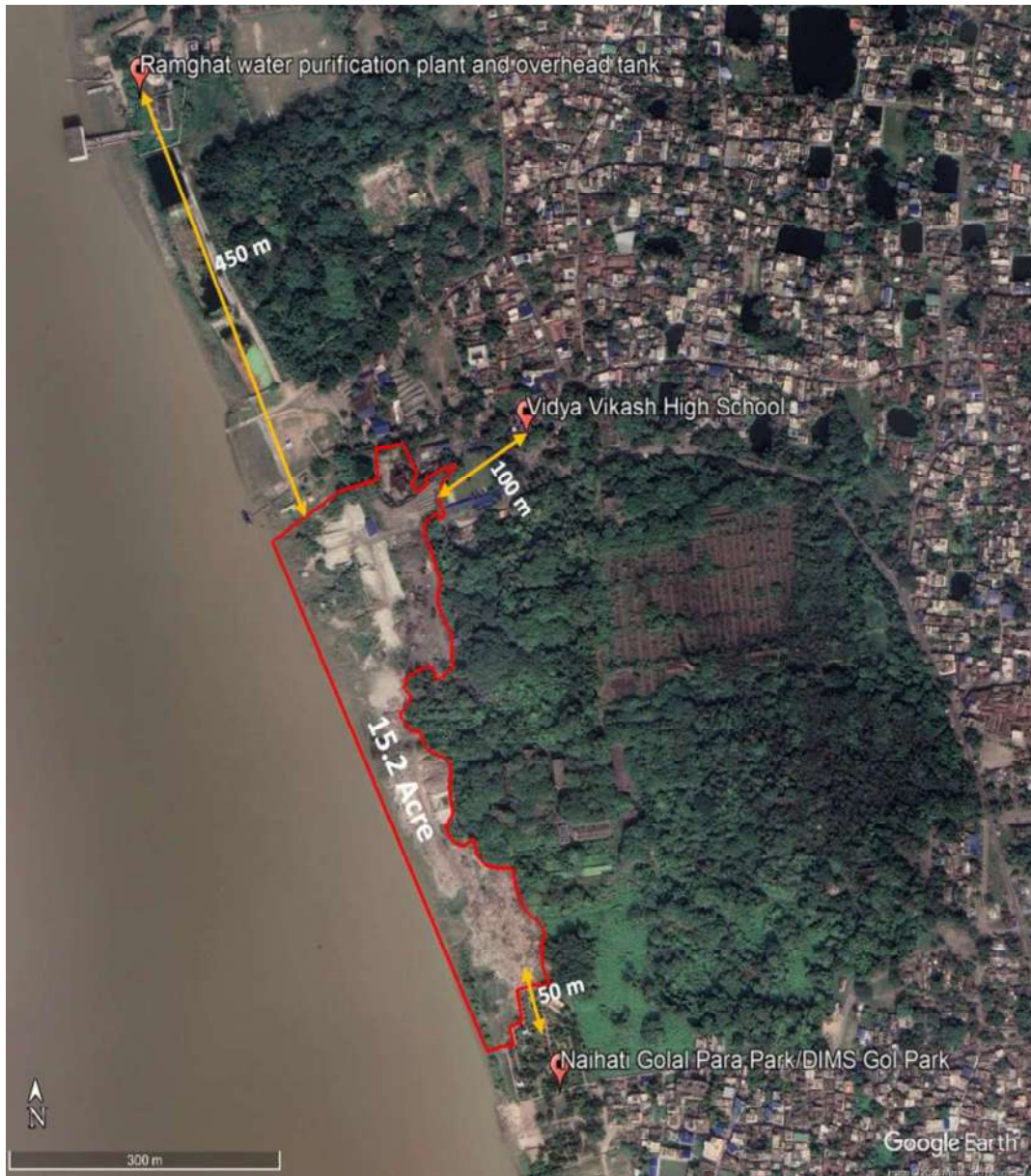


t.c.

Handwritten signature

ANNEXURE A/5.

COPY OF THE SATELLITE IMAGE TAKEN BY THE APPLICANT SHOWING THAT THE DUMPING AREA IS LOCATED ALONGSIDE THE HOOGHLY RIVER AND IS LOCATED JUST 100 METERS AWAY FROM VIDYA VIKAS HIGH SCHOOL AND HUMAN HABITATION AND JUST 50 METERS AWAY FROM NAIHATI GOLAL PARA PARK:



t.c.

A handwritten signature in blue ink, appearing to read "F. S. (M. S. 7)", is written over a white rectangular box.

नगरपालिकाओं की कुल संख्या:

प्रस्तुत की गई कार्य योजना की संख्या:

प्ररूप-VI

[नियम 25 देखें]

दुर्घटना का प्रतिवेदन

| | | | |
|-------------|---|-----------------|--|
| 1. | दुर्घटना की तारीख और समय | : | |
| 2. | दुर्घटना के लिए कारकों का अनुक्रम | : | |
| 3. | दुर्घटना में शामिल अपशिष्ट | : | |
| 4. | मानव स्वास्थ्य और पर्यावरण पर दुर्घटनाओं के प्रभावों का मूल्यांकन | : | |
| 5. | किए गए आपातकालीन उपाय | : | |
| 6. | दुर्घटनाओं के प्रभावों को कम करने के लिए उठाए गए कदम | : | |
| 7. | ऐसी किसी दुर्घटना की पुनरावृत्ति को रोकने के लिए उठाए गए कदम | : | |
| तारीख | | हस्ताक्षर | |
| स्थान | | पदनाम | |

[फा. सं. 18-3/2004-एचएसएमडी]

विश्वनाथ सिन्हा, संयुक्त सचिव

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 8th April, 2016

S.O. 1357(E).—Whereas the draft of the Solid Waste Management Rules, 2015 were published under the notification of the Government of India in the Ministry of Environment, Forest and Climate Change number G.S.R. 451 (E), dated the 3rd June, 2015 in the Gazette of India, part II, Section 3, sub-section (i) of the same date inviting objections or suggestions from the persons likely to be affected thereby, before the expiry of the period of sixty days from the publication of the said notification on the Solid Waste Management Rules, 2015 in supersession of the Municipal Solid Waste (Management and Handling) Rules, 2000;

And whereas, copies of the said Gazette were made available to the public on the 3rd June, 2015;

And whereas, the objections or comments received within the stipulated period were duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sections 3, 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) and in supersession of the Municipal Solid Waste (Management and Handling) Rules, 2000, except as respect things done or omitted to be done before such supersession, the Central Government hereby makes the following rules for management of Solid Waste, namely:-

1. **Short title and commencement.-**

- (1) These rules may be called the Solid Waste Management Rules, 2016.
- (2) They shall come into force on the date of their publication in the Official Gazette.

2. **Application.-** These rules shall apply to every urban local body, outgrowths in urban agglomerations, census towns as declared by the Registrar General and Census Commissioner of India, notified areas, notified industrial townships, areas under the control of Indian Railways, airports, airbases, Ports and harbours, defence establishments, special economic zones, State and Central government organisations, places of pilgrims, religious and historical importance as may be notified by respective State government from time to time and to every domestic, institutional, commercial and any other non residential solid waste generator situated in the areas except industrial waste, hazardous waste, hazardous chemicals, bio medical wastes, e-waste, lead acid batteries and radio-active waste, that are covered under separate rules framed under the Environment (Protection) Act, 1986.

3. **Definitions** –(1) In these rules, unless the context otherwise requires,- (1) **“aerobic composting”** means a controlled process involving microbial decomposition of organic matter in the presence of oxygen;

2. **“anaerobic digestion”** means a controlled process involving microbial decomposition of organic matter in absence of oxygen;
3. **“authorisation”** means the permission given by the State Pollution Control Board or Pollution Control Committee, as the case may be, to the operator of a facility or urban local authority, or any other agency responsible for processing and disposal of solid waste;
4. **“biodegradable waste ”** means any organic material that can be degraded by micro-organisms into simpler stable compounds;
5. **“bio-methanation”** means a process which entails enzymatic decomposition of the organic matter by microbial action to produce methane rich biogas;
6. **“brand owner”** means a person or company who sells any commodity under a registered brand label.
7. **“buffer zone”** means zone of no development to be maintained around solid waste processing and disposal facility, exceeding 5 TPD of installed capacity. This will be maintained within total area allotted for the solid waste processing and disposal facility.
8. **“bulk waste generator”** means and includes buildings occupied by the Central government departments or undertakings, State government departments or undertakings, local bodies, public sector undertakings or private companies, hospitals, nursing homes, schools, colleges, universities, other educational institutions, hostels, hotels, commercial establishments, markets, places of worship, stadia and sports complexes having an average waste generation rate exceeding 100kg per day;
9. **“bye-laws”** means regulatory framework notified by local body, census town and notified area townships for facilitating the implementation of these rules effectively in their jurisdiction.
10. **“census town”** means an urban area as defined by the Registrar General and Census Commissioner of India;
11. **“combustible waste”** means non-biodegradable, non-recyclable, non-reusable, non hazardous solid waste having minimum calorific value exceeding 1500 kcal/kg and excluding chlorinated materials like plastic, wood pulp, etc;
12. **“composting”** means a controlled process involving microbial decomposition of organic matter;
13. **“contractor”** means a person or firm that undertakes a contract to provide materials or labour to perform a service or do a job for service providing authority;
14. **“co-processing”** means use of non-biodegradable and non recyclable solid waste having calorific value exceeding 1500kcal as raw material or as a source of energy or both to replace or supplement the natural mineral resources and fossil fuels in industrial processes;
15. **“decentralised processing”** means establishment of dispersed facilities for maximizing the processing of bio-degradable waste and recovery of recyclables closest to the source of generation so as to minimize transportation of waste for processing or disposal;
16. **“disposal”** means the final and safe disposal of post processed residual solid waste and inert street sweepings and silt from surface drains on land as specified in Schedule I to prevent contamination of ground water, surface water, ambient air and attraction of animals or birds;
17. **“domestic hazardous waste”** means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level;

18. **"door to door collection"** means collection of solid waste from the door step of households, shops, commercial establishments, offices, institutional or any other non residential premises and includes collection of such waste from entry gate or a designated location on the ground floor in a housing society, multi storied building or apartments, large residential, commercial or institutional complex or premises;
19. **"dry waste"** means waste other than bio-degradable waste and inert street sweepings and includes recyclable and non recyclable waste, combustible waste and sanitary napkin and diapers, etc;
20. **"dump sites"** means a land utilised by local body for disposal of solid waste without following the principles of sanitary land filling;
21. **"extended producer responsibility" (EPR)** means responsibility of any producer of packaging products such as plastic, tin, glass and corrugated boxes, etc., for environmentally sound management, till end-of-life of the packaging products;
22. **"facility"** means any establishment wherein the solid waste management processes namely segregation, recovery, storage, collection, recycling, processing, treatment or safe disposal are carried out;
23. **"fine"** means penalty imposed on waste generators or operators of waste processing and disposal facilities under the bye-laws for non-compliance of the directions contained in these rules and/or bye-laws
24. **"Form"** means a Form appended to these rules;
25. **"handling"** includes all activities relating to sorting, segregation, material recovery, collection, secondary storage, shredding, baling, crushing, loading, unloading, transportation, processing and disposal of solid wastes;
26. **"inerts"** means wastes which are not bio-degradable, recyclable or combustible street sweeping or dust and silt removed from the surface drains;
27. **"incineration"** means an engineered process involving burning or combustion of solid waste to thermally degrade waste materials at high temperatures;
28. **"informal waste collector"** includes individuals, associations or waste traders who are involved in sorting, sale and purchase of recyclable materials;
29. **"leachate"** means the liquid that seeps through solid waste or other medium and has extracts of dissolved or suspended material from it;
30. **"local body"** for the purpose of these rules means and includes the municipal corporation, nagar nigam, municipal council, nagarpalika, nagar Palikaparishad, municipal board, nagar panchayat and town panchayat, census towns, notified areas and notified industrial townships with whatever name they are called in different States and union territories in India;
31. **"materials recovery facility" (MRF)** means a facility where non-compostable solid waste can be temporarily stored by the local body or any other entity mentioned in rule 2 or any person or agency authorised by any of them to facilitate segregation, sorting and recovery of recyclables from various components of waste by authorised informal sector of waste pickers, informal recyclers or any other work force engaged by the local body or entity mentioned in rule 2 for the purpose before the waste is delivered or taken up for its processing or disposal;
32. **"non-biodegradable waste"** means any waste that cannot be degraded by micro organisms into simpler stable compounds;
33. **"operator of a facility"** means a person or entity, who owns or operates a facility for handling solid waste which includes the local body and any other entity or agency appointed by the local body;
34. **primary collection"** means collecting, lifting and removal of segregated solid waste from source of its generation including households, shops, offices and any other non-residential premises or from any collection points or any other location specified by the local body;
35. **"processing"** means any scientific process by which segregated solid waste is handled for the purpose of reuse, recycling or transformation into new products;
36. **"recycling"** means the process of transforming segregated non-biodegradable solid waste into new material or product or as raw material for producing new products which may or may not be similar to the original products;
37. **"redevelopment"** means rebuilding of old residential or commercial buildings at the same site, where the existing buildings and other infrastructures have become dilapidated;

38. "**refused derived fuel**"(RDF) means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste ;
39. "**residual solid waste**" means and includes the waste and rejects from the solid waste processing facilities which are not suitable for recycling or further processing;
40. "**sanitary land filling** " means the final and safe disposal of residual solid waste and inert wastes on land in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, wind-blown litter, bad odour, fire hazard, animal menace, bird menace, pests or rodents, greenhouse gas emissions, persistent organic pollutants slope instability and erosion;
41. "**sanitary waste**" means wastes comprising of used diapers, sanitary towels or napkins, tampons, condoms, incontinence sheets and any other similar waste;
42. "**Schedule**" means the Schedule appended to these rules;
43. "**secondary storage**" means the temporary containment of solid waste after collection at secondary waste storage depots or MRFs or bins for onward transportation of the waste to the processing or disposal facility;
44. "**segregation**" means sorting and separate storage of various components of solid waste namely biodegradable wastes including agriculture and dairy waste, non biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste and non recyclable inert waste, domestic hazardous wastes, and construction and demolition wastes;
45. "**service provider**" means an authority providing public utility services like water, sewerage, electricity, telephone, roads, drainage, etc;
46. "**solid waste**" means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities mentioned in rule 2;
47. "**sorting**" means separating various components and categories of recyclables such as paper, plastic, cardboards, metal, glass, etc., from mixed waste as may be appropriate to facilitate recycling;
48. "**stabilising**" means the biological decomposition of biodegradable wastes to a stable state where it generates no leachate or offensive odours and is fit for application to farm land ,soil erosion control and soil remediation;
49. "**street vendor**" means any person engaged in vending of articles, goods, wares, food items or merchandise of everyday use or offering services to the general public, in a street, lane, side walk, footpath, pavement, public park or any other public place or private area, from a temporary built up structure or by moving from place to place and includes hawker, peddler, squatter and all other synonymous terms which may be local or region specific; and the words "street vending" with their grammatical variations and cognate expressions, shall be construed accordingly;
50. "**tipping fee**" means a fee or support price determined by the local authorities or any state agency authorised by the State government to be paid to the concessionaire or operator of waste processing facility or for disposal of residual solid waste at the landfill;
51. "**transfer station**" means a facility created to receive solid waste from collection areas and transport in bulk in covered vehicles or containers to waste processing and, or, disposal facilities;
52. "**transportation**" means conveyance of solid waste, either treated, partly treated or untreated from a location to another location in an environmentally sound manner through specially designed and covered transport system so as to prevent the foul odour, littering and unsightly conditions;
53. "**treatment**" means the method, technique or process designed to modify physical, chemical or biological characteristics or composition of any waste so as to reduce its volume and potential to cause harm;
54. "**user fee**" means a fee imposed by the local body and any entity mentioned in rule 2 on the waste generator to cover full or part cost of providing solid waste collection, transportation, processing and disposal services.
55. "**vermi composting**" means the process of conversion of bio-degradable waste into compost using earth worms;
56. "**waste generator**" means and includes every person or group of persons, every residential premises and non residential establishments including Indian Railways, defense establishments, which generate solid waste;
57. "**waste hierarchy**" means the priority order in which the solid waste is to should be managed by giving

emphasis to prevention, reduction, reuse, recycling, recovery and disposal, with prevention being the most preferred option and the disposal at the landfill being the least;

58. **“waste picker”** means a person or groups of persons informally engaged in collection and recovery of reusable and recyclable solid waste from the source of waste generation the streets, bins, material recovery facilities, processing and waste disposal facilities for sale to recyclers directly or through intermediaries to earn their livelihood.

(2) Words and expressions used herein but not defined, but defined in the Environment (Protection) Act, 1986, the Water (Prevention and Control of Pollution) Act, 1974, Water (Prevention and Control of Pollution) Cess Act, 1977 and the Air (prevention and Control of Pollution) Act, 1981 shall have the same meaning as assigned to them in the respective Acts.

4 Duties of waste generators.- (1) Every waste generator shall,-

(a) segregate and store the waste generated by them in three separate streams namely bio-degradable, non bio-degradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorised waste pickers or waste collectors as per the direction or notification by the local authorities from time to time;

(b) wrap securely the used sanitary waste like diapers, sanitary pads etc., in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material as instructed by the local authorities and shall place the same in the bin meant for dry waste or non- bio-degradable waste;

(c) store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; and

(d) store horticulture waste and garden waste generated from his premises separately in his own premises and dispose of as per the directions of the local body from time to time.

(2) No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.

(3) All waste generators shall pay such user fee for solid waste management, as specified in the bye-laws of the local bodies.

(4) No person shall organise an event or gathering of more than one hundred persons at any unlicensed place without intimating the local body, at least three working days in advance and such person or the organiser of such event shall ensure segregation of waste at source and handing over of segregated waste to waste collector or agency as specified by the local body.

(5) Every street vendor shall keep suitable containers for storage of waste generated during the course of his activity such as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits, etc., and shall deposit such waste at waste storage depot or container or vehicle as notified by the local body.

(6) All resident welfare and market associations shall, within one year from the date of notification of these rules and in partnership with the local body ensure segregation of waste at source by the generators as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

(7) All gated communities and institutions with more than 5,000 sqm area shall, within one year from the date of notification of these rules and in partnership with the local body, ensure segregation of waste at source by the generators as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorized recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

(8) All hotels and restaurants shall, within one year from the date of notification of these rules and in partnership with the local body ensure segregation of waste at source as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

5. Duties of Ministry of Environment, Forest and Climate Change.- (1) The Ministry of Environment, Forest and Climate Change shall be responsible for over all monitoring the implementation of these rules in the country. It shall constitute a Central Monitoring Committee under the Chairmanship of Secretary, Ministry of Environment, Forest and Climate Change comprising officer not below the rank of Joint Secretary or Advisor from the following namely,-

- 1) Ministry of Urban Development
- 2) Ministry of Rural Development
- 3) Ministry of Chemicals and Fertilizers
- 4) Ministry of Agriculture
- 5) Central Pollution Control Board
- 6) Three State Pollution Control Boards or Pollution Control Committees by rotation
- 7) Urban Development Departments of three State Governments by rotation
- 8) Rural Development Departments from two State Governments by rotation
- 9) Three Urban Local bodies by rotation
- 10) Two census towns by rotation
- 11) FICCI, CII
- 12) Two subject experts

2. This Central Monitoring Committee shall meet at least once in a year to monitor and review the implementation of these rules. The Ministry of Environment, Forest and Climate Change may co-opt other experts, if needed. The Committee shall be renewed every three years.

6. Duties of Ministry of Urban Development.- (1) The Ministry of Urban Development shall coordinate with State Governments and Union territory Administrations to,-

- (a) take periodic review of the measures taken by the states and local bodies for improving solid waste management practices and execution of solid waste management projects funded by the Ministry and external agencies at least once in a year and give advice on taking corrective measures;
- (b) formulate national policy and strategy on solid waste management including policy on waste to energy in consultation with stakeholders within six months from the date of notification of these rules;
- (c) facilitate States and Union Territories in formulation of state policy and strategy on solid management based on national solid waste management policy and national urban sanitation policy;
- (d) promote research and development in solid waste management sector and disseminate information to States and local bodies;
- (e) undertake training and capacity building of local bodies and other stakeholders;and
- (f) provide technical guidelines and project finance to states, Union territories and local bodies on solid waste management to facilitate meeting timelines and standards.

7. Duties of Department of Fertilisers, Ministry of Chemicals and Fertilisers.- (1) The Department of Fertilisers through appropriate mechanisms shall,-

- (a) provide market development assistance on city compost; and
- (b) ensure promotion of co-marketing of compost with chemical fertilisers in the ratio of 3 to 4 bags: 6 to 7 bags by the fertiliser companies to the extent compost is made available for marketing to the companies.

8. Duties of Ministry of Agriculture, Government of India.- The Ministry of Agriculture through appropriate mechanisms shall,-

- (a) provide flexibility in Fertiliser Control Order for manufacturing and sale of compost;
- (b) propagate utilisation of compost on farm land;
- (c) set up laboratories to test quality of compost produced by local authorities or their authorised agencies; and
- (d) issue suitable guidelines for maintaining the quality of compost and ratio of use of compost visa-a-vis chemical fertilizers while applying compost to farmland.

9. Duties of the Ministry of Power.-The Ministry of Power through appropriate mechanisms shall,-

- (a) decide tariff or charges for the power generated from the waste to energy plants based on solid waste.
- (b) compulsory purchase power generated from such waste to energy plants by distribution company.

10. Duties of Ministry of New and Renewable Energy Sources- The Ministry of New and Renewable Energy Sources through appropriate mechanisms shall,-

- (a) facilitate infrastructure creation for waste to energy plants; and
- (b) provide appropriate subsidy or incentives for such waste to energy plants.

11. Duties of the Secretary-in-charge, Urban Development in the States and Union territories.- (1) The Secretary, Urban Development Department in the State or Union territory through the Commissioner or Director of Municipal Administration or Director of local bodies shall,-

- (a) prepare a state policy and solid waste management strategy for the state or the union territory in consultation with stakeholders including representative of waste pickers, self help group and similar groups working in the field of waste management consistent with these rules, national policy on solid waste management and national urban sanitation policy of the ministry of urban development, in a period not later than one year from the date of notification of these rules;
- (b) while preparing State policy and strategy on solid waste management, lay emphasis on waste reduction, reuse, recycling, recovery and optimum utilisation of various components of solid waste to ensure minimisation of waste going to the landfill and minimise impact of solid waste on human health and environment;
- (c) state policies and strategies should acknowledge the primary role played by the informal sector of waste pickers, waste collectors and recycling industry in reducing waste and provide broad guidelines regarding integration of waste picker or informal waste collectors in the waste management system.
- (d) ensure implementation of provisions of these rules by all local authorities;
- (e) direct the town planning department of the State to ensure that master plan of every city in the State or Union territory provisions for setting up of solid waste processing and disposal facilities except for the cities who are members of common waste processing facility or regional sanitary landfill for a group of cities; and
- (f) ensure identification and allocation of suitable land to the local bodies within one year for setting up of processing and disposal facilities for solid wastes and incorporate them in the master plans (land use plan) of the State or as the case may be, cities through metropolitan and district planning committees or town and country planning department;
- (h) direct the town planning department of the State and local bodies to ensure that a separate space for segregation, storage, decentralised processing of solid waste is demarcated in the development plan for group housing or commercial, institutional or any other non-residential complex exceeding 200 dwelling or having a plot area exceeding 5,000 square meters;
- (i) direct the developers of Special Economic Zone, Industrial Estate, Industrial Park to earmark at least five percent of the total area of the plot or minimum five plots or sheds for recovery and recycling facility.
- (j) facilitate establishment of common regional sanitary land fill for a group of cities and towns falling within a distance of 50 km (or more) from the regional facility on a cost sharing basis and ensure professional management of such sanitary landfills;
- (k) arrange for capacity building of local bodies in managing solid waste, segregation and transportation or processing of such waste at source;
- (l) notify buffer zone for the solid waste processing and disposal facilities of more than five tons per day in consultation with the State Pollution Control Board; and
- (m) start a scheme on registration of waste pickers and waste dealers.

12. Duties of District Magistrate or District Collector or Deputy Commissioner.- The District Magistrate or District Collector or as the case may be, the Deputy Commissioner shall, -

- (a) facilitate identification and allocation of suitable land as per clause (f) of rules 11 for setting up solid waste processing and disposal facilities to local authorities in his district in close coordination with the Secretary-in-charge of State Urban Development Department within one year from the date of notification of these rules;
- (b) review the performance of local bodies, at least once in a quarter on waste segregation, processing, treatment and disposal and take corrective measures in consultation with the Commissioner or Director of Municipal Administration or Director of local bodies and secretary-in-charge of the State Urban Development.

13. Duties of the Secretary-in-charge of Village Panchayats or Rural Development Department in the State and Union territory.- (1) The Secretary-in-charge of Village Panchayats or Rural Development Department in the State and Union territory shall have the same duties as the Secretary-in-charge, Urban Development in the States and Union territories, for the areas which are covered under these rules and are under their jurisdictions.

14. Duties of Central Pollution Control Board.-The Central Pollution Control Board shall, -

- (a) co-ordinate with the State Pollution Control Boards and the Pollution Control Committees for implementation of these rules and adherence to the prescribed standards by local authorities;
- (b) formulate the standards for ground water, ambient air, noise pollution, leachate in respect of all solid waste processing and disposal facilities;
- (c) review environmental standards and norms prescribed for solid waste processing facilities or treatment technologies and update them as and when required;
- (d) review through State Pollution Control Boards or Pollution Control Committees, at least once in a year, the implementation of prescribed environmental standards for solid waste processing facilities or treatment technologies and compile the data monitored by them;
- (e) review the proposals of State Pollution Control Boards or Pollution Control Committees on use of any new technologies for processing, recycling and treatment of solid waste and prescribe performance standards, emission norms for the same within 6 months;
- (f) monitor through State Pollution Control Boards or Pollution Control Committees the implementation of these rules by local bodies;
- (g) prepare an annual report on implementation of these rules on the basis of reports received from State Pollution Control Boards and Committees and submit to the Ministry of Environment, Forest and Climate Change and the report shall also be put in public domain;
- (h) publish guidelines for maintaining buffer zone restricting any residential, commercial or any other construction activity from the outer boundary of the waste processing and disposal facilities for different sizes of facilities handling more than five tons per day of solid waste;
- (i) publish guidelines, from time to time, on environmental aspects of processing and disposal of solid waste to enable local bodies to comply with the provisions of these rules; and
- (j) provide guidance to States or Union territories on inter-state movement of waste.

15. Duties and responsibilities of local authorities and village Panchayats of census towns and urban agglomerations.- The local authorities and Panchayats shall,-

- (a) prepare a solid waste management plan as per state policy and strategy on solid waste management within six months from the date of notification of state policy and strategy and submit a copy to respective departments of State Government or Union territory Administration or agency authorised by the State Government or Union territory Administration;
- (b) arrange for door to door collection of segregated solid waste from all households including slums and informal settlements, commercial, institutional and other non residential premises. From multi-storage buildings, large commercial complexes, malls, housing complexes, etc., this may be collected from the entry gate or any other designated location;
- (c) establish a system to recognise organisations of waste pickers or informal waste collectors and promote and establish a system for integration of these authorised waste-pickers and waste collectors to facilitate their participation in solid waste management including door to door collection of waste;
- (d) facilitate formation of Self Help Groups, provide identity cards and thereafter encourage integration in solid waste management including door to door collection of waste;
- (e) frame bye-laws incorporating the provisions of these rules within one year from the date of notification of these rules and ensure timely implementation;
- (f) prescribe from time to time user fee as deemed appropriate and collect the fee from the waste generators on its own or through authorised agency;
- (g) direct waste generators not to litter i.e throw or dispose of any waste such as paper, water bottles, liquor bottles, soft drink canes, tetra packs, fruit peel, wrappers, etc., or burn or burry waste on streets, open public spaces, drains, waste bodies and to segregate the waste at source as prescribed under these rules and hand over the segregated waste to authorised the waste pickers or waste collectors authorised by the local body;
- (h) setup material recovery facilities or secondary storage facilities with sufficient space for sorting of recyclable materials to enable informal or authorised waste pickers and waste collectors to separate recyclables from the waste and provide easy access to waste pickers and recyclers for collection of segregated recyclable waste such as paper, plastic, metal, glass, textile from the source of generation or from material recovery facilities; Bins for storage of bio-degradable wastes shall be painted green, those for storage of recyclable wastes shall be printed white and those for storage of other wastes shall be printed black;

- (i) establish waste deposition centres for domestic hazardous waste and give direction for waste generators to deposit domestic hazardous wastes at this centre for its safe disposal. Such facility shall be established in a city or town in a manner that one centre is set up for the area of twenty square kilometers or part thereof and notify the timings of receiving domestic hazardous waste at such centres;
- (j) ensure safe storage and transportation of the domestic hazardous waste to the hazardous waste disposal facility or as may be directed by the State Pollution Control Board or the Pollution Control Committee;
- (k) direct street sweepers not to burn tree leaves collected from street sweeping and store them separately and handover to the waste collectors or agency authorised by local body;
- (l) provide training on solid waste management to waste-pickers and waste collectors;
- (m) collect waste from vegetable, fruit, flower, meat, poultry and fish market on day to day basis and promote setting up of decentralised compost plant or bio-methanation plant at suitable locations in the markets or in the vicinity of markets ensuring hygienic conditions;
- (n) collect separately waste from sweeping of streets, lanes and by-lanes daily, or on alternate days or twice a week depending on the density of population, commercial activity and local situation;
- (o) set up covered secondary storage facility for temporary storage of street sweepings and silt removed from surface drains in cases where direct collection of such waste into transport vehicles is not convenient. Waste so collected shall be collected and disposed of at regular intervals as decided by the local body;
- (p) collect horticulture, parks and garden waste separately and process in the parks and gardens, as far as possible;
- (q) transport segregated bio-degradable waste to the processing facilities like compost plant, bio-methanation plant or any such facility. Preference shall be given for on site processing of such waste;
- (r) transport non-bio-degradable waste to the respective processing facility or material recovery facilities or secondary storage facility;
- (s) transport construction and demolition waste as per the provisions of the Construction and Demolition Waste management Rules, 2016;
- (t) involve communities in waste management and promotion of home composting, bio-gas generation, decentralised processing of waste at community level subject to control of odour and maintenance of hygienic conditions around the facility;
- (u) phase out the use of chemical fertilizer in two years and use compost in all parks, gardens maintained by the local body and wherever possible in other places under its jurisdiction. Incentives may be provided to recycling initiatives by informal waste recycling sector.
- (v) facilitate construction, operation and maintenance of solid waste processing facilities and associated infrastructure on their own or with private sector participation or through any agency for optimum utilisation of various components of solid waste adopting suitable technology including the following technologies and adhering to the guidelines issued by the Ministry of Urban Development from time to time and standards prescribed by the Central Pollution Control Board. Preference shall be given to decentralised processing to minimize transportation cost and environmental impacts such as-
- a) bio-methanation, microbial composting, vermi-composting, anaerobic digestion or any other appropriate processing for bio-stabilisation of biodegradable wastes;
 - b) waste to energy processes including refused derived fuel for combustible fraction of waste or supply as feedstock to solid waste based power plants or cement kilns;
- (w) undertake on their own or through any other agency construction, operation and maintenance of sanitary landfill and associated infrastructure as per Schedule 1 for disposal of residual wastes in a manner prescribed under these rules;
- (x) make adequate provision of funds for capital investments as well as operation and maintenance of solid waste management services in the annual budget ensuring that funds for discretionary functions of the local body have been allocated only after meeting the requirement of necessary funds for solid waste management and other obligatory functions of the local body as per these rules;
- (y) make an application in Form-I for grant of authorisation for setting up waste processing, treatment or disposal facility, if the volume of waste is exceeding five metric tones per day including sanitary landfills from the State Pollution Control Board or the Pollution Control Committee, as the case may be;
- (z) submit application for renewal of authorisation at least sixty days before the expiry of the validity of authorisation;

- (za) prepare and submit annual report in Form IV on or before the 30th April of the succeeding year to the Commissioner or Director, Municipal Administration or designated Officer;
- (zb) the annual report shall then be sent to the Secretary -in-Charge of the State Urban Development Department or village panchayat or rural development department and to the respective State Pollution Control Board or Pollution Control Committee by the 31st May of every year;
- (zc) educate workers including contract workers and supervisors for door to door collection of segregated waste and transporting the unmixed waste during primary and secondary transportation to processing or disposal facility;
- (zd) ensure that the operator of a facility provides personal protection equipment including uniform, fluorescent jacket, hand gloves, raincoats, appropriate foot wear and masks to all workers handling solid waste and the same are used by the workforce;
- (ze) ensure that provisions for setting up of centers for collection, segregation and storage of segregated wastes, are incorporated in building plan while granting approval of building plan of a group housing society or market complex; and
- (zf) frame bye-laws and prescribe criteria for levying of spot fine for persons who litters or fails to comply with the provisions of these rules and delegate powers to officers or local bodies to levy spot fines as per the bye laws framed; and
- (zg) create public awareness through information, education and communication campaign and educate the waste generators on the following; namely:-
- (i) not to litter;
 - (ii) minimise generation of waste;
 - (iii) reuse the waste to the extent possible;
 - (iv) practice segregation of waste into bio-degradable, non-biodegradable (recyclable and combustible), sanitary waste and domestic hazardous wastes at source;
 - (v) practice home composting, vermi-composting, bio-gas generation or community level composting;
 - (vi) wrap securely used sanitary waste as and when generated in the pouches provided by the brand owners or a suitable wrapping as prescribed by the local body and place the same in the bin meant for non-biodegradable waste;
 - (vii) storage of segregated waste at source in different bins;
 - (viii) handover segregated waste to waste pickers, waste collectors, recyclers or waste collection agencies; and
 - (ix) pay monthly user fee or charges to waste collectors or local bodies or any other person authorised by the local body for sustainability of solid waste management.
- (zh) stop land filling or dumping of mixed waste soon after the timeline as specified in rule 23 for setting up and operationalisation of sanitary landfill is over;
- (zi) allow only the non-usable, non-recyclable, non-biodegradable, non-combustible and non-reactive inert waste and pre-processing rejects and residues from waste processing facilities to go to sanitary landfill and the sanitary landfill sites shall meet the specifications as given in Schedule-I, however, every effort shall be made to recycle or reuse the rejects to achieve the desired objective of zero waste going to landfill;
- (zj) investigate and analyse all old open dumpsites and existing operational dumpsites for their potential of bio-mining and bio-remediation and wheresoever feasible, take necessary actions to bio-mine or bio-remediate the sites;
- (zk) in absence of the potential of bio-mining and bio-remediation of dumpsite, it shall be scientifically capped as per landfill capping norms to prevent further damage to the environment.

16. Duties of State Pollution Control Board or Pollution Control Committee.- (1) The State Pollution Control Board or Pollution Control Committee shall,-

- (a) enforce these rules in their State through local bodies in their respective jurisdiction and review implementation of these rules at least twice a year in close coordination with concerned Directorate of Municipal Administration or Secretary-in-charge of State Urban Development Department;
- (b) monitor environmental standards and adherence to conditions as specified under the Schedule I and Schedule II for waste processing and disposal sites;
- (c) examine the proposal for authorisation and make such inquiries as deemed fit, after the receipt of the application for the same in Form I from the local body or any other agency authorised by the local body;

- (d) while examining the proposal for authorisation, the requirement of consents under respective enactments and views of other agencies like the State Urban Development Department, the Town and Country Planning Department, District Planning Committee or Metropolitan Area Planning Committee, as may be applicable, Airport or Airbase Authority, the Ground Water Board, Railways, power distribution companies, highway department and other relevant agencies shall be taken into consideration and they shall be given four weeks time to give their views, if any;
- (e) issue authorisation within a period of sixty days in Form II to the local body or an operator of a facility or any other agency authorised by local body stipulating compliance criteria and environmental standards as specified in Schedules I and II including other conditions, as may be necessary;
- (f) synchronise the validity of said authorisation with the validity of the consents;
- (g) suspend or cancel the authorization issued under clause (a) any time, if the local body or operator of the facility fails to operate the facility as per the conditions stipulated:
provided that no such authorization shall be suspended or cancelled without giving notice to the local body or operator, as the case may be; and
- (h) on receipt of application for renewal, renew the authorisation for next five years, after examining every application on merit and subject to the condition that the operator of the facility has fulfilled all the provisions of the rules, standards or conditions specified in the authorisation, consents or environment clearance.

(2) The State Pollution Control Board or Pollution Control Committee shall, after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to grant or renew an authorisation.

(3) In case of new technologies, where no standards have been prescribed by the Central Pollution Control Board, State Pollution Control Board or Pollution Control Committee, as the case may be, shall approach Central Pollution Control Board for getting standards specified.

(4) The State Pollution Control Board or the Pollution Control Committee, as the case may be, shall monitor the compliance of the standards as prescribed or laid down and treatment technology as approved and the conditions stipulated in the authorisation and the standards specified in Schedules I and II under these rules as and when deemed appropriate but not less than once in a year.

(5) The State Pollution Control Board or the Pollution Control Committee may give directions to local bodies for safe handling and disposal of domestic hazardous waste deposited by the waste generators at hazardous waste deposition facilities.

(6) The State Pollution Control Board or the Pollution Control Committee shall regulate Inter-State movement of waste.

17. Duty of manufacturers or brand owners of disposable products and sanitary napkins and diapers.- (1) All manufacturers of disposable products such as tin, glass, plastics packaging, etc., or brand owners who introduce such products in the market shall provide necessary financial assistance to local authorities for establishment of waste management system.

(2) All such brand owners who sell or market their products in such packaging material which are non-biodegradable shall put in place a system to collect back the packaging waste generated due to their production.

(3) Manufacturers or brand owners or marketing companies of sanitary napkins and diapers shall explore the possibility of using all recyclable materials in their products or they shall provide a pouch or wrapper for disposal of each napkin or diapers along with the packet of their sanitary products.

(4) All such manufacturers, brand owners or marketing companies shall educate the masses for wrapping and disposal of their products.

18. Duties of the industrial units located within one hundred km from the refused derived fuel and waste to energy plants based on solid waste- All industrial units using fuel and located within one hundred km from a solid waste based refused derived fuel plant shall make arrangements within six months from the date of notification of these rules to replace at least five percent of their fuel requirement by refused derived fuel so produced.

19. Criteria for Duties regarding setting-up solid waste processing and treatment facility.- (1) The department in-charge of the allocation of land assignment shall be responsible for providing suitable land for setting up of the solid waste processing and treatment facilities and notify such sites by the State Government or Union territory Administration.

(2) The operator of the facility shall design and set up the facility as per the technical guidelines issued by the Central Pollution Control Board in this regard from time to time and the manual on solid waste management prepared by the Ministry of Urban Development.

- (3) The operator of the facility shall obtain necessary approvals from the State Pollution Control Board or Pollution Control Committee.
- (4) The State Pollution Control Board or Pollution Control Committee shall monitor the environment standards of the operation of the solid waste processing and treatment facilities.
- (5) The operator of the facility shall be responsible for the safe and environmentally sound operations of the solid waste processing and or treatment facilities as per the guidelines issued by the Central Pollution Control Board from time to time and the Manual on Municipal Solid Waste Management published by the Ministry of Urban Development and updated from time to time-
- (6) The operator of the solid waste processing and treatment facility shall submit annual report in Form III each year by 30th April to the State Pollution Control Board or Pollution Committee and concerned local body.

20. Criteria and actions to be taken for solid waste management in hilly areas.- In the hilly areas, the duties and responsibilities of the local authorities shall be the same as mentioned in rule 15 with additional clauses as under:

- (a) Construction of landfill on the hill shall be avoided. A transfer station at a suitable enclosed location shall be setup to collect residual waste from the processing facility and inert waste. A suitable land shall be identified in the plain areas down the hill within 25 kilometers for setting up sanitary landfill. The residual waste from the transfer station shall be disposed of at this sanitary landfill.
- (b) In case of non-availability of such land, efforts shall be made to set up regional sanitary landfill for the inert and residual waste.
- (c) Local body shall frame Bye-laws and prohibit citizen from littering wastes on the streets and give strict direction to the tourists not to dispose any waste such as paper, water bottles, liquor bottles, soft drink cans, tetra packs, any other plastic or paper waste on the streets or down the hills and instead direct to deposit such waste in the litter bins that shall be placed by the local body at all tourist destinations.
- (d) Local body shall arrange to convey the provisions of solid waste management under the bye-laws to all tourists visiting the hilly areas at the entry point in the town as well as through the hotels, guest houses or like where they stay and by putting suitable hoardings at tourist destinations.
- (e) Local body may levy solid waste management charge from the tourist at the entry point to make the solid waste management services sustainable.
- (f) The department in- charge of the allocation of land assignment shall identify and allot suitable space on the hills for setting up decentralised waste processing facilities. Local body shall set up such facilities. Step garden system may be adopted for optimum utilisation of hill space.

21. Criteria for waste to energy process.- (1) Non recyclable waste having calorific value of 1500 K/cal/kg or more shall not be disposed of on landfills and shall only be utilised for generating energy either or through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel.

- (2) High calorific wastes shall be used for co-processing in cement or thermal power plants.
- (3) The local body or an operator of facility or an agency designated by them proposing to set up waste to energy plant of more than five tones per day processing capacity shall submit an application in Form-I to the State Pollution Control Board or Pollution Control Committee, as the case may be, for authorisation.
- (4) The State Pollution Control Board or Pollution Control Committee, on receiving such application for setting up waste to energy facility, shall examine the same and grant permission within sixty days.

22. Time frame for implementation.- Necessary infrastructure for implementation of these rules shall be created by the local bodies and other concerned authorities, as the case may be, on their own, by directly or engaging agencies within the time frame specified below:

| Sl. No. | Activity | Time limit from the date of notification of rules |
|---------|---|---|
| (1) | (2) | (3) |
| 1. | identification of suitable sites for setting up solid waste processing facilities | 1 year |

| | | |
|-----|--|---------|
| 2. | identification of suitable sites for setting up common regional sanitary landfill facilities for suitable clusters of local authorities under 0.5 million population and for setting up common regional sanitary landfill facilities or stand alone sanitary landfill facilities by all local authorities having a population of 0.5 million or more . | 1 year |
| 3. | procurement of suitable sites for setting up solid waste processing facility and sanitary landfill facilities | 2 years |
| 4. | enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste domestic hazardous and inert solid wastes at source , | 2 years |
| 5. | Ensure door to door collection of segregated waste and its transportation in covered vehicles to processing or disposal facilities. | 2 years |
| 6. | ensure separate storage, collection and transportation of construction and demolition wastes | 2 years |
| 7. | setting up solid waste processing facilities by all local bodies having 100000 or more population | 2 years |
| 8. | Setting up solid waste processing facilities by local bodies and census towns below 100000 population. | 3 years |
| 9. | setting up common or stand alone sanitary landfills by or for all local bodies having 0.5 million or more population for the disposal of only such residual wastes from the processing facilities as well as untreatable inert wastes as permitted under the Rules | 3 years |
| 10. | setting up common or regional sanitary landfills by all local bodies and census towns under 0.5 million population for the disposal of permitted waste under the rules | 3years |
| 11. | bio-remediation or capping of old and abandoned dump sites | 5years |

23. State Level Advisory Body. – (1) Every Department in-charge of local bodies of the concerned State Government or Union territory administration shall constitute a State Level Advisory Body within six months from the date of notification of these rules comprising the following members, namely:-

| Sl. No | Designation | Member |
|--------|--|-------------------------|
| (1) | (2) | (3) |
| 1. | Secretary, Department of Urban Development or Local self government department of the State | Chairperson, ex-officio |
| 2. | One representative of Panchayats or Rural development Department not below the rank of Joint Secretary to State Government | Member, ex-officio |
| 3. | one representative of Revenue Department of State Government | Member, ex-officio |
| 4. | One representative from Ministry of Environment, Forest and Climate Change Government of India | Member, ex-officio |

| | | |
|-----|---|--------------------|
| 5. | One representative from Ministry of Urban Development, Government of India | Member, ex-officio |
| 6. | One representative from Ministry of Rural Development, Government of India | Member, ex-officio |
| 7. | One representative from the Central Pollution Control Board | Member, ex-officio |
| 8. | One representative from the State Pollution Control Board or Pollution Control Committee | Member, ex-officio |
| 9. | One representative from Indian Institute of Technology or National Institute of Technology | Member, Ex-officio |
| 10. | Chief town planner of the state | Member |
| 11. | Three representatives from the local bodies by rotation | Member |
| 12. | Two representatives from census towns or urban agglomerations by rotation. | Member |
| 13. | One representative from reputed Non-Governmental Organisation or Civil Society working for the waste pickers or informal recycler or solid waste management | Member |
| 14. | One representative from a body representing Industries at the State or Central level | Member |
| 15. | one representative from waste recycling industry | member |
| 16. | Two subject experts | Member |
| 17. | Co-opt one representative each from agriculture department, and labour department of State Government. | Member |

(2) The State Level Advisory Body shall meet at least one in every six months to review the matters related to implementation of these rules, state policy and strategy on solid waste management and give advice to state government for taking measures that are necessary for expeditious and appropriate implementation of these rules.

(3) The copies of the review report shall be forwarded to the State Pollution Control Board or Pollution Control Committee for necessary action.

24. Annual report.- (1) The operator of facility shall submit the annual report to the local body in Form-III on or before the 30th day of April every year.

(2) The local body shall submit its annual report in Form-IV to State P Control Board or P Committee and the Secretary-in-Charge of the Department of Urban Development of the concerned State or Union Territory in case of metropolitan city and to the Director of Municipal Administration or Commissioner of Municipal Administration or Officer in -Charge of Urban local bodies in the state in case of all other local bodies of state on or before the 30th day of June every year

(3) Each State Pollution Control Board or Pollution Control Committee as the case may be, shall prepare and submit the consolidated annual report to the Central Pollution Control Board and Ministry of Urban Development on the implementation of these rules and action taken against non complying local body by the 31st day of July of each year in Form-V.

(4) The Central Pollution Control Board shall prepare a consolidated annual review report on the status of implementation of these rules by local bodies in the country and forward the same to the Ministry of Urban Development

and Ministry of Environment, Forest and Climate Change, along with its recommendations before the 31st day of August each year.

(5) The annual report shall be reviewed by the Ministry of Environment, Forest and Climate Change during the meeting of Central Monitoring Committee.

25. Accident reporting- In case of an accident at any solid waste processing or treatment or disposal facility or landfill site, the Officer- in- charge of the facility shall report to the local body in Form-VI and the local body shall review and issue instructions if any, to the in- charge of the facility.

SCHEDULE I

[see rule 15 (w),(zi), 16 (1) (b) (e), 16 (4)]

Specifications for Sanitary Landfills

(A) Criteria for site selection.-

- (i) The department in the business allocation of land assignment shall provide suitable site for setting up of the solid waste processing and treatment facilities and notify such sites.
- (ii) The sanitary landfill site shall be planned, designed and developed with proper documentation of construction plan as well as a closure plan in a phased manner. In case a new landfill facility is being established adjoining an existing landfill site, the closure plan of existing landfill should form a part of the proposal of such new landfill.
- (iii) The landfill sites shall be selected to make use of nearby wastes processing facilities. Otherwise, wastes processing facility shall be planned as an integral part of the landfill site.
- (iv) Landfill sites shall be set up as per the guidelines of the Ministry of Urban Development, Government of India and Central Pollution Control Board.
- (v) The existing landfill sites which are in use for more than five years shall be improved in accordance with the specifications given in this Schedule.
- (vi) The landfill site shall be large enough to last for at least 20-25 years and shall develop 'landfill cells' in a phased manner to avoid water logging and misuse.
- (vii) The landfill site shall be 100 meter away from river, 200 meter from a pond, 200 meter from Highways, Habitations, Public Parks and water supply wells and 20 km away from Airports or Airbase. However in a special case, landfill site may be set up within a distance of 10 and 20 km away from the Airport/Airbase after obtaining no objection certificate from the civil aviation authority/ Air force as the case may be. The Landfill site shall not be permitted within the flood plains as recorded for the last 100 years, zone of coastal regulation, wetland, Critical habitat areas, sensitive eco-fragile areas..
- (viii) The sites for landfill and processing and disposal of solid waste shall be incorporated in the Town Planning Department's land-use plans.
- (ix) A buffer zone of no development shall be maintained around solid waste processing and disposal facility, exceeding five Tonnes per day of installed capacity. This will be maintained within the total area of the solid waste processing and disposal facility. The buffer zone shall be prescribed on case to case basis by the local body in consultation with concerned State Pollution Control Board.
- (x) The biomedical waste shall be disposed of in accordance with the Bio-medical Waste Management Rules, 2016, as amended from time to time . The hazardous waste shall be managed in accordance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, as amended from time to time. The E-waste shall be managed in accordance with the e-Waste (Management) Rules, 2016 as amended from time to time.
- (xi) Temporary storage facility for solid waste shall be established in each landfill site to accommodate the waste in case of non- operation of waste processing and during emergency or natural calamities.

(B) Criteria for development of facilities at the sanitary landfills.-

- (i) Landfill site shall be fenced or hedged and provided with proper gate to monitor incoming vehicles, to prevent entry of unauthorised persons and stray animals
- (ii) The approach and / internal roads shall be concreted or paved so as to avoid generation of dust particles due to vehicular movement and shall be so designed to ensure free movement of vehicles and other machinery.
- (iii) The landfill site shall have waste inspection facility to monitor waste brought in for landfilling h, office facility for record keeping and shelter for keeping equipment and machinery including pollution monitoring equipment. The operator of the facility shall maintain record of waste received, processed and disposed.

- (iv) Provisions like weigh bridge to measure quantity of waste brought at landfill site, fire protection equipment and other facilities as may be required shall be provided.
- (v) Utilities such as drinking water and sanitary facilities (preferably washing/bathing facilities for workers) and lighting arrangements for easy landfill operations during night hours shall be provided.
- (vi) Safety provisions including health inspections of workers at landfill sites shall be carried out made.
- (vii) Provisions for parking, cleaning, washing of transport vehicles carrying solid waste shall be provided. The wastewater so generated shall be treated to meet the prescribed standards.

(C) Criteria for specifications for land filling operations and closure on completion of land filling.-

- (i) Waste for land filling shall be compacted in thin layers using heavy compactors to achieve high density of the waste. In high rainfall areas where heavy compactors cannot be used, alternative measures shall be adopted.
- (ii) Till the time waste processing facilities for composting or recycling or energy recovery are set up, the waste shall be sent to the sanitary landfill. The landfill cell shall be covered at the end of each working day with minimum 10 cm of soil, inert debris or construction material..
- (iii) Prior to the commencement of monsoon season, an intermediate cover of 40-65 cm thickness of soil shall be placed on the landfill with proper compaction and grading to prevent infiltration during monsoon. Proper drainage shall be constructed to divert run-off away from the active cell of the landfill.
- (iv) After completion of landfill, a final cover shall be designed to minimise infiltration and erosion. The final cover shall meet the following specifications, namely :--
 - a) The final cover shall have a barrier soil layer comprising of 60 cm of clay or amended soil with permeability coefficient less than 1×10^{-7} cm/sec.
 - b) On top of the barrier soil layer, there shall be a drainage layer of 15 cm.
 - c) On top of the drainage layer, there shall be a vegetative layer of 45 cm to support natural plant growth and to minimise erosion.

(D) Criteria for pollution prevention.-In order to prevent pollution from landfill operations, the following provisions shall be made, namely:-

- (i) The storm water drain shall be designed and constructed in such a way that the surface runoff water is diverted from the landfilling site and leachates from solid waste locations do not get mixed with the surface runoff water. Provisions for diversion of storm water discharge drains shall be made to minimise leachate generation and prevent pollution of surface water and also for avoiding flooding and creation of marshy conditions.
- (ii) Non-permeable lining system at the base and walls of waste disposal area. For landfill receiving residues of waste processing facilities or mixed waste or waste having contamination of hazardous materials (such as aerosols, bleaches, polishes, batteries, waste oils, paint products and pesticides) shall have liner of composite barrier of 1.5 mm thick high density polyethylene (HDPE) geo-membrane or geo-synthetic liners, or equivalent, overlying 90 cm of soil (clay or amended soil) having permeability coefficient not greater than 1×10^{-7} cm/sec. The highest level of water table shall be at least two meter below the base of clay or amended soil barrier layer provided at the bottom of landfills.
- (iii) Provisions for management of leachates including its collection and treatment shall be made. The treated leachate shall be recycled or utilized as permitted, otherwise shall be released into the sewerage line, after meeting the standards specified in Schedule- II. In no case, leachate shall be released into open environment.
- (iv) Arrangement shall be made to prevent leachate runoff from landfill area entering any drain, stream, river, lake or pond. In case of mixing of runoff water with leachate or solid waste, the entire mixed water shall be treated by the concern authority.

(E) Criteria for water quality monitoring.-

- (i) Before establishing any landfill site, baseline data of ground water quality in the area shall be collected and kept in record for future reference. The ground water quality within 50 meter of the periphery of landfill site shall be periodically monitored covering different seasons in a year that is, summer, monsoon and post-monsoon period to ensure that the ground water is not contaminated.
- (ii) Usage of groundwater in and around landfill sites for any purpose (including drinking and irrigation) shall be considered only after ensuring its quality. The following specifications for drinking water quality shall apply for monitoring purpose, namely :-

| S. No. | Parameters | IS 10500:2012, Edition 2.2(2003-09) Desirable limit (mg/l except for pH) |
|--------|--|---|
| (1) | (2) | (3) |
| | Arsenic | 0.01 |
| | Cadmium | 0.01 |
| | Chromium(as Cr ⁶⁺) | 0.05 |
| | Copper | 0.05 |
| | Cyanide | 0.05 |
| | Lead | 0.05 |
| | Mercury | 0.001 |
| | Nickel | - |
| | Nitrate as NO ₃ | 45.0 |
| | pH | 6.5-8.5 |
| | Iron | 0.3 |
| | Total hardness (as CaCO ₃) | 300.0 |
| | Chlorides | 250 |
| | Dissolved solids | 500 |
| | Phenolic compounds (as C ₆ H ₅ OH) | 0.001 |
| | Zinc | 5.0 |
| | Sulphate (as SO ₄) | 200 |

(F) Criteria for ambient air quality monitoring.-

- (i) Landfill gas control system including gas collection system shall be installed at landfill site to minimize odour, prevent off-site migration of gases, to protect vegetation planted on the rehabilitated landfill surface. For enhancing landfill gas recovery, use of geomembranes in cover systems along with gas collection wells should be considered.
- (ii) The concentration of methane gas generated at landfill site shall not exceed 25 per cent of the lower explosive limit (LEL).
- (iii) The landfill gas from the collection facility at a landfill site shall be utilized for either direct thermal applications or power generation, as per viability. Otherwise, landfill gas shall be burnt (flared) and shall not be allowed to escape directly to the atmosphere or for illegal tapping. Passive venting shall be allowed in case if its utilisation or flaring is not possible.
- (iv) Ambient air quality at the landfill site and at the vicinity shall be regularly monitored. Ambient air quality shall

meet the standards prescribed by the Central Pollution Control Board for Industrial area.

G. Criteria for plantation at landfill Site.- A vegetative cover shall be provided over the completed site in accordance with the following specifications, namely:-

- (a) Locally adopted non-edible perennial plants that are resistant to drought and extreme temperatures shall be planted;
- (b) The selection of plants should be of such variety that their roots do not penetrate more than 30 cms. This condition shall apply till the landfill is stabilized;
- (c) Selected plants shall have ability to thrive on low-nutrient soil with minimum nutrient addition;
- (d) Plantation to be made in sufficient density to minimise soil erosion.
- (e) Green belts shall be developed all around the boundary of the landfill in consultation with State Pollution Control Boards or Pollution Control Committees .

H. Criteria for post-care of landfill site.- (1) The post-closure care of landfill site shall be conducted for at least fifteen years and long term monitoring or care plan shall consist of the following, namely :-‘

- (a) Maintaining the integrity and effectiveness of final cover, making repairs and preventing run-on and run-off from eroding or otherwise damaging the final cover;
- (b) Monitoring leachate collection system in accordance with the requirement;
- (c) Monitoring of ground water in and around landfill;
- (d) Maintaining and operating the landfill gas collection system to meet the standards.
- (2) Use of closed landfill sites after fifteen years of post-closure monitoring can be considered for human settlement or otherwise only after ensuring that gaseous emission and leachate quality analysis complies with the specified standards and the soil stability is ensured.

I. Criteria for special provisions for hilly areas.-Cities and towns located on hills shall have location-specific methods evolved for final disposal of solid waste by the local body with the approval of the concerned State Pollution Control Board or the Pollution Control Committee. The local body shall set up processing facilities for utilisation of biodegradable organic waste. The non-biodegradable recyclable materials shall be stored and sent for recycling periodically. The inert and non-biodegradable waste shall be used for building roads or filling-up of appropriate areas on hills. In case of constraints in finding adequate land in hilly areas, waste not suitable for road-laying or filling up shall be disposed of in regional landfills in plain areas.

J. Closure and Rehabilitation of Old Dumps- Solid waste dumps which have reached their full capacity or those which will not receive additional waste after setting up of new and properly designed landfills should be closed and rehabilitated by examining the following options:

- (i) Reduction of waste by bio mining and waste processing followed by placement of residues in new landfills or capping as in (ii) below.
- (ii) Capping with solid waste cover or solid waste cover enhanced with geomembrane to enable collection and flaring / utilisation of greenhouse gases.
- (iii) Capping as in (ii) above with additional measures (in alluvial and other coarse grained soils) such as cut-off walls and extraction wells for pumping and treating contaminated ground water.
- (iv) Any other method suitable for reducing environmental impact to acceptable level.

SCHEDULE II

[see rule 16 (1), (b), (e), 16 (4)]

Standards of processing and treatment of solid waste

A. Standards for composting.- The waste processing facilities shall include composting as one of the technologies for processing of bio degradable waste. In order to prevent pollution from compost plant, the following shall be complied with namely :-

- (a) The incoming organic waste at site shall be stored properly prior to further processing. To the extent possible, the waste storage area should be covered. If, such storage is done in an open area, it shall be provided with impermeable base with facility for collection of leachate and surface water run-off into lined drains leading to a leachate treatment and disposal facility;
- (b) Necessary precaution shall be taken to minimise nuisance of odour, flies, rodents, bird menace and fire hazard;

- (c) In case of breakdown or maintenance of plant, waste intake shall be stopped and arrangements be worked out for diversion of waste to the temporary processing site or temporary landfill sites which will be again reprocessed when plant is in order;
- (d) Pre-process and post-process rejects shall be removed from the processing facility on regular basis and shall not be allowed to pile at the site. Recyclables shall be routed through appropriate vendors. The non-recyclable high calorific fractions to be segregated and sent to waste to energy or for RDF production, co-processing in cement plants or to thermal power plants. Only rejects from all processes shall be sent for sanitary landfill site(s).
- (e) The windrow area shall be provided with impermeable base. Such a base shall be made of concrete or compacted clay of 50 cm thick having permeability coefficient less than 10^{-7} cm/sec. The base shall be provided with 1 to 2 per cent slope and circled by lined drains for collection of leachate or surface run-off;
- (f) Ambient air quality monitoring shall be regularly carried out. Odour nuisance at down-wind direction on the boundary of processing plant shall also be checked regularly.
- (g) Leachate shall be re-circulated in compost plant for moisture maintenance.
- (h) The end product compost shall meet the standards prescribed under Fertilizer Control Order notified from time to time.
- (i) In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely:-

| Parameters | Organic Compost (FCO 2009) | Phosphate Rich Organic Manure (FCO 2013) |
|--|-------------------------------|--|
| (1) | (2) | (3) |
| Arsenic (mg/Kg) | 10.00 | 10.00 |
| Cadmium (mg/Kg) | 5.00 | 5.00 |
| Chromium (mg/Kg) | 50.00 | 50.00 |
| Copper (mg/Kg) | 300.00 | 300.00 |
| Lead (mg/Kg) | 100.00 | 100.00 |
| Mercury (mg/Kg) | 0.15 | 0.15 |
| Nickel (mg/Kg) | 50.00 | 50.00 |
| Zinc (mg/Kg) | 1000.00 | 1000.00 |
| C/N ratio | <20 | Less than 20:1 |
| pH | 6.5-7.5 | (1:5 solution) maximum 6.7 |
| Moisture, percent by weight, maximum | 15.0-25.0 | 25.0 |
| Bulk density (g/cm ³) | <1.0 | Less than 1.6 |
| Total Organic Carbon, per cent by weight, minimum | 12.0 | 7.9 |

| | | |
|--|--|--|
| Total Nitrogen (as N), per cent by weight, minimum | 0.8 | 0.4 |
| Total Phosphate (as P ₂ O ₅) percent by weight, minimum | 0.4 | 10.4 |
| Total Potassium (as K ₂ O), percent by weight, minimum | 0.4 | - |
| Colour | Dark brown to black | - |
| Odour | Absence of foul Odor | - |
| Particle size | Minimum 90% material should pass through 4.0 mm IS sieve | Minimum 90% material should pass through 4.0 mm IS sieve |
| Conductivity (as dsm-1), not more than | 4.0 | 8.2 |

* Compost (final product) exceeding the above stated concentration limits shall not be used for food crops. However, it may be utilized for purposes other than growing food crops.

B. Standards for treated leachates.-The disposal of treated leachates shall meet the following standards, namely:-

| S. No | Parameter | Standards (Mode of Disposal) | | |
|-------|--|-----------------------------------|---------------|---------------|
| | | Inland surface water | Public sewers | Land disposal |
| (1) | (2) | (3) | (4) | (5) |
| 1. | Suspended solids, mg/l, max | 100 | 600 | 200 |
| 2. | Dissolved solids (inorganic) mg/l, max. | 2100 | 2100 | 2100 |
| 3 | pH value | 5.5 to 9.0 | 5.5 to 9.0 | 5.5 to 9.0 |
| 4 | Ammonical nitrogen (as N), mg/l, max. | 50 | 50 | - |
| 5 | Total Kjeldahl nitrogen (as N), mg/l, max. | 100 | - | - |
| 6 | Biochemical oxygen demand (3 days at 27 ⁰ C) max.(mg/l) | 30 | 350 | 100 |
| 7 | Chemical oxygen demand, mg/l, max. | 250 | - | - |
| 8 | Arsenic (as As), mg/l, max | 0.2 | 0.2 | 0.2 |
| 9 | Mercury (as Hg), mg/l, max | 0.01 | 0.01 | - |
| 10 | Lead (as Pb), mg/l, max | 0.1 | 1.0 | - |
| 11 | Cadmium (as Cd), mg/l, max | 2.0 | 1.0 | - |

| | | | | |
|----|---|------|------|-----|
| 12 | Total Chromium (as Cr), mg/l, max. | 2.0 | 2.0 | - |
| 13 | Copper (as Cu), mg/l, max. | 3.0 | 3.0 | - |
| 14 | Zinc (as Zn), mg/l, max. | 5.0 | 15 | - |
| 15 | Nickel (as Ni), mg/l, max | 3.0 | 3.0 | - |
| 16 | Cyanide (as CN), mg/l, max. | 0.2 | 2.0 | 0.2 |
| 17 | Chloride (as Cl), mg/l, max. | 1000 | 1000 | 600 |
| 18 | Fluoride (as F), mg/l, max | 2.0 | 1.5 | - |
| 19 | Phenolic compounds (as C ₆ H ₅ OH) mg/l, max. | 1.0 | 5.0 | - |

Note : While discharging treated leachates into inland surface waters, quantity of leachates being discharged and the quantity of dilution water available in the receiving water body shall be given due consideration.

C. Standards for incineration: The Emission from incinerators /thermal technologies in Solid Waste treatment/disposal facility shall meet the following standards, namely:-

| Parameter | Emission standard | | |
|---|----------------------------|--|-----|
| | (1) | (2) | (3) |
| Particulates | 50 mg/Nm ³ | Standard refers to half hourly average value | |
| HCl | 50 mg/Nm ³ | Standard refers to half hourly average value | |
| SO₂ | 200 mg/Nm ³ | Standard refers to half hourly average value | |
| CO | 100 mg/Nm ³ | Standard refers to half hourly average value | |
| | 50 mg/Nm ³ | Standard refers to daily average value | |
| Total Organic Carbon | 20 mg/Nm ³ | Standard refers to half hourly average value | |
| HF | 4 mg/Nm ³ | Standard refers to half hourly average value | |
| NO_x (NO and NO₂ expressed as NO₂) | 400 mg/Nm ³ | Standard refers to half hourly average value | |
| Total dioxins and furans | 0.1 ng TEQ/Nm ³ | Standard refers to 6-8 hours sampling. Please refer guidelines for 17 concerned congeners for toxic equivalence values to arrive at total toxic equivalence. | |
| Cd + Th + their compounds | 0.05 mg/Nm ³ | Standard refers to sampling time anywhere between 30 minutes and 8 hours. | |
| Hg and its compounds | 0.05 mg/Nm ³ | Standard refers to sampling time anywhere between 30 minutes and 8 hours. | |

| | | |
|----|--|--|
| 3. | Nodal Officer & designation (Officer authorised by the local body or agency responsible for operation of processing/ treatment or disposal facility) | |
| 4. | Authorisation required for setting up and operation of the facility (Please tick mark) | waste processing recycling treatment disposal at landfill |
| 5. | Attach copies of the Documents Site clearance (local body) Proof of Environmental Clearance Consent for establishment Agreement between municipal authority and operating agency Investment on the project and expected return | |
| 6. | Processing/recycling/treatment of solid waste (i) Total Quantity of waste to be processed per day Quantity of waste to be recycled Quantity of waste to be treated Quantity of waste to be disposed into landfill (ii) Utilisation programme for waste processed (Product utilisation) (iii) Methodology for disposal (attach details) Quantity of leachate Treatment technology for leachate (iv) Measures to be taken for prevention and control of environmental pollution (v) Measures to be taken for safety of workers working in the plant (vi) Details on solid waste processing/recycling/ treatment/disposal facility (to be attached) | |
| 7. | Disposal of solid waste Number of sites identified Quantity of waste to be disposed per day Details of methodology or criteria followed for site selection (attach) Details of existing site under operation Methodology and operational details of landfilling Measures taken to check environmental pollution | |
| 8 | Any other information. | |

Date:

Place:

Signature:

Designation

Form- II

[see rule 16 (1) (e)]

Format for issue of authorisation

File No.: _____

Dated: _____

Authorisation No

To

Ref: Your application number _____ dt. _____

The _____ State Pollution Control Board/Pollution Control Committee after examining the proposal hereby authorises _____ having administrative office at _____ to set up and operate waste processing/recycling/ treatment/disposal facility at _____

The authorisation is hereby granted to operate the facility for processing, recycling, treatment and disposal of solid waste.

The authorisation is subject to the terms and conditions stated below and such conditions as may be otherwise specified in these rules and the standards laid down in Schedules I and II under these rules.

The _____ State Pollution Control Board/Pollution Control Committees of the UT _____ may, at any time, revoke any of the conditions applicable under the authorisation and shall communicate the same in writing.

Any violation of the provision of the Solid Waste Management Rules, 2016 will attract the penal provision of the Environment (Protection) Act, 1986 (29 of 1986).

(Member Secretary)

State Pollution Control Board/Pollution Control Committee of the UT

(Signature and designation)

Date:

Place:

Form – III

[see rule 19 (6), 24 (1)]

Format of annual report to be submitted by the operator of facility to the local body

| | | |
|---|--|--|
| 1 | Name of the City/Town and State | |
| 2 | Population | |
| 3 | Area in sq. kilometers | |
| 4 | Name & Address of the local body Telephone No. Fax No. E-mail: | |
| 5 | Name and address of operator of the facility | |
| 6 | Name of officer in-charge of the facility Phone No: Fax No: E-mail: | |

| | | |
|---|---|---|
| 7 | Number of households in the city/town , Number of non-residential premises in the city Number of election/ administrative wards in the city/town | |
| 8 | Quantity of Solid waste | |
| | Estimated Quantity of solid waste generated in the local body area per day in metric tones | /tpd |
| | Quantity of solid waste collected per day | /tpd |
| | Per capita waste collected per day | /gm/day |
| | Quantity of solid waste processed | /tpd |
| | Quantity of solid waste disposed at landfill | /tpd |
| 9 | Status of Solid Waste Management (SWM) service | |
| | Segregation and storage of waste at source Whether solid waste is stored at source in domestic/commercial/ institutional bins If yes, Percentage of households practice storage of waste at source in domestic bins Percentage of non-residential premises practice storage of waste at source in commercial /institutional bins Percentage of households dispose of throw solid waste on the streets Percentage of non-residential premises dispose of throw solid waste on the streets Whether solid waste is stored at source in a segregated form If yes, Percentage of premises segregating the waste at source | Yes/No % % % % Yes/No % |
| | Door to Door Collection of solid waste | |
| | Whether door to door collection (D2D) of solid waste is being done in the city/town | Yes/No |
| | if yes | |
| | Number of wards covered in D2D collection of waste | |
| | No. of households covered | |
| | No. of non-residential premises including commercial establishments ,hotels, restaurants educational institutions/ offices etc covered | |

| | | | | | | |
|---|---------------------------------|----------------------------|----------------|--------------|--------------|----|
| Percentage of residential and non-residential premises covered in door to door collection through : | Motorized vehicle | | | | | % |
| | Containerized tricycle/handcart | | | | | % |
| | Other device | | | | | % |
| | | | | | | |
| If not, method of primary collection adopted | | | | | | |
| Sweeping of streets | | | | | | |
| Length of roads, streets, lanes, bye-lanes in the city that need to be cleaned | | | | | | km |
| Frequency of street sweepings and percentage of population covered | frequency | Daily | Alternate days | Twice a week | Occasionally | |
| | % of population covered | | | | | |
| | Tools used | | | | | % |
| Manual sweeping | | | | | % | |
| Mechanical sweeping | | | | | Yes/No | |
| Whether long handle broom used by sanitation workers | | | | | Yes/No | |
| Whether each sanitation worker is given handcart/tricycle for collection of waste | | | | | Yes/No | |
| Whether handcart / tricycle is containerized | | | | | Yes/No | |
| Whether the collection tool synchronizes with collection/ waste storage containers utilized | | | | | Yes/No | |
| Secondary Waste Storage facilities | | | | | | |
| No. and type of waste storage depots in the city/town | No. | Capacity in m ³ | | | | |
| Open waste storage sites | | | | | | |
| Masonry bins | | | | | | |
| Cement concrete cylinder bins | | | | | | |
| Dhalao/covered rooms/space | | | | | | |
| Covered metal/plastic containers | | | | | | |
| Upto 1.1 m ³ bins | | | | | | |
| 2 to 5 m ³ bins | | | | | | |
| Above 5m ³ containers | | | | | | |
| Bin-less city | | | | | | |
| Bin/ population ratio | | | | | | |

| | | | |
|--|--|---|---|
| | Ward wise details of waste storage depots (attach) : Ward No: Area: Population: No. of bins placed Total volume of bins placed | | |
| | Total storage capacity of waste storage facilities in cubic meters | | |
| | Total waste actually stored at the waste storage depots daily Give frequency of collection of waste from the depots Number of bins cleared Whether storage depots have facility for storage of segregated waste in green, blue and black bins | Frequency Daily Alternate day Twice a week Once a week Occasionally Yes/ No (if yes, add details) No. of green bins: No. of blue bins: No. of black bins: | No. of bins |
| | Whether lifting of solid waste from storage depots is manual or mechanical. Give percentage | (%) of Manual Lifting of SOLID WASTE | % |
| | | (%) of Mechanical lifting | % |
| | If mechanical – specify the method used | front-end loaders/ Top loaders | |
| | Whether solid waste is lifted from door to door and transported to treatment plant directly in a segregated form | Yes/ No (if yes, specify) | |

| | | |
|--|--|---|
| | Waste Transportation per day Type and Number of vehicles used (pl tick or add) | No. Trips made waste transported |
| | Animal cart Tractors Non tipping Truck Tipping Truck Dumper Placers Refuse collectors Compactors Others JCB/loader | |
| | Frequency of transportation of waste | Frequency (%) of waste transported Daily Alternate day Twice a week Once a week Occasionally |
| | Quantity of waste transported each day | /tpd |
| | Percentage of total waste transported daily | % |
| | Waste Treatment Technologies used | |
| | Whether solid waste is processed | Yes/No |
| | If yes, Quantity of waste processed daily | /tpd |
| | Land(s) available with the local body for waste processing (in Hectares) | |
| | Land currently utilized for waste processing | |
| | Solid waste processing facilities in operation | |
| | Solid waste processing facilities under construction | |
| | Distance of processing facilities from city/town boundary | |
| | Details of technologies adopted | |

| | |
|---|--|
| Composting , | Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled |
| vermi composting | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Bio-methanation | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Refuse Derived Fuel | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Waste to Energy technology such as incineration, gasification, pyrolysis or any other technology (give detail) | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Co-processing | Qty. raw material processed |
| Combustible waste supplied to cement plant | |
| Combustible waste supplied to solid waste based power plants | |
| Others | Qty. |
| Solid waste disposal facilities | |
| No. of dumpsites sites available with the local body | |
| No. of sanitary landfill sites available with the local body | |
| Area of each such sites available for waste disposal | |
| Area of land currently used for waste disposal | |
| Distance of dumpsite/landfill facility from city/town | kms |
| Distance from the nearest habitation | kms |
| Distance from water body | kms |

| | | |
|----|---|--|
| | Distance from state/national highway | kms |
| | Distance from Airport | kms |
| | Distance from important religious places or historical monument | kms |
| | Whether it falls in flood prone area | Yes/No |
| | Whether it falls in earthquake fault line area | Yes/No |
| | Quantity of waste landfilled each day | tpd |
| | Whether landfill site is fenced | Yes / No |
| | Whether Lighting facility is available on site | Yes / No |
| | Whether Weigh bridge facility available | Yes / No |
| | Vehicles and equipments used at landfill (specify) | Bulldozer, Compacters etc. available |
| | Manpower deployed at landfill site | Yes/No (if yes, attach details) |
| | Whether covering is done on daily basis | Yes/No |
| | If not, Frequency of covering the waste deposited at the landfill | |
| | Cover material used | |
| | Whether adequate covering material is available | Yes/No |
| | Provisions for gas venting provided | Yes/No, (if yes, attach technical data sheet) |
| | Provision for leachate collection | Yes/No, (if yes, attach technical data sheet) |
| 10 | Whether an Action Plan has been prepared for improving solid waste management practices in the city | Yes/No (if Yes attach Action Plan details) |
| 11 | What separate provisions are made for : Dairy related activities : Slaughter houses waste : C&D waste (construction debris) : | Attach details on Proposals, Steps taken, Yes/No Yes/No Yes/No |
| 12 | Details of Post Closure Plan | Attach Plan |
| 13 | How many slums are identified and whether these are provided with Solid Waste Management facilities : | Yes/ No (if Yes, attach details) |
| 14 | Give details of manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste | |

| | | |
|----|---|--|
| 15 | Mention briefly, the difficulties being experienced by the local body in complying with provisions of these rules | |
| 16 | Mention briefly, if any innovative idea is implemented to tackle a problem related to solid waste, which could be replicated by other local bodies. | |

Signature of Operator

Dated :

Place:

Form – IV

[see rules 15(za), 24(2)]

Format for annual report on solid waste management to be submitted by the local body

| | |
|-----------------------|--------------------------------------|
| CALENDAR YEAR: | DATE OF SUBMISSION OF REPORT: |
| | |

| | | |
|---|--|------|
| 1 | Name of the City/Town and State | |
| 2 | Population | |
| 3 | Area in sq. kilometers | |
| 4 | Name & Address of local body Telephone No. Fax No. E-mail: | |
| 5 | Name of officer in-charge dealing with solid waste management (SOLID WASTEM)Phone No: Fax No: E-mail: | |
| 6 | Number of households in the city/town Number of non-residential premises in the city Number of election/ administrative wards in the city/town | |
| 7 | Quantity of Solid waste (solid waste) | |
| | Estimated Quantity of solid waste generated in the local body area per day in metric tones | /tpd |
| | Quantity of solid waste collected per day | /tpd |

| | | |
|---|---|---|
| | Per capita waste collected per day | /gm/day |
| | Quantity of solid waste processed | /tpd |
| | Quantity of solid waste disposed at dumpsite/ landfill | /tpd |
| 8 | Status of Solid Waste Management service | |
| | Segregation and storage of waste at source Whether SOLID WASTE is stored at source in domestic/commercial/ institutional bins, If yes, Percentage of households practice storage of waste at source in domestic bins Percentage of non-residential premises practice storage of waste at source in commercial /institutional bins Percentage of households dispose or throw solid waste on the streets Percentage of non-residential premises dispose of throw solid waste on the streets Whether solid waste is stored at source in a segregated form, If yes, Percentage of premises segregating the waste at source | Yes/No % % % % Yes/No % |
| | Door to Door Collection of solid waste | |
| | Whether door to door collection (D2D) of solid waste is being done in the city/town | Yes/No |
| | if yes | |
| | Number of wards covered in D2D collection of waste | |
| | No. of households covered | |
| | No. of non-residential premises including commercial establishments ,hotels, restaurants educational institutions/ offices etc covered | |
| | Percentage of residential and non-residential premises covered in door to door collection through : Motorized vehicle Containerized tricycle/handcart Other device | % % % |
| | If not, method of primary collection adopted | |
| | Sweeping of streets | |
| | Length of roads, streets, lanes, bye-lanes in the city that need to be cleaned | km |

| Frequency of street sweepings and percentage of population covered | frequency | Daily | Alternate days | Twice a week | Occasionally |
|---|-------------------------|----------------------------|----------------|--------------|--------------|
| | % of population covered | | | | |
| Tools used | | | | | |
| Manual sweeping | % | | | | |
| Mechanical sweeping | % | | | | |
| Whether long handle broom used by sanitation workers | Yes/No | | | | |
| Whether each sanitation worker is given handcart/tricycle for collection of waste | Yes/No | | | | |
| Whether handcart / tricycle is containerized | Yes/No | | | | |
| Whether the collection tool synchronizes with collection/ waste storage containers utilized | Yes/No | | | | |
| Secondary Waste Storage facilities | | | | | |
| No. and type of waste storage depots in the city/town | No. | Capacity in m ³ | | | |
| Open waste storage sites | | | | | |
| Masonry bins | | | | | |
| Cement concrete cylinder bins | | | | | |
| Dhalao/covered rooms/space | | | | | |
| Covered metal/plastic containers | | | | | |
| Upto 1.1 m ³ bins | | | | | |
| 2 to 5 m ³ bins | | | | | |
| Above 5m ³ containers | | | | | |
| Bin-less city | | | | | |
| Bin/ population ratio | | | | | |
| Ward wise details of waste storage depots (attach) : | | | | | |
| Ward No: | | | | | |
| Area: | | | | | |
| Population: | | | | | |
| No. of bins placed | | | | | |
| Total volume of bins placed | | | | | |
| Total storage capacity of waste storage facilities in cubic meters | | | | | |
| Total waste actually stored at the waste storage depots daily | | | | | |

| | Give frequency of collection of waste from the depots Number of bins cleared | Frequency | No. of bins |
|--|--|---|-------------|
| | | Daily | |
| | | Alternate day | |
| | | Twice a week | |
| | | Once a week | |
| | | Occasionally | |
| | Whether storage depots have facility for storage of segregated waste in green, blue and black bins | Yes/ No (if yes, add details) No. of green bins: No. of blue bins: No. of black bins: | |
| | Whether lifting of solid waste from storage depots is manual or mechanical. Give percentage (%) of Manual Lifting of solid waste (%) of Mechanical lifting | % % | |
| | If mechanical – specify the method used | front-end loaders/ Top loaders | |
| | Whether solid waste is lifted from door to door and transported to treatment plant directly in a segregated form | Yes/ No (if yes, specify) | |
| | Waste transportation per day Type and Number of vehicles used | No. Trips made waste transported | |
| | <ul style="list-style-type: none"> Animal cart Tractors Non tipping Truck Tipping Truck Dumper Placers Refuse collectors Compactors Others JCB/loader | | |

| | |
|--|--|
| Frequency of transportation of waste | Frequency (%) of waste transported Daily Alternate day Twice a week Once a week Occasionally |
| Quantity of waste transported each day | /tpd |
| Percentage of total waste transported daily | % |
| Waste Treatment Technologies used | |
| Whether solid waste is processed | Yes/No |
| If yes, Quantity of waste processed daily | /tpd |
| Whether treatment is done by local body or through an agency Land(s) available with the local body for waste processing (in Hectares) | |
| Land currently utilized for waste processing | |
| Solid waste processing facilities in operation | |
| Solid waste processing facilities under construction | |
| Distance of processing facilities from city/town boundary | |
| Details of technologies adopted | |
| Composting , | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Vermi composting | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Bio-methanation | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |

| | |
|---|---|
| Refuse Derived Fuel | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Waste to Energy technology such as incineration, gasification, pyrolysis or any other technology (give detail) | Qty. raw material processed Qty. final product produced Qty. sold Quantity of residual waste landfilled |
| Co-processing | Qty. raw material processed |
| Combustible waste supplied to cement plant | |
| Combustible waste supplied to solid waste based power plants | |
| Others | Qty. |
| Solid waste disposal facilities | |
| No. of dumpsites sites available with the local body | |
| No. of sanitary landfill sites available with the local body | |
| Area of each such sites available for waste disposal | |
| Area of land currently used for waste disposal | |
| Distance of dumpsite/landfill facility from city/town | kms |
| Distance from the nearest habitation | kms |
| Distance from water body | kms |
| Distance from state/national highway | kms |
| Distance from Airport | kms |
| Distance from important religious places or historical monument | kms |
| Whether it falls in flood prone area | Yes/No |
| Whether it falls in earthquake fault line area | Yes/No |
| Quantity of waste landfilled each day | tpd |
| Whether landfill site is fenced | Yes / No |
| Whether Lighting facility is available on site | Yes / No |

| | | |
|----|--|--|
| | Whether Weigh bridge facility available | Yes / No |
| | Vehicles and equipments used at landfill (specify) | Bulldozer, Compacters etc. available |
| | Manpower deployed at landfill site | Yes/No (if yes, attach details) |
| | Whether covering is done on daily basis | Yes/No |
| | If not, Frequency of covering the waste deposited at the landfill | |
| | Cover material used | |
| | Whether adequate covering material is available | Yes/No |
| | Provisions for gas venting provided | Yes/No (if yes, attach technical data sheet) |
| | Provision for leachate collection | Yes/No (if yes, attach technical data sheet) |
| 9 | Whether an Action Plan has been prepared for improving solid waste management practices in the city | Yes/No (if Yes attach Action Plan details) |
| 10 | What separate provisions are made for : Dairy related activities : Slaughter houses waste : C&D waste (construction debris) : | Attach details on Proposals,Steps taken, Yes/No Yes/No Yes/No |
| 11 | Details of Post Closure Plan | Attach Plan |
| 12 | How many slums are identified and whether these are provided with Solid Waste Management facilities : | Yes/ No (if Yes, attach details) |
| 13 | Give details of: Local body's own manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste | |
| 14 | Give details of: Contractor/ concessionaire's manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste | |
| 15 | Mention briefly, the difficulties being experienced by the local body in complying with provisions of these rules | |

| | | |
|----|--|--|
| 16 | Mention briefly, if any innovative idea is implemented to tackle a problem related to solid waste, which could be replicated by other local bodies | |
|----|--|--|

Signature of CEO/Municipal Commissioner/
Executive Officer/Chief Officer

Date:

Place:

Form – V
[see rule 24(3)]

Format of annual report to be submitted by the state pollution control board or pollution control committee committees to the central pollution control board

PART A

To,

The Chairman
Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar
DELHI- 110 0032

| | | | |
|----|--|---|-------------------------------|
| 1. | Name of the State/Union territory | : | |
| 2. | Name & address of the State Pollution Control | : | |
| 3. | Number of local bodies responsible for management of: solid waste in the State/Union territory under these rules | : | |
| 4. | No. of authorisation application Received | : | |
| 5. | A Summary Statement on progress made by local body: in respect of solid waste management | : | Please attach as Annexure-I |
| 6. | A Summary Statement on progress made by local bodies: in respect of waste collection, segregation, transportation and disposal | : | Please attach as Annexure-II |
| 7. | A summary statement on progress made by local bodies: in respect of implementation of Schedule II | : | Please attach as Annexure-III |

| | |
|--------------|---|
| Date: | Chairman or the Member Secretary State Pollution Control Board/ Pollution Control Committee |
| Place: | |

PART B**Towns/cities**

Total number of towns/cities

Total number of ULBs

Number of class I & class II cities/towns

Authorisation status (names/number)

Number of applications received

Number of authorisations granted

Authorisations under scrutiny

SOLID WASTE Generation status

Solid waste generation in the state (TPD)

collected

treated

landfilled

Compliance to Schedule I of SW Rules (Number/names of towns/capacity)

Good practices in cities/towns

House-to-house collection

Segregation

Storage

Covered transportation

Processing of SW (Number/names of towns/capacity)

Solid Waste processing facilities setup:

| Sl. No. | Composting | Vermi-composting | Biogas | RDF/Pelletization |
|---------|------------|------------------|--------|-------------------|
| | | | | |

Processing facility operational:

| Sl. No. | Composting | Vermi-composting | Biogas | RDF/Pelletization |
|---------|------------|------------------|--------|-------------------|
| | | | | |

Processing facility under installation/planned:

| Sl. No. | Composting | Vermi-composting | Biogas | RDF/Pelletisation |
|---------|------------|------------------|--------|-------------------|
| | | | | |

Waste-to-Energy Plants: (Number/names of towns/capacity)

| Sl. No. | Plant Location | Status of operation | Power generation (MW) | Remarks |
|---------|----------------|---------------------|-----------------------|---------|
| | | | | |

Disposal of solid waste (number/names of towns/capacity):

Landfill sites identified

Landfill constructed

Landfill under construction

Landfill in operation

Landfill exhausted

Landfilled capped

Solid Waste Dumpsites (number/names of towns/capacity):

Total number of existing dumpsites

Dumpsites reclaimed/capped

Dumpsites converted to sanitary landfill

Monitoring at Waste processing/Landfills sites

| Sl. No. | Name of facilities | Ambient air | Groundwater | Leachate quality | Compost quality | VOCs |
|---------|--------------------|-------------|-------------|------------------|-----------------|------|
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |

Status of Action Plan prepared by Municipalities

Total number of municipalities:

Number of Action Plan submitted:

Form – VI

[see rule 25]

Accident Reporting

| | | | |
|----|--|---|--|
| 1. | Date and time of accident | : | |
| 2. | Sequence of events leading to accident | : | |
| 3. | The waste involved in accident | : | |

| | | | |
|--------------|--|--------------------|--|
| 4. | Assessment of the effects of the accidents on human health: and the environment | : | |
| 5. | Emergency measures taken | : | |
| 6. | Steps taken to alleviate the effects of accidents | : | |
| 7. | Steps taken to prevent the recurrence of such an accident | : | |
| Date: | | Signature:..... | |
| Place: | | Designation: | |

[F. No. 18-3/2004-HSMD]
BISHWANATH SINHA, Jt. Secy.

t.c.



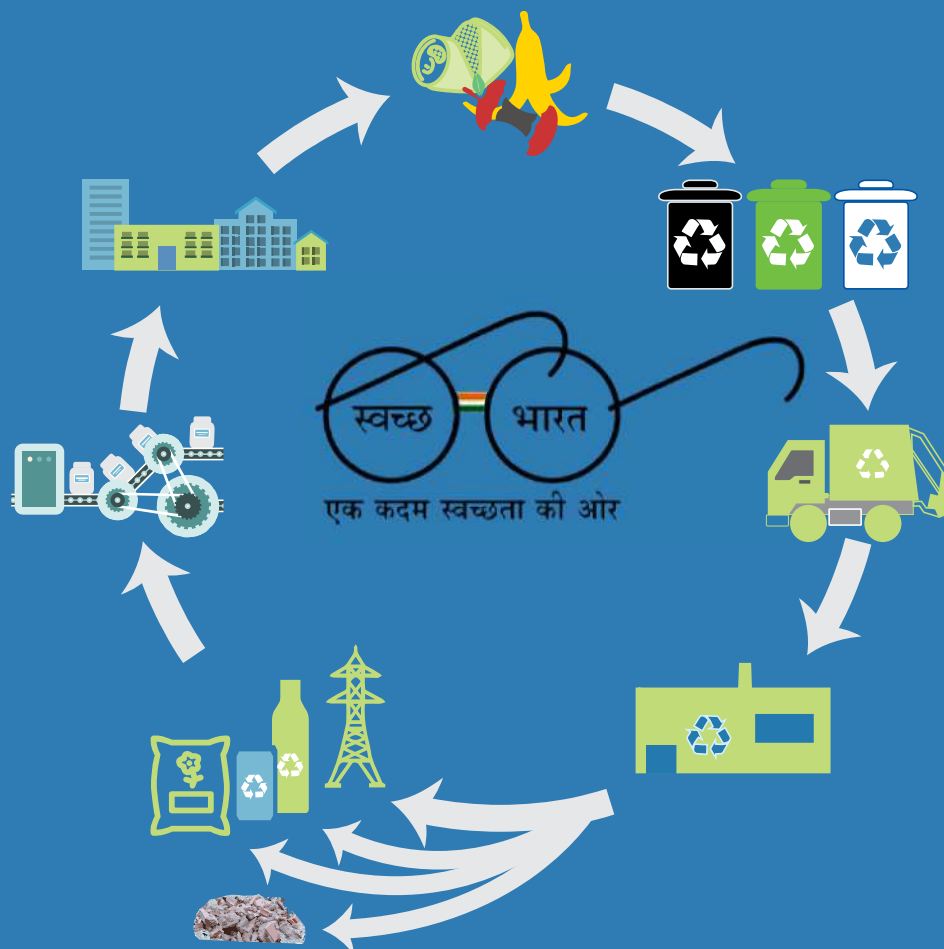


GOVERNMENT OF INDIA

SWACHH BHARAT MISSION

MUNICIPAL SOLID WASTE MANAGEMENT MANUAL

PART II: THE MANUAL



Central Public Health and Environmental Engineering Organisation (CPHEEO)

MINISTRY OF URBAN DEVELOPMENT

www.moud.gov.in

www.swachhbharaturban.gov.in

2016



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF URBAN DEVELOPMENT

<http://moud.gov.in>

MUNICIPAL SOLID WASTE MANAGEMENT MANUAL

Central Public Health and Environmental
Engineering Organisation (CPHEEO)

IN COLLABORATION WITH



giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

German International Cooperation

In keeping with the advancements in this sector, updates as and when found necessary will be hosted in the Ministry website: <http://moud.gov.in/> and the reader is advised to refer to these also.

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Designed under contract with GIZ by Aspire Design, New Delhi

PART II:
Manual on
Municipal Solid
Waste Management

AN INTRODUCTION TO THE MANUAL

The management of municipal solid waste in India has surfaced or continued to be a severe problem not only because of environmental and aesthetic concerns but also because of the enormous quantities generated every day. Even though only 31% of Indian population resides in urban areas, this population of 377 million (Census of India, 2011) generates a gigantic 1,43,449 metric tonnes per day of municipal solid waste, as per the Central Pollution Control Board (CPCB), 2014-15 and these figures increase every day with an increase in population. To further add to the problem, the total number of towns (statutory and census) in the country have also increased from 5,161 in 2001 to 7,936 in 2011, thus increasing the number of municipal waste generation by 2,775 within a decade.

The management of municipal solid waste is one of the main functions of all Urban Local Bodies (ULBs) in the country. All ULBs are required to meticulously plan, implement and monitor all systems of urban service delivery especially that of municipal solid waste. With limited financial resources, technical capacities and land availability, urban local bodies are constantly striving to meet this challenge.

With the launch of the flagship programme by the Government of India, Swachh Bharat Mission in 2014 that aims to provide basic infrastructural and service delivery with respect to sanitation facilities to every family, including toilets and adopting the scientific methods to collect, process and disposal of municipal solid waste. The mission focuses on quality and sustainability of the service provision as well as emphasising on the commitment on every stakeholder to bring about a visible change in society.

This manual on Municipal Solid Waste Management provides guidance to urban local bodies on the planning, design, implementation and monitoring of municipal solid waste management systems. Issues of environmental and financial sustainability of these systems are a critical consideration.

The manual clearly defines the planning process to be adopted by urban local bodies for preparing, revising and implementing Municipal Solid Waste Management Plans (MSWM Plans). The long term planning horizon of 25 years is further divided into short term plans to be prepared once every five years, with a mid-term review once every 2-3 years within this 5 year period, as per requirement. 'A seven step approach for MSWM Planning' is defined (Chapter 1), with special emphasis on community or stakeholder contribution and inter-departmental coordination at the local authority level to ensure implementation success. The Planning process suggests the adoption of the integrated solid waste management hierarchy for deciding on processing or technology solutions for municipal solid waste. Procedure for establishing the baseline of municipal solid waste management in urban local bodies is detailed

out. Ensuring financial viability of municipal solid waste management systems through revenue generation and encouraging Private Sector Participation (PSP) and Public Private Partnerships (PPPs) is suggested in this manual.

The MSWM Planning has to be supplemented with ‘Technical Aspects of MSW Segregation, Collection and Transportation’ that are addressed in detail (Chapter 2) in this manual. Processes for ensuring segregation at the household level in wet, dry and domestic hazardous waste, as suggested in the Solid Waste Management (SWM) Rules, 2016, are defined. Guidance mentioned under the SWM Rules, 2016 on waste collection and transportation systems is highlighted where relevant. Requirements for segregated secondary storage and transportation of segregated waste to appropriate processing and disposal facilities, sizing of systems for different scales of operation, norms for transfer stations, typical configurations of transfer stations, norms for street sweeping and corresponding resource allocation are provided in detail. Potential for involvement of the informal sector is explored, with a strong message that ULBs should consider the involvement of the informal sector after appropriately recognizing their services and with due focus on their livelihood and health.

MSWM Planning has to be strengthened by the ‘Technical Aspects of Processing and Treatment of MSW (Chapter 3)’: Urban Local Bodies, in the planning process, should make appropriate technology choices for waste management within the jurisdiction of the ULB, either independently or through the involvement of the private sector, with an aim to maximise resource conservation and efficiency and minimize health and environmental impacts. Waste minimization should be the primary focus of all community awareness programmes. Material recovery and recycling potential of municipal solid waste should be the first consideration in the management of generated waste. Where ever possible waste should be segregated into fractions promising viable recycling potential. Subsequently other forms of treatment and processing should be considered in accordance to the guidance given by the ISWM waste treatment and processing hierarchy. Guidance under the Solid Waste Management, Rules 2016 on waste processing and treatment technologies is highlighted where relevant. Technical specifications and design considerations for composting: windrow composting, aerated static pile, in-vessel composting decentralised composting, vermicomposting and yard waste composting, are given in detail. Waste to Energy technologies: incineration, biomethanation and RDF production and use are also covered in this manual. Specific issues to be considered while planning for and implementing these systems are defined and the scale at which these technologies are viable is clearly mentioned. Technologies under development: pyrolysis, gasification are discussed for guidance of urban local bodies. C&D waste management and guidance for urban local bodies is also included as part of this chapter.

The ISWM hierarchy clearly indicates that landfilling of municipal solid waste is the least preferred option for MSW management. However, given that the

municipal solid waste management system in the country has not yet reached a stage where landfilling can be avoided, sanitary landfill design guidelines and operational guidance is detailed out (Chapter 4). Rehabilitation of old dump sites is also addressed.

MSWM plan preparation considers operational and technological choices for an appropriate implementation route. This could be done either independently by the ULB or through private sector involvement or informal sector and with defined contracting and financing arrangements. Plan implementation should commence after the plan is approved by the Municipal Council and the buy-in from the community is ascertained.

Management aspects of municipal solid waste include statutory clearances like environmental clearances that are required for establishing municipal solid waste treatment, processing and disposal facilities. Pre-feasibility and feasibility studies may be required for ascertaining appropriate modes of treatment and processing at selected locations. Detailed Project Reports will need to be prepared to ensure detailed planning and financial viability of projects. Guidance on these aspects and on tendering, contracting and contract monitoring are also detailed out in Chapter 5.

Managing municipal solid waste is not easy, it requires regular monitoring of MSWM service provision by the ULB through basic or advanced Management Information Systems. All services provided by the ULB either through its own sources or through those outsourced to private entities, should be appropriately documented and monitored in order to ensure effective implementation and to identify issues that are to be addressed in the mid-term review of the MSWM plan and in subsequent short term plans (Chapter 6). Aspects of environmental monitoring, record keeping, training requirements for MSWM service provision are also addressed in this chapter.

Several waste types find their way into the municipal solid waste stream, which require special handling and disposal because of their quantity, concentration, physical and chemical characteristics or biological properties (special wastes). Many of these waste streams are also governed by specific Rules, viz. Plastic Waste Management Rules, 2016. Guidance on the ULBs' responsibilities for managing specific special waste streams namely, plastic waste, bio-medical waste, slaughter house waste, E-waste, waste tyres and lead battery waste are included in this manual (Chapter 7).

A compendium of good practises both national and international are included as Part III of the manual. All Rules and guidelines that are of relevance in the management of municipal solid waste for an ULB and are referred to in the different sections of Part II of the manual are included in the Part III of the Manual.

- a final cover system at the top of the sanitary landfill which enhances surface drainage, prevents infiltrating water, and supports surface vegetation;
- a surface water drainage system which collects and removes all surface runoff from the sanitary landfill site;
- an environmental monitoring system which periodically collects and analyses air, surface water, soil, gas, and groundwater samples around the sanitary landfill site; and
- a closure and post-closure plan which lists the steps that must be taken to close and secure a sanitary landfill site once the filling operation has been completed and the activities for long-term monitoring and operation and maintenance (O&M) of the completed sanitary landfill are functional.

4.5 PLANNING AND DESIGN OF A LANDFILL

Steps for designing, implementation and operation of a Sanitary Landfill are:

1. site selection,
2. sanitary landfill design,
3. construction of a sanitary landfill,
4. sanitary landfill operation, and
5. closure and post-closure plan.

4.5.1 SITE SELECTION

Selection of a sanitary landfill site shall be governed by the strategy identified in the state policy and SWM strategy and the municipal solid waste management (MSWM) plan of the urban local body (ULB). Decisions on constructing local landfills in relation to utilising regional landfills are based on these strategies or planning documents.

Site selection usually includes the following steps, which are described in the section below:

- location criteria,
- search area,
- development of a list of potential sites,
- data collection for potential sites,
- field visit for local verification and identification of potential sites,
- selection of best-ranked sites,
- preliminary environmental impact investigation, and
- final site selection.

4.5.1.1 LOCATION CRITERIA

The SWM Rules, 2016 provide the criteria for the location of a sanitary landfill (Section 4.1 of Part II). It should be verified if further criteria are specified by a regional regulatory agency (e.g., SPCB and PCC). “Guidelines for the Selection of Site for Landfilling” from the Central Pollution Control Board (CPCB) (Annexure 6) should also be referred. It also includes guidance for developing a site sensitivity index potential sites.

Pursuant to guidance in the SWM Rules, 2016 and based on good practices, the following criteria in Table 4.2 are suggested. Construction of sanitary landfills for municipal waste within restricted zones should be avoided at all costs.

Table 4.1: Criteria for Identifying Suitable Land for Sanitary Landfill Sites

| S.NO | PLACE | MINIMUM SITING DISTANCE |
|------|---|---|
| 1 | Coastal regulation, wetland, critical habitat areas, sensitive eco-fragile areas, and flood plains as recorded for the last 100 years | Sanitary landfill site not permitted within these identified areas |
| 2 | Rivers | 100 metres (m) away from the flood plain |
| 3 | Pond, lakes, water bodies | 200 m |
| 3 | Non-meandering water channel (canal, drainage, etc.) | 30 m |
| 4 | Highway or railway line, water supply wells | 500 m from center line |
| 5 | Habitation | All landfill facilities: 500 m |
| 6 | Earthquake zone | 500 m from fault line fracture* |
| 7 | Flood prone area | Sanitary landfill site not permitted |
| 8 | Water table (highest level) | The bottom liner of the landfill should be above 2 m from the highest water table |
| 9 | Airport | 20 km** |

* The urban local bodies (ULBs) located in seismic zone 4 and zone 5 should consult the seismic fault map before finalising the site for the sanitary landfill. They should also ensure that when the sanitary landfill is designed, the seismic factors are taken into consideration in determining the stability of the landfill structure.

** In a special case, a landfill site may be set up within 10–20 km away from the airport or airbase if there is no objection certificate from the civil aviation authority or air force as the case may be.

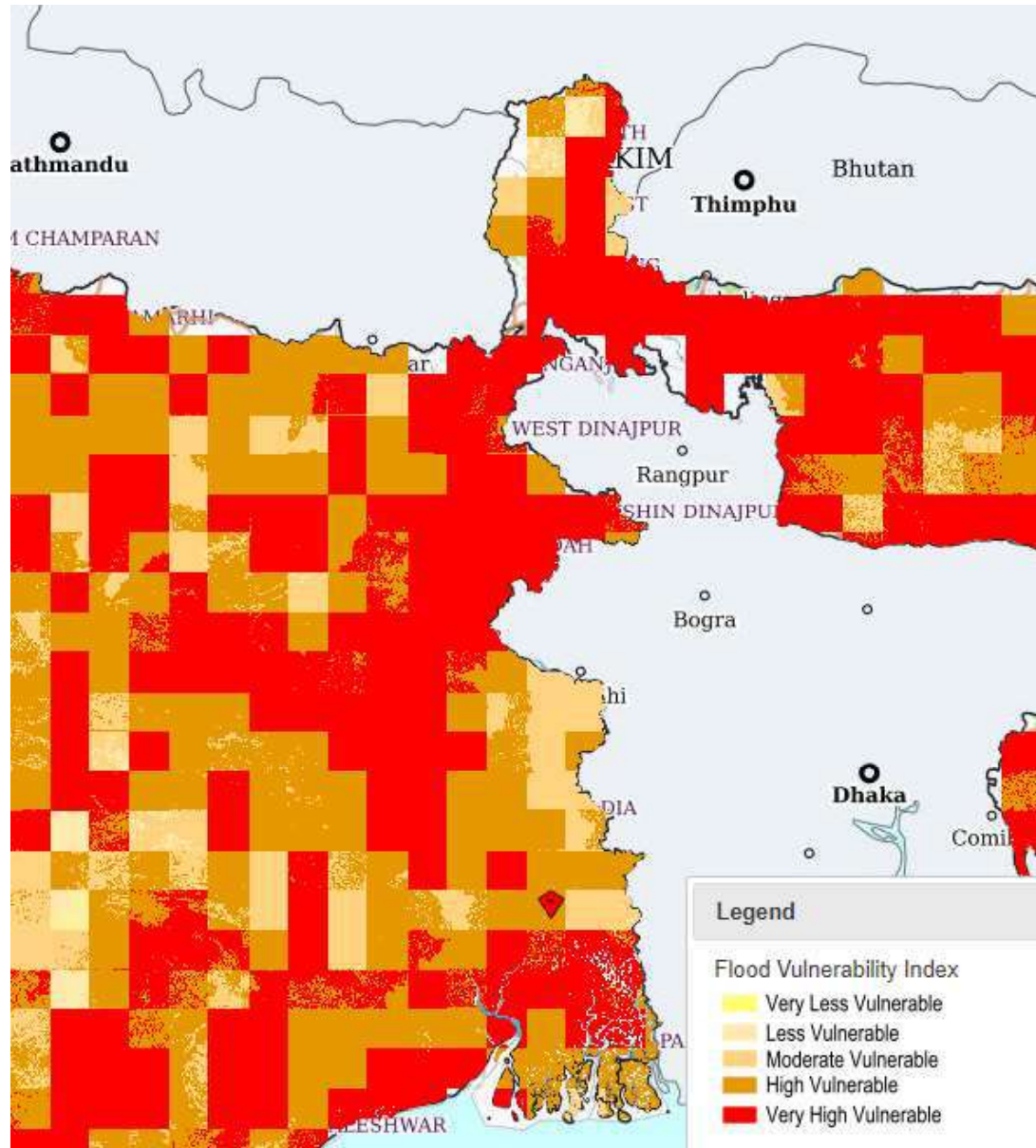
4.5.1.2 SEARCH AREA

In an event where potential sites for MSW landfill facilities are not demarcated by the Town Planning Department, the ULB should delineate an appropriate search area, which should ideally be located within the municipal boundary. The extent of the search area is usually governed by the economics of waste transportation (Section 2.3.12 of Part II). The Town Planning Department and other concerned authorities should be consulted while demarcating the search area.

Search areas help in identifying potential sites for sanitary landfill by delineating waste generating unit as a centre

ANNEXURE A/8**COPY OF THE FLOOD VULNERABILITY INDEX MAP SHOWING THAT THE DUMPING SITE FALLS UNDER HIGH VULNERABLE AREAS WHICH ARE PRONE TO FLOOD.**

National Remote Sensing Centre (NRSC) / Indian Space Research Organisation (ISRO) in collaboration with State remote sensing applications centres has generated database on several thematic information. These databases are hosted on Bhuvan Portal under thematic services. Among these thematic services, Flood Vulnerability Index (FVI) of the country has been computed by integrating all the layers in Spatial Decision Support Systems Environment using Multi-criteria evaluation Technique. The Applicant has put the coordinates of the dumping site (22°53'55.15"N, 88°24'34.01"E) on Flood Vulnerability Index (FVI) map, wherein it shows that the dumping site falls under High Vulnerable areas which are prone to flood:



t.c.

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NAIHATI MUNICIPALITY

WEST BENGAL

NOTIFICATION

In exercise of power conferred by clause (e) of Rule 15 of the Solid Waste Management Rules, 2016 published under the notification of the Government of India in the Ministry of Environment, Forest and climate Change vide S.O. 1357 (E), dated the 8th April, 2016 read with provisions under the West Bengal Municipality Act, 1993 (West Ben. Act XXII of 1993) the Naihati Municipality hereby makes the following bye-laws;

BYE-LAWS

CHAPTER – I

GENERAL

1. Short Title and Commencement:

These bye-laws may be called as Naihati Municipality Solid Waste management Bye-Laws,- 2023

They shall come into force on the date of their Notification

2. Application : These bye-laws shall apply to every domestic, institutional commercial and other non-residential solid waste generators within the Urban Local Body (ULB) area of Naihati Municipality except industrial waste, hazardous waste, hazardous chemicals, bio-medical waste, e-waste, lead acid batteries and radio –active waste, as those are covered under separate rules made under separate of 2016 made under the Environment (Protection) Act, 2016
3. Definitions :- (I) In these bye-laws, unless there is anything repugnant on the subject or contest-
 - (a) “Aerobic Composting” means a controlled process involving microbial decomposition of organic matter in the presence of oxygen.

- (b) "Anaerobic Digestion" means a controlled process of digestion involving microbial decomposition of the organic matter in the absence of oxygen;
- (c) "Bio- degradable substance" means a substance which can be degraded by microorganisms into simpler stable compounds;
- (d) "Bio- medical Waste" means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological or in health camps;
- (e) "Bio-meth nation" means a process, which entails the enzymatic decomposition of organic matter by microbial action to produce methane- rich biogas,
- (f) "Bulk Garden and Horticultural Waste" means bulk waste from parks, gardens etc. including grass clippings, weeds, woody 'brown' carbon-rich material such as pruning, branches, twigs, wood chipping, straw, dead leaves, tree trimmings, etc. which cannot be accommodated in the daily collection system for bio-degradable waste;
- (g) "Collection" means lifting and removal of solid waste from collection points or any other location;
- (h) "Collection at Source" means the collection of municipal solid waste by the ULBS directly from the premises of any building or common premises of a group of buildings. This is also referred to as "door to door collection";
- (i) "Composting" means a controlled process involving microbial decomposition of organic matter;
- (j) "Construction and Demolition waste" means waste from building materials, debris and rubble resulting from construction, remodeling, repair and demolition operations;
- (k) "Co-processing" means use of non-biodegradable and non-recyclable solid waste having calorific value exceeding 1500 Kcal as raw material or as a source of energy or both to replace or supplement the natural mineral resources and fossil fuels in industrial processes;
- (l) "Disposal" means the final and safe disposal of post processed residual solid waste and inert street sweepings and silt from surface drains on land to prevent contamination of ground water, surface water, ambient air and attraction of animals or birds;
- (m) "Door to Door Collection" means collection of solid waste from the door step of households, shops, commercial establishments, offices, institutional or any other non residential premises and includes collection of such waste from entry gate or a designated location on the ground floor in a housing society, multi storied building or apartments, large residential, commercial or institutional complex or premises,
- (n) "Door-to-Door Collection System or Vehicle" means the bell-ringing vehicle (includes a carriage, cart, van, truck, hand-cart, bicycle, cycle-rickshaw, auto-rickshaw, motor vehicle and every wheeled conveyance which is used or is capable of

- being used on a street) provided by the ULB for point to point collection of Municipal Solid Waste;
- (o) "Domestic Hazardous Waste" means waste contaminated with hazardous chemicals or infectious waste such as discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles, gauge and syringes, etc. generated at the household level;
 - (p) "Dry Waste" means waste other than bio-degradable waste and inert street sweepings and includes recyclable and non-recyclable waste, combustible waste and sanitary napkin and diapers, etc;
 - (q) "Dump Sites" means a land utilized by urban local body for unscientific disposal of solid waste without following the principles of sanitary land filling;
 - (r) "E-waste" means waste electrical and electronic equipment in whole or in part or rejects from their manufacturing, refurbishment and repair process which are intended to be discarded as waste;
 - (s) "Facility" means any establishment wherein the solid waste management processes namely segregation, recovery, storage, collection, recycling, processing, treatment or safe disposal are carried out;
 - (t) "Fine" means penalty imposed on waste generator or operator of waste processing and disposal facilities under these bye-laws for non-compliance of the directives contained in these bye-laws;
 - (u) "Handling" includes all activities relating to sorting, segregation, material recovery, collection, secondary storage, shredding, baling, crushing, loading, unloading, compacting, transportation, processing and disposal of solid waste;
 - (v) "Incineration" means an engineered process involving burning or combustion of solid waste to thermally degrade waste materials at high temperatures;
 - (w) "Inert Waste" means wastes which are not bio-degradable, recyclable or combustible and includes non-recyclable fraction of construction and demolition waste, street sweeping or dust and silt removed from the surface drains;
 - (x) "Institutional Generators" includes occupier of the institutional buildings such as building occupied by the Central Government Departments, State Government Departments, public or private sector companies, marriage halls, hospitals, education institutions, hotels and restaurants, etc.
 - (y) "Land Filling" means disposal of solid waste on land in facility designed with protective measures against pollution of surface water, ground water and air fugitive dust, wind-blown litter, foul smell, fire hazard, bird menace, pests and rodents, green house gas emission, slope instability and erosion;
 - (z) "Leachate" means the liquid that seeps through solid waste or other medium and has extracts of dissolved or suspended material in it;

- (aa) "Litter" means all refuse and include any other waste material which, if thrown or deposited as prohibited under these bye-laws, tends to create nuisance, or a danger to life, environment, public health, safety and welfare;
- (ab) "Littering" means putting litter in such a location that it falls, descends, blows, is washed, percolates or otherwise escapes or is likely to fall, descend, blow, be washed, percolate or otherwise escape into or onto any public place; or causing, permitting or allowing litter to fall, descend, blow, be washed, percolate or otherwise escape into or onto any public place;
- (ac) "Municipal Solid Waste" includes commercial and residential waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non waste, street sweepings, silt removed or collected from the surface drains, horticulture waste, construction and demolition waste generated in ULBS area in either solid or semi solid form excluding hazardous industrial waste but including treated bio-medical waste
- (ad) "Non-Biodegradable Waste" means any waste that cannot be degraded by micro organisms into simpler stable compounds;
- (ae) "Operator of a Facility" means a person who owns or operates a facility for collection, segregation, storage, transportation, processing and disposal of municipal solid waste and also includes any other agency authorized as such by the ULB for management and handling of solid waste in the respective areas;
- (af) "Pelletisation" means a process whereby pellets are prepared which are small cubes or cylindrical pieces made out of solid wastes and includes fuel pellets are also referred as refuse derived fuel;
- (ag) "Primary Collection" means collecting, lifting and removal of segregated solid waste from source of its generation including households, shops, offices and any other non-residential premises or from any collection points or any other location specified by the ULB;
- (ah) "Processing" means the process by which waste materials are transformed into new or recycled products;
- (ai) "Recycling" means the process of transforming segregated solid waste into raw materials for producing new products which may or may not be like its original products;
- (aj) "Redevelopment" means rebuilding of old residential or commercial buildings at the same site, where the existing buildings and other infrastructures have become dilapidated;

- (ak) "Refused Derived Fuel" (RDF) means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste;
- (al) "Residual Waste" means and includes the waste and rejects from the solid waste processing facilities which are not suitable for recycling or further processing;
- (am) "Sanitation" means the promotion of hygiene and the prevention of disease and other consequences of ill health related to environmental factors;
- (an) "Sanitary Waste" means waste comprising of used diapers, sanitary towels or napkins, condoms, incontinence sheets and any other similar waste;
- (ao) "Schedule" means schedule appended to these bye-laws;
- (ap) "Secondary Collection" means collection of solid waste deposited at secondary waste storage depots or bins for onward transportation of the waste to the processing or disposal facility;
- (aq) "Secondary Storage" means the temporary containment of solid waste at a public place in a covered bin or container in a manner so as to prevent littering, vectors, stray animals and odour;
- (ar) "Segregation" means sorting and separate storage of various components of solid waste namely biodegradable waste or wet waste, non biodegradable waste or dry waste including recyclable waste, combustible waste, sanitary waste, non recyclable inert waste, domestic hazardous waste, e-waste and construction and demolition waste;
- (as) "Source" means the premises in which waste is generated;
- (at) "Storage" means the temporary containment of municipal solid waste in a manner so as to prevent littering, attraction to vectors, stray animals and excessive foul odour;
- (au) "Street" includes any way, road, lane, square, court, alley, gully, passage, whether a thoroughfare or not and whether built upon or not, over which the public have a right of way and also the roadway or footway over any bridge or causeway;
- (av) "Stabilization of Waste" means the biological decomposition of biodegradable waste to a stable state where it generates no leachate or offensive odours and is fit for application to farm land ,soil erosion control and soil remediation;

- (aw) "Transportation" means a specially designed transportation system to carry municipal solid waste from one place to another hygienically so as to prevent foul odour, littering, unsightly conditions, accessibility to vectors, etc.;
- (ax) "Treatment" means the method, technique or process designed to modify physical, chemical or biological characteristics or composition of any waste so as to reduce its volume and potential to cause harm;
- (ay) "Treated bio-medical waste" means the waste generated in hospitals and health care institutions which have been prescribed as treated in accordance with the Bio-Medical Waste Management Rules, 2016;
- (az) "User Fee" means a fee imposed through these bye-laws by the urban local body on the waste generator;
- (ba) "Vermi Composting" is the process of the conversion of bio-degradable waste into compost using earth worms;
- (bb) "Waste Generator" means and includes every person or group of persons or residential and commercial establishments including Indian Railways, Defence Cantonments, industries, hospitals, hotels etc. which generate solid waste;
- (bc) "Waste Pickers" means a person or groups of persons engaged in collection of reusable and recyclable solid waste from the source of waste generation as well as picking up of waste from the streets, bins, processing and waste disposal facilities for sale to recyclers directly or through intermediaries to earn their livelihood.
- (bd) "Bulk Waste Generator" means bulk waste generator defined under Rule 3(1)(8) of the Solid Waste Management Rules, 2016 (hereinafter referred to as 'SWM Rules') and any other waste generator notified by the ULB;
- (be) "Competent Authority" means the Chairman ofMunicipality/Notified Area Authority or any person authorized by him.
- (bf) "Clean Area" means the public place in front of and all around or adjacent to any premises extending to the kerb side and including the drain, foot path and kerb cleaned and so maintained in accordance with these bye-laws;
- (bg) "Community Waste Storage Bin" means any storage facility set up and maintained by ULB or collectively by owners and/or occupiers of one or more premises for storage of solid waste in a segregated manner (green bin for bio-degradable waste, blue bin for non-biodegradable waste and black bins for hazardous waste) on the roadside/in premises

of any one of such owners/occupiers or in their common premises as authorized by the competent authority;

(bh) "Household Bins" means any storage facility set up and maintained by the family members in their households for storage of solid waste in a segregated manner (green bin for bio-degradable waste and blue bin for non-biodegradable waste, white bin/ pouch for bio medical waste, yellow bin/ pouch for COVID waste if required and black bin/ pouch for hazardous waste).

(bi) "User fee / Charges" means fees or charges imposed by ULB, through general or special order of the Competent Authority from time-to-time, on the waste generator to recover full or part cost of providing solid waste collection, transportation, processing and disposal services;

(bj) "Fine" means fees imposed by ULBS to public or institution for non-compliers of anti-littering direction of the ULB;

(bk) "Vacant Plot" means any land or open space belonging to a private party/person/Govt. agency that is not occupied.

(2) The words and expressions used but not defined herein shall have the same meaning as respectively assigned to them in the Environment Protection Act, 1986 or the Solid Waste Management Rules, 2016 or the Construction and Demolition waste Management Rules, 2016 made by the Government of India, Ministry of Environment, Forest and Climate Change under the provisions of the Environment (Protection) Act, 1986 (29 of 1986) respectively published in the Gazette of India

in Part II-Section 3(ii) vide No.1357(E) dated the 8th April, and in Part II-Section 3(ii) vide G.S.R. No. 317(E) dated the 29th March, 2016.

CHAPTER-II

MANAGEMENT OF MUNICIPAL SOLID WASTE

4. Municipal Solid Waste Management:

The Municipality/Notified Area Authority shall establish an integrated Solid Waste Management (SWM) system with an aim to reduce the amount of waste being disposed, while maximizing

resources recovery and efficiency. The preferred waste management system shall focus on the following points, namely:-

i. Reduction and reuse at source: The most preferred option for Solid Waste Management shall be prevention of waste generation. It will be helpful in reducing the handling, treatment, and disposal costs and specially reduce various environmental impacts such as leachate, air emissions and generation of greenhouse gases.

ii. Waste Recycling: Recovery of recyclable material resources through a process of segregation, collection and re-processing to create new products shall be the next preferred alternative.

iii. Waste to Composting. As far as possible the organic fraction of waste shall be composted and used to improve soil health and agricultural production adhering to norms.

iv. Waste-to-Energy: Where material recovery from waste is not possible, energy recovery from waste through production of heat, electricity or fuel may be preferred. Bio-methanation, waste incineration, production of Refuse Derived Fuel (RDF) and co-processing of the sorted dry rejects from municipal solid waste are to be commonly adopted as "Waste to Energy" technology

v. Waste Disposal: Remaining residual waste, which are ideally comprised of inerts, shall be disposed in sanitary landfills constructed in accordance with stipulations of the Solid Waste Management Rules, 2016.

vi. The Integrated Solid Waste Management system shall be environment friendly. Waste minimization, waste recycling, waste-to-energy strategies and landfill gas capture and use which are promoted in the Solid Waste Management Rules, 2016 are strategies for reduction of greenhouse gases.

CHAPTER-III

SEGREGATION AND PRIMARY STORAGE OF MUNICIPAL SOLID WASTE

5. Segregation and storage of solid waste at source:-

1. It shall be necessary for all waste generators to separate and store the solid waste coming out of their own places regularly into four following streams and handover segregated waste to designated waste collectors as per the direction of ULB from time to time.

- a. collection of non-biodegradable or dry waste and deposit of it into covered waste bin,
- b. collection of biodegradable or wet waste and deposit of it into covered waste bin,
- c. collection of domestic hazardous waste and deposit of it into covered waste bin/ pouch,
- d. collection of domestic biomedical waste and deposit of it into covered waste bin/ pouch,

If required, for the waste of home quarantine patients keeping of the bio medical and other waste into pouch.

2. Every bulk waste generator is to be separated and stored as the solid waste coming out of their own places into four streams namely:-

- a. non-biodegradable or dry waste to be deposited deposit it into covered waste bin,
- b. biodegradable or wet waste to be deposited into covered waste bin,
- c. hazardous waste to be deposited into covered waste bin,
- d. biomedical waste to be deposited into covered waste bin,

The Municipality shall install wet waste processing unit within their area and the other waste in segregated manner and shall handover to authorize waste processing or disposal facilities or deposition centers through the authorized waste collection agency with paying the carrying charges specified by ULB from time to time. If they cannot establish wet waste processing unit then they are to handover segregated waste to authorized waste processing or disposal facilities or deposition centers through the authorized waste collection agency with paying the carrying charges specified by ULB from time to time.

3. The colour of bins for storage of segregated waste shall be: green- for biodegradable waste, blue - for non- biodegradable or dry waste, black-for domestic hazardous waste, white for bio-medical waste and yellow for COVID waste.

4. All resident welfare and market associations shall, in partnership with ULB, ensure segregation of waste at source by the generators; facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorized waste pickers or the authorized recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by ULB.
5. All gated communities and institutions with more than 5,000 sqm area shall, in partnership with ULB, ensure segregation of waste at source by the generators, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorized waste pickers or the authorized recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by ULB.
6. All hotels and restaurants shall, in partnership with ULB, ensure segregation of waste at source; facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorized waste pickers or the authorized recyclers. The biodegradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by ULB.
7. No person shall organize an event or gathering of more than one hundred persons at any unlicensed place without intimating ULB along with payment of user fee as prescribed in the schedule, at least three working days before such event or gathering and the organizer of such event shall ensure segregation of waste at source and handing over of segregated waste to waste collector or agency as specified by ULB.
8. Used sanitary waste are to be securely wrapped as and when generated in the pouches provided by the manufacturers or brand owners of those products or in a news paper or suitable biodegradable wrapping material and place the same in the bin meant for bio-medical waste.
9. Every street vendor shall keep suitable containers for storage of segregate waste generated during the course of his activity such as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits, etc., and shall deposit such waste at waste storage depot or container or vehicle as notified by ULB..
10. Waste generator of garden and horticulture waste generated from his premises shall store such waste separately in his own premises and dispose of the same as per the directions of ULB from time to time.

11. Domestic Hazardous Waste shall be stored and delivered by every waste generator to the collection vehicle which shall be provided daily/ weekly/periodically by ULB or any other Agency authorized by it or Government of West Bengal or the West Bengal Pollution Control Board (WBPCB) for collection of such waste, or by a centre designed for collection of such waste for disposal in a manner that is mandated by the Government of West Bengal or WBPCB.

12. Construction and Demolition Waste shall be stored and delivered separately as per the Construction and Demolition Waste Management Rules, 2016.

13. No untreated bio-medical waste, e-waste, hazardous chemicals and industrial waste shall be mixed with biodegradable and non-biodegradable solid waste. Such waste shall be disposed of in accordance with the respective rules framed under the Environment (Protection) Act, 1986,

14. Every owner/occupier of any premises other than designated slaughter houses and markets, who generates poultry, fish and slaughter waste as a result of any commercial activity, shall store the same separately in closed, hygienic condition and deliver it at a specified time, on a daily basis to the ULB's collection vehicle provided for this purpose. Depositing of such waste in any community waste bin is prohibited.

15. Segregated bio-degradable solid waste if not composted by the generators, shall be stored by them within their premises and its delivery shall be ensured to the municipal worker/vehicle/waste picker/waste collector or to the bio-degradable waste collection vehicle provided for specified commercial generators of bulk bio-degradable waste at such times as may be notified from time to time.

CHAPTER-IV

MUNICIPAL SOLID WASTE COLLECTION

6. Collection of Solid Waste:-

i. In compliance of SWM Rules, door to door collection of segregated solid waste shall be implemented in all areas or wards of ULB, to collect garbage from every house, including slums and informal settlements on a daily basis by integrating the informal door to door collection system with ULB collection system.

ii. Arrangements shall be made for collection of residual solid waste from bulk waste generators, which are processing waste in-situ.

iii. Residual solid waste from vegetable, fruit, flower, meat, poultry and fish market shall be collected on day to day basis.

- iv. Horticulture and garden waste shall be separately collected and disposed of. One or two days in a week will be specified for this purpose.
- v. To make optimum use of bio-degradable waste from fruits and vegetable markets, meat and fish markets, bulk horticulture and garden waste and to minimize the cost of collection and transportation, such waste shall be processed or treated within the area where waste is generated.
- vi. Manual handling of waste in the containers shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper protection with due care for safety of workers.
- vii. Waste generators shall be responsible to deposit their segregated waste in the Auto-Tippers/ Pedal Tri-cycle van etc deployed by ULB or by the notified authorized waste collector of the ULB. Segregated waste from multi-storied buildings, apartments, housing complexes (other than those falling under sub-clauses (iv) and (v) of clause 4 of these bye-laws) may be collected from the entry gate or any other designated location.
- viii. Changing needs and advances in technology shall be taken into consideration for selection of collection equipment and vehicles. Auto-Tippers or vehicles of specific capacity with-hydraulically operated hopper covering mechanism from top having two compartments for carrying biodegradable and non-biodegradable waste separately with a hooter shall be deployed for collection of waste.
- ix. Automatic voice recorded device, bell or horn having sound not more than the permissible noise level shall be installed on every garbage collection vehicle used by waste collectors.
- x. In narrow streets that cannot be serviced by auto tipper or the vehicle, a pedal tri-cycle or 3-Wheeler or smaller motorized vehicle with hydraulically operated hopper covering mechanism from top having two compartments for carrying wet and dry waste separately with a hooter, compatible with mobile transfer station shall be deployed.
- xi. In congested and narrower streets that cannot even be serviced by 3-Wheeler or smaller vehicle; pedal tri cycle or any other type of suitable equipment shall be deployed.
- xii. Smaller, narrow and congested streets/lanes where even a 3-wheeler/ pedal tri cycle etc. cannot be operated, vantage point/s shall be designated at the start of the locality/street where the collection vehicle shall be parked and the helper/driver of vehicle shall carry a whistle and walk in the locality to announce arrival of vehicle for collecting solid waste. Time table for such collection system shall be displayed at the notice board and uploaded on the website of ULB.
- xiii. ULB or its notified authorized waste collectors shall be responsible to cover all the streets/lanes of each zone for the primary collection.

CHAPTER-V**SECONDARY STORAGE OF MUNICIPAL WASTE****7. Storage of Solid waste in the secondary storage points:-.**

i. Segregated solid waste collected from doorsteps shall be taken to waste storage depots, community storage bins or secondary stations or the locations specified by the ULB for secondary storage of waste.

ii. Such secondary storage points shall have covered containers (of specified colour) for separate storage of:

- a. non-biodegradable or dry waste
- b. biodegradable or wet waste
- c. domestic hazardous waste

iii. Different containers shall be used in the areas demarcated by ULB to keep segregated waste in the following manner

- green- for biodegradable waste,
- blue for non-biodegradable,
- black for domestic hazardous waste

ULB shall separately notify, from time to time, mandatory colour coding and other specifications of receptacles prescribed for storage and delivery of different types of solid waste to enable safe and easy collection without any mixing or spillage of waste, which generators of different types of solid waste shall have to adhere to.

iv. ULB on its own or through outsourcing agencies shall maintain the storage facilities for solid waste in a manner that does not create unhygienic and unsanitary conditions around it.

v. Containers of various sizes in the secondary storage depots shall be provided by ULB or any assigned agencies in different colours as mentioned in these bye-laws.

vi. Storage facilities shall be created and established by taking into account quantities of waste generation in a given area and the density of population;

vii. Storage facilities shall be user friendly and shall be so designed that it ensures compaction of waste and that the waste stored is not exposed to open atmosphere;

viii. All the housing cooperative societies, associations, residential and commercial establishments and gated communities etc. shall have the responsibility to put coloured bins as

prescribed by these bye-laws and to keep adequate number of containers in appropriate places in their own complexes, so that the daily waste generated there can be properly deposited.

ix. The Bulk waste generators who are generating 100 KG or more waste per day shall have to install wet waste processing unit within their premises. If they feel that they are unable to install such unit due to shortage of land or technology or manpower then they may request ULB to collect such waste for disposal.

x. ULB or its specified agency shall carry out washing and disinfection of all the bins on a weekly basis.

xi. Recycling Centers [Material Recovery Facility (MRF)] for Dry Waste (Non-Biodegradable Waste) –

a. ULB shall convert its existing storage bin or identify specific location as per requirement, as 'Recycling Centers' which shall be used for segregation of dry waste received through street /door to door waste collection service. Recycling centers may be increased depending on the quantity of dry waste received.

b. Dry (non-biodegradable) waste from street /door-to-door collection system and from commercial establishments shall be transferred only to these designated 'recycling centers'. These designated centers shall receive only dry waste.

c. There shall also be a provision for the households to directly deposit or sell their recyclable dry waste to the authorized agents and/or authorized waste dealers of ULB at these recycling centers at pre- notified rates. A weighing scale and a counter shall be provided at each recycling unit for this purpose. The authorized agents and/or authorized waste dealers shall be allowed to dispose of or sell the recyclable waste to the secondary market or recycling units only in consonance with the provisions of SWM Rules. The authorized agents and/or authorized waste dealers will be entitled to retain sales realization thereof.

xii. Deposition Centre for specified Domestic Hazardous Waste

a. For the collection of domestic hazardous waste, a deposition centre will be set up at a suitable location for receiving the specified domestic hazardous waste. Such facility shall be set in each ward in a manner as per guidelines prescribed by the Government and notifying the timing of receiving of such

b. ULB may also give the responsibility to its agency or concessionaire to collect domestic hazardous waste from all waste generators in segregated manner.

c. Such waste shall be transported separately to the hazardous waste disposal facility set up by the Government.

xiii. Every street vendor shall keep suitable containers for storage of waste generated during the course of his activity such as food ways disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits etc. and deposit such waste at waste storage depot or container or vehicle as notified by the ULB.

CHAPTER – VI

TRANSPORTATION OF MUNICIPAL WASTE

8. Transportation of solid waste:-

- i. Vehicles used for transportation of waste shall be covered in such manner that the collected waste is not exposed to open environment.
- ii. The storage facilities set up by ULB shall be attended daily for clearing waste. The areas around the place where the bins or containers are kept shall also be cleaned.
- iii. Collected segregated bio-degradable waste from residential and other areas shall be transferred to the processing plants like compost plants, bio-meth nation plants or any such other facilities in a covered manner, which has been established by the ULB.
- iv. Wherever applicable, for bio-degradable waste, preference shall be given for on-site processing of such waste.
- v. Collected non-bio-degradable waste shall be transported to the respective processing facilities or secondary storage facilities.
- vi. Construction and Demolition Waste shall be transported as per the provisions of the Construction and Demolition Waste Management Rules, 2016.
- vii. ULB shall make arrangements for transportation of inert in a proper manner. The street sweeping waste and removable drain silt shall be removed immediately after the work is over,
- viii. Transportation vehicles shall be so designed that multiple handling of waste, prior to final disposal, is avoided.
- ix. The collection vehicles engaged for the purpose shall deposit /transfer waste only at the Secondary Transfer Station/ Point wherever provided.
- x. In case Secondary Transfer Station/ Point wherever is not stationed at the designated location at a particular point of time for any reason, the loaded vehicle' shall go to the next designated location of the Secondary Transfer Station/ Point wherever the site is specified by ULB to unload the waste.
- xi. Secondary Transfer Station/ Point wherever shall transport the waste directly to compost plant, waste to energy plant or any other site/plant designated by ULB.

xii. There should be no inter-mixing of waste from various sources during the transportation of waste.

xiii. The services of street level collection and transportation of waste shall be provided every day including holidays.

xiv. Garbage spilled near Secondary Transfer Station/ Point wherever, while transferring the solid waste, should be cleaned so that no spillage is left. Disinfectant should be used after cleaning process at that location.

CHAPTER – VII

PROCESSING OF MUNICIPAL WASTE

9. Processing of solid waste:

i. ULB shall facilitate construction, operation and maintenance of solid waste processing facilities and associated infrastructure on their own or through any agency for optimum utilization of various components of solid waste adopting suitable technology including the following technologies and adhering to the guidelines issued by the Ministry of Housing & Urban Affairs from time to time and standards prescribed by the Central Pollution Control Board. To minimize transportation cost and environment impacts, preference shall be given to decentralization processing such as-

a. bio-methanation, microbial composting, vermi- composting, anaerobic digestion or any other appropriate processing for bio-stabilization of biodegradable waste through medium/large composting/bio-methanation plants at centralized locations;

b. waste to energy processes including refuse derived fuel (RDF) for combustible fraction of waste or supply as feedstock to solid waste based power plants; and/or through construction and demolition waste management plants.

i. ULB shall Endeavour to create a market for consumption of RDF.

ii. In waste to energy plant by direct incineration, absolute segregation shall be mandatory and be part of the terms and conditions of the relevant contracts.

iii. ULB shall ensure that recyclables such as paper, plastic, metal, glass, textile etc. are gone to authorized recyclers.

10. Other guidelines for processing of solid waste:

i. ULB shall enforce processing of bio-degradable waste on site of generation of such waste through composting or bio-methanation, as far as possible, at Resident Welfare Associations (RWAs), group housing, societies, markets, gated communities and institutions with more than

5000 sqm. area, hotels and restaurants, banquet halls and places of such nature. Preference shall be given for onsite processing of biodegradable waste generated by other waste generators as well.

ii. ULB shall ensure hygienic conditions of the markets dealing with vegetables, fruits, flowers, meat, poultry and fish while processing bio-degradable waste.

iii. ULB shall enforce processing of horticulture, parks and garden waste separately in the parks and gardens as far as possible.

Iv. ULB shall involve communities in waste management and promote home composting, bio gas generation, decentralized processing of waste at community level, subject to control of odour and maintenance of hygienic conditions around the facility.

CHAPTER – VIII

DISPOSAL OF MUNICIPAL SOLID WASTE

11. Disposal of solid waste:

ULB shall undertake on its own or through any other agency, the construction, operation and maintenance of sanitary landfill and associated infrastructure for disposal of residual waste and inert street sweepings and silt from surface drains in a manner prescribed under SWM Rules and any other obligation imposed by any other law for the time being in force.

CHAPTER – IX

USER FEE AND LEVYING OF SPOT FINE/ PENALTY

12. User fee for collection, transportation, disposal of solid waste:

a. User fee shall be fixed for providing services for garbage collection, transportation and disposal from waste generators by ULB. The rates of user fee are specified in Schedule-A.

b. The user fee so fixed shall be collected from waste generators by ULB or the authorized agency or person as may be authorized by Competent Authority in this behalf.

c. ULB shall prepare the database of all the waste generators for the purpose of levying user fee, and evolve appropriate mechanism for billing/collection/ recovery of user charges, within three months from the date of notification of these bye-laws. The database shall be updated regularly.

d. ULB shall adopt different methods for collection of user fee including online payment.

e. Special days in a month, preferably in first week of each month, shall be fixed for collection of user fee.

f. The user fee mentioned in Schedule-A shall stand automatically increased by 5% per year with effect from 1st January of each successive year.

g. The user fee shall be collected only the institution/person authorized by the competent authority by a general or special order in this behalf.

h. In case of default of payment of user fee, the competent authority may recover the same from the defaulter.

13. Fine / Penalty for contravention of SWM Rules:-

a. Whosoever contravenes or fails to comply with any of the provisions of SWM Rules or these bye-laws shall be imposed with fine as mentioned in Schedule-B appended to these bye-laws.

b. In case of repeated contravention or non-compliance as mentioned in clause (a) above, fine amount for every such default shall be levied per day or month, as the case maybe.

c. The Competent Authority shall designate officers for levying fine or penalty by a general or special order in this behalf. The fine/penalty amount is specified in Schedule-B.

d. The fine or penalty mentioned in Schedule -B shall stand automatically increased by 5% per year with effect from 1 January of each successive year.

e. The fine shall be levied and collected on the spot by the designated officers. In case of non-payment of fine at the spot, the procedure for prosecution prescribed under provisions of the Environment (Protection) Act, 1986 shall follow.

CHAPTER – X

RESPONSIBILITIES OF STAKEHOLDERS

14. Responsibilities of Waste Generators:

i. Prohibition of littering

a. Littering in any public place: No person shall litter in any public place except in authorized public or private litter receptacles. No person shall repair vehicles, wash/clean utensils or any other object or keep any type of storage in any public place except in such public facilities or conveniences specifically provided for any of these purposes.

b. Littering on any property: No person shall litter on any open or vacant property except in authorized private or public receptacles.

c. Litter-throwing from vehicles: No person, whether a driver or passenger in a vehicle, shall litter upon any street, road, sidewalk, playground, garden, traffic island or other public place.

d. Litter from goods vehicles: No person shall drive or move any truck or other goods vehicle unless such vehicle is so constructed and loaded as to prevent any load, contents or litter from being blown off or deposited upon any road, sidewalks, traffic island, playground, garden or other public place.

e. Litter by owned/pet animals: it shall be the responsibility of the owner of any pet animal including dog, cat etc. to promptly scoop/clean up any litter created by such pet on the street or any public place and take adequate steps for the proper disposal of such waste preferably by their own sewage system.

f. Disposal of waste in drain etc.: No person shall litter in any drain/river/open pond/water bodies.

ii. Burning of waste: Disposal by burning of any type of solid waste at public places or at any private or public property is prohibited.

iii. "Clean Area": Every person shall Endeavour that any public place in front of or adjacent to any premises owned or occupied by him including the footpath and open drain/gutter and kerb is free of any waste, either in solid or liquid form.

iv. For Public Gatherings and Events organized in public places for any reason (including for processions, exhibitions, circuses, fairs, political rallies, commercial, religious, socio-cultural events, protests and demonstrations, etc.) where the permission from the Police department and/or from the ULB is required, it will be the responsibility of the organizer of the event or gathering to ensure the cleanliness of that area as well as all appurtenant areas.

v. Dumping of solid waste on vacant plot and depositing construction and demolition waste at non- designated locations shall be dealt with by the ULB in the following manner:

a. The ULB shall serve a notice on the owner/occupier of any premises, requiring such owner / occupier to clear any waste on such premises in a manner and within a time specified in such notice.

b. If the person on the notice has been served fails to comply with the requirements imposed by the notice, such person shall be liable to pay penalties as prescribed from time to time.

c. If the person on whom the notice is served fails to comply with any requirements imposed by such notice, the ULB may-

1. Enter on the premises and clear the waste;

&

2. Recover from the occupier the expenditure incurred in having done so.

vi. Duty of manufacturers or brand owners of disposable products and sanitary napkins and diapers:

a. All manufacturers of products such as tin, glass, plastic packaging, etc., or brand owners who introduce such products in the market within the jurisdiction of ULB shall provide necessary financial assistance to ULB for establishment of waste management system. ULB may also coordinate with the concerned departments of Central Govt, and/or the Govt, of West Bengal for implementation of this provision.

b. All such brand owners who sell or market their products in such packaging material which are non-biodegradable shall put in place a system to collect back the packaging waste generated due to their production.

c. Manufacturers or brand owners or marketing companies of sanitary napkins and diapers shall explore the possibility of using all recyclable materials in their products or they shall provide a pouch or wrapper for disposal of each napkin or diapers along with the packet of their sanitary products.

d. All such manufacturers, brand owners or marketing companies shall educate the masses for wrapping and disposal of their products.

vii. All industrial units using fuel and located within one hundred km from a solid waste based refuse derived fuel plant shall make arrangements to replace at least five percent of their fuel requirement by refused derived fuel so produced.

15. Responsibilities of ULB:

i. ULB shall within its territorial area, be responsible for ensuring regular system of surface cleaning of all common streets / roads, public places, temporary settlements, slum areas, markets, its own parks, gardens, drains etc. by employing human resources and machines collect the garbage from the declared storage containers, and transport it every day to the final disposal point in closed vehicles for which ULB may engage private parties on contract or Public Private Partnership mechanism, apart from its own cleaning staff and vehicles. In addition, ULB shall identify all the commercial areas for carrying out sweeping twice a day.

ii. ULB or the authorized agency engaged by it shall provide and maintain sufficient number of community litter bins of sufficient size on public roads, in surroundings of railway stations, bus stops, religious places, in commercial areas etc.

iii. ULB for the purpose of managing solid waste activities in decentralized and regular manner shall designate one staff in every ward to supervise the spots of containers, public toilets, community toilets or urinals in public places, transfer station for public garbage, landfill processing units etc.

-
- iv. The competent authority shall designate Nodal Officer/s to monitor the progress of segregation, collection, transportation, processing and disposal of solid waste.
 - v. In each ward sufficient manpower shall be deployed for waste collection & road sweeping. ULB shall monitor their work by using latest technology. Wherever it is unable to get collection and sweeping through its own staff, it may outsource through contract.
 - vi. ULB shall employ latest road/street cleaning machines, mechanical sweepers or other equipments which improve the efficiency of sweeping and drainage cleaning.
 - vii. ULB shall create awareness and sensitization through Information, Education and Communication (IEC) campaign and educate the waste generators and other stakeholders about the various provisions of SWM Rules and these bye laws with special emphasis on user fee and fines/penalties.
 - viii. ULB shall encourage waste generators to treat wet waste at source. It may consider creating systems for incentives for adoption of decentralized technologies such as bio-methanation, composting etc. Incentives may be like awarding and recognizing the households, RWAS and institutions etc. by giving certificates, by publishing their names on respective websites or rebate in property tax etc.
 - ix. ULB shall phase out the use of chemical fertilizers and use compost in all parks, gardens maintained by it and wherever possible in other places under its jurisdiction. Incentives may be provided to recycling initiatives by informal waste recycling sector.
 - x. ULB shall make efforts to streamline and formalize solid waste management systems and endeavor that the informal sector workers in waste management (waste pickers) are given priority to upgrade their work conditions and are enumerated and integrated into the formal system of solid waste management.
 - xi. ULB shall ensure that the operator of a facility provides personal protection equipment including uniform, fluorescent jacket, hand gloves, raincoats, appropriate foot wear and masks to all workers handling solid waste and the same are used by the workforce.
 - xii. ULB shall ensure occupational safety of its own staff and staff of outsourced agency involved in collection, transport and handling of waste by providing appropriate and adequate personal protective equipments.
 - xiii. In case of an accident at any solid waste processing or treatment or disposal facility or landfill site, the officer- in- charge of the facility shall report to ULB immediately which shall review and issue instructions, if any, to the in- charge of the facility.

xiv. Regular checks: The Commissioner/ Executive Officer of the ULB or any other officer/s authorized by the ULB shall conduct regular checks in various parts of the wards and other places of collection, transportation, processing and disposal of solid waste to supervise compliance of various provisions of SWM Rules and these bye laws.

xv. ULB shall develop a public grievance redressal system (PGRS) by setting up of Call Centre at its head office. The PGRS may include SMS based service, mobile application or web based services.

xvi. ULB shall install bio-metric/smart card technologies/ICT System for tracking and recording attendance of employees associated with the working of SWM Rules and these byelaws at HO/all zones/ward offices etc. and shall make an endeavor to integrate such system with the salary/wages/ remuneration.

xvii. Transparency and Public Accessibility: To ensure greater transparency and public accessibility, ULB shall provide all necessary information through its website.

(xviii) ULB shall perform all other duties mentioned in SWM Rules, which have not been specifically mentioned in these bye-laws.

CHAPTER-XI

MISCELLANEOUS

Interpretation: If any doubt or difficulty arises in the interpretation or implementation of these bye- laws, the same shall be placed before the Commissioner/ Executive Officer of ULB, whose decision in the matter shall be final.

Co-ordination with Government Bodies:ULB shall co-ordinate with other government agencies and authorities, to ensure compliance of these bye-laws within areas under the jurisdiction or control of such bodies. In case of any difficulty, matter shall be placed before the Urban Development & Municipal Affairs Department, Government of West Bengal.

Direction by the Competent Authority: The competent authority may issue general or special orders from time to time for proper implementation of Solid Waste Management Rules, 2016 and these bye-Laws.

Overriding Power: Notwithstanding anything contained in these bye-laws the levying of fees, rates, charges, penalty & fine as determined by the ULB shall be payable by the bulk waster generator.

Self Declaration: The waste generator shall submit a self declaration in the form of Annexure-I.

SCHEDULE-A

| |
|---|
| SUGGESTED USER CHARGES TO BE COLLECTED FOR SWM BY ULB |
| NAIHATI MUNICIPALITY |

| Type of Generator | User fee per month (In Rs.) |
|--|-----------------------------|
| 1) Houses (applicable to built up area of single storied and carpet area of multi storied buildings). | |
| 1.1) < 3000 sq. ft. | 20/- |
| 1.2) 3000 sq. ft & above. | 25/- |
| 2) Guest House/ Dharamsala [lodging only] | |
| 2.1) 200 sq ft to < 400 sq. ft. | 20/- |
| 2.2) 400 sq. ft. to < 500 sq ft. | 25 |
| 2.3) 500 sq. ft. to < 1000 sq. ft. | 25/- |
| 2.4) 1000 sq. ft. to < 2000 sq. ft. | 30/- |
| 2.5) 2000 sq. ft. to < 2500 sq ft. | 35/- |
| 2.6) 2500 sq. ft. and above. | 50/- |
| 3) Hostel [working women's hostel, private hostels etc.] | |
| 3.1) Up to 20 beds | Rs 50/- |
| 3.2) > 20 beds | Rs 50/- + Rs. 5/- per bed |
| 4) Hotel/Restaurant/Bar | |
| <i>4A) Un starred (built up area)</i> | |
| 4A.1) < 500 sq. ft. | 100/- |
| 4A.2) 500 sq. ft. to < 1000 sq. ft. | 200/- |
| 4A.3) 1000 sq. ft. to < 2000 sq. ft. | 300/- |
| 4A.4) 2000 sq. ft. to < 3000 sq ft. | 350/- |
| 4A.5) 3000 sq. ft. to <4000 sq. ft. | 400/- |
| <i>4B) 2 Star Hotels</i> | |
| 4B.1) < 2000 sq. ft. | 600/- |
| 4B.2) 2000 sq. ft. to < 3000 sq. ft. | 900/- |
| 4B.3) 3000 sq. ft. and above | 1500/- |
| 4C) 3 Stars | |
| 4C.1) < 6000 sq. ft. | 1800/- |
| 4C.2) 6000sq. ft. to < 10500 sq ft. | 2500/- |

| Type of Generator | User fee per month (In Rs.) |
|---|-----------------------------|
| 4D) 5 Star | 10000/- |
| 4E) 7 Star | 12500/- |
| 4F) Restaurant / Restaurant cum Bar | |
| 4F.1) < 300 sq. ft. | 200/- |
| 4F.2) 300 sq. ft.to < 500 sq. ft. | 300/- |
| 4F.3) 500 sq. ft.to < 650 sq. ft. | 400/- |
| 4F.4) 650 sq. ft.to < 1500 sq. ft. | 500/- |
| 4F.5) 1500 sq. ft.to < 2500 sq. ft. | 750/- |
| 4F.6) 2500 sq. ft.to <3500 sq ft. | 1000/- |
| 5) Health Care Establishments (Clinic, Dispensary, Laboratories, Diagnostic Centers / Pathological Centers/ Hospital Nursing Home) only for MSW i.e. non-biomedical Waste | |
| 5A) Non- bedded HcS | |
| 5A.1)Charitable Doctor's Clinic < 1000 sq. ft. | 100/- |
| 5A.2)Charitable Doctor's Clinic 1000 sq. ft. to <2000sq. ft. | 200/- |
| 5AA.1) Doctor's Polyclinic @sq. ft. (Up to 700 sq. ft.) | 150/- |
| 5AA.2) Doctor's Polyclinic @ sq. ft. (700 sq. ft. to < 1000 sq. ft.) | 300/- |
| 5AA.3) Doctor's Polyclinic @ sq. ft. (1000 sq. ft. to < 1500 sq. ft.) | 500/- |
| 5AA.4) Doctor's Polyclinic @ sq. ft. (1500 sq. ft. to <2000 sq. ft.) | 600/- |
| 5AA.5) Doctor's Polyclinic @ sq. ft. (2000 sq. ft. to <5000 sq. ft.) | 900/- |
| 5AA.6) Doctor's Polyclinic @ sq. ft. (5000 sq. ft. to <10000 sq. ft.) | 1500/- |
| 5AA.7) Doctor's Polyclinic @ sq. ft. (10000 sq. ft. and above) | 2000/- |
| 5B) With beds Health Care Establishments | |
| 5B.1) Day Care Centre with 10 beds < 650 sq. ft. | 500/- |
| 5B.2) Day Care Centre with 10 beds (650 sq. ft.<2010 sq. ft.) | 1000/- |
| 5C) Eye Hospitals | |
| 5C.1) Eye Hospital <550 sq. ft. area | 100/- |
| 5C.2) Eye Hospital @ sq. ft. (550 sq.ft. to <1000 sq. ft. area) | 200/- |
| 5C.3) Eye Hospital @ sq. ft. (1000 sq. ft. to <2010 sq. ft. area) | 250/- |
| 5C.4) Eye Hospital @ sq. ft. (2010 sq. ft. to <3000 sq. ft. area) | 275/- |
| 5C.5) Eye Hospital @ sq. ft. (3000 sq. ft. to <5000 sq. ft. area) | 400/- |
| 5C.6) Eye Hospital with 15 beds @ sq. ft. (up to 2010 sq. ft. area) | 400/- |
| 5C.7) Eye Hospital with @ sq. ft. (up to 2010 sq. ft. area) Charitable | 150/- |
| 5D) Private Nursing Home/Hospitals | |
| 5D.1) Nursing Home with 5 - 10 beds @ sq. ft (800 sq.ft. to < 2215 sq. ft.) | 500/- |
| 5D.2) Nursing Home with 137 beds @ sq. ft (<3000 sq. ft.) | 2000/- |
| 5D.3) Nursing Home with 70 beds @ sq. ft (5000 sq. ft.) | 3000/- |
| 5D.4) Nursing Home with 62 beds @ sq. ft (40276 sq. ft.) | 5000/- |
| 5D.5) Nursing Home with 179 beds @ sq. ft (65000 sq. ft.) | 7000/- |
| 5D.6) Nursing Home with 750 beds @ sq. ft (12000 sq. ft.) | 12000/- |
| 5D.7) Private Hospital with 550 beds @ 60000 sq. ft | 12500/- |
| 5E) Diagnostic Centre / Pathological collection under Hospitals: | |

| Type of Generator | User fee per month (In Rs.) |
|---|------------------------------------|
| 5E.1)) USG / X-RAY/COLOUR DOPPLER CENTRE < 1000 sq. ft. | 250/- |
| 5E.2) USG & ECG centre 1000 sq. ft. to < 1500 sq. ft. | 500/- |
| 5E.3) USG / X-RAY/COLOUR DOPPLER CENTRE 1500 to < 2000 sq. ft. | 600/- |
| 5E.4) X-RAR, ECG, USG, ENDOSCOPY etc. 2000 sq. ft to < 2500 sq. ft. | 750/- |
| 5E 5) Pathological Collection Centre @ 2500 sq. ft. to < 3000 sq. ft. | 900/- |
| 5E.61 Diagnostic / Pathological Centre 3000 sq. ft. & above | 1200/- |
| 6 Commercial establishments, shops, eating places (Dhabas/Sweets shop/ Coffee house etc.) area | |
| 6A) Shop of Furniture / Jewellery etc | |
| 6A .1) 100sq. ft. to < 200 sq. ft. | 25/- |
| 6A .2) 200 sq. ft.to < 400 sq. ft. | 30/- |
| 6A .3) 400sq. ft. to < 500 sq. ft. | 40/- |
| 6A .4) 500sq. ft. to < 1000 sq. ft. | 50/- |
| 6A.5) 1000sq. ft. to < 2000 sq. ft. | 100/- |
| 6A.6) 2000 sq. ft. & above | 150/- |
| 6B) Eating House | |
| 6B.1) < 100 sq. ft. | 50/- |
| 6B.2) 100 sq. ft. to < 200sq. ft. | 75/- |
| 6B.3) 200 sq. ft. to < 300sq. ft. | 100/- |
| 6B.4) 300 sq. ft. to < 500sq. ft. | 200/- |
| 6B.5) 500 sq. ft. to <1000 sq. ft. | 250/- |
| 6B.6) 1000 sq. ft. to <2000 sq. ft. | 400/- |
| 6B.7) 2000 sq.ft. & above. | 800/- |
| 6C) Sweet Shop | |
| 6C.1) < 100 sq. ft. | 40/- |
| 6C.2) 100 sq. ft. to < 200 sq. ft. | 75/- |
| 6C.3) 200 sq. ft. to <400 sq. ft. | 100/- |
| 6C.4) 400 sq. ft. to < 500 sq. ft. | 150/- |
| 6C.5) 500sq. ft. to < 1000 sq. ft. | 180/- |
| 6C.6) 1000 sq. ft. to <1500 sq. ft. | 270/- |
| 6C.7) 1500 sq. ft. to <2000 sq. ft. | 360/- |
| 6D) Garments Shop | |
| 6D.1) < 100 sq. ft. | 40/- |
| 6D.2) 100 sq. ft. to < 200 sq. ft. | 75/- |
| 6D.3) 200 sq. ft. to <400 sq. ft. | 100/- |
| 6D.4) 400 sq. ft. to <500 sq. ft. | 150/- |

| Type of Generator | User fee per month (In Rs.) |
|---|------------------------------------|
| 6D.5) 500 sq. ft. to <1000 sq. ft. | 180/- |
| 6D.6) 1000 sq. ft. to <2000 sq. ft. | 270/- |
| 6D.7) 2000 sq. ft. to <3000 sq. ft. | 910/- |
| 6D.8) 3000 sq. ft. to < 4000 sq. ft. | 1085/- |
| 7) Commercial Offices, Government/Private Offices, Banks, Insurance offices, etc. | |
| 7.1) <500 sq. ft. | 90/- |
| 7.2) 500 sq. ft.to < 1000 sq. ft. | 180/- |
| 7.3) 1000 sq. ft. to < 1500 sq. ft. | 365/- |
| 7.4) 1500 sq. ft. to <2500 sq. ft. | 545/- |
| 7.5) 2500 sq. ft. to <3000 sq. ft. | 730/- |
| 8) Educational Institutions (play school/ Coaching Classes, school and colleges) only Pvt. | |
| 8A) Non residential | |
| 8AA) Nursery School/Play School | |
| 8AA.1) < 500 sq. ft. | 50/- |
| 8AA.2)500 sq. ft.to < 1000 sq tt | 100/- |
| 8AA.3) 1000sq. ft. to < 2000 sq. ft. | 360/- |
| 8AA.4) 2000 sq ft.& above | 640/- |
| 8AAA) Coaching Centre | |
| 8AAA.1)< 500 sq. ft. | 50/- |
| 8AAA.2) 500sq. ft. to < 1000 sq. ft. | 180/- |
| 8AAA.3) 1000 sq. ft. to < 2000 sq. ft. | 365/- |
| 8AAAA) Charitable Nursing College | |
| 8AAAA.1) < 9000 sq ft. | 180/- |
| 8AAAA.2) 9000 sq. ft. to < 15000 sq. ft. | 820/- |
| 8B Residential | |
| 8B.1)< 100 students | 200/- |
| 8B.2) 100 sq. ft. to < 500 students | 300/- |
| 8B.3) 500 sq. ft. to < 1000 students | 400/- |
| 8B.4) 1000 students & above | 500/- |
| 9) Micro small & Medium Enterprises MSME occupied area(non- hazardous) | |
| 9.1)<500 sq. ft. | 90/- |
| 9.2) 500 sq. ft. to < 1000sq. ft. | 140/- |
| 9.3) 1000 sq. ft. to < 1500 sq. ft. | 210/- |
| 9.4) 1500 sq. ft. to < 2000sq. ft. | 280/- |
| 10) Go down, Ware house, cold storage (occupied area) (only non hazardous) | |
| 10.1) 500 sq. ft. to <1000 sq. ft. | 100/- |

| Type of Generator | User fee per month (In Rs.) |
|--|------------------------------------|
| 10.2) 1000sq. ft. to <1500sq. ft. | 180/- |
| 10.3) 1500 sq. ft. to < 2000 sq. ft. | 300/- |
| 10.4) 2000 sq. ft. to < 2500 sq. ft. | 545/- |
| 10.5) 2500 sq. ft. to < 3000 sq. ft. | 730/- |
| <i>11) Marriage Hall, Kalyani Mandap, Festival Hall, Exhibition and Fair Hall, Open space, Banquet (with temporary tent/standard arrangement for functions/onetime event) for each day (occupied area)</i> | |
| 11.1) < 800 sq. ft. | 180/- |
| 11.2) 800 sq. ft. to < 1500 sq. ft. | 365/- |
| 11.3) 1500sq. ft. to < 2000 sq. ft. | 545/- |
| 11.4) 2000 sq. ft. to < 2500 sq. ft. | 910/- |
| 11.5) 2500 sq. ft. to < 3500 sq. ft. | 1825/- |
| 11.6) 3500sq. ft. to < 5000 sq. ft. | 4015/- |
| 12) Petrol Pumps (Occupied area) | |
| 12.1) < 1200 sq. ft. | 180/- |
| 12.2) 1200sq. ft. to < 2000 sq. ft. | 365/- |
| 12.3) 2000 sq. ft.to < 2700 sq. ft. | 545/- |
| 12.4) 2700sq. ft. to < 3400 sq. ft. | 730/- |
| 13) Beauty Parlour, Saloon, Spa (AC) | |
| 13.1) < 100 sq. ft. | 40/- |
| 13.2) 100 sq. ft.to < 200 sq. ft. | 75/- |
| 13.3) 200 sq. ft. to <400 sq. ft. | 100/- |
| 13.4) 400 sq. ft. to <600 sq. ft. | 150/- |
| 13.5) 600 sq. ft. to <1000 sq. ft. | 180/- |
| 13.6) 1000 sq. ft. to <2000 sq. ft. | 365/- |
| 14) Beauty Parlour, Spa, Saloon (Non AC) | |
| 14.1) < 100 sq. ft. | 30/- |
| 14.2) 100 sq. ft. to < 200 sq. ft. | 50/- |
| 14.3) 200 sq. ft. to < 400 sq. ft. | 75/- |
| 14.4) 400 sq. ft. to < 600 sq. ft. | 100/- |
| 14.5) 600 sq. ft. to < 1000 sq. ft. | 135/- |
| 14.6) 1000 sq. ft. to < 2000 sq. ft. | 273/- |
| 15) Printing Press (Non hazardous waste) | |
| 15.1) < 500 sq ft. | 70/- |
| 15.2) 500 sq. ft. to < 1000 sq. ft. | 140/- |
| 15.3) 1000 sq. ft. < 1500 sq. ft. | 210/- |
| 15.4) 1500 sq. ft. to < 2000sq. ft. | 280/- |
| 15.5) Designated Road side vendors | NIL |
| 16) Motor vehicle Service Centre/Garage/Fabrication shop | |
| 16A) Garage | |

| Type of Generator | User fee per month (In Rs.) |
|---|------------------------------------|
| 16A.1) < 1000 sq. ft. | 180/- |
| 16A.2) 1000sq. ft. to < 1500 sq. ft. | 365/- |
| 16A.3) 1500sq. ft. to < 2500 sq. ft. | 730/- |
| 17) Transport Company | |
| 17.1) Shops in Hat (daily / weekly mark) | |
| 17.2) < 200 sq. ft. | 100/- |
| 17.3) 200 sq. ft. to < 500 sq. ft. | 200/- |
| 17.4) 500 sq ft to < 1000 sq ft. | 500/- |
| 18) Meat Shop/ fish shop/ chicken Shop | 20/- |
| 19) Wine Shop[ON] | |
| 19.1) < 700 sq. ft. | 1825/- |
| 19.2) 700sq. ft. to < 1500 sq. ft. | 3650/- |
| 19.3) 1500 sq. ft. to < 2000 sq ft. | 4560/- |
| 19.4) 2000 sq. ft. to < 2500 sq. ft. | 5475/- |
| 20) Wine Shop [OFF] | |
| 20.1) < 600 sq. ft. | 910/- |
| 20.2) 600 sq. ft. to < 1500 sq. ft. | 1640/- |
| 20.3) Railway station and Bus stand | NIL |
| 21) Cinema hall and multiplex | |
| 21.1) < 1000 sq. ft. | 180/- |
| 21.2) 1000sq. ft. to < 2000 sq. ft. | 365/- |
| 21.3) 2000sq. ft. to < 3000 sq. ft. | 545/- |
| 22) Shopping Mall | |
| 22.1) with 134 shops @ 150835 sq ft. area | 50187.50/- |
| 23) Pharmacy | |
| 23.1) 500 sq. ft. to < 1000 sq. ft. | 365/- |
| 23.2) 1000sq. ft. to <1500 sq ft. | 547.5/- |
| 23.3) 1500sq. ft. to 2000 sq. ft. | 730/- |

In case any individual/ establishment does not come under the chart/ schedule, proportionate charges shall be imposed/ levied having resemblance of the other establishment as already incorporated therein.

SCHEDULE-B

| Fine to be levied by the Naihati Municipality on the Offenders | | | | | | |
|--|--------------|---|----------------------------|---------------------|-----------------|----------------------------|
| No | Bye Law Ref: | Offence | Generators | Compounding Charges | | |
| | | | | First Instance | Second Instance | At every Repeated Instance |
| 1 | Ch | Non-Segregation of Solid Waste | Individual/Residential | 200/ | 300/ | 400/ |
| | | | Bulk generator | 300/- | 500/- | 700/- |
| | | | Commercial & Institutional | 500/- | 750/- | 1000/- |
| | | | Industrial | 1000/- | 1500/- | 2000/- |
| 2 | Ch | Disregarding the provisions of bye-laws- storage of solid waste | Individual/Residential | 200/ | 300/ | 400/ |
| | | | Bulk generator | 300/- | 500/- | 700/- |
| | | | Commercial & Institutional | 500/- | 750/- | 1000/- |
| | | | Industrial | 1000/- | 1500/- | 2000/- |
| 3 | Ch | Disregarding the provisions of bye-laws- delivery and collection of solid waste | Individual/Residential | 200/ | 300/ | 400/ |
| | | | Bulk generator | 300/- | 500/- | 700/- |
| | | | Commercial & Institutional | 500/- | 750/- | 1000/- |
| | | | Industrial | 1000/- | 1500/- | 2000/- |
| 4 | Ch | Disregarding the provisions of bye-laws- wet waste processing | Individual/Residential | 500/ | 750/ | 1000/ |
| | | | Bulk generator | 400/- | 600/- | 800/- |
| | | | Commercial & Institutional | 1000/- | 1500/- | 2000/- |
| | | | Industrial | 1000/- | 1500/- | 2000/- |
| 5 | Ch | Non-Payment of applicable User Fees | Individual/Residential | 200/ | 300/ | 400/ |
| | | | Bulk generator | 300/- | 500/- | 700/- |
| | | | Commercial & Institutional | 500/- | 750/- | 1000/- |
| | | | Industrial | 1000/- | 1500/- | 2000/- |

| | | | | | | |
|---|----|--|--|---------------|---------------|---------------|
| 6 | Ch | Breach of responsibilities or bye-laws by Generators, not penalized under any other heading. | Individual/Residential Bulk generator | 200/ 300/- | 300/ 500/- | 400/ 700/- |
|---|----|--|--|---------------|---------------|---------------|

| | | | | | | |
|--|--|--|-------------------------------|--------|--------|--------|
| | | | Commercial & Institutional | 500/- | 750/- | 1000/- |
| | | | Industrial | 1000/- | 1500/- | 2000/- |

| No. | Bye Law Ref: | Offence | | Compounding Charges | | |
|-----|--------------|--|--|---------------------|-----------------|----------------------------|
| | | | | First Instance | Second Instance | At every Repeated Instance |
| 7 | Ch | Production, distribution, storage, sale or use of plastic/thermocool etc. in violation of standards laid down under Plastic Waste Management rules or any other regulations. | | 5000/- | 7000/- | 10000/- |
| 8 | Ch | Non segregation of plastic at source/carrying, using or storing any plastic carry bags below the permissible limits or using plastic items in prohibited locations. | | 200/- | 300/- | 400/- |
| 9 | Ch | Disposing of plastic waste in ways other than mentioned in the byelaws. | | 200/- | 300/- | 400/- |
| 10 | Ch | Failure to register with Corporation for providing plastic carry bags to customers. | | 500/- | 750/- | 1000/- |

| 11 | Ch | Using or providing commodities in plastic carry bags, multi-layered packaging, plastic sheets or covers made of plastic sheets by retailers, street vendors in violation of Plastic Waste Management Rules'2016. | | 200/- | 300/- | 400/- |
|--|--------------|--|----------------------------|---------------------|-----------------|----------------------------|
| 12 | Ch | Providing plastic carry bags to customers for free and effective control of use of unauthorized carry bags, pollution cost will be realized. | User Shop owners | 200/- | 300/- | 400/- |
| <i>The Administrative fees for all Public nuisance related offences will be a minimum of Rs 1000/- and maximum of Rs. 2000 per offence</i> | | | | | | |
| | | | | | | |
| | | | | | | |
| <i>Specific Offences</i> | | | | | | |
| | | | | | | |
| No. | Bye Law Ref: | Offensive Acts | Generator | Compounding Charges | | |
| | | | | First Instance | Second Instance | At every Repeated Instance |
| Dumping or Littering of waste in and around: | | | | | | |
| 1 | Ch | Open/vacant land, gardens, play ground, Public streets, roads, traffic islands, in a dustbin/vehicle not intended for the removal of the same, from moving /parked vehicles. | Individual/Residential | 500/- | 700/- | 1000/- |
| | | | Commercial & Institutional | 1000/- | 1500/- | 2000/- |
| | | | Industrial | 2000/- | 3000/- | 4000/- |

| | | | | | | |
|---|----|--|----------------------------|---------|--------|----------|
| | Ch | Water body and/or on the bank of the water body. | Individual/Residential | 200/- | 300/- | 400/- |
| | | | Commercial & Institutional | 500/- | 750/- | 1000/- |
| | | | Industrial | 1000/- | 1500/- | 2000/- |
| 2 | Ch | Educational institutions, hospitals and other healthcare institutions, religious places, heritage buildings. | All | 1000/- | 1500/- | 2000/- |
| 3 | Ch | Accumulating of filth in premises for more than 24 hours; placing/depositing waste on own property in breach of by-laws | Individual/Residential | 500/- | 750/- | 1000/- |
| | | | Commercial & Institutional | 1000/- | 1500/- | 2000/- |
| | | | Industrial | 2000/- | 3000/- | 4000/- ^ |
| 4 | Ch | Littering/defecation by pet/owned animals | All | 200/- | 300/- | 400/- |
| 5 | Ch | For not delivering (non house hold] fish, poultry and meat waste in a segregated manner, as specified. | All | 200/- | 300/- | 400/- |
| 6 | Ch | Disposal of Solid Waste by burning,dumping and/or unauthorized burial by any <i>Bulk Waste generator</i> . | All | 25000/- | | |
| 7 | Ch | Disposal of Solid Waste by burning, dumping and/or unauthorized burial by any <i>non-Bulk Waste generator</i> . | All | 5000/- | | |

| | | | | | | |
|---------------------------------|----|--|-----|--------|--------|---------|
| 8 | Ch | For not storing & delivering construction & demolition waste in segregated manner as specified. | | 5000/- | | |
| 9 | Ch | Disposing of C&D waste or other waste in storm water drains, roads, pavements, etc. | All | 5000/- | 7500/- | 10000/- |
| 10 | Ch | For a street vendor without a container/waste basket and /or who does not deliver Solid Waste in a segregated manner as specified in the Bye-Laws. | All | 750/- | | |
| Creating Public Nuisance | | | | | | |
| 11 | Ch | Spitting in public, Urinating in non- designated places, Washing clothes/utensils in non-designated places, Littering in order to feed animals or birds in non- designated places. | All | 500/- | | |
| 12 | Ch | Defecating in non- designated places. | All | 500/- | | |
| 13 | Ch | Damaging or removing Corporation's/agent's infrastructure. | All | 1000/- | 1500/- | 2000/- |
| 14 | Ch | Putting garbage on the common roads, ways, footpath by private hospitals, nursing homes, dispensaries etc. | All | 2000/- | | |

| | | | | | | |
|--|----|---|-----|--------------|--|--|
| 15 | Ch | By putting the peels and remains of the vegetables while selling vegetables in common places, land and road side etc. | All | 100/- | | |
| | | | | | | |
| <i>The Administrative fees for all Public nuisance related offences will be a minimum of Rs 1000/- and maximum of Rs. 2000 per offence</i> | | | | | | |
| | | | | | | |
| | | | | | | |

t.c.





HUMAN
RIGHTS
WATCH

“As If You’re Inhaling Your Death”

The Health Risks of Burning Waste in Lebanon



“As If You’re Inhaling Your Death”

The Health Risks of Burning Waste in Lebanon

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“As If You’re Inhaling Your Death”

The Health Risks of Burning Waste in Lebanon

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Summary

“It’s like there’s fog across the whole town. We are coughing all the time, unable to breathe, sometimes we wake up and see ash in our spit. The intensity of the smell would cause us to become dizzy.”

— Othman, Kfar Zabad, February 16, 2017

“When they burn we can’t breathe.... We’ve had to go to the hospital because of this.”

— Mohamed, Kfar Zabad, February 16, 2017

Open burning of waste is a dangerous and avoidable practice that takes place across Lebanon. Because it risks causing a range of short and long-term health problems, it implicates the Lebanese government’s legal obligations to protect the health of its citizens. In Lebanon, open burning is a consequence of the government’s failure to manage solid waste in a way that respects environmental and health laws designed to protect people. Children and older persons are at particular risk.

Open burning of waste occurs when existing waste management plans break down, such as occurred in Beirut and surrounding Mount Lebanon during a 2015 waste management crisis that saw garbage piling up in the streets. But it is also the result of the central government’s prioritization of waste collection and disposal in Beirut and Mount Lebanon, which produce just half of Lebanon’s municipal solid waste, while leaving other municipalities to fend for themselves without adequate financial support, technical expertise, and oversight.

The open burning of waste in Lebanon may have serious consequences for the health of people living nearby. A range of scientific studies have documented the dangers that emissions from the open burning of household waste pose to human health. These include exposure to fine particles, dioxins, volatile organic compounds, polycyclic aromatic hydrocarbon, and polychlorinated biphenyls, which have been linked to heart disease, cancer, skin diseases, asthma, and respiratory illnesses. The dangers of open burning of waste are compounded by the fact that Lebanon often does not properly dispose of industrial and healthcare waste, which may be mixed into the municipal solid waste stream.



An open dump in Baalbek just meters from this family's home. © Bassam Khawaja/Human Rights Watch

Human Rights Watch found that those living near open burning reported an array of health problems consistent with the frequent and sustained inhalation of smoke from the open burning of waste. These included chronic obstructive pulmonary disease, coughing, throat irritation, skin conditions, and asthma. In many cases, interviewees described a temporal relationship between the burning of waste and their health condition; some developed a condition after the burning started or they moved to an area where burning was taking place. Others said their symptoms subsided after a municipality stopped burning or they moved away from an area where burning was taking place.

Because of its detrimental impact on health, the burning of waste triggers Lebanon's obligations under international human rights law. Lebanon is a party to the International Covenant on Economic, Social and Cultural Rights (ICESCR), which requires it to take steps



An open dump in Bar Elias, where nearby residents said burning has taken place for years. © Bassam Khawaja/Human Rights Watch

to achieve “the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.”

While other factors may play some part in these illnesses, the extent of air pollution from the open burning of waste, the correlation between these conditions and periods of open burning, and interviews with doctors and other public health experts suggest a causal relationship between air pollution from the open burning of waste and poor community health.

Ten doctors told Human Rights Watch that they believed the open burning of waste was causing respiratory illnesses. Doctors in and near Beirut often noted an increase in respiratory illness cases in areas that began burning waste after the 2015 waste management crisis.

about cancer, many people are getting it. I'm scared for my children more than myself. I just want a good future for my children."⁸⁶

Mariam, who lives in the south near a different dump, said that she has difficulty breathing and all of her children have allergies. "My brothers went and tried to complain but there was no result.... I'm worried that in the future we'll get more diseases or cancer."⁸⁷ Mousa who lives in Chehabiyeh near a dump that is still being burned, said, "It's logical. Time after time you're breathing this stuff in. It's just common sense to be concerned about cancer."⁸⁸

The Health Risks of Open Burning

The open burning of waste can cause serious impacts on human health. A range of scientific studies have documented the danger emissions from the open burning of household waste pose to human health.⁸⁹ These include exposure to fine particles, dioxins, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbon (PAHs), and polychlorinated biphenyls (PCBs), which have been linked to heart disease, cancer, skin diseases, asthma, and respiratory illnesses.⁹⁰

⁸⁶ Human Rights Watch interview with Samar (pseudonym), Baalbek, February 17, 2017.

⁸⁷ Human Rights Watch interview with Mariam, Chehabiyeh, February 21, 2017.

⁸⁸ Human Rights Watch interview with Mousa, Chehabiyeh, February 21, 2017.

⁸⁹ See, for example, Yan Wang et al., "Atmospheric Emissions of Typical Toxic Heavy Metals from Open Burning of Municipal Solid Waste in China," *Atmospheric Environment*, vol. 152 (2017); Lawin Bastian et al., "Behavior of PCDD/Fs During Open Burning of Municipal Solid Waste in Open Dumping Sites," *Journal of Material Cycles and Waste Management*, vol. 15 (2013); Paul M. Lemieux et al., "Emissions of Organic Air Toxics from Open Burning: A Comprehensive Review," *Progress in Energy and Combustion Science*, vol. 30 (2004); Paul M. Lemieux et al., "Emissions of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from the Open Burning of Household Waste in Barrels," *Environmental Science and Technology*, vol. 34 (2000); Christine Wiedinmyer, Robert J. Yokelson, and Brian K. Gullett, "Global Emissions of Trace Gases, Particulate Matter, and Hazardous Air Pollutants from Open Burning of Domestic Waste," *Environmental Science and Technology*, vol. 48 (2014); A. Hodzic et al., "Impact of Trash Burning on Air Quality in Mexico City," *Environmental Science and Technology*, vol. 46 (2012); Gustavo Solorzano-Ochoa et al., "Open Burning of Household Waste: Effect of Experimental Condition on Combustion Quality and Emission of PCDD, PCDF and PCB," *Chemosphere*, vol. 87 (2012); A.O. Barakat, "Persistent Organic Pollutants in Smoke Particles Emitted During Open Burning of Municipal Solid Wastes," *Bulletin of Environmental Contamination and Toxicology*, vol. 70 (2003); Young Koo Park, Wooram Kim, and Young Min Jo, "Release of Harmful Air Pollutants from Open Burning of Domestic Municipal Solid Wastes in a Metropolitan Area of Korea," *Aerosol and Air Quality Research*, vol. 13 (2013); Carl Renan Estrellan and Fukuya Lino, "Toxic Emissions from Open Burning," *Chemosphere*, vol. 80 (2010).

⁹⁰ International Solid Waste Association, "Wasted Health: The Tragic Case of Dumpsites," June 2015, <http://www.iswa.org/nc/home/news/news-detail/article/wasted-health-the-tragic-case-of-dumpsites/109/> (accessed August 28, 2017), pp. 17-19, 30.

Open burning in Lebanon is particularly troubling given the mixing of hazardous and medical waste into the solid municipal waste stream.⁹¹

According to the US Environmental Protection Agency (EPA), open burning of solid waste can increase the risk of heart disease, aggravate respiratory ailments such as asthma and emphysema, and cause rashes, nausea, or headaches among exposed people.⁹² It notes that the burning of waste “is particularly dangerous because it releases pollutants at the ground level where they are more readily inhaled or incorporated into the food chain.”⁹³

A 2012 World Bank report found that open dumping and burning of solid waste can have a significant health impact on local residents and workers, and that “open-burning of waste is particularly discouraged due to severe air pollution associated with low temperature combustion.”⁹⁴

Around the world, several governments, provinces, and states have banned or heavily restricted open burning of municipal waste, citing adverse health effects.⁹⁵ In its Guide to Municipal Solid Waste Management, the American University of Beirut found that “open dumping and burning carry extremely high risks for contaminating natural resources with

⁹¹ Ministry of Environment and United Nations Development Programme, “State and Trends of the Lebanese Environment 2010,” 2011, <http://www.moe.gov.lb/The-Ministry/Reports/State-Of-the-Environment-Report-2010.aspx?lang=en-us> (accessed June 6, 2017), pp. 281-284.

⁹² “Backyard Burning,” US Environmental Protection Agency, accessed July 21, 2017, <https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/index-3.html>.

⁹³ “Dioxins Produced by Backyard Burning,” US Environmental Protection Agency, accessed June 6, 2017, <https://www.epa.gov/dioxin/dioxins-produced-backyard-burning>.

⁹⁴ World Bank, “What a Waste: A Global Review of Solid Waste Management,” March 2012, <http://documents.worldbank.org/curated/en/302341468126264791/pdf/68135-REVISED-What-a-Waste-2012-Final-updated.pdf> (accessed June 6, 2017), pp. 29, 50.

⁹⁵ See, for example, “Burning of Trash,” Michigan Department of Environmental Quality, accessed June 6, 2017, http://www.michigan.gov/deq/0,4561,7-135-3310_4106_70665_70668-234558--,00.html; “Don’t Trash Our Air,” New York Department of Environmental Conservation, accessed June 6, 2017, <http://www.dec.ny.gov/chemical/32060.html>; “Open Burning,” Indiana Department of Environmental Management, accessed June 6, 2017, <http://www.in.gov/idem/airquality/2411.htm>; “Citizens’ Guide to Open Burning,” Delaware Division of Waste and Hazardous Substances, accessed June 6, 2017, <http://www.dnrec.delaware.gov/dwhs/info/pages/opcitizensguide.aspx>; “Open Burning,” Iowa Department of Natural Resources, accessed June 6, 2017, <http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Open-Burning>; Saskatchewan Ministry of Environment, “Health and Environmental Effects of Burning Municipal Solid Waste,” January 2010, <http://www.environment.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=2571,114,104,81,1,Documents&MediaID=416d2c4e-ce8b-4bba-ada8-f84d2865779e&Filename=Health+and+Environmental+Effects+of+Burning+Municipal+Solid+Waste.pdf> (accessed June 6, 2017).

harmful and potentially toxic pollutants that increase the likelihood of nearby inhabitants contracting chronic, and potentially lethal, diseases and infections.”⁹⁶

Open burning solid waste can release a range of pollutants into the air. PM₁₀ particles, which are particles of 10 micrometers or less, can penetrate the lungs or enter the bloodstream, and can lead to heart disease, lung cancer, asthma, and acute lower respiratory infections.⁹⁷ PM_{2.5} are smaller fine inhalable particles, with diameters that are 2.5 micrometers and smaller.⁹⁸ The health effects of inhalable PM include respiratory and cardiovascular morbidity, such as “aggravation of asthma, respiratory symptoms and an increase in hospital admissions” and mortality from cardiovascular and respiratory diseases and lung cancer.⁹⁹ Although the harmful effect of these pollutants has been well documented, the particular health impact on individuals in Lebanon will vary depending on variables including the total dose and time of exposure. Children, people with chronic heart and lung diseases, and older persons may be at particular risk.

Burning also produces harmful dioxins, such as Polychlorinated dibenzodioxins and dibenzofurans (PCCD/Fs), a group of highly toxic chemicals classified as persistent, bioaccumulative, and toxic pollutants.¹⁰⁰ According to the US Environmental Protection Agency, dioxins can cause “cancer, reproductive and developmental problems, damage to the immune system, and can interfere with hormones.”¹⁰¹ Dioxins are persistent organic pollutants, which persist for long periods of time in the environment and can accumulate and pass from one species to the next through the food chain.¹⁰² Dioxin-like

⁹⁶ American University of Beirut, “Guide to Municipal Solid Waste Management,” 2016, https://aub.edu.lb/units/natureconservation/gallery/Documents/guide_to_municipal_solid_waste_management.pdf (accessed June 6, 2017), p. 8.

⁹⁷ “Tackling the global clean air challenge,” World Health Organization press release, accessed July 21, 2017, http://www.who.int/mediacentre/news/releases/2011/air_pollution_20110926/en/.

⁹⁸ “Particulate Matter (PM_{2.5}) Trends,” Environmental Protection Agency, accessed July 21, 2017, <https://www.epa.gov/air-trends/particulate-matter-pm25-trends>.

⁹⁹ World Health Organization, “Health Effects of Particulate Matter,” 2013, http://www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf (accessed July 21, 2017), p. 6.

¹⁰⁰ “Backyard Burning,” US Environmental Protection Agency, accessed June 6, 2017, <https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/index-3.html>; “Human Health,” US Environmental Protection Agency, accessed June 6, 2017, <https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/health.html>.

¹⁰¹ “Learn about Dioxin,” US Environmental Protection Agency, accessed June 6, 2017, <https://www.epa.gov/dioxin/learn-about-dioxin#tab-3>.

¹⁰² “Persistent Organic Pollutants: A Global Issue, A Global Response,” Environmental Protection Agency, accessed July 21, 2017, <https://www.epa.gov/international-cooperation/persistent-organic-pollutants-global-issue-global-response>.

polychlorinated biphenyls (PCBs) are synthetic organic chemicals that can cause skin conditions and are “probably carcinogenic to humans.”¹⁰³

Open burning of waste can also expose nearby residents to high levels of volatile organic compounds (VOCs) which can worsen respiratory, heart, and other existing health problems and lead to “eye, nose, and throat irritation; headache; loss of coordination; nausea; and damage to liver, kidney, and central nervous system.”¹⁰⁴ Polycyclic aromatic hydrocarbons (PAHs) have been classified as carcinogenic in humans, and studies have linked breathing or skin contact for long periods to lung or skin cancer.¹⁰⁵

There is a troubling lack of scientific testing, monitoring and surveillance, or public information regarding the health consequences of open burning of waste in Lebanon. According to a Ministry of Environment official, the ministry doesn’t monitor or test the impact of open burning due to a lack of resources and expertise.¹⁰⁶ However, two local studies have also indicated the health risks of open burning of waste.

In October and December 2015, researchers from the American University of Beirut conducted scientific tests of air quality taken near the top of a four-story residency building east of Beirut, over a series of days when waste burning and no burning occurred in a nearby waste site. The results were released to the public in January 2016.

The researchers found an alarming increase of air pollution on days during which waste was being burned at the site.¹⁰⁷ The air was found to contain significantly higher concentrations of pollutants, including particulate matter, PAHs, and PCDD/Fs, compared to measurements taken prior to the period of burning (in 2014) or to measurements taken

¹⁰³ “Polychlorinated Biphenyls (PCBs),” Agency for Toxic Substances and Disease Registry, accessed July 22, 2017, <https://www.atsdr.cdc.gov/phs/phs.asp?id=139&tid=26>.

¹⁰⁴ “Wastes - Non-Hazardous Waste - Municipal Solid Waste,” US Environmental Protection Agency, accessed June 6, 2017, <https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/health.html>.

¹⁰⁵ Public Health England, “Polycyclic aromatic hydrocarbons (Benzo[a]pyrene),” 2008, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/316535/benzoapyrene_BaP_polycyclic_aromatic_hydrocarbons_PAH_guidance.pdf (accessed July 21, 2017), p. 3.

¹⁰⁶ Human Rights Watch interview with Ministry of Environment official, Beirut, August 25, 2017 (details withheld).

¹⁰⁷ “AUB releases its latest findings on toxic emissions of waste burning and launches a solution manual,” American University of Beirut, accessed June 6, 2017, <http://www.aub.edu.lb/news/2016/Pages/toxic-waste-manual.aspx>; Rima Baalbaki et al., “Exposure to Atmospheric PMs, PAHs, PCDD/Fs and Metals Near an Open Air Waste Burning Site in Beirut,” *Lebanese Science Journal*, vol. 17.2 (2016).

away from a burning incident or after it had rained. The researchers noted that exposure to these pollutants would result in a considerable increase in cancer risk to local residents.

Another study conducted by a different group of researchers at the American University of Beirut measured self-reported acute health conditions among men working in a variety of industries in Beirut, comparing the results between those working in the vicinity of a dump site with open burning, and those working without a dump site nearby. The study found significantly higher reports of fatigue, headaches, sneezing, insomnia, and breathing difficulties among the exposed individuals.¹⁰⁸ The researchers note that their study may underestimate the potential health effects, in part because this study excluded children or those above the age of 60, who may be more susceptible to effects of open burning.¹⁰⁹ The researchers concluded that exposure to waste, being near it or breathing air polluted by waste burning, led to serious acute health impacts, especially in the respiratory and digestive systems.¹¹⁰

In the course of researching this report, Human Rights Watch spoke with ten doctors regarding the impact of open burning of waste on the health of nearby residents. Ten doctors told Human Rights Watch that they believed the open burning of waste was causing respiratory illnesses. Doctors in and near Beirut often noted an increase in respiratory illness cases in areas that began burning waste after the 2015 crisis. Seven of them mentioned patients whose illnesses they were confident were caused or exacerbated by open burning, noting patterns of symptoms consistent with exposure to open burning of waste, patients' complaints of burning nearby, and the temporal link between the burning and their symptoms. Doctors reported cases of patients who had not previously had symptoms developing respiratory illnesses, as well as patients with preexisting respiratory conditions that deteriorated when burning started or was taking place.¹¹¹ However the doctors could not definitively confirm that open burning was the sole cause of the respiratory illnesses in their patients.

¹⁰⁸ Rami Z. Morsi et al., "The Protracted Waste Crisis and Physical Health of Workers in Beirut: A Comparative Cross-sectional Study," *Environmental Health*, vol. 16 (2017), p. 5.

¹⁰⁹ Ibid.; Human Rights Watch interview with Dr. Monique Chaaya, Beirut, December 1, 2016.

¹¹⁰ "AUB: First Scientific Study Demonstrates Enormity of Waste Crisis Effect on Public Health in Lebanon," American University of Beirut news release, November 17, 2016, <https://www.aub.edu.lb/communications/media/Documents/nov-16/waste-crisis-effect-public-health-EN.pdf> (accessed June 6, 2017).

¹¹¹ See, for example, Human Rights Watch interview with pulmonologist, Zahle, April 12, 2017 (details withheld).

Human Rights Watch also spoke with eight pharmacists in areas where open burning was taking place, who said that residents were seeking treatment for respiratory illnesses and complaining of smoke inhalation.

Seven doctors also told Human Rights Watch that they were concerned that the most serious, longer term effects of open burning of waste, including cancer, would take years to manifest.

A pulmonologist at the al-Mashreq hospital near Beirut said after the 2015 waste crisis in Beirut and Mount Lebanon, “Ten percent of patients I’m seeing explicitly say they were bothered by the smell of garbage in the air.... The biggest issue is the burning of garbage. Patients ask, ‘Should we stop breathing?’” She said most of these patients presented with pulmonary infections, bronchitis, and asthma attacks, and that symptoms were worse in patients that already had asthma or Chronic Obstructive Pulmonary Disease (COPD). She worried that respiratory dysfunction, respiratory failure, and pulmonary fibrosis would increase among the population.¹¹² Dr. Abda Alam, in Jdeideh, east of Beirut, said that she was witnessing worsening in the condition of patients who already had asthma and COPD living near open burning of waste. “Asthma that was under control is now out of control, and people who previously had [COPD] are getting worse, an out of control cough. People say, ‘They were burning right by my house, and then the [health] situation deteriorated.’”¹¹³

A pulmonologist at the Hotel Dieu hospital in Beirut noted that those who already had respiratory illnesses were at the highest risk. “After the burning increased, symptoms in people that had COPD or asthma got worse,” she said. “They became unstable and some needed hospitalization. If COPD is not controlled, it will lead to respiratory failure, and will require home respiratory assistance. We are seeing this more and more from the burning.”¹¹⁴

Some doctors also noted a temporal link between open burning and their patients’ respiratory symptoms. A doctor at the Saint Joseph hospital in Beirut told Human Rights Watch, “We’ve seen cases directly relating to burning garbage. For example, in 2015 an old lady kept her window open [during burning] and caught a respiratory illness directly after

¹¹² Human Rights Watch interview with pulmonologist, Beirut, October 19, 2016 (details withheld).

¹¹³ Human Rights Watch interview with Dr. Abda Alam, Jdeideh, October 19, 2016.

¹¹⁴ Human Rights Watch interview with pulmonologist, Beirut, October 13, 2016 (details withheld).

exposure.... In some cases, it's very obvious. One day they are burning, and the next day the symptoms manifest."¹¹⁵

A doctor at a hospital in Hermel located near an open dump told Human Rights Watch that burning of waste is taking place in close proximity, and affecting the hospital itself. "Smoke and dust fills the place, especially if the wind is blowing toward us," he said. "The dust, the flies, what can I say? Sometimes my patients complain. It's only natural that the smell and the pollution will bother them. But what can I do? What more can I do than closing all the windows?"¹¹⁶ A government official who oversees the hospital said that although the construction of the hospital began in 1998, the nearby dump was never moved.

Whenever there's a dump, burning will take place. And it lasts for hours.... There's a constant smell. If wind is blowing south, the smoke and smell will reach the hospital. Patients who have allergies, asthma, chest problems, heart problems, will get affected. We obviously can't check who was and who wasn't. But the effect on patients is indisputable.¹¹⁷

The Impact of Open Burning on Nearby Residents

The vast majority of the residents interviewed by Human Rights Watch reported health effects that they attributed to the inhalation of smoke from the open burning of the waste. Thirty-eight individuals said that they were suffering from respiratory issues including COPD, coughing, throat irritation, and asthma. According to an extensive body of scientific literature, these symptoms are consistent with exposure to the open burning of waste.¹¹⁸ Thirty-two individuals had sought medical treatment for these respiratory illnesses, and two said that a doctor or hospital had prescribed oxygen masks.

Residents in Beirut and Mount Lebanon said that after the 2015 waste management crisis, garbage piling up in the streets was routinely burned. Most of the residents Human Rights Watch spoke with in these areas reported an increase in respiratory symptoms after the burning began.

¹¹⁵ Human Rights Watch interview with doctor, Beirut, October 18, 2016 (details withheld).

¹¹⁶ Human Rights Watch telephone interview with doctor, May 9, 2017 (details withheld).

¹¹⁷ Human Rights Watch telephone interview with Hermel government official, May 9, 2017 (details withheld).

¹¹⁸ See above, The Effects of Open Burning.

Amal, an immunologist and university professor, told Human Rights Watch that when she was living in the Furn el Chebbak neighborhood near Beirut, burning had commenced in the summer of 2016. “I woke up suffocating,” she said. “We had to close the windows. I could sleep in the living room because there are less windows there.... At first you feel like you can’t breathe normally.... I wasn’t breathing normally.”¹¹⁹ Haitham, a resident of Dekwaneh, a suburb east of Beirut, said that he began needing to use an inhaler after the 2015 crisis. “When you smell the burning, of course you get bothered,” he said. “The area filled with smoke, we’d go inside.” Haitham said that a doctor conducted a chest scan, and found an infection that the doctor attributed to the open burning.¹²⁰

In areas outside of Beirut and Mount Lebanon, open burning of waste has been taking place for decades. Almost all residents living near open dumps that have been burned reported living with health issues. Mohamed, who lives near a dump in Bar Elias, in the Bekaa Valley, that he says was burned regularly for more than 20 years, told us that he suffers from coughing, pulmonary infections, an inability to breathe, and more recently, coughing blood.¹²¹ He said:

The smell had a license to go anywhere, it affected our ability to breathe. We had no health issues before it began burning.... My children all have difficulty breathing because of the smoke. My wife was the most affected, but everyone has symptoms. When they burn we can’t breathe.... We’ve had to go to the hospital because of this. My wife has gone four or five times [since burning began], my son and I went two times. All because of breathing [problems]. We usually stay two days to a week. The hospital said it was an infection in the lungs because of the smoke. They would give us pills, they were very expensive. They also gave us oxygen masks.... We’re not even able to fix our house because of how much we spend on medical care.... In the summer we can’t sleep because of all the smoke, we kept waking up trying to breathe.

¹¹⁹ Human Rights Watch interview with Amal, Fanar, February 15, 2017.

¹²⁰ Human Rights Watch interview with Haitham, Dekwaneh, October 19, 2016.

¹²¹ Human Rights Watch interview with Mohamed, Kfar Zabad, February 16, 2017.

Hassan lives near an open dump in Baalbek, in the Bekaa Valley, that residents say was burned regularly for more than 10 years. He said he has had asthma since he was 10 years old, and that his condition is exacerbated by the burning. He told Human Rights Watch:

We have to put masks on our children and go inside to hide from the smell whenever they are burning. Imagine sitting next to a dump and living on a dump. Every 4-5 months we need to take our children to the hospital.... It's like a dust storm, whenever the smoke gets here we have to leave. We have to rent a bigger oxygen machine sometimes. It costs more than \$100 per month. The dump used to be burning continuously.¹²²

Haitham, another resident near the Baalbek dump said, "When they are burning, we'd be inside and we'd suffocate. You choke. We go to the pharmacy when we get sick. Every summer we have to go get medicine. In the summer, the smell is terrible, even if you're drinking coffee or tea you want to throw up."¹²³ The head of the Baalbek municipality told Human Rights Watch that "residents used to leave with their kids when [the dump] was on fire," but that the municipality has since put an end to burning at the dump.¹²⁴

In many cases, interviewees told Human Rights Watch that there was a temporal relationship between the burning of waste and their health condition(s); that they developed a condition after the burning started or moving to an area where burning was taking place. Others reported that their symptoms subsided after they moved away from an area, or their municipality stopped burning.

Sami lives near the dump in Bar Elias that he says was burned frequently for more than 20 years, but that the municipality recently put an end to the regular burning. He said his symptoms have subsided since the burning largely stopped.

Sometimes it was more intense burning. Children in this area are always in the hospital, children are the most affected. We took them to hospitals and pharmacies for respiratory symptoms, flu, cold. Ever since they stopped

¹²² Human Rights Watch interview with Hassan, Baalbek, February 17, 2017.

¹²³ Human Rights Watch interview with Haitham, Baalbek, February 17, 2017.

¹²⁴ Human Rights Watch interview with head of Baalbek municipality, Beirut, February 17, 2017.

burning these symptoms have become rare.... Ever since they stopped burning, they haven't needed oxygen.¹²⁵

Human Rights Watch also spoke with Syrian refugees living near open burn sites, who said that they had never had respiratory problems in the past, but developed symptoms after moving near the dumps. Ahmed who lives with his family near an open burn site in south Lebanon, said that he, his wife, and daughters had all developed problems breathing. "Sometimes my throat gets blocked. It gets worse when there is burning," he said. "Sitting outside here is a pleasure, but the smell is slaughtering us. Before we came here we never had these symptoms, now all my kids do."¹²⁶ "We never had these symptoms in Syria," said Adnan, another refugee who experienced similar symptoms in the Bekaa Valley.¹²⁷

Vulnerable Populations

Children

Children are physically, developmentally, and socially different from adults, and these differences leave them uniquely vulnerable to the harmful effects of pollutants. Children also have faster metabolic rates than adults, and proportionally consume more water and food, and breathe more air than adults.¹²⁸ As a result, when toxins are present in the environment, children may suffer greater exposure to these toxins than an adult would in the same environment. Children also have more years of life remaining than adults, meaning more time to suffer long-term health effects that develop over time.¹²⁹ Children under 18 still remain in a critical stage of development as their nervous systems and reproductive systems are maturing. Exposure to toxins during these critical years can have lasting impacts on children's growth and development.¹³⁰

¹²⁵ Human Rights Watch interview with Sami, Kfar Zabad, February 16, 2017.

¹²⁶ Human Rights Watch interview with Ahmed, Chehabiyeh, February 21, 2017.

¹²⁷ Human Rights Watch interview with Adnan, Kfar Zabad, February 16, 2017.

¹²⁸ Catherine Karr, "Children's Environmental Health in Agricultural Settings," *Journal of Agromedicine*, vol. 17.2, (2012), p. 128.

¹²⁹ Human Rights Watch, *Teens of the Tobacco Fields: Child Labor in United States Tobacco Farming*, December 2015, <https://www.hrw.org/report/2015/12/09/teens-tobacco-fields/child-labor-united-states-tobacco-farming#ced79a>, p. 43.

¹³⁰ Elaine M. Faustman et al., "Mechanisms Underlying Children's Susceptibility to Environmental Toxicants," *Environmental Health Perspectives*, vol. 108, no. Supp 1 (2000), pp. 13-21.

Human Rights Watch documented many cases in which families said they believed open burning was affecting the health of their children.

Human Rights Watch spoke with Khalil, who lives with his four children in Chehabiyeh near a dump in neighboring Majadel. Khalil told Human Rights Watch that the site is burning on an almost daily basis; the dump was burning on two of the three occasions that Human Rights Watch visited it in February and March 2017. Human Rights Watch met Khalil's three-year-old daughter, who was coughing continuously during the 20-minute interview. Khalil told Human Rights Watch:

It's always on fire unless it's raining. It's a very serious smell in the summer, the smoke fills everything. They throw everything in the dump. I have three children with health issues, aged 15, 13, and 11. All are affected. They have allergies because of this. When we smell the smoke, we can't breathe. It's from the dump, we start coughing. My wife also has shortness of breath.... We're very concerned that the health issues will get worse. In the summer, we have to close all the windows when they are burning it at night. My three-year-old daughter is starting to show symptoms. When they smell the smoke, they are irritated.¹³¹

Parents expressed frustration that they were not able to protect their children from the potential health effects of the burning. Samar, who lives in Baalbek, next to a dump that she says was burning almost every week until fall 2016, told Human Rights Watch that she and her children developed respiratory conditions after moving there. "There is a connection, when there is smoke our symptoms become worse," she said. "My children are coughing, I have to take them to the doctor and the pharmacy. Everything the doctor recommends is not possible. I don't have clean air. It's not available here. What can I do?"¹³²

Human Rights Watch also documented three cases in which open burning was taking place directly adjacent to schools. At one of the schools, near Naameh, administrators said that garbage was being dumped and burned across the street from the school for four days

¹³¹ Human Rights Watch interview with Khalil, Chehabiyeh, February 21, 2017.

¹³² Human Rights Watch interview with Samar (pseudonym), Baalbek, February 17, 2017.

during October 2016, causing them to adopt emergency measures and send children home. Administrators told Human Rights Watch:

It was unclear if the school would stay open, we had to adopt procedures for dealing with the garbage.... They were burning it every day. We called the municipality and had to buy water to put out the fire outside the school several times. We had to provide medical masks to all of our students, kept them inside, and then sent them home early when the garbage was burning. We reported to the municipality and kept reporting it each time the garbage was burned. The nurse got in touch with parents of kids with respiratory illnesses, allergies, and asthma first, and parents pulled their kids out of school. One girl was waiting for her parents and coughing, coughing, coughing. People who had asthma were affected.... Eventually the municipality put up a fence and signs, and stopped people from dumping garbage there.¹³³

The school nurse told Human Rights Watch that when the burning was taking place, children at the school suffered from difficulty breathing, headaches, and nausea after the burning, and that children who were asthmatic and those with pre-existing respiratory conditions suffered most. She said,

There were literally yellow and grey clouds of smoke around the school. Even the teachers were affected by headaches.... I saw around 20 kids that were really affected. Others had general issues.... We are trying to take precautions, but we need to end the problem itself. It's the whole community being affected, not just the school.... You can't imagine the smell when they were burning, you can't imagine.¹³⁴

A pediatrician working in the Bekaa Valley told Human Rights Watch:

Everybody is affected but children are even more vulnerable. The burning of waste can cause allergies and irritations. What I prescribe depends on the

¹³³ Human Rights Watch interview with school administrators, Doha, October 27, 2016 (details withheld).

¹³⁴ Human Rights Watch interview with school nurse, Doha, October 27, 2016 (details withheld).

symptoms.... If they are small children, months old, and not able to breathe or eat, I'm sending them to the hospital to get oxygen, an IV, and medication. It's obviously expensive for the family. I'm still seeing cases from burning garbage. This is now, but we need to look to the future consequences, increases in cancer among the population. The burning of plastic of course causes cancer. You need to look at the future.¹³⁵

Older People

Open burning of solid waste can also especially affect older persons.¹³⁶ Doctors consistently told Human Rights Watch that children and older people were among the most vulnerable to respiratory illnesses as a result of nearby open burning of waste.¹³⁷

Hamze, who lives near a dump in Bar Elias, where he said waste was burned on a regular basis, told Human Rights Watch, "My mother has asthma, and it got worse anytime there was burning. They would transport her to the hospital to give her oxygen. One or two times per year we would take my mother to the hospital." Hamze's mother confirmed his account, saying "I had symptoms in my lungs, I would stay a week [in the hospital], it happened several times. When the smoke starts we'd start coughing."¹³⁸

Khabsa, 79, who lives in the same area, told Human Rights Watch:

I developed an allergy after the smoke started and now I have shortness of breath. This was after the dump started burning. Before, I had nothing. They had to take me to the hospital many times, whenever I would get respiratory irritations. I would get tired from breathing, it would be difficult to breath and I cough. When they are burning, it gets worse. After they stopped burning I haven't needed to go to the hospital. The doctor told me that it was from the smoke, they gave me oxygen at the hospital.... The

¹³⁵ Human rights Watch interview with pediatrician, Zahle, April 12, 2017.

¹³⁶ See, for example, "Open Burning of Garbage," Environment and Climate Change Canada, accessed July 23, 2017, <http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=684b44dd-1>.

¹³⁷ See, for example, Human Rights Watch interview with American University of Beirut Faculty of Health Sciences, Beirut, October 6, 2016; International Solid Waste Association, "Wasted Health: The Tragic Case of Dumpsites," June 2015, <http://www.iswa.org/nc/home/news/news-detail/article/wasted-health-the-tragic-case-of-dumpsites/109/> (accessed August 28, 2017), p. 31.

¹³⁸ Human Rights Watch interview with Hamze, Kfar Zabad, February 16, 2017.

smoke used to come all the way up here, black smoke. It would blind us. You couldn't stay outside. You couldn't even see your neighborhood.¹³⁹

Disproportionate Impact on Poor Communities

The open burning of waste in Lebanon has had a disproportionate effect on residents in lower income areas, where people may be least able to afford healthcare costs or avoid exposure by moving to another location. A map of the open dumps in Lebanon provided to Human Rights Watch by the Ministry of Environment and the United Nations Development Programme (UNDP) show that although there are open dumps in Beirut and Mount Lebanon, some of the wealthiest parts of the country, burning is not taking place at most of these dumps. Meanwhile, the map shows that the majority of dumps where burning takes place frequently are located in some of the poorest areas in the country including the Bekaa Valley and the south.¹⁴⁰

An analysis of the most recent disaggregated socioeconomic data available for Lebanon indicates that open burning of waste is taking place in some of the poorest areas of the country. A 2004 national survey of household living conditions asked participants to self-identify their socioeconomic class as either “rich,” “upper middle class,” “middle class,” “lower middle class,” or “poor.” The responses are disaggregated by 13 geographic strata, the smallest geographic area for which data is available in Lebanon.¹⁴¹

There appears to be a moderate correlation between the burning of waste taking place and the stratum where a higher percentage of respondents classified themselves as either “lower middle class” or “poor.” With some exceptions, strata where higher percentages of the population identified as lower middle class or poor were associated with higher levels of open burning.

¹³⁹ Human Rights Watch interview with Khabsa, Kfar Zabad, February 16, 2017.

¹⁴⁰ Central Administration of Statistics and World Bank, “Measuring poverty in Lebanon using 2011 HBS,” December 2015, http://www.cas.gov.lb/images/Excel/Poverty/Measuring%20poverty%20in%20Lebanon%20using%202011%20HBS_technical%20report.pdf (accessed June 7, 2017), p. 22.

¹⁴¹ United Nations Development Programme (UNDP), Household Living Conditions 2004: A National Survey, special tabulations by the United Nations Economic and Social Commission for Western Asia (UN-ESCWA).



OPEN

Identification of prevalent leachate percolation of municipal solid waste landfill: a case study in India

Pervez Alam¹, Afzal Husain Khan^{2✉}, Raisul Islam³, Ehab Sabi², Nadeem A. Khan^{4✉} & Tasneem Imtiyaz Zargar¹

Landfill leachate forms when waste-inherent water and percolated rainfall transfer are highly toxic, corrosive, acidic, and full of environmental pollutants. The release of leachate from municipal solid waste (MSW) landfill sites poses a severe hazard to human health and aquatic life. This study examined the impact of leachate from Delhi's Ghazipur landfill on the nearby groundwater quality. Analysis of leachate samples was done to determine various parameters such as total dissolved solids (TDS), hardness, alkalinity, electrical conductivity, pH, BOD₅, COD, nitrate, sulphate, chloride and iron, and presence of coliform bacteria. Significant dissolved elements (22,690–34,525 mg/L) were observed in the samples, indicated by the high conductivity value (1156–1405 mho/cm). However, a stable pH range (6.90–7.80) of leachate samples was observed due to high alkalinity concentrations between 2123 and 3256 mg/L. The inverse distance weighing (IDW) interpolation tool from QGIS 3.22.7 developed spatial interpolated models for each parameter across the Ghazipur area. The IDW interpolated graphs of various parameters over the whole study area confirmed these contaminations. In addition, leachate and groundwater samples were physio-chemically analyzed, and temporal fluctuation in landfill waste has also been studied. The temporal fluctuation results showed that when heat is produced, transmitted, and lost throughout the waste system, the maximum temperature position fluctuates over time. The findings of this study highlight the critical importance of landfill management in reducing groundwater contamination from MSW leachate.

Keywords Leachate, Municipal solid waste, Landfills, Groundwater, Temperature

Municipal solid waste (MSW) encompasses a wide range of waste materials that originate from homes, businesses, institutions, and industries in urban areas¹. It includes papers, plastics, glasses, metals, food scraps, clothes, yard wastes, and other miscellaneous waste materials². The volume, composition, and management needs of the MSW make it an environmental, economic, and social challenge³. Reduced environmental effects of MSW may be achieved by analyzing energy generation and recycling possibilities from waste, which also has the added benefit of supplying a nearby source of electricity⁴. By 2025, it is projected that the yearly production of MSW will have increased by 2.2 billion metric tons due to urbanization, economic expansion, population growth, and changing lifestyles^{5,6}.

Since most MSW is disposed of in open areas, many developing countries typically observe or engage in this behaviour. It ultimately causes the toxic leachate generated from the waste to contaminate nearby water bodies or percolate to reach groundwater. Leachate primarily results from solid waste, which occurs mainly through the process of percolation or leaching⁷. When precipitation or any other liquid encounters solid waste in a landfill or disposal site, it seeps through the various layers of waste, dissolving both suspended and dissolved contaminants along the way⁸. With high concentrations of inorganic ions, organic molecules, and other harmful substances, including heavy metals and ammonia, landfill leachate is a highly contaminated liquid⁹. Dissolved organic matter (DOM) in leachate can potentially interfere with microbial activity and foul membranes, impairing the coagulation phase's efficiency¹⁰. A variety of treatments have been developed to treat landfill leachate, including biological treatment (such as activated sludge and fluidized bed reactor operations), chemical treatment

¹Department of Civil Engineering, Baba Ghulam Shah Badshah University, Jammu, Jammu and Kashmir, India. ²Civil Engineering Department, College of Engineering, Jazan University, P.O. Box. 706, 45142 Jazan, Saudi Arabia. ³Department of Civil Engineering, GLA University, Mathura, UP, India. ⁴Interdisciplinary Research Center for Membranes and Water Security, King Fahd University of Petroleum and Minerals, 31261 Dhahran, Saudi Arabia. ✉email: amuafzal@gmail.com; ahkhan@jazanu.edu.sa; nadeem.khan@kfupm.edu.sa

(such as Fenton process and chemical precipitation), and physico-chemical treatment (such as adsorption and membrane processes).

Every waste landfill must have efficient leakproofing and drainage systems to reduce the environmental risk associated with landfill leachate¹¹. The sealing system ensures leachate is not confined in the landfill while preventing rain from penetrating the landfill and releasing leachate to the environment. Leachate is moved to the basin via open or enclosed canal systems, where it can then be used in various landfill technology processes or processed in a wastewater treatment facility before being discharged into the sewer^{12–16}. There is a severe risk of greatly exaggerating the emissions and environmental damage caused by landfills due to a lack of understanding of the dynamic nature of landfill leachate throughout its life cycle¹⁷. Although landfills have gained popularity as a low-cost and technically feasible solution for treating MSW, they are likely to substantially damage groundwater through solute leaching^{18,19}.

A study conducted in China reported that open disposal of solid waste can have several adverse effects on the surrounding environment, public health, and aesthetics²⁰. Further, the decomposing of organic matter produces methane gas and leachate, contributing to climate change and groundwater contamination²¹. According to Mor et al., leachate released or transported from waste can contaminate soil and water bodies, leading to ecosystem degradation²². Leachate remains a significant risk to groundwater even if hazardous waste is not dumped in municipal landfills^{23,24}. Further, if leachate is not adequately contained or managed, it can flow into nearby surface water bodies such as rivers, lakes, or streams, causing pollution and endangering aquatic ecosystems²⁵. It also emits foul odors and volatile organic compounds (VOCs) as it decomposes, contributing to air pollution in the surrounding area²⁶.

Previous research has shown that the four major chemical groups comprising landfill leachate are DOM, inorganic compounds, heavy metals, and xenobiotic organic components²⁷. Because acetogenic leachate contains more organic matter than methanogenic leachate, it has a higher BOD: COD ratio than the latter. The acetogenic leachate has higher concentrations of heavy metal contaminants due to its acidic composition, which increases metal solubility²⁸. Due to changes in waste composition, water content, and seasonal variables like temperature and precipitation, landfill leachate properties show significant variability²⁹. It has been observed from the literature survey that some researchers have carried out the effects of landfill leachate on groundwater^{17,18,22,30,31}. However, our study navigates the intricate landscape of waste management, focusing on the pervasive issue of leachate percolation in Ghazipur landfill, India. With meticulous analysis and comprehensive data, we examine the environmental impact and implications of the prevalent leachate percolation in MSW landfills. Through this insightful case study, we unravel the environmental complexities, striving towards sustainable solutions for a cleaner, greener future. Thus, landfill leachate must be monitored to ensure human and environmental safety. Herein, this study investigated the leachate percolation through the soil into the underlying aquifers. The main objectives of this study are (a) to identify characteristics of leachate generated from landfill sites and (b) to identify the impacts on the groundwater quality using GIS-based interpolation techniques. To achieve these objectives, the inclusion of field measurements, GPS data, and physico-chemical parameters was assessed. Furthermore, an evaluation of the temporal evolution with depth and time was also made on the landfill's site.

Methodology

The study area, sample collection and preparation, temporal variation, inverse distance weighting interpolation technique, and water quality index will be discussed in the subsequent sections of the methodology.

Study area

The current research was carried out at the Ghazipur landfill in New Delhi, which has been in operation since 1984 and overflowing since 2002. However, waste has still been put there despite the landfill's capacity being surpassed for at least 10 years. The landfill had surpassed 65 m at the most recent count in 2019 (213 feet). The latitude and longitude of the Ghazipur landfill site are 28° 37' 27.2064" N and 77° 19' 37.8372" E, respectively. Delhi City generates around 11,144 tons of MSW daily, deposited at open dumpsites at different landfill sites. Among all landfill sites, the major portion of MSW over the last two decades has been diverted to the Ghazipur landfill. Therefore, several fire and smouldering accidents were observed at the Ghazipur landfill, which affected those residing in the nearby housing societies, slums, and schools who complained of difficulty breathing, itching in the eyes, etc.

Further, the study area has also been selected due to its significance as one of the largest and most prominent waste disposal sites in the region. The environmental challenges it poses make it interesting for research. The landfill reflects the acute waste management issues facing the city and raises questions about the impacts of rapid urbanization, population growth, and unsustainable consumption patterns on the environment and public health.

Sample collection and preparation

Chemical composition of leachate

The original MSW content, the level of compaction, the site's hydrology, the climate, and lastly, landfill age all affect the chemical components of leachate. For these reasons, there is significant variation in the leachate characteristics produced from landfills. Ghazipur landfill site is an open dumping site with no liners, leachate collection system, or arrangement for gas collection. Hence, leachate production rate and characteristics are more complex than sanitary landfills. The monthly collection of six leachate samples was done between May 2021 and October 2021 from the landfill of Ghazipur. A comprehensive total of 36 samples were systematically collected across the study area. This sampling protocol was determined based on an initial assessment, which concluded that six strategically positioned samples adequately represented the entire landfill area. These selected sampling locations were confirmed to encompass all classes of waste present in the landfill. The sampling was meticulously

done to ensure that the leachate collected was produced from all types of waste in the landfill, thereby maintaining homogeneity throughout the sampling process.

Leachate sampling was done as follows and outlined by Cerne and Junestedt³². Leachate sampling was done using grab sampling in 1000 mL bottles made from plastic cleaned thoroughly, and the samples were then stored at 4 °C. The laboratory analyzed various samples using standardized methods outlined in the American Public Health Association's (APHA) Standard Methods for the Examination of Water and Wastewater³³. The parameters examined included pH, electrical conductivity, BOD₅, COD, hardness, alkalinity, total dissolved solid (TDS), chloride, sulphate, nitrate, and iron. In addition to the above, the samples have been tested for the presence of coliform bacteria because the coliform group of bacteria is the principal indicator of the suitability of water. Further, the following precautions have been taken during the collection of samples³⁴.

- Thoroughly clean containers with laboratory detergent rinse and deionized water were used to collect samples.
- The samples are properly handled to avoid contamination. The sample was stored in dark, cold conditions, adjusted to 4 °C within 6 h, and promptly delivered to the laboratory.
- Care has been taken to avoid touching container openings to prevent contamination.
- Collected samples has been directly transferred into clean bottles to prevent contamination.

Analysis of groundwater samples in the proximity of Ghazipur landfill

In order to better understand how landfill leachate affects groundwater, samples from hand pumps already in place at the Ghazipur landfill site are being taken. From May 2021 to October 2021, six groundwater samples from each area were taken monthly. Clean plastic bottles were used for a 1000 mL grab sampling, and samples were subsequently held at 4 °C in the environmental laboratory. The laboratory analyzed samples for various parameters following the American Public Health Association (APHA), Standard Methods for the Examination of Water and Wastewater (1998). The parameters examined included iron, pH, electrical conductivity, BOD₅, COD, hardness, alkalinity, chloride, sulphate, nitrate, and total dissolved solids (TDS). In addition to the aforementioned, the samples have been examined for coliform bacteria. The cornerstone for bacteriological water quality standards has been the density of coliform group bacteria, which measures the level of contamination. Although it would be ideal if all samples were free of coliform bacteria, the reality is that no water sample should include more than 10 coliform bacteria per 100 mL. Table 1 lists the locations of groundwater test points, depth and their separation from the landfill site, and Fig. 1 illustrates the same information visually.

Temporal variation

Thermocouples, for example, have been used to detect the temperature in landfills with a wide range of other sensors^{35,36} and thermistors, e.g.³⁷. According to the researchers, type K thermocouples are excellent for landfill applications because of their exceptional resilience to chemical conditions³⁸.

Temperatures were recorded at several points in the landfills, such as the waste mass, cover, and peripheral control areas. Type K thermocouples were placed in specially made-arrays to measure temperatures³⁹. Due to the rugged temperature measuring device usage, Type-K thermocouple was preferred over any other type of device. In addition to that, due to its broad temperature range, longer lifespan, prompt reaction, affordability, reliability and compact nature, this temperature measuring device was preferred.

For horizontal installations buried in trenches underneath liners, coverings, and wastes, the arrays spanned from 150 to 250 m in length. Vertical installations between 1 and 50 m high were built in boreholes through waste and coverings and at control sites. Following waste placement, vertical installations were created that made it possible to measure temperature changes with depth and waste age at a specific spot. During waste placement or liner/cover construction, horizontal installations were installed that made it possible to determine temperatures at a spot with a single waste age and a particular depth. All measurements were taken on a weekly basis.

Inverse distance weighting interpolation technique

Inverse distance weighting (IDW) is a commonly used technique in spatial interpolation, which is a method used to estimate values at unsampled locations within a defined area based on measured values at sampled locations.

| Sample number | Source of collection | Depth of sample collection (m) | Coordinates | | Distance from landfill (m) |
|---------------|----------------------|--------------------------------|---------------|----------------|----------------------------|
| | | | Latitude (°N) | Longitude (°E) | |
| GW1 | HP | 24 | 28.61771 | 77.32388 | 220 (West) |
| GW2 | HP | 30 | 28.62226 | 77.32227 | 235 (South-West) |
| GW3 | HP | 30 | 28.625 | 77.3238 | 190 (North-West) |
| GW4 | HP | 31 | 28.6261 | 77.327 | 25 (South) |
| GW5 | HP | 25 | 28.62772 | 77.33209 | 220 (East) |
| GW6 | HP | 26 | 28.62953 | 77.32657 | 290 (North) |
| GW7 | HP | 23 | 28.62888 | 77.32028 | 375 (North-West) |
| GW8 | HP | 29 | 28.63158 | 77.32881 | 380 (North-East) |

Table 1. Locations of groundwater samples (HP: hand pump).

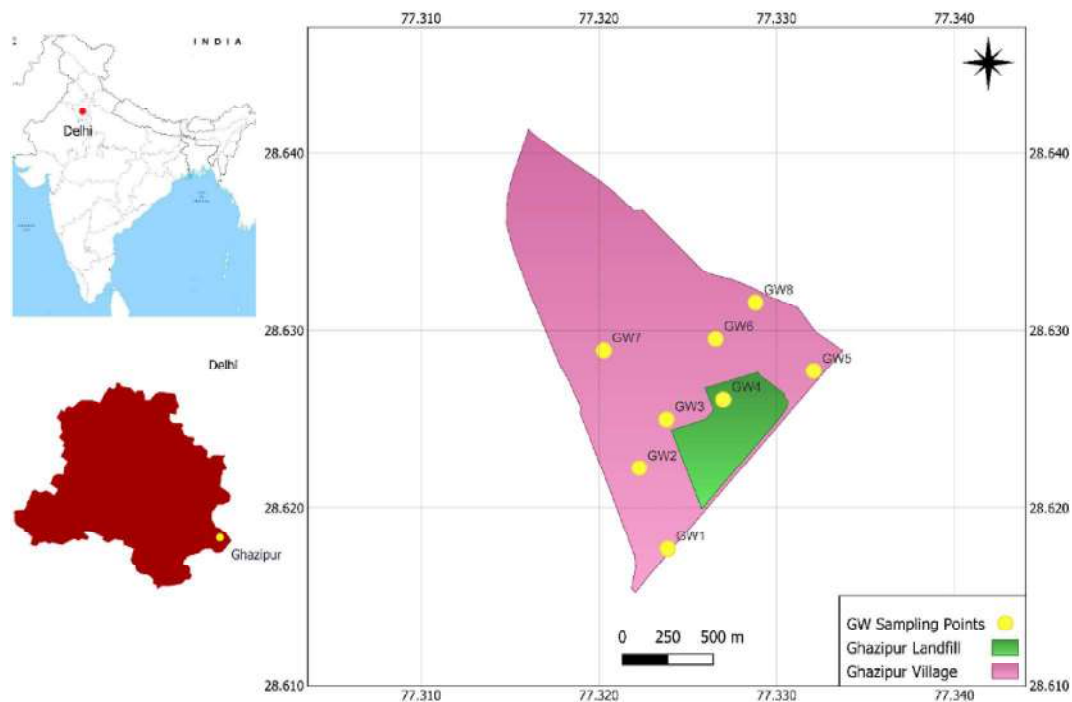


Figure 1. Location of study area on the Map of India and various ground water sampling points.

We have selected this approach because our study involves spatially distributed data points with a relatively high density. Further, it is suitable for interpolating values from nearby data points, making it well-suited for datasets with dense spatial coverage. In addition, unlike other interpolation techniques, such as kriging, IDW does not require assumptions about the underlying distribution of the data. This flexibility is advantageous when dealing with environmental datasets where the data distribution may be complex or unknown. Given these considerations, IDW is the preferred interpolation technique for our study. While other interpolation methods may offer advantages in specific scenarios, IDW aligns well with the characteristics of our data and the objectives of our analysis, making it the most suitable choice for estimating values across the study area.

Methodology for water quality index

The methodology employed for calculating the water quality index (WQI) in this research encompasses a systematic approach involving several essential steps and mathematical formulas. The observed values were compared with established standard values as per guidelines provided by BIS 10500. Weighted Normalized Scores (W_n) for each parameter were computed utilizing the formula:

$$W_n = \frac{k}{S},$$

where k represents the reciprocal of the standard value of each parameter, and S denotes the standard values. Subsequently, Q_n for each parameter were derived by the formulae:

$$Q_n = 100 \times \frac{O - I}{S - I},$$

where O represents the observed value, I represent the ideal value (7 for pH, 0 otherwise), and S representing the standard value of the parameter. The weighted sum ($W_n \log Q_n$) was then calculated and finally summed up. Finally, the WQI was computed by:

$$WQI = \frac{\sum W_n Q_n}{\sum W_n}.$$

Results and discussion

The obtained results of leachate characteristics, effect on groundwater, temporal variation in landfill and water quality index has been discussed in the subsequent sections of result and discussion.

Leachate characteristics

The pH values of the leachate samples ranged from 6.9 to 7.8 due to high alkalinity concentrations between 2123 and 3256 mg/L. The pH of leachate collected from an emerging and young landfill is usually less than 7, due to the production of carboxylic acids. However, as time passes, the pH of leachate usually turns from acidic to alkaline due to the formation of alkaline compounds, which indicates anaerobic biodegradation and a methanogenic stage of decomposition⁴⁰. The pH values obtained from the leachate indicate the dominance of alkaline compounds and hence point out the maturity of the landfill.

The high conductivity value (1156–1405 mho/cm) represents the presence of salts in the samples (22,690–34,525 mg/L). The dissolved material concentration and conductivity are high for active landfills, whereas the conductivity values for abandoned landfills are often lower⁴¹. Leachate sample hardness ranged from 4312 to 5925 mg/L. The hardness was found to be high during the wet period of the year (July and August).

The chloride concentration was highest in October (2300 mg/L) and lowest in August (1760 mg/L). Because it is neither physically nor physiologically reactive, it is abundant and largely not preserved by soil systems. It spreads swiftly and frequently, indicating the progress of a plume of tainted water. Such large deviation in the chloride content could be linked to the precipitation, which may cause significant leaching of pollutants. The range of chloride content of active landfill leachate was reported by⁴¹ as 853 mg/L to 2670 mg/L. BOD₅ and COD values were found high, of the order 2216 mg/L and 7998 mg/L, respectively, indicates severe contamination and may lead to direct groundwater pollution.

Furthermore, it is worth pointing out that the values of BOD₅ and COD almost remained stable throughout the analysis. This may be attributed to the stabilized chemical reactions in the landfill; on the contrary⁴² obtained fluctuations in the COD values of leachate collected from active and un-stabilized landfills. The BOD₅/COD value calculated for maximum values of BOD₅ and COD was 0.27, which lies in the biodegradable zone⁴³. Figure 2A,B illustrate the changes in hardness, alkalinity, chloride, BOD₅, and COD. The nitrate concentration was highest (140 mg/L) in July and lowest (80 mg/L) in October. Sulphate values ranged from 210 to 309 mg/L, and iron values were very high (54–81 mg/L). It suggested that steel and iron are also being disposed of in landfills, where they might cause groundwater to become reddish-brown.

Micronutrients that are necessary for the growth of plants include metals like Fe and Ni. As a result, at some concentrations, they are required and can promote growth, but once they reach specific levels, they become poisonous to them. Metals in excessive amounts can interrupt germination and impede the growth of roots or shoots^{44,45}. The concentrations of sulphate, nitrate and iron are shown in Fig. 2C. A comparison is drawn between

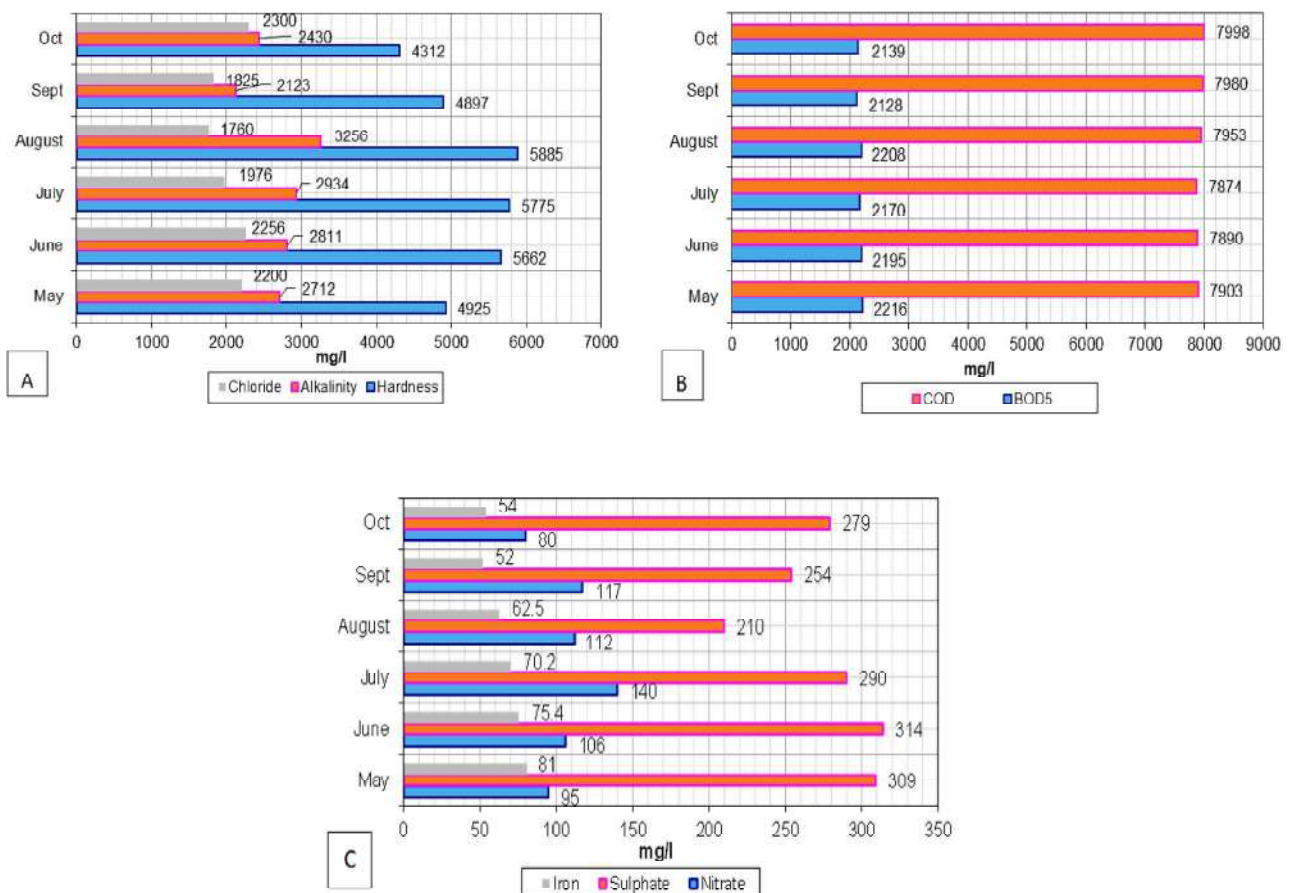


Figure 2. Variation of leachate characteristics in Ghazipur landfill (A) hardness, alkalinity, and chloride, (B) BOD₅ and COD, and (C) nitrate, sulphate and iron.

the concentration of contaminants in leachate and municipal wastewater samples, as shown in Table 2. It could be seen that the Ghazipur landfill leachate concentration is very high on comparing various contaminant concentrations of typical wastewater and indicates heavy pollution of surface water and groundwater. Due to the high biodegradable content of MSW in Delhi, it is evident that it will produce leachate with more organics. Some hazardous, industrial, and hospital wastes are disposed of at the MSW disposal site. As a result, the leachate has substantially greater levels of pollution.

The pollution index devised by Kumar and Alappat⁴⁶, serves as a practical tool for evaluating the potential contamination posed by leachate discharged from municipal solid waste (MSW) landfills. Leachate from landfills can contaminate nearby soil and water sources, necessitating a method to quantify this risk. The index fulfills this need, aiding in identifying landfill sites requiring immediate attention. The leachate pollution index (LPI) can be calculated using the equation:

$$LPI = \sum_{i=1}^n (w_i p_i),$$

where LPI—the weighted additive leachate pollution index, w_i —the weight for the i th pollutant variable, p_i —the sub index value of the i th leachate pollutant variable, n —number of leachate pollutant variables used in calculating LPI and $\sum w_i = 1$ ⁴⁷.

The overall weights and subindex values considered in this study were taken in accordance with previous studies^{47,48}. Now, overall LPI,

$$LPI = 0.232LPI_{org} + 0.257LPI_{inorg} + 0.511LPI_{heavy\ metals}.$$

In this study, LPI value of 23.7 is found using the above calculated values, which is in line with the previous studies.

Effect of leachate on groundwater

The results of the present investigation are summarized in Table 3, which provides a comprehensive picture of the characteristics of groundwater in and around the Ghazipur landfill site. The mean value of all the parameters was interpolated over the whole Ghazipur village and intensity models were prepared using Inverse Distance Weighing (IDW). Such models were trained using QGIS 3.22.7, as shown in Fig. 3A–L. In this investigation, parameter values were predicted using the geo-statistical modelling tool (QGIS 3.22.7) by averaging the parameters of sample data points near each known data point. The sample point map and the data at each sample point were imported into the QGIS software, and the IDW technique was used to interpolate the digitized values at unmeasured places. The average deviation between the neighbouring data and the un-sampled regions was measured experimentally using the IDW approach.

The core concept of IDW (Inverse Distance Weighting) interpolation involves utilizing a collection of sample points in a weighted linear combination. This method relies on statistical and mathematical techniques to construct surfaces and predict locations where measurements are unavailable³⁰.

The impact of leachate on groundwater quality parameters with respect to the distance from the landfill site is shown in Fig. 4A–D. Using the interpolated spatial models, the regions of groundwater affected by the landfill leachate can be easily determined. As seen in the spatial models, the parameters had greater values inside and at the boundaries of the landfill site, which seemed to decrease as the distance from the landfill site increased. The concerned authorities can use these interpolated models to monitor and improve the groundwater at critical points, whose location can be easily determined by the interpolated spatial models.

The pH value in the wells near the landfill (GW4) is more than that far from the landfill (GW8), which indicates that the water is more alkaline near the landfill, as shown in Fig. 4A. Groundwater samples showed a wide conductivity range from 799 to 3568 mho/cm. As shown in Table 4, the conductivity of groundwater is low and within the desired value in the South-West of the landfill (GW1) and in the west (GW2), whereas high

| Parameter (s) | Average value (s) | Range | Typical wastewater concentration |
|----------------------------------|-------------------|---------------|----------------------------------|
| pH | 7.4 | 6.9–7.8 | 6–8.5 |
| Electrical conductivity (mho/cm) | 1314 | 1156–1405 | – |
| BOD ₅ (mg/L) | 2176 | 2128–2216 | – |
| COD (mg/L) | 7933 | 7874–7998 | 250–1000 |
| Hardness (mg/L) | 5002 | 4312–5623 | – |
| Alkalinity (mg/L) | 2711 | 2123–3256 | 50–200 |
| TDS (mg/L) | 28,509 | 22,690–34,525 | 250–850 |
| Chloride (mg/L) | 2041 | 1765–2294 | 30–100 |
| Sulphate (mg/L) | 276 | 210–314 | – |
| Nitrate (mg/L) | 107 | 76–136 | 0 |
| Iron (mg/L) | 65.95 | 52–78.6 | 0.05–0.1 |
| No. of coliform (MPN/100 mL) | 262 | 240–300 | – |

Table 2. Physico-chemical parameter concentrations of typical wastewater and leachate sample from Ghazipur landfill site.

| Parameter (s) | Average value (s) | Weight (w) | Subindex value |
|------------------------------|-------------------|------------|----------------|
| LPI organic | | | |
| BOD ₅ (mg/L) | 2176 | 0.158 | 62 |
| COD (mg/L) | 7933 | 0.322 | 24 |
| No. of coliform (MPN/100 mL) | 262 | 0.52 | 100 |
| Summation | | 1 | 69.524 |
| LPI inorganic | | | |
| pH | 7.4 | 0.214 | 15 |
| TDS (mg/L) | 28,509 | 0.195 | 63 |
| Chloride (mg/L) | 2041 | 0.3546 | 10 |
| Nitrate (mg/L) | 107 | 0.2364 | 2 |
| Summation | | 1 | 19.5138 |
| LPI heavy metals | | | |
| Iron (mg/L) | 65.95 | 1 | 5 |
| Summation | | 1 | 5 |

Table 3. Leachate pollution index of Ghazipur landfill.

conductivity of water at the North of the landfill and in the points near the landfill (GW4 and GW5). Such typical pH and Electrical Conductivity values indicate leaching leachate into the groundwater. The alkaline nature of water and high conductivity values near the landfill suggest a severe risk of groundwater pollution³¹. The BOD₅ and COD values for all wells are more than the desirable limit, indicating severe groundwater contamination around the landfill, especially in the points near the landfill (GW4, GW5 and GW6), as shown in Fig. 4B. The hardness, alkalinity, total dissolved solids (TDS), and chloride were high and more than the desirable limit in all groundwater wells except for GW1, located in the South-West of the landfill. These values were very high in the wells near the landfill (GW4 and GW5), which is more than that far from the landfill (GW8), as shown in Fig. 4C. Sulphate values are within the desirable limit in the South-West landfill (GW1) and the west landfill (GW2).

In contrast, it is high in the other wells. Nitrate value and the number of coliform bacteria are low for all wells, indicating no bacteriological contamination in groundwater. Iron value was high in all wells, especially in the wells near the landfill (GW4, GW5 and GW6), except for the wells GW2, and GW7, as shown in Fig. 4D. It could be seen from the physio-chemical characteristics of groundwater (Table 2) that the groundwater quality around the Ghazipur landfill site surpassed the desired criteria, and it does not meet the drinking water level. The groundwater contamination is generally worse in landfills in the North and North-Western regions. The areas close to the dump have higher pollution levels. It steadily decreases as it gets farther away towards the north and west, indicating that the landfill leachate is having a negative impact on the groundwater in the landfill and that the groundwater is flowing in a North-Western direction. Further, as one moves away from the dump towards the North and West, pollution levels gradually decrease, suggesting a downstream flow direction of groundwater.

Temporal variation in landfill

The biological decomposition of waste in landfills releases gases, heat, and leachate as a by-product. Various up-to-date technologies are available to collect methane gas released from landfills, but it's very problematic to utilize a large amount of heat generated from landfills due to the exothermic reaction inside the landfills. Because the right temperature is crucial for the continuous biological decomposition processes and methane generation, it is imperative to prevent undercooling. A temperature of 35 to 40 °C and 50 to 60 °C were the ideal temperature range for developing mesophilic and thermophilic bacteria engaged in garbage decomposition. The ideal temperature range for gas generation at a landfill was determined to be between 40 and 45 °C. The thermal regime of MSW landfills was thoroughly examined in this work, including the variations in temperature with depth and waste age.

The temperature data were gathered from the Ghazipur landfill to explore the typical temperature profile with respect to depth. Temperature versus depth comparisons between years were done at this location. Low temperatures were recorded over and under this intermediate zone of a landfill, while maximum temperatures were recorded close to its mid-depths. The position of the highest temperature changes over time as heat is produced, distributed, and dissipated across the landfill system. The average temperature variation for this landfill with depth is presented in Fig. 5, where waste was dumped from 1989 to 2019. The depiction in Fig. 5 shows that waste temperature increases as time passes, and the heat zone continuously changes with depth. The landfill subsoil could be broadly categorized into three zones based on the magnitude of temperature. Zone-1 can be established upto the depth of 30 m from the surface and has a temperature range of 30–50 °C. Zone-2 is identified to start at a depth of 30 m and end at 50 m from the surface. The temperature of this zone is the maximum of all and lies between 60 and 70 °C. Zone-3 extends beyond Zone-2 up to a depth of 60 m. This zone is the coolest, and the temperature is below 30 °C. Similar observations were made by⁴⁹, i.e., the highest temperatures were recorded at central spots in the middle third of the waste mass depth.

Municipal solid waste (MSW) landfills operate at 20–65 °C, usually below 55 °C⁴⁹. MSW landfills have had temperatures above 80 to 100 °C during the previous 10 years^{50,51}. Such landfills that exhibit higher temperatures than usual are called elevated temperature landfills (ETLs). The Ghazipur landfill can be accepted as an ETL.

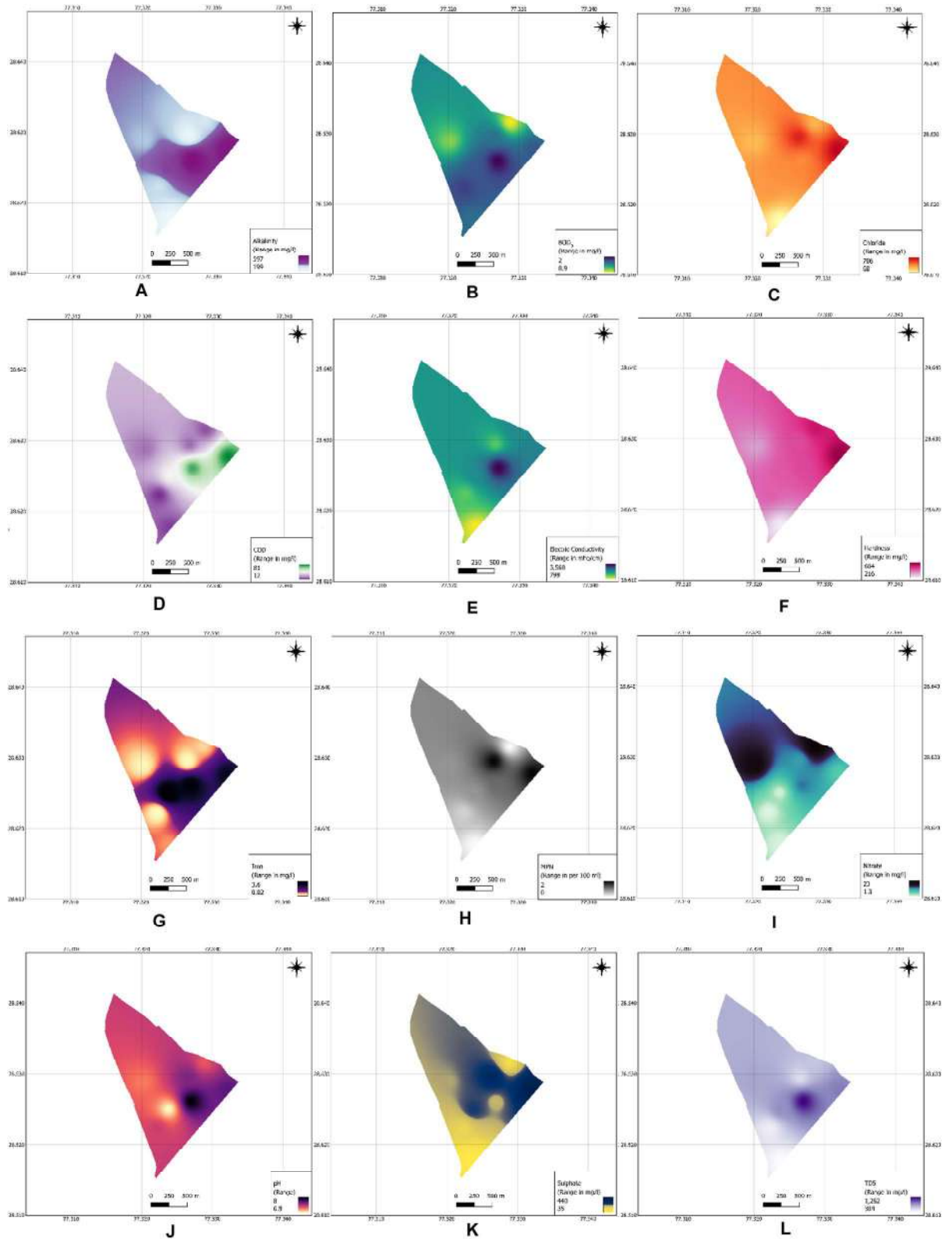


Figure 3. IDW Interpolated graphs of various parameters over the whole study area (A) alkalinity, (B) BOD₅, (C) chloride, (D) COD, (E) electric conductivity, (F) hardness, (G) iron, (H) MPN, (I) nitrate, (J) pH, (K) sulphate, (L) TDS.

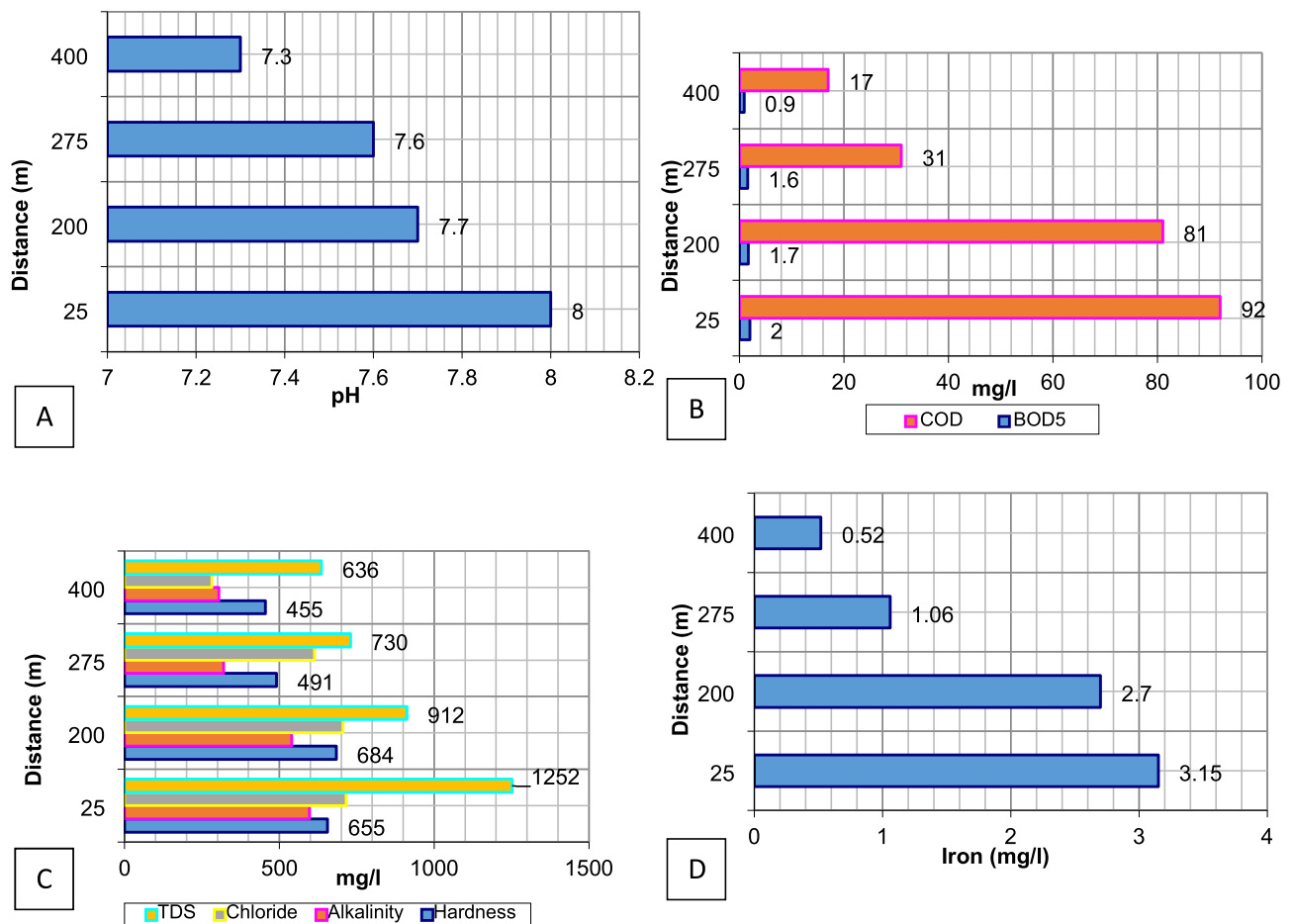


Figure 4. Variations of physico-chemical parameters with respect to distance from the landfill (A) pH value, (B) BOD₅ and COD value, (C) TDS, chloride, alkalinity and hardness value, and (D) iron concentration.

based on the temperature data obtained. The gases produced in such landfills may be devoid of methane and may lead to the release of more odorous compounds. Furthermore, the liquid pressure may increase due to high temperatures and lead to unexpected leachate outbreaks^{50,52}.

The biological, chemical, and geomechanical reactions in waste liners and coverings are influenced by temperature and heat transport⁴⁹. Laboratory and field investigations have indicated that the ideal temperature ranges for gas generation from waste degradation are between 34 and 45 °C. At temperatures between about 20 and 75 °C, much lower gas production rates are anticipated. Temperature has an impact on the engineering characteristics of wastes; for instance, in laboratory studies, waste compressibility rises by almost double as the temperature increases from 20 to 35 °C. Elevated temperatures can have detrimental effects on lining systems, leading to various negative outcomes. Geosynthetic materials used for lining landfills or containment structures experience a reduced lifespan under high temperatures. The increased heat can cause accelerated degradation, compromising their integrity and performance over time⁵³. However, using thermal and biochemical transformations to produce energy-rich substrates and gases for heat and electricity production are also reported^{33,54,55}.

Water quality index

The detailed calculation of the water quality index using BIS standards is shown in Table 5. It has been observed from the calculation that the WQI is found to be 537.3, indicating very poor quality, as reported by Chidiac et al.¹¹ and not fit for drinking. This comprehensive index furnishes a singular numerical representation signifying the overall water quality status, thereby facilitating effective communication of research findings to pertinent stakeholders and decision-makers for water resource management strategies^{34,38,39}.

Control of leachate generation-related groundwater contamination

Controlling leachate to control groundwater pollution requires a holistic approach that combines monitoring and preventive measures. Implementing leachate collection devices, maintaining landfills properly, and enforcing strict rules on waste disposal practices are all part of prevention. In order to identify contamination early on, monitoring is comprised of routinely evaluating groundwater quality by sample and analysis. Groundwater quality and pollution can be improved by the employment of remediation solutions such as permeable reactive barriers, natural attenuation techniques, and pump-and-treat systems. Furthermore, it is critical to utilize

| Location | No. of samples | Min | Max | Average | St. D | % Error at 95% confidence |
|-------------------------|----------------|------|------|---------|-------|---------------------------|
| pH | | | | | | |
| GW1 | 6 | 6.9 | 7.8 | 7.4 | 0.33 | 0.22 |
| GW2 | 6 | 7 | 7.8 | 7.4 | 0.31 | 0.2 |
| GW3 | 6 | 6.7 | 7.2 | 6.9 | 0.21 | 0.14 |
| GW4 | 6 | 7.7 | 8.3 | 8 | 0.24 | 0.16 |
| GW5 | 6 | 7.1 | 8.3 | 7.7 | 0.4 | 0.26 |
| GW6 | 6 | 7.2 | 7.9 | 7.6 | 0.24 | 0.16 |
| GW7 | 6 | 6.8 | 7.6 | 7.2 | 0.29 | 0.19 |
| GW8 | 6 | 7.1 | 7.5 | 7.3 | 0.18 | 0.12 |
| Conductivity (mho/cm) | | | | | | |
| GW1 | 6 | 775 | 817 | 799 | 15.94 | 10.41 |
| GW2 | 6 | 1491 | 1508 | 1499 | 6.05 | 3.95 |
| GW3 | 6 | 2244 | 2268 | 2255 | 9.25 | 6.04 |
| GW4 | 6 | 3557 | 3580 | 3568 | 8.37 | 5.47 |
| GW5 | 6 | 2342 | 2362 | 2354 | 7.13 | 4.66 |
| GW6 | 6 | 1509 | 1526 | 1517 | 5.66 | 3.7 |
| GW7 | 6 | 2103 | 2118 | 2110 | 5.4 | 3.53 |
| GW8 | 6 | 2251 | 2262 | 2256 | 4 | 2.61 |
| BOD ₅ (mg/L) | | | | | | |
| GW1 | 6 | 1.2 | 2 | 1.6 | 0.32 | 0.21 |
| GW2 | 6 | 1.5 | 2.2 | 1.8 | 0.24 | 0.16 |
| GW3 | 6 | 1.5 | 2 | 1.7 | 0.18 | 0.12 |
| GW4 | 6 | 1.8 | 2.2 | 2 | 0.14 | 0.09 |
| GW5 | 6 | 1.4 | 2.1 | 1.7 | 0.26 | 0.17 |
| GW6 | 6 | 1.9 | 2.3 | 1.6 | 0.14 | 0.09 |
| GW7 | 6 | 0.8 | 1.3 | 1.1 | 0.21 | 0.14 |
| GW8 | 6 | 0.8 | 1.1 | 0.9 | 0.13 | 0.08 |
| COD (mg/L) | | | | | | |
| GW1 | 6 | 12 | 16 | 14 | 1.41 | 0.92 |
| GW2 | 6 | 10 | 14 | 12 | 1.41 | 0.92 |
| GW3 | 6 | 42 | 54 | 47 | 4.38 | 2.86 |
| GW4 | 6 | 84 | 98 | 92 | 5.48 | 3.58 |
| GW5 | 6 | 77 | 85 | 81 | 3.52 | 2.3 |
| GW6 | 6 | 28 | 35 | 31 | 2.61 | 1.71 |
| GW7 | 6 | 19 | 25 | 22 | 2.28 | 1.49 |
| GW8 | 6 | 14 | 21 | 17 | 2.61 | 1.71 |
| Hardness (mg/L) | | | | | | |
| GW1 | 6 | 209 | 221 | 216 | 4.15 | 2.71 |
| GW2 | 6 | 458 | 465 | 462 | 2.76 | 1.8 |
| GW3 | 6 | 465 | 480 | 473 | 6.2 | 4.05 |
| GW4 | 6 | 649 | 662 | 655 | 4.43 | 2.89 |
| GW5 | 6 | 674 | 692 | 684 | 7.67 | 5.01 |
| GW6 | 6 | 483 | 497 | 491 | 5.18 | 3.38 |
| GW7 | 6 | 352 | 373 | 363 | 8.56 | 5.59 |
| GW8 | 6 | 446 | 462 | 455 | 6.26 | 4.09 |
| Alkalinity (mg/L) | | | | | | |
| GW1 | 6 | 187 | 209 | 199 | 8.39 | 5.48 |
| GW2 | 6 | 297 | 324 | 313 | 9.08 | 5.93 |
| GW3 | 6 | 408 | 426 | 418 | 5.8 | 3.79 |
| GW4 | 6 | 587 | 606 | 597 | 6.51 | 4.25 |
| GW5 | 6 | 526 | 556 | 540 | 10.26 | 6.7 |
| GW6 | 6 | 312 | 325 | 320 | 4.82 | 3.15 |
| GW7 | 6 | 336 | 352 | 344 | 6.23 | 4.07 |
| GW8 | 6 | 289 | 315 | 305 | 9.32 | 6.09 |
| TDS (mg/L) | | | | | | |
| GW1 | 6 | 295 | 311 | 304 | 6.54 | 4.27 |
| Continued | | | | | | |

| Location | No. of samples | Min | Max | Average | St. D | % Error at 95% confidence |
|----------------------------|----------------|------|------|---------|-------|---------------------------|
| GW2 | 6 | 401 | 426 | 414 | 10.58 | 6.91 |
| GW3 | 6 | 828 | 860 | 844 | 12.51 | 8.17 |
| GW4 | 6 | 1238 | 1266 | 1252 | 11.45 | 7.48 |
| GW5 | 6 | 892 | 924 | 912 | 11.82 | 7.72 |
| GW6 | 6 | 720 | 739 | 730 | 6.78 | 4.43 |
| GW7 | 6 | 743 | 772 | 757 | 11.1 | 7.25 |
| GW8 | 6 | 624 | 645 | 636 | 8.12 | 5.3 |
| Chloride (mg/L) | | | | | | |
| GW1 | 6 | 54 | 76 | 68 | 8.02 | 5.24 |
| GW2 | 6 | 347 | 370 | 360 | 8.2 | 5.36 |
| GW3 | 6 | 231 | 423 | 385 | 75.68 | 49.44 |
| GW4 | 6 | 709 | 724 | 716 | 5.4 | 3.53 |
| GW5 | 6 | 680 | 722 | 706 | 14.75 | 9.64 |
| GW6 | 6 | 595 | 626 | 613 | 10.32 | 6.74 |
| GW7 | 6 | 255 | 278 | 268 | 9.14 | 5.97 |
| GW8 | 6 | 274 | 289 | 282 | 5.93 | 3.87 |
| Sulphate (mg/L) | | | | | | |
| GW1 | 6 | 26 | 40 | 35 | 5.18 | 3.38 |
| GW2 | 6 | 148 | 161 | 155 | 4.47 | 2.92 |
| GW3 | 6 | 259 | 275 | 266 | 5.93 | 3.87 |
| GW4 | 6 | 212 | 226 | 219 | 5.55 | 3.63 |
| GW5 | 6 | 432 | 446 | 440 | 5.51 | 3.6 |
| GW6 | 6 | 312 | 337 | 325 | 8.94 | 5.84 |
| GW7 | 6 | 220 | 236 | 229 | 5.66 | 3.7 |
| GW8 | 6 | 132 | 141 | 136 | 3.35 | 2.19 |
| Nitrate (mg/L) | | | | | | |
| GW1 | 6 | 1.1 | 2.1 | 1.6 | 0.4 | 0.26 |
| GW2 | 6 | 0.9 | 1.7 | 1.3 | 0.32 | 0.21 |
| GW3 | 6 | 1.7 | 2.3 | 2 | 0.24 | 0.16 |
| GW4 | 6 | 11.9 | 14 | 12.8 | 0.89 | 0.58 |
| GW5 | 6 | 6.6 | 7.3 | 7 | 0.26 | 0.17 |
| GW6 | 6 | 10.7 | 11.1 | 10.9 | 0.15 | 0.1 |
| GW7 | 6 | 17 | 25 | 21 | 3.22 | 2.1 |
| GW8 | 6 | 19 | 27 | 23 | 3.22 | 2.1 |
| Iron (mg/L) | | | | | | |
| GW1 | 6 | 0.75 | 0.81 | 0.78 | 0.03 | 0.02 |
| GW2 | 6 | 0 | 0.04 | 0.02 | 0.01 | 0.01 |
| GW3 | 6 | 3.3 | 3.9 | 3.6 | 0.24 | 0.16 |
| GW4 | 6 | 3.1 | 3.2 | 3.15 | 0.04 | 0.03 |
| GW5 | 6 | 2.65 | 2.75 | 2.7 | 0.03 | 0.02 |
| GW6 | 6 | 1.01 | 1.11 | 1.06 | 0.04 | 0.03 |
| GW7 | 6 | 0.15 | 0.19 | 0.17 | 0.02 | 0.01 |
| GW8 | 6 | 0.49 | 0.55 | 0.52 | 0.02 | 0.01 |
| No. of coliform MPN/100 mL | | | | | | |
| GW1 | 6 | 0 | 0 | 0 | 0 | 0 |
| GW2 | 6 | 0 | 1 | 0.33 | 0.52 | 0.34 |
| GW3 | 6 | 0 | 2 | 0.83 | 0.98 | 0.64 |
| GW4 | 6 | 0 | 3 | 1.17 | 1.17 | 0.76 |
| GW5 | 6 | 0 | 5 | 2 | 2.1 | 1.37 |
| GW6 | 6 | 0 | 4 | 2 | 1.9 | 1.24 |
| GW7 | 6 | 0 | 2 | 0.83 | 0.98 | 0.64 |
| GW8 | 6 | 0 | 0 | 0 | 0 | 0 |

Table 4. Physico-chemical characteristics of groundwater near Ghazipur landfill site.

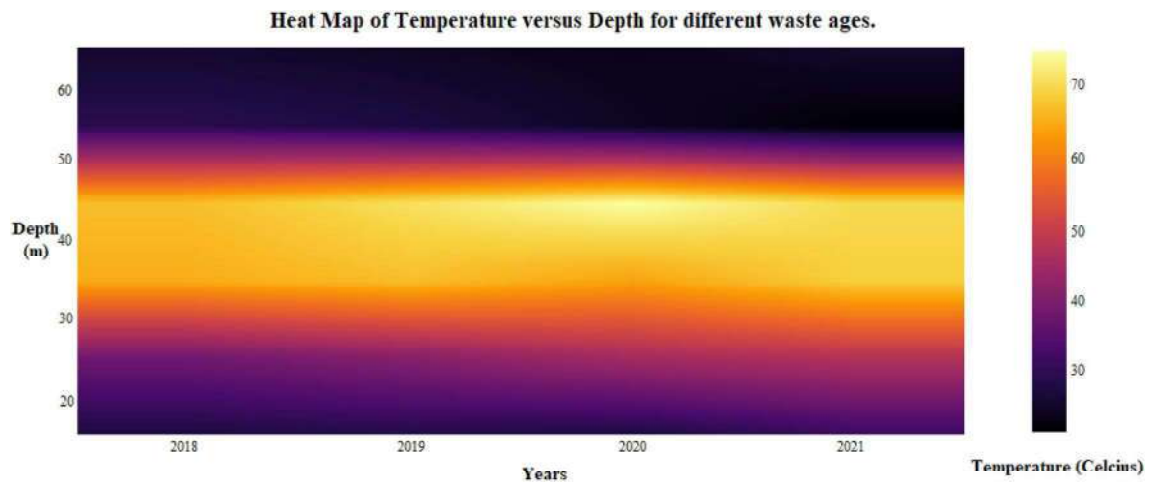


Figure 5. Temperature versus depth profile at different waste age.

| Parameter | Standard value | (Standard values) ⁻¹ | Observed value | W _n | Q _n | W _n Q _n |
|-----------------------|----------------|---------------------------------|----------------|----------------|----------------|-------------------------------|
| pH | 7.5 | 0.1 | 7.4 | 0.1 | 87.5 | 8.75 |
| Conductivity (mho/cm) | 300 | 0.0 | 2044.8 | 0.0 | 681.6 | 0 |
| COD (mg/L) | 4 | 0.3 | 39.5 | 0.1 | 987.5 | 98.7 |
| Hardness (mg/L) | 200 | 0.0 | 474.9 | 0.0 | 237.4 | 0 |
| Alkalinity (mg/L) | 200 | 0.0 | 379.5 | 0.0 | 189.8 | 0 |
| TDS (mg/L) | 500 | 0.0 | 731.1 | 0.0 | 146.2 | 0 |
| Chloride (mg/L) | 250 | 0.0 | 424.8 | 0.0 | 169.9 | 0 |
| Sulphate (mg/L) | 200 | 0.0 | 225.6 | 0.0 | 112.8 | 0 |
| Nitrate (mg/L) | 45 | 0.0 | 10.0 | 0.0 | 22.1 | 0 |
| Summation | | 0.4 | | | | 107.45 |

Table 5. Water quality index using BIS standards.

community involvement and public awareness initiatives to promote sustainable waste management procedures and an environmental protection policy in order to maintain groundwater resources for future generations.

Future prospects

The Ghazipur landfill is surrounded by the Hindon-Yamuna canal on two sides, ultimately falling into the Yamuna River. Due to the Ghazipur landfill, the subsurface water pollution will ultimately pollute or may be currently polluting one of the major rivers of India. Thus, the scope of this work may be further widened by developing a method to reduce subsurface pollution by incorporating various geosynthetic, clay or composite liner systems.

Furthermore, the water quality of the major surface water bodies surrounding the Ghazipur landfill site may be studied, and the effect of the subsurface water pollution, as reported in this study, can also be found. In addition, the concerned authorities must take note of the deteriorating underground water quality, and efficient water treatment plans must be designed to ensure a safe livelihood. The temporal variations of the landfill are another factor to be considered in compliance. The zone of maximum temperature continuously changes its dimensions (increasing), which is not suitable for the life of a landfill. The composition of the input waste must be carefully decided so that the temperature fluctuations are normalized. Another aspect to be taken care of is the increasing height of the landfill. However, utilizing existing processes to maintain the landfill height by integrating geoinforcements is necessary to assure stability and safety.

Conclusion

Leachate and groundwater samples were collected near the MSW Ghazipur landfill in Delhi and selected based on predetermined sampling points and distance from the site. Laboratory tests were conducted to assess their physico-chemical properties and parameters, following guidelines from the American Public Health Association's (APHA) Standard Methods for the Examination of Water and Wastewater. Leachate samples exhibited pH values ranging from 6.9 to 7.8, with significant alkalinity concentrations (2123–3256 mg/L) and high conductivity (1156–1405 mho/cm), indicative of dissolved particle presence. Leachate hardness ranged from 4312 to 5925 mg/L, while chloride concentrations varied from 176 to 2300 mg/L. Groundwater pH levels were higher

closer to the landfill, with conductivity ranging from 799 to 3568 mho/cm. Most groundwater wells exceeded the desired limits for total dissolved solids (TDS), chloride, hardness, and alkalinity, particularly in northern and north-western areas. Leachate from the landfill significantly influenced groundwater flow, decreasing steadily with distance north and westward, as demonstrated by spatial interpolation models. Temporal analysis revealed the landfill's classification as an elevated temperature landfill (ETL), with the highest temperature zone widening over time and moving towards the surface, raising concerns. However, no significant changes were observed in the width of zone 3. Apart from these conclusions, the study has some limitations, including overlooking long-term ecosystem and human health impacts, socioeconomic implications for nearby communities, and alternative waste management strategies. Addressing these gaps requires interdisciplinary research to ensure effective landfill management and pollution prevention.

Data availability

The data that support the findings of this study are available from [Pervez Alam]. Still, restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. However, data are available from the authors upon reasonable request and with permission of [Pervez Alam].

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References

- Demirbas, A., Alamoudi, R. H., Ahmad, W. & Sheikh, M. H. Optimization of municipal solid waste (MSW) disposal in Saudi Arabia. *Energy Sources A Recov. Utiliz. Environ. Effects* **38**, 1929–1937. <https://doi.org/10.1080/15567036.2015.1034385> (2016).
- Alam, S. S., Husain Khan, A. & Khan, N. A. Plastic waste management via thermochemical conversion of plastics into fuel: A review. *Energy Sources A Recov. Utiliz. Environ. Effects* **44**, 1–20. <https://doi.org/10.1080/15567036.2022.2097750> (2022).
- Khan, A. H. *et al.* Current solid waste management strategies and energy recovery in developing countries—State of art review. *Chemosphere* **291**, 133088. <https://doi.org/10.1016/j.chemosphere.2021.133088> (2022).
- Alam, P. *et al.* Energy generation and revenue potential from municipal solid waste using system dynamic approach. *Chemosphere* **299**, 134351. <https://doi.org/10.1016/j.chemosphere.2022.134351> (2022).
- Daniel, H. & Perinaz, B.-T. *What a Waste: A Global Review of Solid Waste Management* (World Bank, 2012).
- Kaza, S. & Yao, L. At a glance: A global picture of solid waste management. In *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050* (eds Kaza, S. *et al.*) 17–38 (The World Bank, 2018).
- Teng, C., Zhou, K., Peng, C. & Chen, W. Characterization and treatment of landfill leachate: A review. *Water Res.* **203**, 117525. <https://doi.org/10.1016/j.watres.2021.117525> (2021).
- Liu, Z., Wu, W., Shi, P., Guo, J. & Cheng, J. Characterization of dissolved organic matter in landfill leachate during the combined treatment process of air stripping, Fenton, SBR and coagulation. *Waste Manag.* **41**, 111–118. <https://doi.org/10.1016/j.wasman.2015.03.044> (2015).
- Jayawardhana, Y., Kumarathilaka, P., Herath, I. & Vithanage, M. Municipal solid waste biochar for prevention of pollution from landfill leachate. In *Environmental Materials and Waste* (eds Jayawardhana, Y. *et al.*) 117–148 (Elsevier, 2016).
- Baderna, D., Caloni, F. & Benfenati, E. Investigating landfill leachate toxicity in vitro: A review of cell models and endpoints. *Environ. Int.* **122**, 21–30. <https://doi.org/10.1016/j.envint.2018.11.024> (2019).
- Chidiac, S., El Najjar, P., Ouaini, N., El Rayess, Y. & El Azzzi, D. A comprehensive review of water quality indices (WQIs): History, models, attempts and perspectives. *Rev. Environ. Sci. Bio/Technol.* **22**(2), 349–395. <https://doi.org/10.1007/s11157-023-09650-7> (2023).
- Kurniawan, T. A., Lo, W. H. & Chan, G. Y. S. Physico-chemical treatments for removal of recalcitrant contaminants from landfill leachate. *J. Hazard. Mater.* **129**, 80–100. <https://doi.org/10.1016/j.jhazmat.2005.08.010> (2006).
- Brennan, R. B. *et al.* Management of landfill leachate: The legacy of European Union Directives. *Waste Manag.* **55**, 355–363. <https://doi.org/10.1016/j.wasman.2015.10.010> (2016).
- Kurniawan, T. A., Lo, W. & Chan, G. Y. S. Radicals-catalyzed oxidation reactions for degradation of recalcitrant compounds from landfill leachate. *Chem. Eng. J.* **125**, 35–57. <https://doi.org/10.1016/j.cj.2006.07.006> (2006).
- Robinson, H. D., Barr, M. J. & Last, S. D. Leachate collection, treatment and disposal. *Water Environ. J.* **6**, 321–332. <https://doi.org/10.1111/J.1747-6593.1992.TB00756.X> (1992).
- Robinson, H. D. & Barr, M. J. Last, SD: Leachate collection, treatment and disposal. *Water Environ. J.* **6**, 321–332. <https://doi.org/10.1111/J.1747-6593.1992.TB00756.X> (1992).
- Sun, X. *et al.* Evolution of geomembrane degradation and defects in a landfill: Impacts on long-term leachate leakage and groundwater quality. *J. Clean Prod.* **224**, 335–345. <https://doi.org/10.1016/J.JCLEPRO.2019.03.200> (2019).
- Zhang, J., Zhang, J. M., Xing, B., Liu, G. D. & Liang, Y. Study on the effect of municipal solid landfills on groundwater by combining the models of variable leakage rate, leachate concentration, and contaminant solute transport. *J. Environ. Manage.* **292**, 112815. <https://doi.org/10.1016/J.JENVMAN.2021.112815> (2021).
- Nyika, J., Dinka, M. & Onyari, E. Effects of landfill leachate on groundwater and its suitability for use. *Mater. Today Proc.* **57**, 958–963. <https://doi.org/10.1016/J.MATPR.2022.03.239> (2022).
- Chain, E. S. K. & DeWalle, F. B. Sanitary landfill leachates and their treatment. *J. Environ. Eng. Div.* **108**, 411–431 (1976).
- Lo, I. M. C. Characteristics and treatment of leachates from domestic landfills. *Environ. Int.* **22**, 433–442. [https://doi.org/10.1016/0160-4120\(96\)00031-1](https://doi.org/10.1016/0160-4120(96)00031-1) (1996).
- Mor, S., Ravindra, K., Dahiya, R. P. & Chandra, A. Leachate characterization and assessment of groundwater pollution near municipal solid waste landfill site. *Environ. Monitor. Assess.* **118**, 435–456. <https://doi.org/10.1007/s10661-006-1505-7> (2006).
- Lee, G. F. Solid waste management: USA lined landfill reliability. *Nat. Resour. Forum U. N. J.* **1**, 1 (2002).
- Pande, G., Sinha, A. & Agrawal, S. Impacts of leachate percolation on ground water quality: A case study of Dhanbad City. *Glob. NEST J.* **17**, 162–174 (2015).
- Khan, A. H. *et al.* Municipal solid waste generation and the current state of waste-to-energy potential: State of art review. *Energy Convers. Manag.* **267**, 115905. <https://doi.org/10.1016/j.enconman.2022.115905> (2022).
- Khan, A. H. *et al.* Evaluation of cost benefit analysis of municipal solid waste management systems. *J. King Saud Univ. Sci.* **34**, 101997. <https://doi.org/10.1016/j.jksus.2022.101997> (2022).
- Kjeldsen, P. *et al.* Present and long-term composition of MSW landfill leachate: A review. *Crit. Rev. Environ. Sci. Technol.* **32**, 297–336. <https://doi.org/10.1080/10643380290813462> (2002).
- Bhalla, B., Saini, M. S. & Jha, M. K. Characterization of leachate from municipal solid waste (MSW) landfilling sites of Ludhiana, India: A comparative study. *Int. J. Eng. Res. Appl.* **2**, 732–745 (2012).

29. Costa, A. M., de Souza Marotta Alfaia, R. G. & Campos, J. C. Landfill leachate treatment in Brazil—An overview. *J. Environ. Manag.* **232**, 110–116. <https://doi.org/10.1016/j.jenvman.2018.11.006> (2019).
30. Ketata, M., Gueddari, M. & Bouhlila, R. Use of geographical information system and water quality index to assess groundwater quality in El Khairat deep aquifer (Enfidha, Central East Tunisia). *Arab. J. Geosci.* **5**, 1379–1390. <https://doi.org/10.1007/s12517-011-0292-9> (2012).
31. Han, D. *et al.* Evaluation of the impact of an uncontrolled landfill on surrounding groundwater quality, Zhoukou, China. *J. Geochem. Explor.* **136**, 24–39. <https://doi.org/10.1016/j.GEXPLO.2013.09.008> (2014).
32. Cerne, O. & Junstedt, C. Landfill leachate sampling techniques. In *Linnaeus Eco-Tech* 279–281. <https://doi.org/10.15626/eco-tech.2001.034> (2019).
33. Adnan, M. *et al.* Characterization and process optimization for enhanced production of polyhydroxybutyrate (PHB)-based biodegradable polymer from *Bacillus flexus* isolated from municipal solid waste landfill site. *Polymers* **15**, 1407. <https://doi.org/10.3390/polym15061407> (2023).
34. Vasistha, P. & Ganguly, R. Water quality assessment in two lakes of Panchkula, Haryana, using GIS: Case study on seasonal and depth wise variations. *Environ. Sci. Pollut. Res.* **29**, 43212–43236. <https://doi.org/10.1007/s11356-022-18635-y> (2022).
35. Rowe, R. K. Short- and long-term leakage through composite liners. The 7th Arthur Casagrande Lecture. *Can. Geotech. J.* **49**, 141–169. <https://doi.org/10.1139/t11-092> (2012).
36. Yeşiller, N., Hanson, J. L. & Liu, W.-L. Heat generation in municipal solid waste landfills. *J. Geotech. Geoenviron. Eng.* **131**, 1330–1344. [https://doi.org/10.1061/\(ASCE\)1090-0241\(2005\)131:11\(1330\)](https://doi.org/10.1061/(ASCE)1090-0241(2005)131:11(1330)) (2005).
37. Han, B., Imhoff, P. T. & Yazdani, R. Field application of partitioning gas tracer test for measuring water in a bioreactor landfill. *Environ. Sci. Technol.* **41**, 277–283. <https://doi.org/10.1021/es061233e> (2007).
38. Rana, R., Ganguly, R. & Gupta, A. K. Indexing method for assessment of pollution potential of leachate from non-engineered landfill sites and its effect on ground water quality. *Environ. Monit. Assess.* **190**, 46. <https://doi.org/10.1007/s10661-017-6417-1> (2018).
39. Rana, R., Ganguly, R. & Gupta, A. K. Toxicity analysis and behavior of nano-particles in leachate from non-engineered landfill sites of Chandigarh, Mohali, and Panchkula cities-tricity. *Nanotechnol. Environ. Eng.* **8**, 615–627. <https://doi.org/10.1007/s41204-023-00322-z> (2023).
40. Ślomożyńska, B. & Ślomożyński, T. Physico-chemical and toxicological characteristics of leachates from MSW landfills. *Pol. J. Environ. Stud.* **13**, 627–637 (2004).
41. Wdowczyk, A. & Szymańska-Pulikowska, A. Comparison of landfill leachate properties by LPI and phytotoxicity—A case study. *Front. Environ. Sci.* **9**, 191. <https://doi.org/10.3389/FENV.S.2021.693112/BIBTEX> (2021).
42. Wdowczyk, A. & Szymańska-Pulikowska, A. Differences in the composition of leachate from active and non-operational municipal waste landfills in Poland. *Water* **12**, 3129. <https://doi.org/10.3390/w12113129> (2020).
43. Samudro, G. & Mangkoedihardjo, S. Review on bod, cod and bod/cod ratio: A triangle zone for toxic, biodegradable and stable levels. *Int. J. Acad. Res.* **2**, 4 (2010).
44. Kranner, I. & Colville, L. Metals and seeds: Biochemical and molecular implications and their significance for seed germination. *Environ. Exp. Bot.* **72**, 93–105. <https://doi.org/10.1016/j.envexpbot.2010.05.005> (2011).
45. Umar, M., Aziz, H. A. & Yusoff, M. S. Trends in the use of fenton, electro-fenton and photo-fenton for the treatment of landfill leachate. *Waste Manag.* **30**, 2113–2121. <https://doi.org/10.1016/j.wasman.2010.07.003> (2010).
46. Kumar, D. & Alappat, B. J. A technique to quantify landfill leachate pollution. In *Ninth International Landfill Symposium* 243–244 (2003).
47. Suprajha, G. S., Prasanna, K. & Sudarsan, J. S. Study on leachate pollution index in Big Lake, Pallavaram, Tamilnadu. *AIP Conf. Proc.* **2277**, 240006. <https://doi.org/10.1063/5.0025612> (2020).
48. Bisht, T. S., Kumar, D. & Alappat, B. J. Revised leachate pollution index (r-LPI): A tool to quantify the contamination potential of landfill leachate. *Process Saf. Environ. Prot.* **168**, 1142–1154. <https://doi.org/10.1016/j.psep.2022.10.052> (2022).
49. Hanson, J. L., Yeşiller, N. & Oettle, N. K. Spatial and temporal temperature distributions in municipal solid waste landfills. *J. Environ. Eng.* **136**, 804–814. [https://doi.org/10.1061/\(ASCE\)EE.1943-7870.0000202](https://doi.org/10.1061/(ASCE)EE.1943-7870.0000202) (2010).
50. Reinhart, D., Joslyn, R. & Emrich, C. T. Characterization of Florida, US landfills with elevated temperatures. *Waste Manag.* **118**, 55–61. <https://doi.org/10.1016/J.WASMAN.2020.08.031> (2020).
51. Stark, T. D., Martin, J. W., Gerbasi, G. T., Thalhamer, T. & Gortner, R. E. Aluminum waste reaction indicators in a municipal solid waste landfill. *J. Geotech. Geoenviron. Eng.* **138**, 252–261. [https://doi.org/10.1061/\(ASCE\)GT.1943-5606.0000581](https://doi.org/10.1061/(ASCE)GT.1943-5606.0000581) (2012).
52. Jafari, N. H., Stark, T. D. & Thalhamer, T. Progression of elevated temperatures in municipal solid waste landfills. *J. Geotech. Geoenviron. Eng.* **143**, 1683. [https://doi.org/10.1061/\(ASCE\)GT.1943-5606.0001683](https://doi.org/10.1061/(ASCE)GT.1943-5606.0001683) (2017).
53. Wang, Y. *et al.* Impact of incineration slag co-disposed with municipal solid waste on methane production and methanogens ecology in landfills. *Bioresour. Technol.* **377**, 128978. <https://doi.org/10.1016/j.biortech.2023.128978> (2023).
54. Hassan, M. A simulation of energy generation from Jatropha solid residues in a power plant in Jazan city, KSA. *Helion* **8**, e09352. <https://doi.org/10.1016/j.helion.2022.e09352> (2022).
55. Amir, M. *et al.* Isolation and optimization of extracellular PHB depolymerase producer *Aeromonas caviae* Kuk1-(34) for sustainable solid waste management of biodegradable polymers. *PLoS ONE* **17**(4), e0264207. <https://doi.org/10.1371/journal.pone.0264207> (2022).

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Author contributions

Conceptualization, Methodology, Software, Supervision: Pervez Alam, Afzal Husain Khan, Raisul Islam, Ehab Sabi, Data curation, Writing—Original draft: Pervez Alam, Afzal Husain Khan, Raisul Islam, Ehab Sabi, Tasneem Imtiyaz Zargar Visualization, Investigation: Pervez Alam, Afzal Husain Khan, Raisul Islam, Ehab Sabi, Tasneem Imtiyaz Zargar, Writing, review & editing: Pervez Alam, Afzal Husain Khan, Raisul Islam, Ehab Sabi, Tasneem Imtiyaz Zargar, Nadeem A Khan.

Competing interests

The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to A.H.K. or N.A.K.

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t.c.

**IN THE HON'BLE NATIONAL GREEN TRIBUNAL
VAKALATNAMA**

Prameya Foundation

Applicant/Petitioner

VERSUS

State of West Bengal & Ors.

Defendant/Respondent

KNOW ALL to whom these present shall come that I/We Sabyasachi Chowdhary the above named Applicant do hereby appoint (herein after called the advocate/s) to be my/our Advocate in the above noted case authorized him :-

**Ritwick Dutta, Rahul Choudhary, Kaustav Dhar Advocates,
N-73, Lower Ground Floor, Greater Kailash-I, New Delhi - 110048.**

To act, appear and plead in the above-noted case in this Court or in any other Court in which the same may be tried or heard and also in the appellate Court including High Court subject to payment of fees separately for each Court by me/ us. To sign, file verify and present pleadings, appeals cross objections or petitions for execution review, revision, withdrawal, compromise or other petitions or affidavits or other documents as may be deemed necessary or proper for the prosecution of the said case in all its stages. To file and take back documents to admit and/or deny the documents of opposite party.

To withdraw or compromise the said case or submit to arbitration any differences or disputes that may arise touching or in any manner relating to the said case. To take execution proceedings. The deposit, draw and receive money, cheque, cash and grant receipts thereof and to do all other acts and things which may be necessary to be done for the progress and in the course of the prosecution of the said case. To appoint and instruct any other Legal Practitioner, authorizing him to exercise the power and authority hereby conferred upon the Advocate whenever he may think it to do so and to sign the Power of Attorney on our behalf.

And I/We the undersigned do hereby agree to ratify and confirm all acts done by the Advocate or his substitute in the matter as my/our own acts, as if done by me/us to all intents and purposes.

And I/We undertake that I / we or my /our duly authorized agent would appear in the Court on all hearings and will inform the Advocates for appearance when the case is called.

And I /we undersigned do hereby agree not to hold the advocate or his substitute responsible for the result of the said case. The adjournment costs whenever ordered by the Court shall be of the Advocate, which he shall receive and retain himself.

And I /we the undersigned do hereby agree that in the event of the whole or part of the fee agreed by me/us to be paid to the Advocate remaining unpaid he shall be entitled to withdraw from the prosecution of the said case until the same is paid up. The fee settled is only for the above case and above Court. I/We hereby agree that once the fee is paid. I /we will not be entitled for the refund of the same in any case whatsoever. If the case lasts for more than three years, the advocate shall be entitled for additional fee equivalent to half of the agreed fee for every addition three years or part thereof.

IN WITNESS WHEREOF I/We do hereunto set my /our hand to these presents the contents of which have been understood by me/us on this 11 day of 09 2024.

Accepted subject to the terms of fees.

Ritwick Dutta

Rahul Choudhary

Kaustav Dhar, Advocates

PRAMEYA FOUNDATION

Treasurer

Sabyasachi Chowdhary Client

