

**REPORT
ON
STATUS OF MUNICIPAL SOLID WASTE
MANAGEMENT IN JODHPUR CITY**



2010-11



**Central Pollution Control Board
Central Zonal Office
Bhopal**



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**Central Pollution Control Board
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Status of Municipal Solid Waste Management in Jodhpur City

Executive Summary:

The increase in generation of solid waste is only the result of the rapidly growing human population and the adopted modern life style; the substantial increase in the solid waste generation resulting into the contamination of air, water and land resources. Municipal solid wastes, commonly known as trash or garbage, are the solid wastes generated from different municipalities. Some of these wastes have been proved to be extremely toxic and infectious. The uncontrolled and unscientific dumping of such wastes has brought about a rising number of incidents of hazards to human health. Contamination of surface and ground water arose more serious human health risk.

Realizing the need for proper and scientific management of solid waste and based on the recommendations of the various committees and of the Supreme Court Committee the Ministry of Environment & Forests notified the Municipal Solid Waste (Management & Handling) Rules, 2000 under the Environment (Protection) Act of 1986. The objective of these Rules was to make every municipal authority responsible for the implementation of various provisions of the Rules within its territorial area and also to develop an effective infrastructure for collection, storage, segregation, transportation, processing and disposal of Municipal Solid Wastes (MSW). The indiscriminate dumping of municipal solid wastes in water bodies and low lying areas is a common practice followed by most of the municipalities with no consideration of its effect on the environment. Moreover, the lack of the basic information regarding generation, collection, transportation and disposal of solid waste was noted.

The non-serious efforts for the proper segregation of waste at source as well as at the disposal site is one of the biggest problem for this most visible, unpleasant odour, potential diseases carrier waste. The poor practise of non-segregated waste, containing some toxic material, chemicals and animal bodies/wastes etc. going into the municipal waste stream end up in the landfills, which serve as dump yards and dump sites. The waste is being disposed in an unscientific manner, which causes serious environmental problems.

As Central Pollution Control Board was identified as the nodal agency to monitor the MSW (Management & Handling) Rules, 2000 implementation directly in the Union territories and in the case of the States through State Pollution Control Boards. In exercise of the same Zonal Office, Bhopal planned to check the status of MSW Rules implementation in the City Jodhpur of State Rajasthan.

A Centrally sponsored scheme started in year 2002-03 to enable the concerned towns to take action for proper Solid Waste Management and drainage which will avoid air crashes in the Air-field towns. The Detailed Project Report (DPR) for Jodhpur was submitted by National Buildings Construction Corporation (NBCC) and approved by the Central Public Health and Environmental Engineering Organisation (CPHEEO), a department under the Ministry of Urban Development (MoUD) and the fund was sanctioned for implementation.

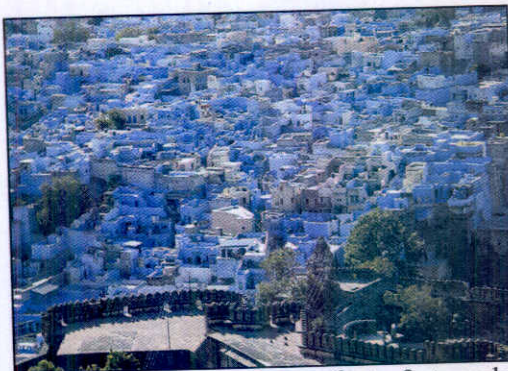
As the Jodhpur city is an Air-field town, Zonal office, Bhopal proposed a project under Annual Action Plan 2010-11 to 'Study the performance of MSW Jodhpur' to get the status of practices followed to implement the MSW Rules, 2000.

The poor waste collection facility was seen throughout the city Jodhpur. It was observed that because of the Carcass plant nearby the MSW processing unit Air-craft crashes possibility increases.

Jodhpur Municipality Corporation should to involve more waste collection vehicles also instruct concern to stop dumping of dead animals near to MSW site to avoid any Air crashes.

1.0 Introduction:

Jodhpur (geographical area of 22850 Km² The district stretches between 26°29' to 27°37' at north Latitude and between 72°55' to 73°52' at East Longitude) the second largest city in the state of Rajasthan. The city's population and density by the end of 2010 is 1,110,000 and 11,210/Km² respectively. A popular tourist place for its palaces, forts & temples



and the view of Sunset in Thar Desert. For the bright, sunny weather the city is known as 'The Sun City' and also known as '**The Blue City**' due to its blue-painted houses around the Mehrangarh Fort. Due to the Pakistan border near to the City. It has its military air-base.

This district comes under arid zone of the Rajasthan state. It covers 11.60% of total area of arid zone of the state. Some of the area of Great Indian Desert THAR also comes with in the district. Despite its arid climate, Jodhpur is blessed with a variety of flora and fauna.

Extreme of heat in summer and cold in winter is the characteristic of the desert. Jodhpur is no exception. The temperature varies from 49⁰C in summer to 01⁰C in winter. The Sandstorm (andhi) spectacle for people from other region of India. The rainy days are limited to maximum 15 in a year. The average rainfall is 302 mm.

1.1 Importance of proper MSW management:

The out-dated, inefficient, institutional weakness, shortage of working manpower, inadequate financial resources, improper choice of technologies, inadequate coverage of areas & poor short & long term waste management planning are few of the reasons why the MSW management system in India is lacking to desired level. The City Jodhpur is also facing these deficiencies in varying degrees and there is a need to make substantial improvement in the MSW practices prevailing in the city to raise the standards of health, sanitation and urban environment keeping pace with the rapid urbanization and growing population.

The adverse effects on environment due to un-scientific management of waste disposal are well known. These are as follow:

- ♣ Ground and Surface water pollution
- ♣ Air pollution due to bad odour of the waste
- ♣ Green-house-gases i.e. Carbon di oxide
- ♣ Harmful effects of rats, stray animals, flies, mosquitoes, germs and other insects
- ♣ Increase in acidity of soil near the garbage heaps
- ♣ Probability of diseases and epidemics
- ♣ Health related problems for rag pickers

In the view of above, studies were taken up to assess the contamination status in and around the dumpsites of the city. The ambient air quality (SPM, SO₂, NO₂ and NH₃) and ground water (physico-chemical parameters) monitoring was carried out and samples were analysed at CPCB, Zonal Office, Bhopal laboratory.

1.2 Present Scenario - Jodhpur city:

Most of the population does not store the waste at source and instead dispose the waste into the municipal bins, streets, open spaces, drains, etc as and when waste is generated. Segregation of recyclable waste is not practiced. Most of the recyclable material is disposed of along with domestic and trade waste. Therefore, recyclable waste is generally found mixed with garbage on the streets, into the municipal bins and at the dumpsites from where part of this waste is picked up by the rag pickers. There is no system of door-to-door collection of waste except in few housing societies earlier in year 2008 M/s **Kanak Resource Management**, Jodhpur was given a tender for the door- to-door collection but the groups worked only for one year and stopped to do it further due to some financial crisis. Street sweeping is thus the only method of primary collection of waste.

There has been a significant increase in the generation of municipal solid waste in Jodhpur over the last few decades. The daily estimated generation of municipal solid waste in Jodhpur city is about 300 to 350 MT/Day, which is collected through street sweepings and from communal waste storage sites. The quantity of waste generally collected and transported to the waste processing site is only about 100 MT/Day, which is about 35% of the waste generated in the city. Remaining solid waste not being transported is the main concern of all visible solid waste pollution in Jodhpur city.

Jodhpur, being a heritage and tourist city, there are many hotels and restaurants in the city. Arrangements of primary collection of waste from hotels and restaurants are not yet made. These establishments, therefore, dispose of their waste on the nearby open space or into the municipal bins.

Adequate storage facilities were not provided in the main vegetable, fruits and fish markets. The market waste is thrown in open space leading to unhygienic conditions and unbearable odour.

Near the waste processing site, Keru village, a private operator is transporting & incinerating the waste to common biomedical waste treatment facility, where proper

disposal of waste is being done as per the guidelines. Some pathology labs, small nursing homes, dental clinics, clinics and dispensaries were disposing their waste along with municipal solid waste.

1.2.1 Collection of Municipal Solid Waste

The storage of MSW at the source is substantially lacking throughout the Jodhpur city. The bins are common for both decomposable and non-decomposable waste (no segregation of waste is performed). Storage bins classified as movable bins and fixed bins. The movable bins are flexible in transportation but lacking in durability,



while the fixed bins are more durable but their positions cannot be changed once they

have been constructed. A sweeper who sweeps the roads manually is allotted a specific area. The sweepers put the road wastes into a wheelbarrow and then transfer the waste to dustbins or collection points.

Very poor storage and collection practice was seen in the city. It was seen that sweepers are not doing their road sweeping duties regularly and sincerely also peoples of Jodhpur were also found less aware to throw the waste into the fixed or movable bins. The mixed waste was seen inside & outside the bins states that segregation of waste is not being done seriously. The stray animals



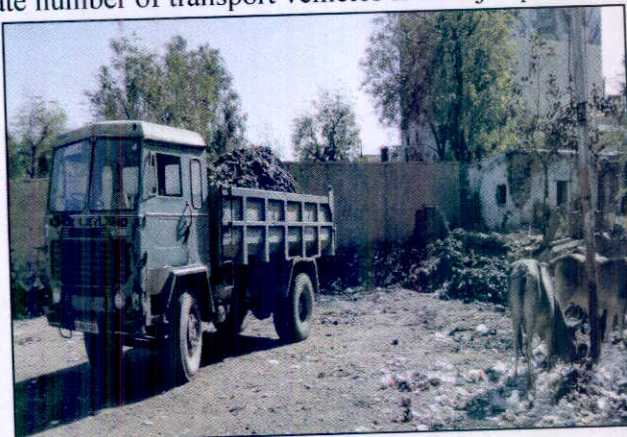
were also seen around the bins as the waste was not also throwing outside the bins. The conditions of plastic & cemented bins were very bad as all were broken. Out of the 15 lakhs of population total generation of municipal waste is 300-350 MT/day.

Out of that only 100 MT/day is being collected through trucks, tractors deputed by municipality. The received 100 MT/day of waste at processing site is being used for composting the rest is being disposed to the backyard of site.

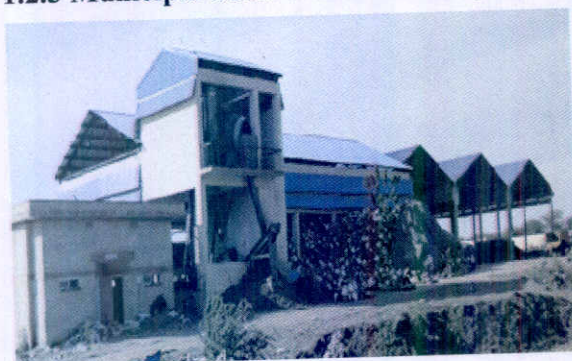
1.2.2 Transportation of Municipal Solid Waste

Transportation of waste is done through a variety of vehicles such as three-wheelers, tractors and trucks. The transport vehicles are loaded manually and these are used for two-three shifts in a day. Inadequate number of transport vehicles is a major problem.

The transportation system also does not synchronize with the system of primary collection and bulk waste storage facilities. Multiple manual handling of waste becomes necessary. During the study period, it was observed that vehicles transporting waste were not covered with the tarpaulin/plastic sheets.

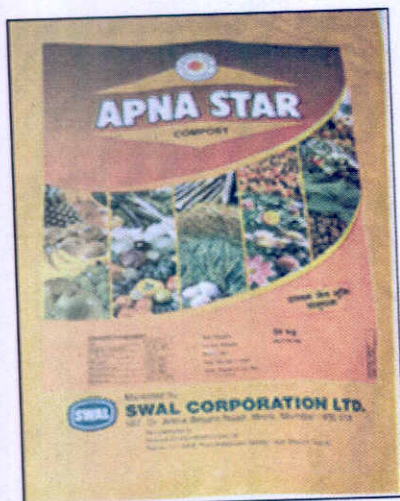


1.2.3 Municipal Solid Waste Process plant



Municipal Solid waste treatment & processing plant (Plant area 48 Acres) at village Keru, Jodhpur 30 Kms away from the Ratanada, Airport operating by M/s U P L Environmental Engineers Ltd. The processing plant is the result of

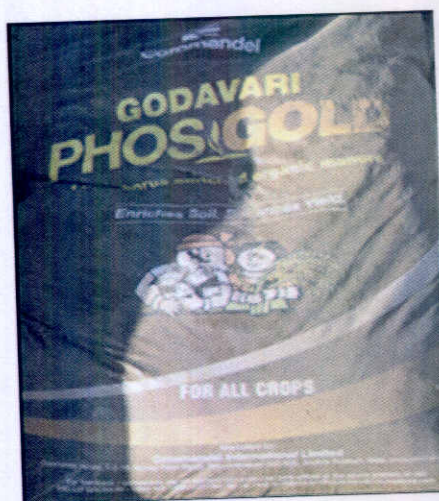
Central Government scheme of establishment of Municipal Solid Waste processing plant in the Air-based town. The Detailed Project Report (DPR) for Jodhpur was submitted by National Buildings Construction Corporation (NBCC) under Solid Waste management scheme for mitigation of bird hit menace to Indian Air Force (IAF) air crafts, Jodhpur and approved by the Central Public Health and Environmental Engineering Organisation (CPHEEO), a department under the Ministry of Urban Development (MoUD) and the fund was sanctioned for



implementation. The processing unit at Keru village of 150 MT/day capacity was commissioned on February, 2007. The receiving of waste started from November, 2007 for the compost & vermi-compost production. As the waste received is only about 100MT/day in that after screening of the waste is being use for composting and bio-composting. The received waste contains polythene, rubber, stones, iron, sand, cloth, wood, foam, leather and vegetables. The processing unit is making compost

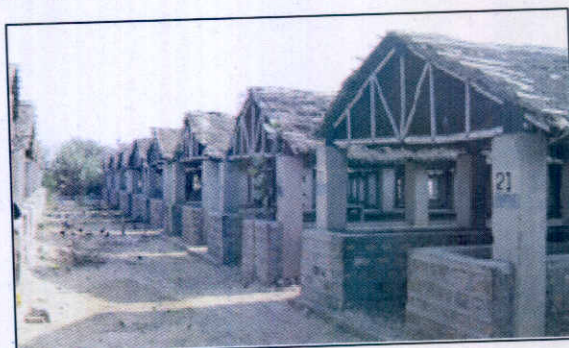
with two brand names i.e. **PhosGold, Godavary** sold to Sikandarabad and **Apna Star**

Compost sold locally. 10-15 MT/day is the production of compost selling at the price of 1-2 Rs/Kg. The windrow technology is being used for the compost manufacturing. Water spraying on the waste is done for three times a week. To compost the waste first it is segregated properly and moisture is to be maintained. After this the segregated waste for the compost is being fed to 35 mm , 16mm trommle machine respectively, the reject of these machine is sent to landfill



area (spread in 20 acres area). After curing (maintain the moisture to 15%) the waste for compost fed into Refinement (Sieve of 6mm, 4mm & 2mm) & metal separator sections. The compost after 40 days of process is ready to mix with rock phosphate in ratio of (630 gms Compost : 370 gms Rock phosphate) and the final product is being packed and sold in the market with a trade name. The flow chart of the compost preparation by MSW is given in **Annexure – I**.

Vermi-composting of organic waste is also being done at this processing plant. There are total 68 huts provided for the same. Moisture is maintained through timely water spraying & earthworms are being fed in the organic waste-cum-



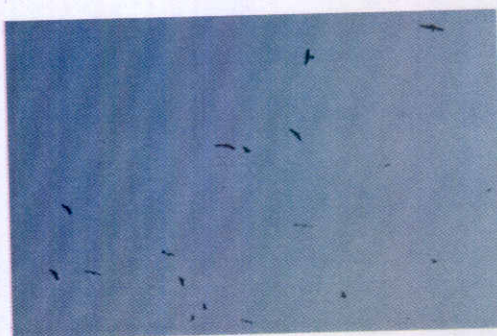
animal dung. Only 10 huts are in operation due to less amount of received organic waste. Total 1 to 3 MT/monthly is the production of vermi-compost sold at the rate of 2-3 Rs/Kg of vermi-compost.

On site fire in the landfilled waste was seen, it was also informed that this happens many times a month. 50 KL of water tank is provided to cop up with the fire-incident & municipality fire-brigade is also being informed for the same.

Fencing was done around the boundary of plant area whereas broken at some places due to animal movements in night.

About 1000 tress are planted e.g. Babool, Ashoka, Neem and Kaner along with the flower garden.

Just near to the waste processing plant a Carcass plant to make the Murgi-Daana from the dead animals flesh. The dead animals are being thrown in front of the Carcass plant causing severe air pollution along with the unbearable smell. The birds like Vulchers are very common here to result in any Air crashes.



It was informed by RSPCB; Jodhpur that the MSW processing site is not working properly and after repeated renewal notices from RSPCB no serious action was taken by the unit's authorities.

1.2.4 Disposal of Municipal waste

The MSW of Jodhpur city was being dumped on unauthorised sites or was used to fill up the pits or low lying areas. Dumping site at Keru (15 KM away from the city Jodhpur) where untreated 300-350 tonnes of MSW was being dumped daily, was situated in catchment area of Kaylana water storage tank of Public Health and Engineering Department (PHED) and Umaid Sagar of Irrigation Department, ignoring health hazards due to contamination of surface water being supplied to Jodhpur city for drinking. The waste processing site is also situated here & having its own municipal landfill site behind the plant in the area of 20 Acres. A Carcass plant to make the Murgi-Daana from dead animals flesh is also running near the site. Dead animals are being dumped in front of the Carcass plant causing serious environmental nuisance. It was also seen that municipality workers are even not disposing the waste to the approved landfill site and dumping the waste on the roadsides.

It was also informed that fire incidents are very much common here in the municipal waste. Fire-brigade is being informed immediately to cop-up with the fire incidences however a temporary arrangement is being done by the waste processing sites officials.

The leachate tank is of HDPE liner to avoid ground water contamination. As the waste received from the city is normally dry, so leachate generation quantity is very less.

2.0 Present study:

The present Municipal Solid Waste Management system at Jodhpur city is not effective to comply with the Norms of the MSW (Management & Handling) 2000 Rules. Jodhpur Municipal Corporation (JMC) adheres to the traditional approaches of collection and disposal of MSW. Due to non-segregation of waste, toxic materials (chemicals), even animal bodies/wastes were also seen entering the municipal waste stream ending up at the landfills, which serve as dumping yards. The Zonal Office, CPCB, Bhopal proposed to study the present status so that the system could be improved.

2.1 Objective of studies:

Studies were taken up to assess the contamination status in and around the Municipal Solid Waste dump sites at Jodhpur. The ambient air quality (SPM, SO₂, NO₂ and NH₃) and ground water (for physico-chemical parameters) were monitored during 2010-11.

2.1.1 Material & Methods

Ambient air monitoring was carried out at two locations for eight hourly basis. The sampling duration was decided as 8 hours at an average flow rate of 1.1 m³/min for suspended particulate matter and 1 LPM for gaseous pollutants.

The Respirable (RSPM) was collected on a G/F filter paper, whereas the Suspended Particulate Matter (SPM) was collected in a dust collector. Samples for determination of SO₂ and NO₂ were collected by bubbling air samples in an appropriate absorbing media in impingers at a flow rate of 1 LPM.

Improved West and Gaeke method for SO₂ - The ambient air is absorbed in a solution of sodium tetrachloromercurate and analysed by colorimetric technique.

Modified Jacob and Hochheiser method for NO₂- ambient air is absorbed in a solution of sodium hydroxide and sodium arsenite and analysed by colorimetric technique.

Monitoring of ammonia was also done at selected locations. Ammonia was measured by Indophenol method by absorbing the air sample in 0.1N H₂SO₄. Ground water samples were collected for various parameters like pH, chloride, sulphate, total solids were analysed at Zonal office, Bhopal laboratory as per CPCB methods.

2.1.2 Sampling locations

In order to assess the contamination status with respect to the emission sources of particulate matter and gases around the processing plant two sampling stations were established as AAQM-1 to AAQM-2. Total fourteen samples of all air pollutant (SO₂, NO₂, NH₃ & SPM) were collected from two different locations using Respirable Dust Samplers (RDS) & Handy-samplers.

Location details of the monitoring stations are given below:

1. **AAQM-1** : Near Weigh-bridge
2. **AAQM-2** : Near processing plant

The backyard of processing plant is being used as trenching/dumping site. There are chances of the serious ground water pollution in future because of nearby Carcass plant and dead animals dumping site. The ground water samples were taken from bore-wells to assess the present water quality status. Details of the ground water monitoring stations are given below:

1. Biomedical Waste Treatment Plant
2. Near to Carcass plant
3. Near to Vermi-composting area

3.0 Results and discussion:

3.1 Ambient air quality

The data of average concentrations of four air pollutants - Suspended Particulate Matter, Sulphur dioxide, Nitrogen dioxide and Ammonia during the study period is provided in **Tables I**.

The estimated SPM concentration in the ambient air of the three sampling sites varied between **82 to 118 $\mu\text{g}/\text{m}^3$** . The primary sources of dust are windblown soil /MSW materials (usually occur in the district) and processing plants activity.

SO₂ values were Below the Detectable Limits (BDL) at all the locations and the NO₂ concentrations were in the range of **09 to 18 $\mu\text{g}/\text{m}^3$** . These concentrations were well within the acceptable limits. Ammonia (as NH₃) concentration in the ambient air varied between **45 and 90 $\mu\text{g}/\text{m}^3$** .

The biological and chemical processes that occur in open dumps produce strong odour, which contaminate the adjacent environment. Fires periodically break out in open dumps, generating smoke and high particulate matter in the region.

3.2 Ground Water Quality

The results of the physico-chemical parameters of ground water in and around the waste dumpsites are presented in Table - II. Three ground water samples were collected 09 December, 2010. The TDS of the water samples in the study area varied from **822 to 1,136 mg/L**, indicating the ionic contamination of ground water due to garbage dumping higher at Carcass plant. Although there is no specific limit for conductivity, but it indicates the soluble ion concentration of the water. The electrical conductivity of water samples varied from **939 to 1,500 $\mu\text{S}/\text{cm}$** . Maximum values of TDS and conductivity was observed at Carcass plant, where un- scientific dumping of dead animals was continued from a long time.

The pH of ground water of the area varied from **7.3 to 8.5**. In the present area, the chloride content of the water samples varied from **18 to 36 mg/L** and the concentration of sulphates in ground water was detected upto **86 mg/L** in the study area. All the concentrations are well within the prescribed limits of **IS 10500:1991**.

4.0 General Observations

- (a) It was observed that very poor community garbage collection facility is in practices all over the Jodhpur city.
- (b) The cemented & plastic bins at many places of Jodhpur area were very dirty, overflowing and broken. People, often threw the garbage out side the bins. The nuisance of huge garbage on roads and sorting by the rag pickers or moving stray animals on the streets, present very ugly scene.
- (c) It was observed at many places in morning, thick black smoke spread over large areas on the roads due to burning of leaves, plastics and other wastes.
- (d) Most of the drains beside the road were found choked due to the indiscriminate dumping of garbage.
- (e) The use of commercial trucks with or without hydraulic tipping arrangement for waste transportation was very common in Jodhpur city. It has a carrying capacity of 3.5 to 8.0 MT waste at a time. Garbage from the roadside bins is lifted manually and hydraulically into the trucks. Besides this, tractor, dumper placer, mobile compactor etc. were also used to transport MSW to the dumping site.
- (f) Dumping of Municipal Solid waste on the unauthorized land is in regular practice. To stop this unauthorized dumping practice RSPCB has already made directions & notices, however action from Municipality is still awaited.
- (g) The un-scientific dumping of dead animals was un-hygienically creating many problems in village Keru.
- (h) The vultures are common here in this dumping area.
- (i) Presently, Jodhpur has one dumping site at Keru village also the refused waste of processing plant is also being dumped backside the plant area where unscientific dumping is continued from a long time. Due to this, there was a possibility of percolation of heavy metals from garbage into the groundwater.
- (j) It was observed that records and documents related to the dumping of waste at each dumpsite were not maintained properly.
- (k) It is estimated that 300 to 350 MTD of solid waste is generated in the city through street sweeping and from the communal waste storage sites. Out of that only 100 MTD is accepted by processing plant and rest is send to dumping site.

- (l) It was observed that proper fencing, approach road, light is being provided however the monitoring facility for pollution measures and pesticide spray to control flies etc. were not available at the dumping sites.
- (m) Significant quantity of garbage was observed near the multi-storied buildings and big apartments due to the absence of the collection bins and closed campus system.

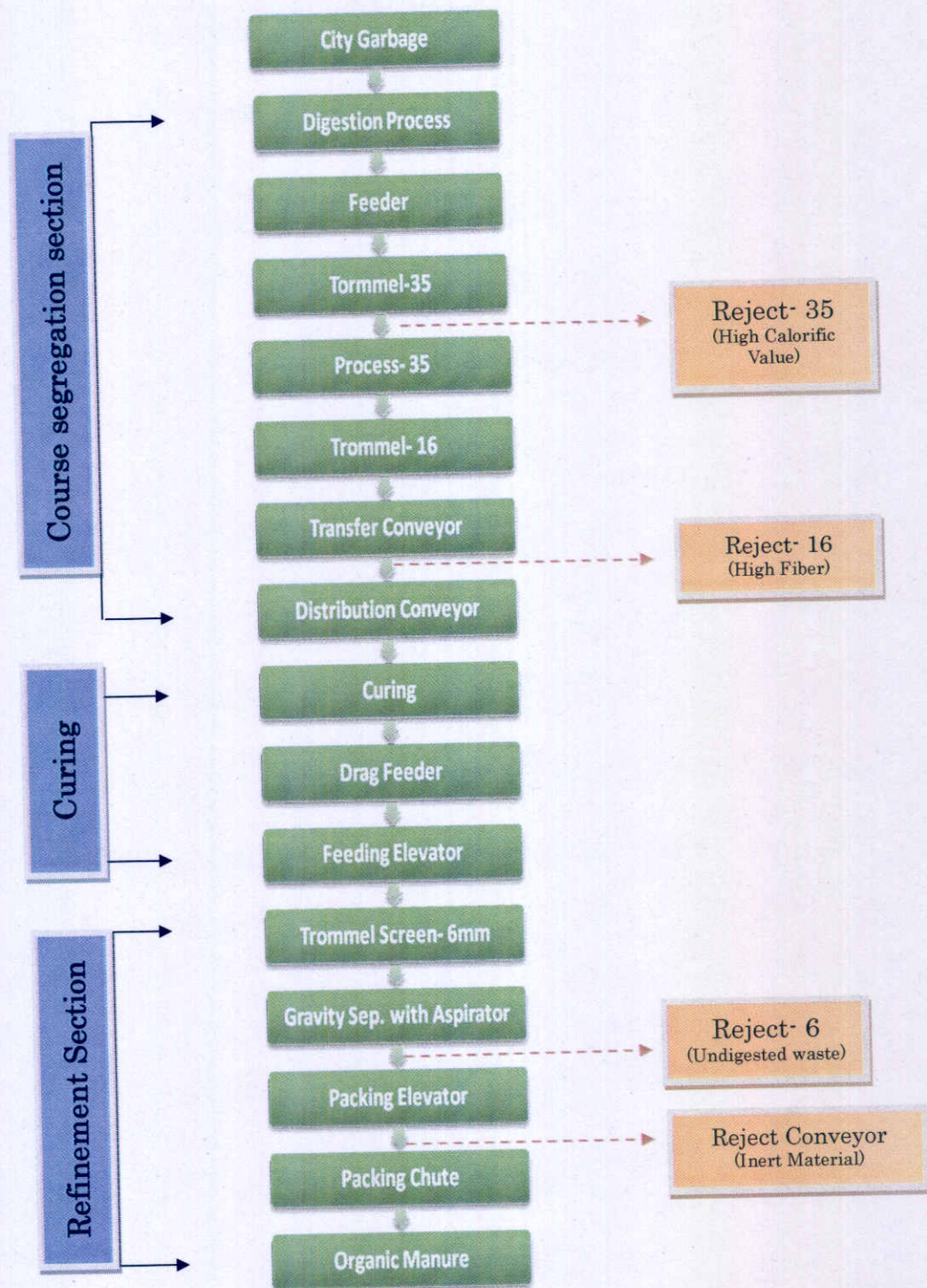
5.0 Recommendations:

- (a) To direct Municipality of Jodhpur to authorize the dumping site as well as the dumping site of MSW processing plant for non-compliance.
- (b) To avoid any air-crashes nearby Carcass site, the dumping of the dead animals should be avoided.
- (c) To develop sanitary landfill sites as per guidelines of MoEF.
- (d) To provide sufficient community garbage storage facilities in the slum area is a pre-requisite to better management of MSW.
- (e) To stop and prevent open burning of tree leaves and other waste by sweepers on the roadside and direct them to take all the waste to the communal waste storage bins/sites only.
- (f) To avoid throwing waste in the open drains to prevent drain choking. To clean the drains in regular basis to permit free flow of wastewater.
- (g) To assess the pollution load, monitoring facility should to be developed at processing plant area.
- (h) To store, transport and dispose industrial waste as per the guideline of SPCB. However, The JMC may act as catalyst by helping industries located in large & small industrial area to procure land and in the transport and dispose off non-hazardous industrial waste on cost recovery basis.
- (i) To spread mass awareness through messages like "Clean Jodhpur, Green Jodhpur" or 'Keep your waste unmixed' etc. and cartoons related to MSW management can be painted on the JMC vehicles, Public buses or private buses for public awareness.
- (j) To spread awareness through cable TV and local channels as these are very powerful media to create awareness for public about solid waste management in the city. NGOs with good mass communication skills can develop good education programmes for the public on the new solid waste management

strategies either through direct support or through use of JMC facilities.

- (k) To encourage Social Clubs to sponsor many events to keep the topic of Solid Waste Management in city alive and design programmes every week or month. Ward committees should use their good offices for public involvement to make their wards litter free and clean. Healthy competitions among the wards may be organized by the JMC. Corporation may also announce rewards to the employees contributing to the cleanliness of city.

Flow chart of Compost preparation



**MSW status at Jodhpur city with cross-references to Municipal Solid Waste
(Management and Handling) Rules, 2000**

Schedule-I

S. No.	Compliance Criteria	Status
1.	Setting up of waste processing and disposal facilities- latest by Dec.2003	Waste processing & disposal site was commissioned on February, 2007.
2.	Monitoring the performance of waste processing and disposal facilities- Once in six months	Not Complied
3.	Improvement of existing landfill site as per provisions of these Rules- latest by Dec.2001	Not Complied
4.	Identification of landfill site for future use and making site(s) ready for operation- latest by Dec.2002	Not Complied

Schedule-II

S. No.	Parameters	Compliance criteria	Status
1.	Collection of Municipal Solid Waste	(i) Organizing house-to-house collection of municipal solid waste through any of the methods like community bin collection, house-to-house collection.	Very Poor status
		(ii) Devising collection of waste from slums and squatter areas or localities including hotels, restaurants, office complexes and commercial areas.	Not Complied
		(iii) Wastes from slaughterhouses, meat and fish markets, fruits and vegetable markets, which are biodegradable in nature shall be managed to make use of such waste.	Not Complied <i>(Thrown near to Carcass Plant of Keru Village)</i>
		(iv) Bio-medical wastes and industrial waste shall not be mixed with municipal solid waste and such wastes shall follow the rules separately specified for the purpose.	Complied <i>(BMW facility is provided at Keru village)</i>
		(v) Waste (garbage, dry leaves) shall not be burnt	Not Complied
		(vi) Stray animals shall not be allowed to move around waste storage facilities or at any other place in the city or town and shall be managed in accordance with the State laws.	Not Complied
2.	Segregation of Municipal Solid Waste	In order to encourage the citizens, municipal authority shall organize awareness programmes for segregation of waste and shall promote recycling or reuse of segregated materials.	Partially Complied
3.	Storage of Municipal Solid Waste	Municipal authorities shall establish and maintain storage facilities in such a manner as they do not create unhygienic and in sanitary conditions around it. Following criteria shall be taken into account while establishing and maintaining storage facilities namely.	Poorly maintained
4.	Transportation	Vehicles used for transportation of waste	

	of Municipal Solid Waste	shall be covered. Waste should not be visible to public, or exposed to open environment preventing their scattering.	Partially Complied
5.	Processing of Municipal Solid Waste	Municipal authorities shall adopt suitable technology or combination of such technology to make use of wastes so as to minimize burden on landfill i.e. biodegradable waste shall be processed by composting, vermicomposting, anaerobic digestion etc.	<i>Waste processing plant to compost & biocomposting is in the Keru village</i>
6.	Disposal of Municipal Solid Waste	Land filling shall be restricted to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing.	Complied

Schedule-III

S. No	Specification for Landfill Sites	MSW dump site Jodhpur
1.	Site Selection	Two dump site were seen; at one place municipality is dumping & behind the processing plant reject of received waste for composting is being dumped
2.	Facilities at the Site	<p>Approach & other internal roads and fence /boundary wall at dumpsite exist the sites. Weigh bridge working in good condition and record related dumping of MSW was maintained properly at both the sites.</p> <p>The following facilities as per MSW Rules, 2000 are not available at the site:</p> <ul style="list-style-type: none"> (i) Protection to prevent entry of unauthorized persons and stray animals is partially managed as the fencing was destroyed by animals. (ii) Inspection facility to monitor wastes brought in for landfill, equipment and machinery and pollution monitoring equipment were not provided.
3.	Specification for land filling	Leachate tank with HDPE liner provided but due to dry & less waste leachate tank was empty
4	Pollution Prevention	<p>The following provisions were not provided:</p> <ul style="list-style-type: none"> (i) Preventing run-off from landfill area. (ii) Water Quality Parameters: piezometric holes were not provided; hence ground water from nearby area was collected. <p>Air Quality Data: The values of SPM, SO₂, NO₂ and NH₃ well within the limits at the time of monitoring.</p> <p>Vegetative covers shall be improved around the plant area.</p>

Table I: Ambient Air Monitoring at MSW Site Keru Village, Jodhpur

S. No	Time	Near Weigh-bridge				Near Compost plant			
		SO ₂	NO ₂	NH ₃	SPM	SO ₂	NO ₂	NH ₃	SPM
Sampling Date: 24.03.2011									
01	10am -- 2pm	BDL	09	45	82	BDL	11	76	118
02	2pm --- 6pm	BDL	18	59		BDL	15	90	

All values are in $\mu\text{g}/\text{m}^3$

Table II: Ground Water Analysis Report

Sample collection: 09 December, 2010

S.No.	Locations	pH	Conductivity (μS)	TS	TDS	Cl ⁻	SO ₄ ⁻²
1.	Biomedical Waste Treatment Plant	7.7	939	933	914	21	86
2.	Carcass Plant	7.3	1500	1154	1136	36	22
3.	Vermi-compost Plant	8.5	1115	830	822	18	40

All values are in mg/l, except pH and conductivity in $\mu\text{S}/\text{cm}$