

18.4.13 Telangana
Tribunal

**BEFORE THE NATIONAL GREEN TRIBUNAL, PRINCIPAL
BENCH, NEW DELHI**

ORIGINAL APPLICATION NO.199 OF 2014

Almitra H. Patel & Anr.

Applicants

Versus

Union of India & Ors.

Respondents

**DETAILED REPORT OF MUNICIPAL SOLID WASTE
MANAGEMENT IN TELANGANA WITH SUPPORTING
AFFIDAVIT**

PAPER BOOK

FOR INDEX PLEASE SEE INSIDE

ADVOCATE FOR THE RESPONDENT: S. UDAYA KUMAR SAGAR

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MUNICIPAL SOLID WASTE MANAGEMENT IN TELANGANA - DETAILED REPORT**BACKGROUND:**

The Hon'ble National Green Tribunal, New Delhi in its judgment dated:02.12.2012 in O.A No. 199 of 2014 have issued directions to all the State Governments to study orders in Appeal No.70 of 2014 in the case of Capt. Mall Singh & others Vs Punjab PCB & others regarding the methodology and steps that are to be taken by the States/State Boards for collection and disposal of Municipal solid waste and that if any suggestion are to be moved by the parties in relation to the said judgment is should be moved within two weeks.

Further, the Hon'ble National Green Tribunal in its orders dated:15.01.2015 in O.A No.199 of 2014 directed the Secretaries, Local Bodies and Urban development of the defaulting States, to be personally present before the Tribunal on the next date of hearing with complete records and proposed project reports which should be well considered in all respects including the plan expenditure for establishment of such plants in accordance with judgment of Capt. Mall Singh & others Vs Punjab PCB & Others- Appeal No.70 of 2012. It was also directed to submit report one week prior to the date of hearing. The case is posted to 5.2.2015.

In obedience to the above orders, a detailed affidavit was filed by the Principal Secretary, MA&UD Department, Telangana in the Hon'ble National Green Tribunal on 29.1.2015.

The Hon'ble National Green Tribunal in the Judgment dt 5.2.2015 have cancelled all the report submitted by the States and granted three weeks time by way of last opportunity for filling status reports with complete reply/suggestions based upon and reference to the judgment of the Tribunal in the case of "Capt. Mall Singh & others Vs Panjab PCB & others" in Appeal No. 70 of 2012.

The Hon'ble National Green Tribunal vide order dt 17.3.2015 have considered the Model Status report submitted by the State of Haryana and finally in Judgment dt 20.03.2015 have directed all the concerned States to file comprehensive affidavit within Four weeks in light of the Judgment of the Tribunal in Original Application No. 40(THC) of 2013 in the matter of people for Transparency Through Kamal Anand V State of Panjab, decided on 25th November,2014 and judgment dt 20.3.2015 with regard to the State of Haryana in the matter of Almitra H. Patel Vs Union of India, Original Application No.199 of 2014. The case is posted for further hearing on 30.4.2015 and 1.5.2015.

In view of the above, a comprehensive status of Municipal Solid Waste Management in the State, functioning of Waste to Energy Projects (WTE) and Action Plan of the State of Telangana on implementation of the MSWM, Rules, 2000 is mentioned below for perusal.

Executive summery:

The newly formed State of Telangana has 10 districts with the population of 352,86,757 as per Census 2011 and with a total geograpical area of the state is 114840 Sqkms. The State comprises Districts of Adilabad, Karimnagar, Medak, Nizamabad, Warangal, Rangareddy, Nalgonda Mahabubnagar, Khammam and Hyderabad. The urban population of the Telangana State as per Census 2011 is 13.72 million representing about 38.89 percent of total population.

Total Urban Local Bodies are 68 consisting of 6 Corporations, 37 Municipalities of all grades and 25 Nagar Panchyats.

The ULBs in the Telangana State generates about 6628 Tonns per Day of wastes and in terms of the per capita of waste generation in the ULBs ranges from 0.2-0.4 kg/per day. In terms of Greater Hyderabad Municipal Corporation it is aaround 0.6-0.7 Kg/per head. The quantities of waste are growing 5% annually and the collection efficiency is 90%. The overall composition of the municipal solid wastes is Organic - 50-60%, Inorganic and Recyclables 25% (paper 8.13, Plastic rubber- 9.22, Metal and Glass - 1- 1.5%, Rags - 4-4.5%, others- 4%) remaining inert material (20-25%). The ULB wise Solid Waste Management service levels in terms of Collection, Transportation, Treatment and Disposal is Annexed (*Annexure-I*).

Cluster Based Approach - Waste to Energy Projects

The erstwhile State of Andhra Pradesh was pioneer in adopting Waste to Energy (WTE) projects on Public Private Partnership (PPP) mode. The Government had constituted a Technical Committee and State Level Official Committee vide G.O.Rt.No.122 M.A, Dated: 16.02.2001 to undertake Techno Economic Assessment of bids received for Municipal Corporations and Municipalities in the State for Waste to Energy (WTE) Projects.

Waste to Energy projects namely at Hyderabad by SELCO International and Refuse Derived Fuel (RDF) based technology by M/s Shriram Energy Systems at Vijayawada were among the pioneer Waste to Energy projects implemented in the state. However, the plants have operational issues. Taking cue from MSW (M&H) Rules, 2000, Municipal Administration and Urban Development Department (MA&UD), Government of A.P. came up with the Comprehensive guidelines/strategy for setting up of MSW Processing Plants and Power Projects in all Municipalities/Municipal Corporation of the state vide G.O. 655 MA on 5th July 2005. As a pioneering approach and for the first time in India, the Municipal Administration and Urban Development Department of erstwhile State of Andhra Pradesh has followed a unique cluster approach and formed 19 clusters from 132 ULBs vide G.O.Rt.No.1424, dated 24.10.2005 comprising of 5 to 12 Urban Local Bodies (depend on distance and financial feasibility) in each cluster covering all the ULBs in the State. The MA&UD Department of erstwhile State of AP planned to develop these clusters on Public-Private-Partnership (PPP) basis as integrated solid waste management projects as per the MSW (M&H) Rules, 2000. Expression of Interest (EOI) was called for to establish Municipal Solid Waste processing projects for the 19 clusters by giving paper notification dt 02.02.2006, giving due preference subject to obtaining of clearance from Andhra Pradesh Pollution Control Board. Government of Andhra Pradesh (erstwhile state) have approved 5 WTE projects after the recommendations of the Technical Committee and State Level Official Committee covering 66 ULBs in 10 clusters.

In the above 5 Waste to Energy Projects, two Projects (M/s Shalivahana (MSW) Green Energy Ltd and M/s Hema Sri Power Projects Ltd) are in Telangana State (*Annuxure - II*). Recently, in Telangana State, 25 Grampanchayats were upgraded as Nagarpanchayats (Municipalities) and number of Grampanchayats were merged into nearby ULBs, hence, the reclusterization of ULBs will have to be done according to the changed circumstances (waste characteristics and quantities) and urban population growth. Out of 10 Districts, the Hyderabad

District is 100% urbanized District named as Greater Hyderabad Municipal Corporation (GHMC). The GHMC generates 4000 MTD of waste which is around 60% of total waste generated in the State.

The GHMC is implementing Integrated Solid Waste Management (ISWM) project under PPP mode. The Ramky Enviro Engineer Ltd., was selected as Concessionaire for the project. The Concession Agreement was entered on 21.02.2009. Presently, Processing and disposal activity is being taken up under this project. The GHMC is paying Rs.678/- per ton per day as a tipping fee to Concessionaire for processing disposal of waste. In the remaining 9 Districts 3 Districts (Karimnagar, Nizamabad and Adilabad) ULBs were allotted to waste to energy project, M/s Shalivahana (MSW) Green Energy Ltd and 3 Districts (Khammam, Nalgonda and Warangal) ULBs were allotted to M/s Hema Sri Power Projects Ltd. The ULBs of Rangareddy, Medak and Mahbubnagar District were not allotted to any project. The above projects are under PPP mode, Government have neither invested any amount nor given any land to the projects, except ULBs have allotted certain portion of land for establishment of processing units in their existing dump yards on lease basis. Both the above projects are Refuse Derived Fuel (RDF) based power projects. They process RDF in the processing units and RDF is transported to their power plant for power generation.

The Department is extending full support to the above two projects for their optimum level functioning, which will in turn help the State in addressing the MSWM in allotted ULBs. M/s Shalivahana (MSW) Green Energy Ltd (SGEL) is suspended its operations due to low tariff rate per unit (Rs.4.48) of power generation, and it is informed that the Project Proponent is finding it uneconomical to run the project successfully. The matter is now pursued with the State Electricity Regulatory Commission, Telangana to enhance the tariff rate. The M/s Hema Sri Power Projects Ltd has also completed their construction work and expected to begin the plant operation by July, 2015.

A. INTEGRATED MUNICIPAL SOLID WASTE MANAGEMENT PROJECT OF GREATER HYDERABAD MUNICIPAL CORPORATION, HYDERABAD

- As per the G.O.Ms.No.264 MA, dated 16.04.2007, the Government has constituted Greater Hyderabad Municipal Corporation duly merging surrounding (12) municipalities.
- Thus, the total area increased from 172 sq. kms to 625 sq. kms and the population has been increased from 40.00 lakh to 80.00 lakh
- The Generation of MSW is about 4000 MTs per day.
- The earlier practice of the GHMC before conceiving ISWM Project is simple open dumping. Due to which air, soil, ground and surface water are contaminated in all the villages in and around Jawaharnagar and spreading the diseases in the public living nearby dumping site.

- Compliance of Municipal Solid Waste (Management & Handling) Rules 2000 is mandatory to all the ULB's as per the directions of Hon'ble Supreme Court of India.
- GHMC desires that its SWM management system shall be a 'model system' for the Country, which would scientifically collect, transport, process and dispose of MSW, have maximum recycling and recovery, and create public awareness and participation.
- Accordingly, the GHMC has conceived an Integrated Solid Waste Management (ISWM) Project of GHMC, Hyderabad, in accordance with the MSW Rules, 2000.
- The GHMC has invited Expression of Interest for having an ISWM Project under BOOT Mechanism with Public Private Partnership (PPP) mode. After following the due procedure M/s.Ramky Enviro Engineers Ltd., was selected as Concessionaire for the project. The Concession Agreement is entered on 21.02.2009.
- Without prejudice to the generality of the foregoing, Concessionaire shall have the right to develop the Project Facilities using such technology that it considers suitable and commercially viable for the purposes of implementing the Project, in accordance with the MSW Rules, 2000. It is acknowledged that it is the intention of Concessionaire to use the technology associated with the concept of an integrated waste processing plant and that Concessionaire shall have the right to modify, adapt, upgrade or change the technology, from time to time, based on actual operations of the Plant and requirements of the Project.
- The estimated project cost as per approved DPR is Rs.727.20 crores. The admissible cost under JNNURM scheme was Rs.500 crores. The financial pattern of the project is ;

○ 35% of admissible cost from JNNURM grant	-Rs.175.00 crores
○ 15% of admissible cost from State Govt.,	- Rs. 75.00 crores
○ 50% Concessionaire share (Rs.250 cr.) + Addl. Cost over and above Rs.500 cr.	
(Rs.227.20 cr) (i.e M/s.Ramky)	-Rs.477.20crores
Total Cost of the Project is	- Rs.727.20 crores
- The scheme is being taken up under 13th Finance Commission Grants. So far, an amount of Rs.290.63 crores was sanctioned and against this an amount of Rs.155.32 crores released to GHMC.
- Further, Annual Development Plans for the project were submitted for consideration under 14th Finance Commission for Rs.485 crores which also includes Processing & Management of Municipal Solid Waste (i.e. tipping fee). Sanction to this is awaited.

- The Concession period of the project is 25 years. The Concessionaire has certain Post Closure obligations for the landfill which it shall continued to fulfill for 15 years after the expiry of the Active Landfill period of 25 years.
- GHMC agreed to pay to Concessionaire, the tipping fee, which shall be the only fee paid by GHMC to the Concessionaire for performing the services. The quoted tipping fee is Rs.1431/- per ton of MSW (also called as base tipping fee) received and weighed at the gate of disposal facility.
- The Tipping Fee covers three main components of work, break up of Tipping Fee for each of the component is given below:
 - i. Primary and secondary collection & transportation of waste upto transfer station: 40% of the Tipping Fee.
 - ii. Transfer station management and transportation of waste from transfer station to the processing facilities: 20% of the Tipping Fee.
 - iii. Treatment & disposal: 40% of the Tipping Fee.
- The base Tipping Fee shall be increased annually, without compounding, by 5% thereof every year plus 0.60 of the WPI escalation.

- The Scope of the project is :

Primary & Secondary Collection: To ensure waste collection from Waste Generators within GHMC Area, including primary and secondary collection, and transportation of waste upto transfer stations. Initially, the two zones for which the Concessionaire, shall be vested with this right and responsibility shall be the East Zone and West Zone of GHMC. The Independent Engineer shall assess the implementation in East and West zones to ascertain adherence to the performance standards as set out. GHMC shall assess and review the same and subject to satisfactory performance by the Concessionaire, permit the Concessionaire to continue the services in East and West zones and extend the services to other zones in a phased manner, on the same terms and conditions.

Collection of Municipal Solid Wastes

Organizing door to door collection of municipal solid wastes through organized door to door collection system by collecting daily on pre-informed timings and scheduling by using bell ringing of musical vehicle (without exceeding permissible noise levels).

Devising organized collection of waste from slums and squatter areas, direct collection of MSW from bulk generators including markets, hotels, restaurants, cinema theaters, malls, multiplexes, function halls, office complexes, commercial areas and other sources as indicated by GHMC time to time.

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Waste from fruits and vegetable markets, which are biodegradable in nature, shall be managed to make use of such wastes.

Bio-medical wastes and industrial wastes shall not be mixed with municipal solid wastes and such wastes shall follow the rules separately specified for the purpose. If the bio-medical and industrial waste is observed same shall be reported to GHMC immediately.

Collected waste from residential and other areas shall be transferred to storage bins by suitable vehicles.

Horticultural waste shall be separately collected and disposed off following proper norms. Similarly, wastes generated at dairies shall be regulated in accordance with the applicable regulations.

At any stage the MSW shall not be burnt.

Stray animals shall not be allowed to move around waste storage facilities or at any other place in the city and shall be managed accordingly.

The concessionaire shall notify waste collection schedule and the likely method to be adopted for the public benefit.

The concessionaire shall achieve the binless system over a period of time as finalized in the implementation plan.

Segregation of Municipal Solid Wastes

In order to encourage the citizens, concessionaire shall organize awareness programmes for segregation of wastes and shall promote recycling or reuse of segregated materials.

The awareness programs shall be conducted periodically once in a month for the first two years from COD-C&T and once in every quarter for rest of the concession period. Every six month schedule shall be prepared and submitted for GHMC approval at least 2 months before the program start date.

The concessionaire shall undertake phased programme to ensure community participation in waste segregation. For this purpose, regular meetings at quarterly intervals shall be arranged by the concessionaire with representatives of local resident welfare associations and non-governmental organizations.

Storage of Municipal Solid Wastes

Concessionaire shall establish and maintain MSW storage facilities/containers/bins in such a manner as they do not create unhygienic and

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in-sanitary conditions around it. Following criteria shall be taken into account while establishing and maintaining storage facilities,

- i. Storage facilities/containers/bins shall be created and established by taking into account quantities of waste generation in a given area and the population densities. A storage facility shall be so placed that it is accessible to users;
- ii. Storage facilities/containers/bins to be set up by concessionaire shall be so designed that wastes stored are not exposed to open atmosphere and shall be aesthetically acceptable and user-friendly.
- iii. Storage facilities/containers/bins shall have 'easy to operate' design for handling, transfer and transportation of waste. Separate bins for storage of bio-degradable and non-bio-degradable wastes shall be provided separately. The colour code for the storage facilities/containers/bins shall be followed as per the GHMC's directions;
- iv. Manual handling of waste shall be prohibited.
- v. Multiple handling of waste shall be prohibited.
- vi. At no stage of the system the MSW shall touch the ground.

Transportation of MSW:

MSW generated in the GHMC Area and the silt collected from the street sweeping activity would be brought in at the transfer stations being operated and maintained by the Concessionaire and Concessionaire shall be required to transport the waste generated and the silt to the designated waste processing and disposal site(s). While, in the East and West Zones, the Concessionaire shall be responsible for transportation of the waste collected from the generators to the transfer stations, in the balance zones the transportation of the waste collected from the generators to the transfer stations or secondary collection points shall be carried out by GHMC till the time balance zones are handed over to the Concessionaire.

Vehicles used for transportation of waste shall be covered. Waste should not be visible to public, nor exposed to open environment preventing their scattering.

The following criteria shall be met:

- i. The storage facilities shall be daily attended for clearing of wastes. The bins or containers wherever placed shall be cleaned before they start overflowing;
 - ii. Transportation vehicles shall be so designed that multiple handling of wastes, prior to final disposal, is avoided.
 - iii. The transportation system shall be designed in synchronization with the collection system.
- a. Providing bin-less waste collection system in GHMC in a phased manner as specified in this Agreement: To identify the location of secondary collection points and to ensure storage of waste from Waste Generators by providing suitable storage system at such locations.

- b. **Upgrading, Operation & Maintenance and Management of Existing Transfer Stations:** located at Lower Tank Bund, Yousufguda, and Imliban.
- c. **Development of New Transfer Stations:** at existing disposal sites and other location in accordance with GHMC: Tentatively, these are proposed at Fathullaguda, Shamshiguda, Gandhamguda, Serilingampally and Kapra.
- d. **Recycle and Reuse of Wastes.**
- e. **Processing & Treatment of MSW:** To process MSW as per MSW Rules and other applicable regulations and to transport and dispose the Residual Inert Matter at the Landfill Site.

Concessionaire shall adopt suitable technology or municipal solid technologies to make use of wastes so as to minimize burden on landfill. Following criteria shall be adopted, namely:-

- i. The bio degradable wastes shall be processed by composting, vermin composting, anaerobic digestion or any other appropriate biological processing for stabilization of wastes. It shall be ensured that compost or any other end product shall comply with standards as specified in Schedule-IV of MSW Rules 2000;
- ii. Mixed waste containing recoverable resources shall follow the route of recycling. Incineration with or without energy recovery can also be used for processing MSW. Concessionaire wishing to use other state-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down before applying for grant of authorization.

Disposal of Municipal Solid Wastes

Land filling shall be restricted to non-biodegradable inert waste and other waste that are not suitable either for recycling or for processing. Land filling shall also be carried out for residues of waste processing facilities as well as pre-processing rejects from waste processing facilities. Land filling of mixed waste shall be avoided unless the same is found unsuitable for waste processing. Till installation of integrated facility, land-filling shall be done following proper norms. Landfill sites shall meet the specifications as given in schedule- III of MSW Rules 2000.

Leachate Management System

Leachate management at the landfill includes the operation of the following units:

- i. Leachate drainage system (drainage layer and drainpipes at the bottom of the landfill cells, the leachate outlet structures in the lowest and in the highest positioned corners of each cell)
- ii. Inspection and leachate collection shafts positioned outside the membrane covered area.

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- iii. Leachate pumps installed in the leachate collection shafts.
- iv. Leachate transportation pipes installed in the surrounding dike.
- v. Leachate treatment

During normal operation the equipment is totally self reliant requiring no input by the site personnel. However care shall be exercised to ensure the proper function of the system at all times.

To ensure an effective operation of the systems the periodical inspections and maintenance must be exercised.

Landfill Gas Management

(i) General

The emission of landfill gas is controlled by the operation of the gas collection system, which will be installed and set in to operation immediately after the top cover system has been installed. The final design in terms of the final number of necessary gas collection wells cannot be undertaken before actual measurements of the gas production have been performed, which again cannot be performed before the deposition of waste in a landfill cell is completed.

When installed and running at a stable level the gas management system is in principle self reliant. In order to secure the most efficient gas control it is however necessary, that the concessionaire monitors and adjusts the system on a regular basis.

(ii) In order to adjust a gas well, it is necessary to monitor 3 parameters:

- i. The vacuum or the flow in the boring
- ii. The methane content (CH₄)
- iii. The oxygen content (O₂).

Measures for Odour Control :

Principal means of minimizing landfill odours include:

- i. Effective compaction.
- ii. Provision of adequate cover especially the daily cover.
- iii. Immediate deposition and covering of especially malodorous wastes.
- iv. Effective gas collection and treatment system.
- v. Immediate deposition and covering of excavated wastes
- vi. Avoid re-cycling of leachate and the storage of untreated leachate in open lagoons or containers

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Measures for Dust Control :

The concessionaire shall organize the operations at the landfill in such a way, that emission of dust is kept to a minimum. The following measures can be used:

- i. Surfaces with dry soil and service roads are sprinkled with water.
- ii. Transportation activities are restricted to the service roads
- iii. Paved service roads are cleaned by sweeping.
- iv. Sprinkling of dry soil or waste during excavation and reposition
- v. Areas with temporary cover area seeded with grass.

Development, Operation, Maintenance, and Management of integrated processing and disposal facility at Jawaharnagar: Subsequently it is proposed to develop new facilities at new sites being identified by GHMC during the course of time, so that, the processing facilities are located in all the directions of the city.

Reclamation and Alternative Use of Existing Dump Sites: The old dump sites at Jawaharnagar, Fathullaguda, Shamshiguda, and Gandhamguda is to be reclaimed and capped scientifically.

Information, Education, & Communication (IEC) campaigns with the public and all stakeholders in GHMC Area to inculcate good MSW management practices, including recycling, and segregation.

Interfacing with existing organized and unorganized waste-collection and management systems to ensure that there is a smooth and harmonious working of the systems.

- **Independent Engineer:** Environmental Protection Training & Research Institute (EPTRI) a State Govt. agency is appointed as Independent Engineer for this project for better implementation of the ISWM project of GHMC.
- M/s.RamkyEnviro Engineers Ltd., (REEL) has taken up the work at site i.e. Jawahar Nagar dumping yard. After the treatment & disposal facilities are completed by the Concessionaire a provisional readiness certificate was issued by EPTRI and the Commercial Operation Date (T&D) was declared on 18.02.2012, in other words T&D of the entire MSW generated in GHMC is being attended by the Concessionaire.
- As per the scope of the work, the Concessionaire is to segregate bio-degradable and non-biodegradable waste at source level itself i.e. at door to door collection. The door to door collection, primary & secondary transportation and tertiary transportation could not be handed over to the Concessionaire for some reasons. At present the same is being

attended by GHMC. Segregation at source level i.e. at door to door collection is actively being considered by GHMC and the same will be started shortly.

- The Present Status of the Project is as follows ;

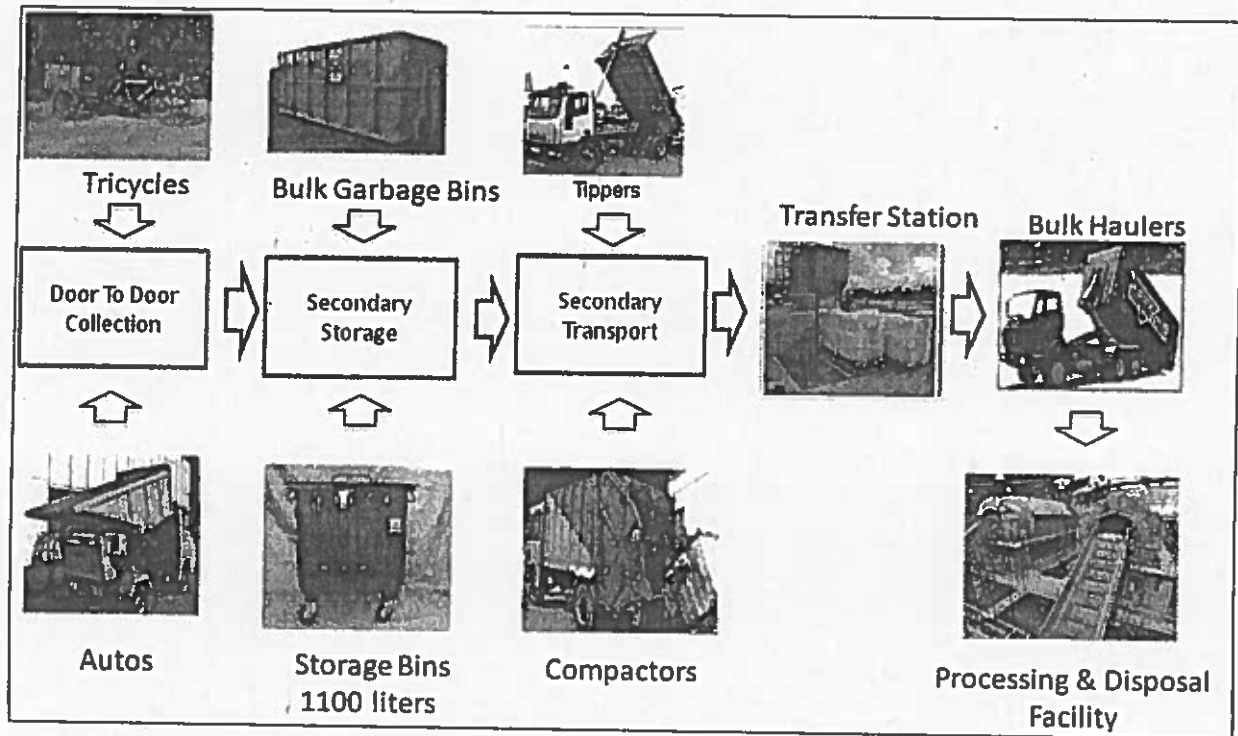
Components completed under the project

<u>Key infrastructure</u>	<u>Supporting Infrastructure</u>
Weighbridge Plaza Internal CC Roads – 7.88 km Storm water drain – 15.76 km Leachate drain – 1.16 km Three leachate collection wells and two ponds Waste Receiving Platform and Pre-Segregation facility Compost Plant Coconut Shredding Unit – 1 No. Recyclables Processing Unit RDF Storage facility Leachate Storage and Treatment Facilities RDF Manufacturing Unit	Health Centre Cafeteria Workers change rooms and toilets Material stores Maintenance facilities for vehicles and other mechanical equipments Vehicle wash facility Transformer yards – connected load of ~ 1MW DG and Electrical Panel Room
Components under progress : <u>Key Infrastructure</u> Compound wall Peripheral roads Green Belt Reclamation Scientific Landfill	Components to be taken up : <u>Key infrastructure</u> Waste to Energy Plant – 19.8 MW (awaiting CFE from TPCB & EFS&T) Transfer stations – 6 nos. Upgradation – Tankbund, Yousufguda New – Uppal (Fathullaguda), Kapra,

- As of now, Rs.163.00 crores is spent for developing facilities for waste Treatment & Processing at the site, construction and up-gradation of two transfer stations, procurement of Compactors and Dumper bins etc. towards Capital Works.
- So far, an amount of Rs.164.83crores was paid to the Concessionaire towards tipping fee since 18.02.2012.

- Some of the photographs pertaining to the ISWM project of GHMC are enclosed herewith for kind perusal.

Integrated Municipal Solid Waste Management – Flow Chart



Replacing Old Bins to New Bins

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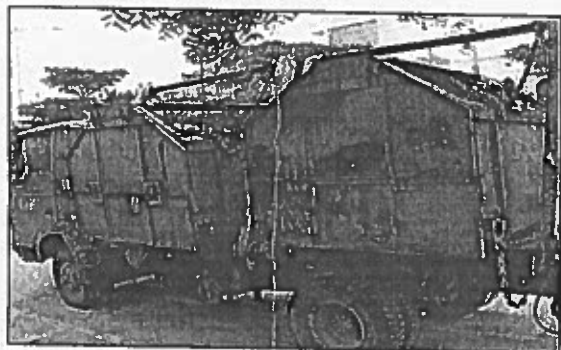


Stationary 3.5 Cum DP bins are currently used which due to weight and size are difficult to clean and transport.

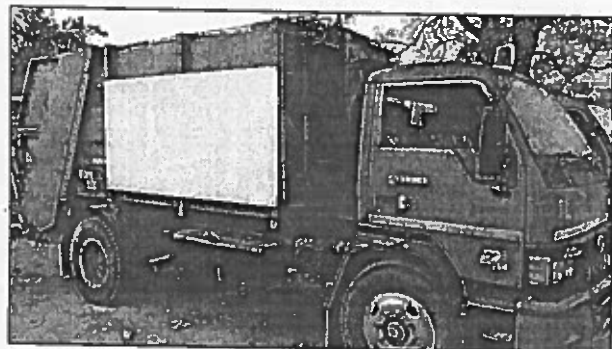


1.1 Cum Galvanized Iron powder coated bin meeting EN 840 International quality standards bins. Flexible for placement due to less weight and mobility.

Replacing Old Vehicles with New Compactors



DP vehicle is restricted to lift only two bins hence very less volume and more trip distance. Leaking and littering. Compactors can lift 6 to 20 bins in one trip and facilitates more frequency of higher number of bin points. Completely enclosed with built in leachate collection tank. No littering, leakages and smell during transportation.

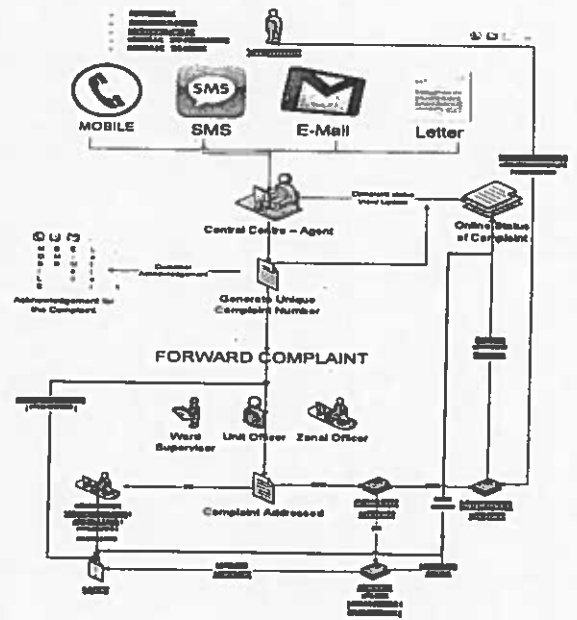
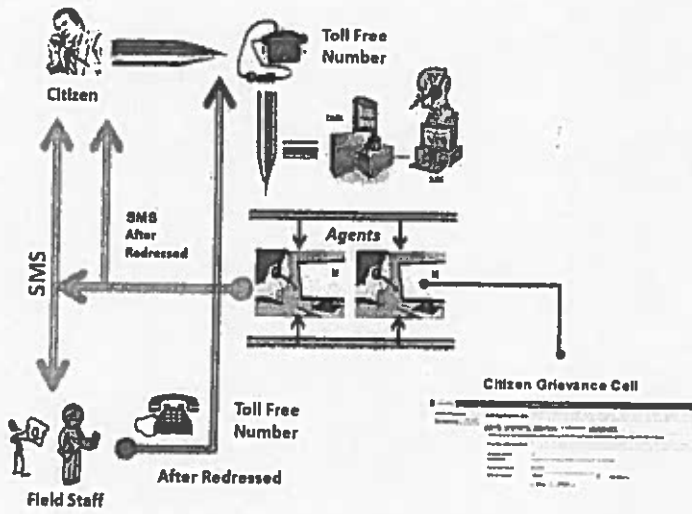


Transfer Station Management



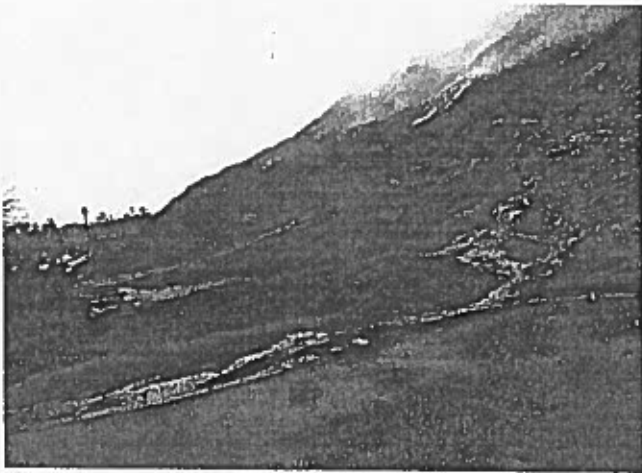
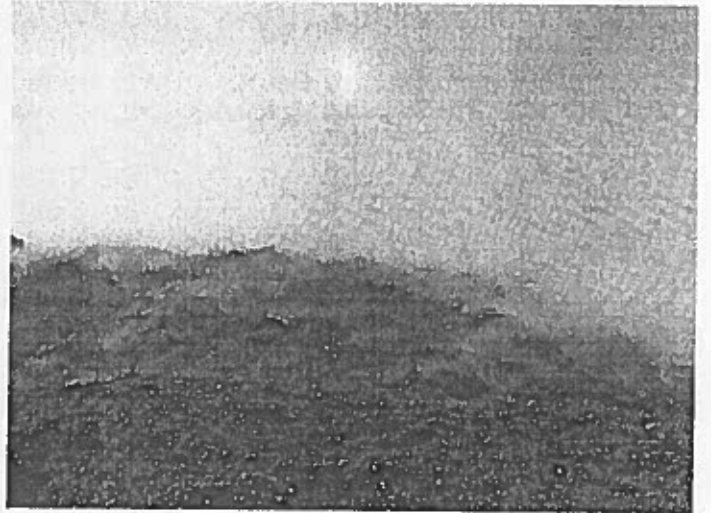
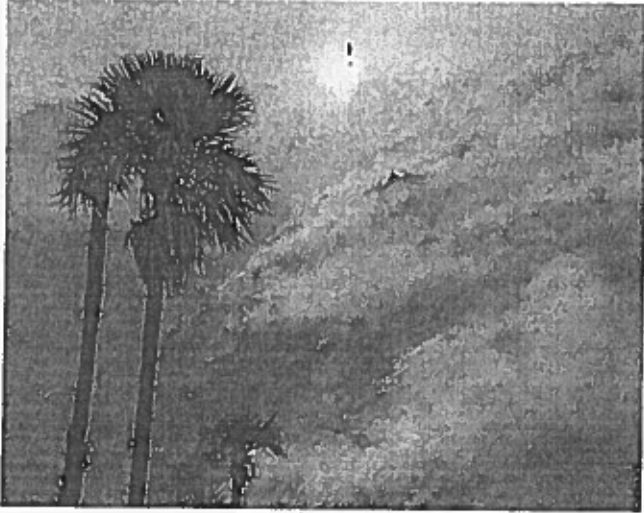
Call Center

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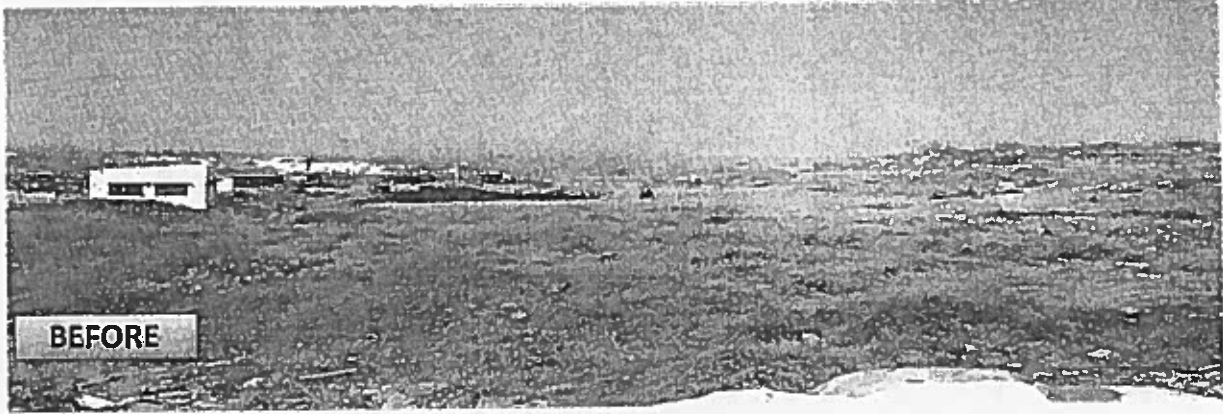
Site Condition before Implementation of IMSWM project

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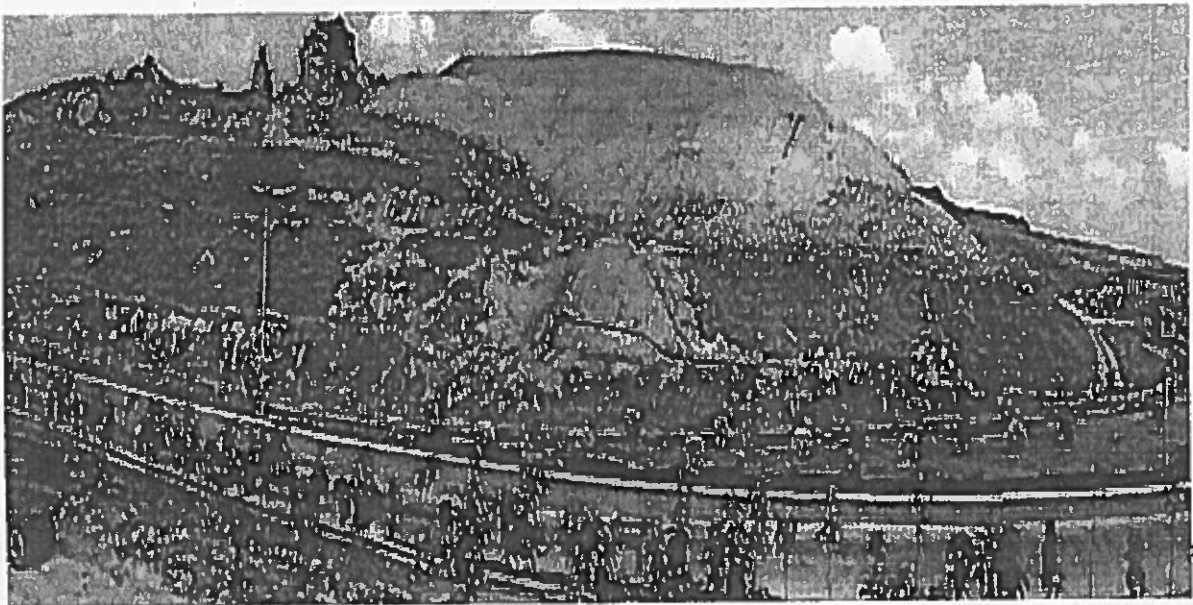
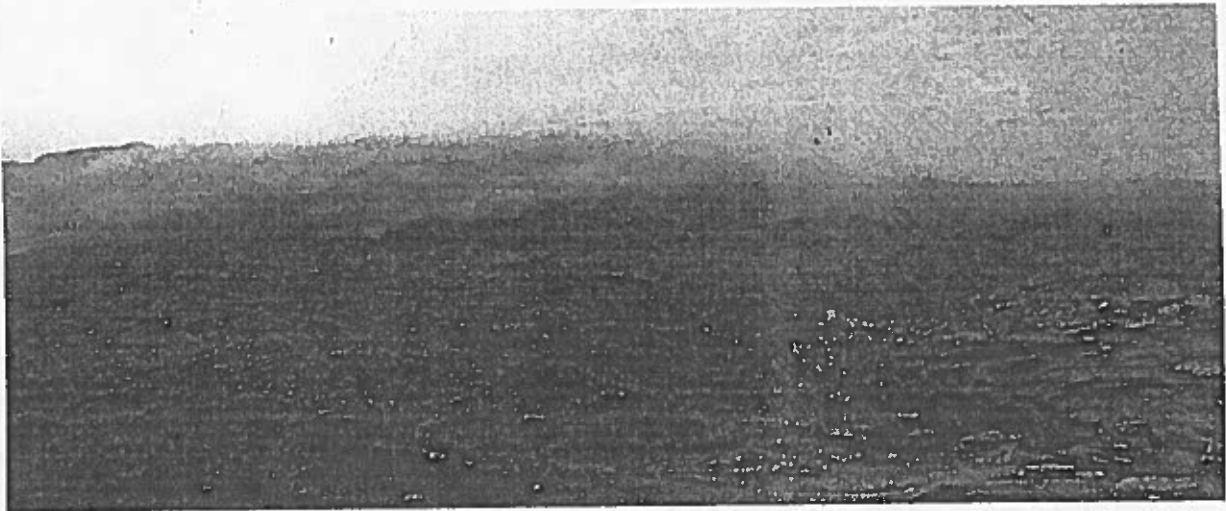


Landscaping development at IMSWM Project

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Land Reclamation by Capping

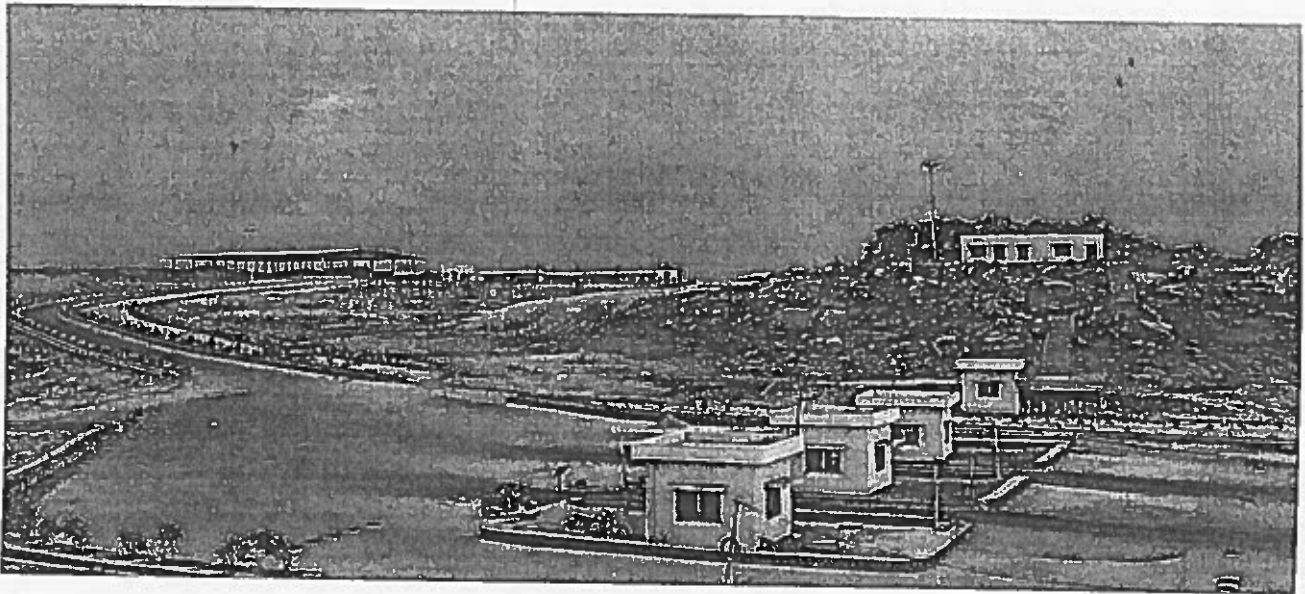


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Windrow and Tipping Floor



Roads and weigh Bridges



Windrows for Composting



Composting Machinery



Compost Packed



A. M/s Shalivahana (MSW) Green Energy Limited:

The M/s Shalivahana (MSW) Green Energy Limited (SMGEL) was allotted 1165 TPD municipal solid waste generated from 18 ULBs of 5 clusters Karimnagar, Nizamabad and Adilabad Districts vide G.O.Ms.No.168 M.A, Dated 15th April 2006, G.O.Ms.No 236, Dated 2nd March, 2009 and G.O.Ms.No 514 Dated 2nd November 2010.

COMPONENTS OF INTEGRATED MSW PROJECT

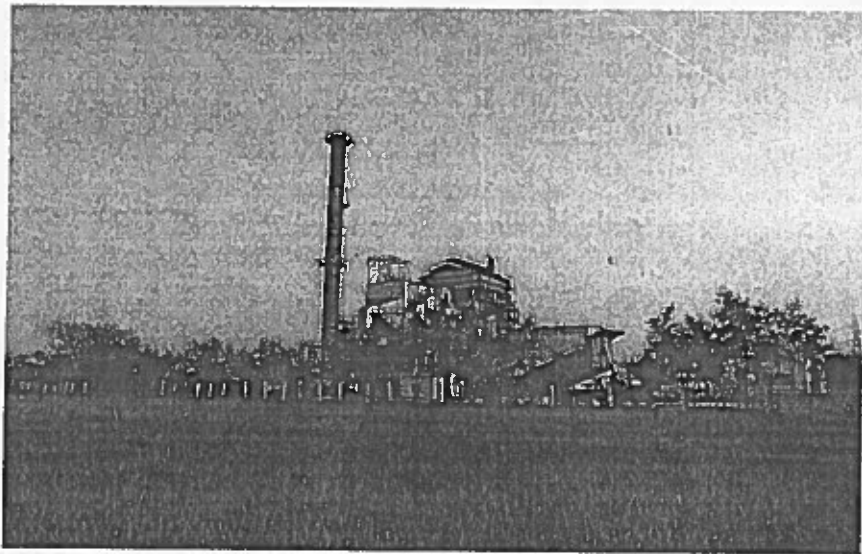
S.No	Unit	Location	Function	Land
1.	Power Plant	Rebladevpalli Village, Karimnagar Dist.	12 MW Power Generation	21 Acres (Project proponent own land)
2.	Processing Unit	Karimnagar Municipal Corporation (KMC) Dump Yard, Karimnagar	RDF, Compost production	3 Acres Land Lease taken from KMC
3.	Processing Unit	Ramagundam Municipal Corporation (RMC) Dump Yard, Ramagundam	RDF, Compost production	3 Acres Land Lease taken from RMC
4.	Processing Unit	Nizamabad Municipal Corporation (NMC) Dump Yard, Nizamabad	RDF, Compost production	3 Acres Land Lease taken from NMC

12 MW WASTE TO ENERGY POWER PLANT

MSW power plant is located at survey no.70 of Rebladevpally village, Sultanabad mandal, Karimnagar district, Telangana State. Geo-graphical coordinates are 18° 32.702" N and 79°21.134" E. Total plot area is 21 acres owned by SMGEL.

MSW power plant is working on direct combustion process where in the Refuse Derived Fuel (RDF) fluff fuel can be directly fired inside the boiler.

POWER PLANT IMAGE



KARIMNAGAR PROCESSING FACILITY

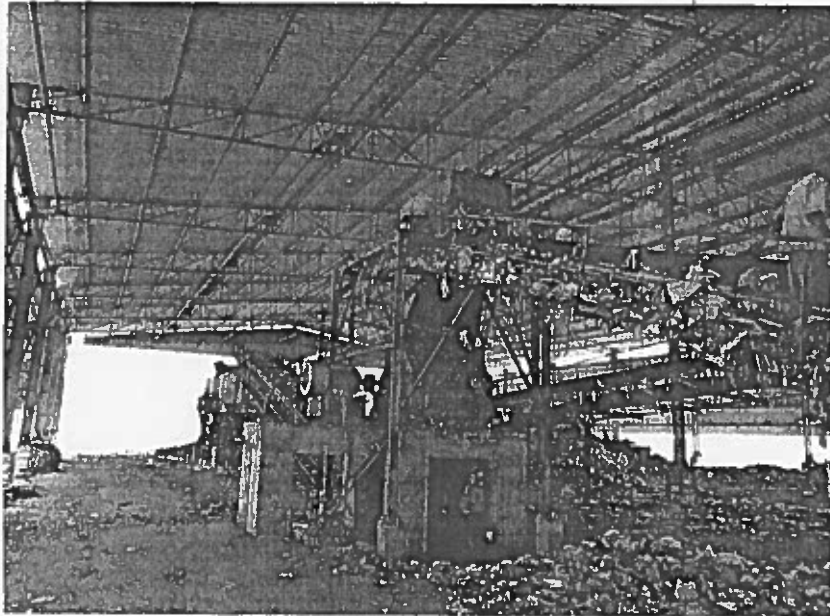
Karimnagar processing plant is in 3 acres of land at the existing dump yard at Autonagar

(survey no.622/1), Karimnagar district, Telangana State. The site is located on the outer fringe of Karimnagar town on Hyderabad-Ramagundam state highway (SH-1) (also called as Karimnagar bypass). Geographical coordinates of the site are $18^{\circ} 24'769''$ N and $79^{\circ}08'632''$ E.

The nearest settlement is Autonagar, an industrial area located at 2 km away in the North-East direction.

Karimnagar Plant was commissioned in December 2010 and is currently processing approximately 75-100 tonnes of heterogeneous waste per day.

KARIMNAGAR WASTE PROCESSING PLANT IMAGE

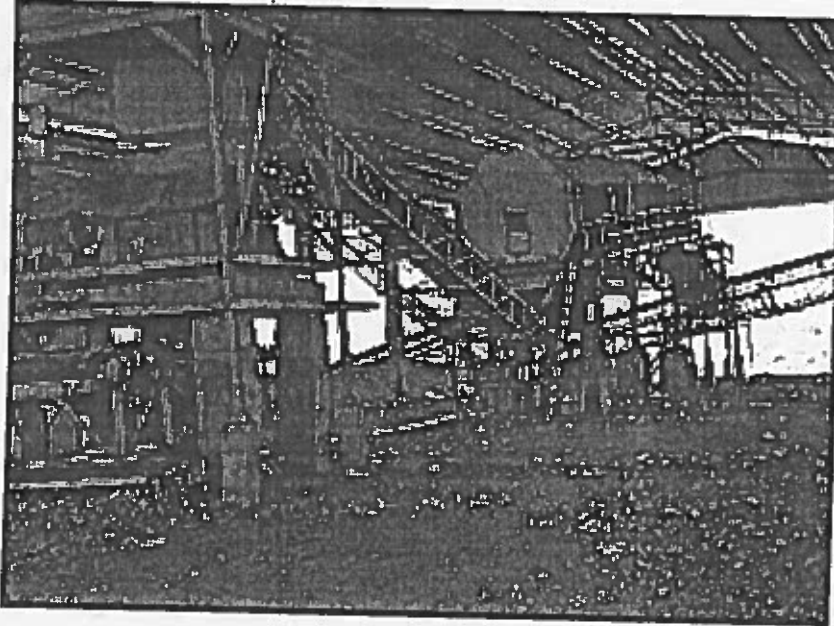


RAMAGUNDAM PROCESSING FACILITY

Ramagundam processing plant is in a part of 3 acre of land at Ramagundam Municipal Corporations Dump Yard, Karimnagar district, Telangana State in the suburbs of the Ramagundam town. Geo-graphical coordinates of the site are $18^{\circ} 46'0''$ N and $79^{\circ} 26.029''$ E.

Ramagundam Plant was commissioned in February 2011 and processed approximately 75-100 tonnes of waste per day. The processing plant was shut down due to frequent disturbances by local people from adjoining colonies.

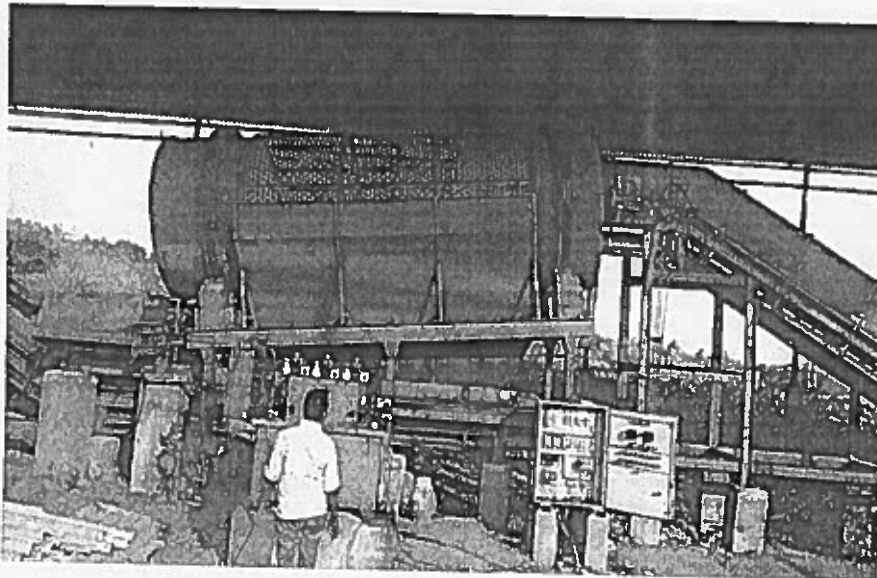
RAMAGUNDAM WASTE PROCESSING PLANT IMAGE



NIZAMABAD PROCESSING FACILITY

The facility is proposed in the part of 3 acre of land at Nagaram village, 8 km from the city urban local body, on Varni Rd. Geo-graphical coordinates of the site are 18o38'61" N and 78o04'08" E.

NIZAMABAD PROCESSING PLANT IMAGE



COLLECTION AND TRANSPORTATION

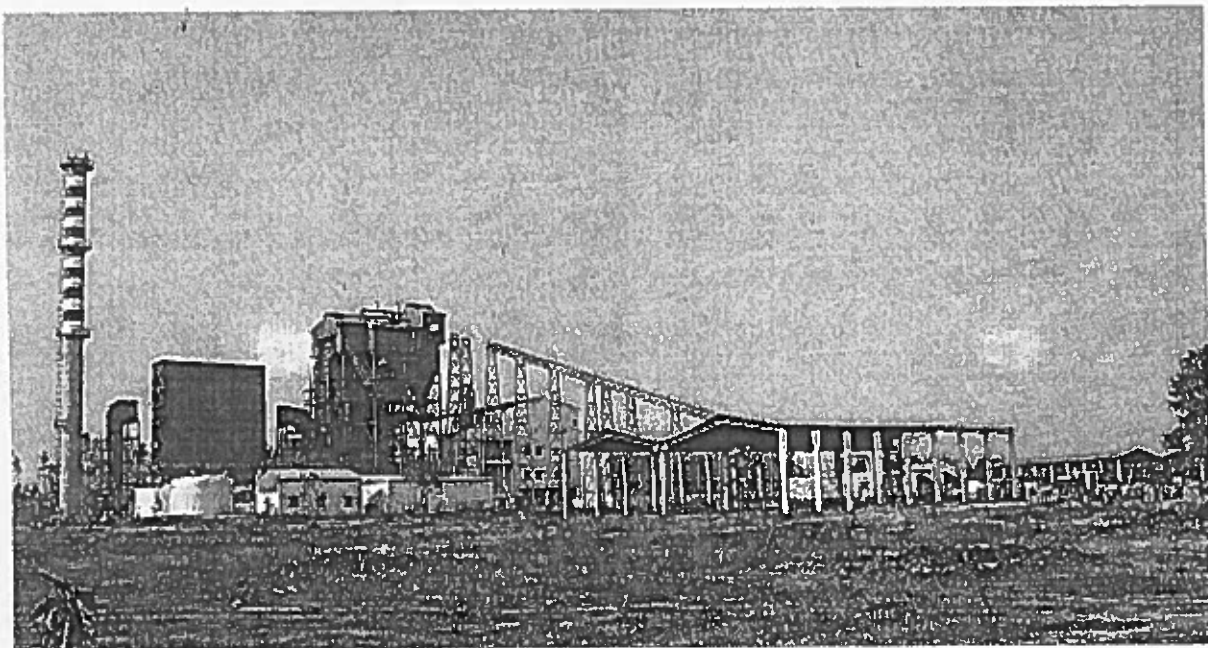
As per the MoUs signed between the ULBs and the SGEL, each ULB is responsible for primary collection of MSW and transport it to the transit point in the existing dump yard. M/s SGEL is responsible for transportation of waste from the transit point (dump yard) to the designated processing facility for processing. The Refuse Derived Fuel (RDF) processed at their processing units is transport to their power plant for power generation.

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B. M/s Hema Sri Power Projects Ltd

M/S Hema Sri Power Project Ltd, 12.6 MW Waste to Energy Plant at Nalgonda

The M/s Hema Sri Power Projects Ltd (HSPPL) has completed 90% of its construction work of power plant at Vibhalapuram (V), Mothe (M), Nalgonda (District), and expected to be commissioning the plant from July, 2015. The HSPPL has started mass awareness generation programs on segregation and storage of waste at source level in the ULBs allotted to them. The HSPPL have even distributed pushcarts bins and bags and IEC material etc., as a motivational aspect in the selected wards of the ULBs allotted to them. Their representatives along with Municipal functionaries have initiated mass awareness generation programs, meetings, rallies, and declared awards for the households who will practice 100% segregation of waste at source level. So far, the HSPPL have distributed 500 bags, 200 pushcarts, 8 Baling machines and 8 Plastic De-duster Machines across the allotted ULBs. The HSPPL have planned to purchase of dry waste from Public Health Workers for Re.1/- per Kg as to incentivize them for segregation of waste. They are planned to process the wet waste into compost in municipal dump yard itself and take out and transport combustible fraction to their power generation plant.



Status of the Cluster based MSW-WASTE TO ENERGY Power Projects in Telangana State at a glance;

Item	Karimnagar- Shalivahana	Nalgonda – Hemasri
Project Cost (Rs in crores)	102.13	98.24
Date of Permission	April 2006	April 2006
No of ULBs	18	14
RDF Processing Plants	Karimnagar Ramagundum Nizamabad	14 Mini- process plants <u>are planned</u>
Capacity - MW	12	12.6
Quantity of Waste to be treated	1165 MTD	724 MTD The remaining waste will be collected from nearby villages

Statutory permission from the PCB	Obtained	Obtained
Status	Commissioned in April 2010	90% of construction of Power Plant work is completed and likely to be commissioned in July 2015
Financial Institutions	IL&FS	IL&FS

The above two are purely PPP projects and the procurement, design, finance, construction and operation and maintenance are by Project Proponents only. ULBs have leased out certain portion of land to the project proponents at their dump yards for construction processing units.

Interventions adopted for Improving Solid Waste Management

The Government has taken a proactive interest in encouraging ULBs in the state to comply with the MSW rules 2000 by strengthening the Municipal Solid Waste Management infrastructure and services by utilizing the 12th Finance Commission grants. The interventions not just focused on the creation of infrastructure but also included innovative Information Education Communication (IEC) and Capacity building activities with involvement of stakeholders and community.

The programs have yielded results in terms of improved service levels and awareness, better management practices in handling solid waste leaving behind greater scope to comply with the MSW Rules in totality especially in relation to the treatment and scientific disposal of waste which needs larger investment and long term planning.

Key interventions undertaken (Annexure –III):

1. Chetta Pai Kotha Samaram – 'New War on Waste'
2. "PARICHAYAM" program or "Know your sanitary worker"
3. Implementation of Plastic Waste (M&H) Rules 2011
4. Hosting the Regional Review Meetings in Compost yards: ✓
5. Clean City Championship in Warangal Corporation: ✓
6. 'Inter Departmental Convergence' & Urban Day
7. 100 Days Clean City Challenge (Annexure – 3) ✓
8. Hosting of Icon-SWM -International Conference on Solid Waste Management 2014:
9. The MSWM efforts being taken up in the State were appreciated in the "**Satyamev Jayate**" premier television debut of popular Bollywood actor and filmmaker Aamir Khan **Titled "Don't waste your Garbage"** published in March 2014
(https://www.youtube.com/watch?v=ISO_FCBzl_w).

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Achievements of some of the Urban Local Bodies in Telangana:

S.No.	Urban Local Body	Achievement in implementing MSW (M&H) Rules 2000
1	Miryalguda	Converted existing dump yard into processing park, organic waste is being converted into compost and vermi-compost under PPP mode through Waste Venture India Pvt Ltd and dry waste is being sold to recyclers
2	Nalgonda	Converted existing dump yard into processing park, organic waste is being converted into compost and vermi-compost under PPP mode through Waste Venture India Pvt Ltd and dry waste is being sold to recyclers
3	Jagityal, Kodad, Bhongir	100% Door to door collection is happening through pushcarts in a segregated manner. Wet waste is composting and dry waste is sold to recyclers
4	Siddipet, Gajwel and Siricilla	ITC WOW (Wealth out of Waste) under CSR activity purchasing entire dry waste at market price from the Public Health workers. In this program PH workers will get incentives for segregation of waste into wet and dry, and wet waste is being converted into compost

Approach towards Effective Municipal Solid Waste Management

Solid Waste Management is one of the top priorities of the State Government. The erstwhile Andhra Pradesh State framed Municipal Solid Waste Management Strategy in line with MSW Rules, 2000 which are in force in Telangana State also. The State also initiated its own "State Municipal Solid Waste Management Strategy" vide GO no MS 64, MA& UD Department dated 13.2.2014 incorporating all vital aspects like Regional approach in processing and disposal of waste, Community participation in SWM activities, PPP in SWM, etc. It also issued guidelines and time bound action plans for sustained improvement of solid waste service in the Urban Local Bodies across the state.

Vision of SWM - Telangana

"To equip the Telangana cities with efficient, environmentally friendly and sustainable waste management system with complete safe collection, treatment & disposal facilities."

Goals and Service outcomes

- ❖ 100% Door to Door collection and source segregation
- ❖ Efficient collection and safe transportation of wastes
- ❖ 100% treatment and scientific disposal facility & cost recovery
- ❖ Better awareness and community participation
- ❖ Capacity Enhancement and Optimization of the human resources in SWM
- ❖ Strengthen the existing bye-laws for better regulation and user charges
- ❖ Encourage PPP in developing integrated SWM system

- ❖ Defining the roles and responsibilities of various stakeholders and putting in place an operating framework
- ❖ Greater emphasis on civic engagement by involving NGOs, women community groups, Ward Committees/Sabhas, Area Sabhas, etc., in awareness generation
- ❖ Establishing Institutional mechanism at State Level for planning, technical, financial and implementation support
- ❖ Promoting PPP investments for developing treatment and final disposal facilities on Regional level on Cluster based approach

Strategic Interventions

The proposed Strategy employs the six main elements

1. Door to Door Collection of Waste generated
2. Waste minimization and promotion of recycling of waste
3. Engaging stakeholders in implementation
4. Processing, Treatment and Disposal of Waste
5. Strengthening the capacities of the Urban Local Bodies
6. State Level Institutional arrangements & Program support

Proposed actions for Improvement of Solid Waste Management

Municipal Solid Waste Management is expenditure driven both in terms of capital and operating expenditure. Revenue from by products can only cover a portion of it. Integrated MSW Management encompasses the Solid Waste Management value chain comprising of the components i.e., source segregation door to door collection of Municipal Solid Waste, secondary storage and transportation, processing facility and transport of rejects / inerts to landfill. The proposed projects would mainly focus on following components

- ❖ Strengthening of infrastructure for 100% door to door collection, segregation and safe transportation of waste
- ❖ Upgradation of the existing Defunct/Partially Functional Processing Plants and setting up processing facilities (ie.Composting, RDF etc) on both stand alone and cluster based approach
- ❖ Modernization/ mechanization of the transport system with vehicle tracking systems
- ❖ Construction of scientific landfill at regional level for disposal of inerts and rejects from waste to energy plants and other processing including landfill gas recovery
- ❖ Material Recovery Facilities and dry waste collection centres
- ❖ Rehabilitation Closure of the existing dumpsites scientifically to reduce environment pollution
- ❖ Decentralized solutions of waste processing at community level
- ❖ Capacity building and Awareness building activities

Proposed Action Plan

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Broadly, the Telangana MSW Operation Plan involves:

- Door to door collection and segregation of MSW at Source;
- Transportation;
- Segregation and Processing;
- Scientific Disposal in Sanitary Landfill Facility.

The following are the details of status and proposed Action Plan:

MSW (M&H) Rules, 2000 / MSW Model Action Plan	Present Status	Proposed Action Plan	Timelines
I. Door to door collection:			
❖ 100% door to door collection of waste	❖ <u>Average 85% of Door to Door collection of waste</u> is being happening	❖ 100% door to door collection of waste	Dec 2015
II. Segregation:			
❖ 100% segregation of waste	❖ <u>25-30%</u> of <u>segregation of waste</u> is being happening	❖ Mass awareness and sensitization programs will be conducted by involving all stakeholders of the society for Segregation of waste into wet and dry separately.	June 2016
III. Regulatory measures:			
❖ Strengthening of Regulatory mechanism for MSWM	❖ Presently there is no specific regulatory mechanism for defaulters of SWM activities	❖ Government will draft bye-laws on the following: i. For levying user charges, penalties for violators and explore revenue options like revenues from sale of compost and other resources of waste to achieve financial sustainability. ii. For Construction and Demolition	June 2016

		<p>(C&D) Waste Management, Horticulture and Waste from Cattle sheds.</p> <p>iii. Prohibition of Burning of waste</p> <p>iv. Constitute ULB level Vigilance teams to prevent littering on streets and illegal dumping of waste in drains.</p> <p>v. Abolish open Waste Storage Sites and other Un-hygienic Street Bins.</p>	
IV. Vegetable/Fruit Markets Waste			
<p>❖ The shopkeepers should be directed that they shall not dispose of waste in front of their shops / establishments or anywhere on the streets or in open spaces and instead shall deposit their waste as and when generated into the large size container that may be provided for storage of waste in the market.</p>	<p>❖ Separate collection mechanism for collection of waste from Market places is already in implementation in all class-I ULBs (above 1 lakh population) of the State by keeping large containers.</p> <p>❖ In the remaining ULBs (except Nagarpanchayats) market waste is being collected with separate vehicle and transported to <u>dumping yard</u>.</p> <p>❖ In newly constituted Nagar panchayats due to lack of vehicles there is no separate collection systems of market waste. This waste is being collected along</p>	<p>❖ Organic waste generated will be collected and transported safely from in the markets separately without mixing with other waste stream and converted into compost/ vermi compost.</p> <p>❖ Capacity building programs will be conducted to the ULB staff on composting of markets waste.</p> <p>❖ Separate mechanism will be adopted for collection of market waste and from commercial establishments.</p> <p>❖ By-laws will be framed to collect the user charges from bulk waste generators.</p>	<p>December, 2015</p>

	with regular sweeping waste.		
V. Marriage Hall/ Kalyan Mandaps/ Community Halls :			
<p>❖ The special arrangement should be made for collection of waste from marriage halls, kalyan mandaps, community halls, etc. daily on a full -cost recovery basis. The cost of such collection could be built into the charges for utilizing such halls. This service may be provided preferably through a contractor or departmentally as the local bodies deem fit. On -site, processing of food wastes by bio-methanation and composting may be encouraged.</p>	<p>❖ In all class-I Cities of the state bulk waste is being collected separately.</p> <p>❖ In small ULBs no separate collection mechanism for collection of waste from marriage hall and function halls e.t.c., They are disposing their waste along with regular domestic waste at road side or deposit nearby dumper bin.</p>	<p>❖ PPP options for generation of biogas for places like community halls, large hotels, marriage halls, hostels through incentives will be explored.</p> <p>❖ Usercharge will be levied for collection of bulk waste based on the quantity of waste.</p>	<p>December 2015</p>
VI. Hospitals/ Nursing Homes/ Pathological Laboratories / Health Care centres:			
<p>❖ Hospital/Nursing Homes are required to store waste in colour -coded bins or bags as per the directions of the Govt. of India, Ministry of Environment Bio - Medical Waste Management & Handling Rules, 1998, and follow the directions of Central Pollution Control</p>	<p>❖ As per the Bio Medical Waste (BMW) Management Handling Rules, 1998, certified Private Agencies are collecting and processing 90% BMW waste generated in the State. The agencies are charging Rs.300/- to Rs.350/- per bed</p>	<p>❖ Pollution Control Board Telangana have already identified Agencies at District Level for Collection of Biomedical waste from Hospitals and Nursing Homes and Clinics etc. Transportatin. Treatment and Disposal of the BMW is responsibility of the Agency which will collect user charges from generators.</p> <p>❖ Existing system will be</p>	<p>December, 2015</p>

<p>Boards and State Pollution Control Boards from time to time for the handling, transportation, treatment and disposal of biomedical waste</p>	<p>per month as user charges from hospitals depending of the category of the town.</p> <p>❖ Pollution Control Board is regularly monitoring the collection, storage, processing and disposal activities of BMW.</p>	<p>further strengthened with improved service coverage.</p>	
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VII. Construciton and Demolition Waste:

<p>❖ Every person who is likely to produce construction waste may be required to deposit with the concerned local body an approximate amount in advance at the rates as may be prescribed by the local body from time to time, for the removal and disposal of construction waste from his premises by the local body. Such amount may be deposited at the time when the building permission is being sought and in cases where such permission is not required, at any time before such waste is produced.</p>	<p>❖ In all corporations <u>separate wing in Town Planning Department</u> is collecting constructions and demolition waste by <u>collecting user charges.</u></p> <p>❖ This waste is currently used for filling up of low lying areas and laying of Kutcha roads etc.</p> <p>❖ Small ULBs not collecting any user charges</p>	<p>❖ State Government will issue guidelines for C&D waste for collection, transportation and processing based on the size of the ULB</p> <p>❖ Bye-laws will be notified for penalizing the violators for illegal C&D waste without the permission of the ULBs.</p> <p>❖ Training programs for all the building and construction companies/ contractors on handling of the C&D waste</p>	<p>March 2016</p>
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<p>❖ The charges for removal of construction waste to be doubled for those who fail to deposit the amount in advance.</p>			
<p>VIII. Garden Waste:</p>			
<p>❖ Garden waste and fallen leaves from avenue trees within large public parks and gardens should be composted to the extent possible. However, if such waste has to be disposed of, large skips may be kept, which match with the municipal transportation system for transportation of such waste. Such skips may be provided by local bodies or State Governments owning such parks and gardens. In case of private parks and gardens they should make their own storage arrangement which matches with the municipal primary collection and transportation system.</p>	<p>❖ In all the Corporations of the State, separate collection and transportation of Garden waste is under implementation. This waste is being converted into compost.</p> <p>❖ In small ULBs garden waste is being collected along with the regular waste stream in mixed form and dumped.</p> <p>❖ In GHMC area 100% Garden waste is being processed through Concessionaire.</p>	<p>❖ The Garden waste collectede which is biodegradable in nature will be collected along with wet garbage and sent for composting.</p>	<p>December, 2015</p>
<p>IX. Dairy and Cattle Waste :</p>			
<p>❖ The dairies and cattle breeders having sheds within</p>	<p>❖ In ULBs dairy and cattle waste is being stored and sold by</p>	<p>❖ Storage of cattle waste in open will be regulated and such</p>	<p>Dec 2015</p>

<p>the city limits should be asked to move the cattle sheds outside the city limits and until this is implemented they should be directed not to stack the cow dung, grass or other stable wastes within their premises or on the roadside. They must transfer the waste produced by them daily into the specified municipal storage containers nearby, which should be collected at regular intervals by local bodies for which they should pay based on quantity.</p>	<p>owners themselves to the farmers which will be used as manure to the fields.</p> <p>❖ In GHMC area 100% Dairy and Cattle waste is being processed through Concessionaire.</p>	<p>waste will be transported along with organic waste and sent for composting.</p> <p>❖ Cattle shed owners will be encouraged for setting up onsite composting units subject to availability of space.</p>	
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X. Provision of litter bins on streets and public places:

<p>❖ With a view to ensure that streets and public places are not littered with wasted materials such as used cans, cartons of soft drinks, used bus tickets, wrappers of chocolates on empty cigarette cases and the like generated while on a move, litter bins may be provided on important streets, markets, public places, tourist spots, bus and metres of</p>	<p>❖ Litter and Street Sweeping are dumped in Garbage Bins and collected by tractors.</p> <p>❖ Litter bins on poles, at public places, bus stations and railway stations in GHMC and certain stretches in other Corporations are under implementation. These bins are being cleaned during street sweepings regularly.</p> <p>❖ In GHMC area litter</p>	<p>❖ Litter Bins will be limited to busy commercial areas, tourist spots and public places with regular collection</p> <p>❖ ULBs will be create litter free zone in phased manner with systematic collection and transportation of waste</p>	<p>December, 2015</p>
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<p>250 metres depending on the local condition. Similar bins for disposal of animal droppings could be placed in posh areas.</p>	<p>bins have been provided at big shopping malls and commercial establishments for their customers by the owners themselves and cleaned by imposing user fees.</p>		
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XI. Storage Depots :

<p>❖ All the waste collected through Primary Collection System, from the households, shops and establishments should be taken to the processing or disposal site either directly necessitating a large fleet of vehicles and manpower or through cost effective systems which are designed to ensure that all the waste collected from the sources of waste generation is transported within reasonable time. The system of providing waste generation is transported unhygienic and unscientific, posing a serious threat to the public health and environment.</p>	<p>❖ In GHMC and other 5 corporations have dumper bins for storage of waste.</p> <p>❖ In remaining ULBs door to door collection waste is <u>directly transported</u> to processing site.</p>	<p>❖ Storage bins will be limited to markets and commercial areas</p> <p>❖ ULBs will procure aesthetically designed appropriate size of storage bins for temporary storage of waste in commercial areas</p> <p>❖ Binless concept will be promoted in residential and insitutional area with effective door to door collection system.</p> <p>❖ Trasporation with sycronised with primary collection with Direct transfer of waste from the primary collection point to secondary collection vehicles promotes a bin-less arrangement for waste collection and transportation.</p> <p>❖ ULBs will set up transfer station in cities wherever the treatment and disposal site is more than 15 kilometers away from</p>	<p>December, 2015</p>
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		the city.	
XII. Transportation:			
<p>❖ Transportation of the waste stored at waste storage depots at regular intervals is essential to ensure that no garbage bin/container overflows and waste is not seen littered on streets. Waste should be transported in covered vehicles. These vehicles must be designated as below: Multi-container vans. Covered, as the waste must not be visible to the eyes or be exposed to the open. Bins or containers of wastes must be cleared and transported at regular intervals.</p>	<p>❖ The waste collected by pushcarts/ tricycles / autos is being transported through tractors and tippers e.t.c., with separate mechanism to <u>carry wet & dry waste separately to processing sites and disposal site.</u></p> <p>❖ The dumper bins are being lifted regularly before it over flowing with waste.</p>	<p>❖ The transportation system will have a routing and loading plan and route maps for efficient collection and coverage on city wide scale</p> <p>❖ Workshop and Service facilities for vehicles will be set up for regular operation and maintenance of vehicles on time.</p> <p>❖ ULBs will adopt containerized / covered system of transportation of waste without spillage during transportation.</p> <p>❖ ULBs will be sanctioned new vehicles wherever necessary for transportation.</p>	Dec 2015
XIII. MSW Processing:			
<p>❖ Ensure that biodegradable waste is processed by composting, vermin composting, anaerobic digestion, or any other appropriate biological process for stabilizing waste. Compost or any other end product must comply with the standards specified</p>	<p>❖ Currently, 18 ULBs were allotted M/s Shalivahana Green Energy Ltd. which is operating and 14 ULBs are allocated to M/s Hema Sri Power Projects Ltd. (will be expected to be commissioned by March 2015) where the compostable fractions are converted to RDF for</p>	<p>❖ State Level Technical Committee and State level Official Committee is already constituted vide G.O.Rt.122, dated to assist ULBs in evaluation of tenders, selection of technologies and feasibility and conceptualization of Public Private partnership models and options for Common Waste Treatment</p>	March 2016

<p>in Schedule IV.</p> <ul style="list-style-type: none"> ❖ Ensure that mixed waste containing recoverable resources follows the route of recycling. Incineration with or without energy recovery may be used in special cases. 	<p>utilizing power generation</p> <ul style="list-style-type: none"> ❖ In the remaining ULBs composting their organic waste and dry waste recycling are practiced on smaller scale by individual ULBs. ❖ In GHMC area 100% waste is being processed through M/s Ramky Enviro Engineers Ltd. under PPP mode (BOOT). 	<p>facilities.</p> <ul style="list-style-type: none"> ❖ Technology for Establishment of Processing and Disposal units will be finalized once the DPRs of the ULBs are submitted by the consultants 	
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XIV. Ultimate disposal Sanitary Landfill:

<ul style="list-style-type: none"> ❖ Restrict land filling to non biodegradable and non recyclable waste ❖ Ensure that land filling meets the specifications in MSW Rules 2000 ❖ Sanitary landfill is an acceptable and recommended method for ultimate disposal of MSW. It is necessary component of MSWM, since all other options produce some residue that must be disposed of through landfilling. 	<ul style="list-style-type: none"> ❖ inert and processing rejects are currently dumped openly in ULBs due to high capital and operating expenditure of landfills. ❖ Poor financials of the ULBs are <u>deterrent to pay tipping regularly</u> for Sanitary Landfill activity. ❖ In GHMC area 100% inerts are disposed through landfilling through concessionaire M/s Ramky Enviro Engineers Ltd. under PPP mode (BOOT). 	<ul style="list-style-type: none"> ❖ Sanitary Landfill will be examined on submission of DPRs by the consultants ❖ The existing dump yards / Lands allotted by the Government shall be considered for the purpose on finalization of DPRs. 	<p>Dec 2016</p>
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XV. Institutional setting:

<ul style="list-style-type: none"> ❖ The ULBs should be 	<ul style="list-style-type: none"> ❖ Environment 	<ul style="list-style-type: none"> ❖ Governments have 	<p>Dec 2015</p>
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<p>mandated to replace inadequately qualified and inefficient staff with staff necessary to maintain the solid waste management system. For outsourcing the job, a stringent pre-qualification criterion should be developed for the contractors, which inter-alia should include sufficient number of sufficiently qualified persons and the contract agreement should be performance based for which necessary performance indicators should be evolved.</p>	<p>Engineers on outsourcing basis are working in the ULBs.</p> <p>❖ Environmental Engineer posts were sanctioned in 42 ULBs of the State.</p>	<p>sanctioned Environmental Engineer posts for all the ULBs (except newly constituted Nagar panchayats) for technical support for implementation MSW Rules, 2000.</p> <p>❖ Training Needs Assessment will be carried out for capacity building programs to the field staff, supervisory staff, contract employees, officers, civil society organizations, Community Based Organizations, on Solid Waste Management topics.</p>	
<p>XVI. Management Plan:</p>			
<p>❖ Rules for operation and maintenance of the solid waste management system must be established in the form of a handbook together with a legal requirement to keep honest records of specified parameters that refer to the performance of the system including the quality of work performed by each individual. Apart</p>	<p>❖ According to the MSW Rules, 2000, State level guidelines and circular instructions were prepared and are under implementation.</p> <p>❖ A Handbook on solid waste management by covering all the issues was published as a ready reckonor for the Municipal Managers of the State.</p>	<p>❖ Urban Local Bodies will adopt mechanism for enforcement, supervision and monitoring the Pin Point System for optimum utilization of manpower resources through social audit mechanisms.</p> <p>❖ Urban Local Bodies will disseminate relevant information on waste management services.</p> <p>❖ ULB will be establishing a Management Information System for</p>	<p>Dec 2015</p>

<p>from the enhancement of capacities of ULBs, there should also be additional checks by a local committee of qualified civil society representatives, health officers and officers from other departments who should be empowered to visit and issue a note of caution when any component of SWM system is not working or inadequately working.</p>		<p>MSWM including records for regular monitoring</p> <ul style="list-style-type: none"> ❖ Urban Local Bodies will develop an City Sanitation Plan identifying gaps and develop short, medium and long term actions for solid waste management ❖ Urban Local Bodies will constitute City Sanitation Task Force involving the stakeholders in Planning, Implementation and Monitoring of the City Sanitation Plans. 	
<p>XVII. Redressal of Public Grievances:</p>			
<ul style="list-style-type: none"> ❖ Local body should draw up a citizen's charter clearly and efficient machinery should be organized by the local body to receive public complaints and attend to them expeditiously. Formats may be prescribed for receiving such complaints, replying to the applicants as soon as the complaints have been redressed and for monitoring the pending complaints. 	<ul style="list-style-type: none"> ❖ Complaints are being recorded over phone or register and forwarded to the concerned departments. ❖ In GHMC area online Grievance redressal system is in place. 	<ul style="list-style-type: none"> ❖ The Citizen Grievance redressal mechanism by use of IT tools with provision for registering complaints over sms service and emails will be developed and implemented in all ULBs. ❖ The implementation of Citizen Charter will be strengthened. 	<p>June 2016</p>
<p>XVIII. Financial Aspect :</p>			

<ul style="list-style-type: none"> ❖ As per the Manual on Solid Waste Management by 20 the Ministry of Urban Development, 2000, the annual requirement of funds for efficient SWM reveals that when the principle of Full Cost Pricing is applied the Total Annual requirements are often 2 -3 times the amount being allocated at present. Thus, it is important that the beneficiaries also share the responsibility of waste management following the 'Polluters pay principle'. The SWM will have to provide SWM Tax/Cess, and to cover not only the annual cost of operation, required to be repaid but also the indirect costs 	<ul style="list-style-type: none"> ❖ Recovery of revenue is limited to charged a cleansing tax as part of the property tax. ❖ Nominal rate is levied in case of commercial and bulk waste generators in few ULBs. 	<ul style="list-style-type: none"> ❖ Urban Local Bodies will adopt the Polluter Pay Principle ❖ User charges will be introduced in all commercial establishments 	<p>Dec 2015</p>
<p>XIX. Preparation of Detailed Project Reports for MSWM</p>			
<p>Preparation DPRs as per the indicative Action Plan given by the Central Pollution Control Board</p>	<p>Most of the ULBs do not have DPRs for implementation of Solid Waste Management action plan</p>	<ul style="list-style-type: none"> ❖ All ULBs will prepare DPRs for MSWM as per the indicative Action Plan given by the Central Pollution Control Board and Expression of Interest is also called for. 	<p>Dec 2015</p>
		<ul style="list-style-type: none"> ❖ 	

XX	Financial Requirement for implementation of the action plan :
<p>Investment requirement:</p> <p>Based on the High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services report, an amount of Rs.325.25 Crores (<i>Annexure IV</i>) are required for strengthening of infrastructure and services for solid waste management in the ULBs (except Greater Hyderabad Municipal Corporation where MSWM project under PPP is implementation) of the State. The above amount will be accessed from Swachh Bharat Mission funds, 14th FC grants and from State Government funds etc., for strengthening the infrastructure and services.</p>	


Based on the success of existing Waste to Energy projects, the Integrated Solid Waste Management approach will be upscaled to the remaining clusters of ULBs in the State.

Best practices:

The State of Telangana is one of the few states where 5 ULBs (Siddipet, Siricilla, Tandur, Bhongir and Miryalguda) are forefront in implementation of MSW Rules, 2000, and another 5 ULBs (Jagityal, Nalgonda, Suryapet, Karimnagar and Gajwel) are in the process. By the end of 2016, the Government of Telangana aims to be the one of the MSW Rules Compliant States in the Country. The MSWM Best practices being implemented in Tandur Municipality is enclosed (*Annexure -III*) for your kind reference.

SOLID WASTE MANAGEMENT ACTIVITIES


(Other than Greater Hyderabad Municipal Corporation)



CLEAN CITIES CHAMPIONSHIP CAMPAIGN

WARANGAL MUNICIPAL CORPORATION

వరంగల్ నగరపాలక సంస్థ



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Solid Waste Management:

Solid waste is the unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given area. It may be categorized according to its origin (domestic, industrial, commercial, construction or institutional) according to its contents (organic material, glass, metal, plastic paper etc) or according to hazard potential (toxic, non-toxic, flammable, radioactive, infectious etc).

Management of solid waste reduces or eliminates adverse impacts on the environment and human health and supports economic development and improved quality of life. A number of processes are involved in effectively managing waste for a municipality. These include monitoring, collection, transport, processing, recycling and disposal.


WARDWISE CAMPAIGN

Ward No: 1

Show

Date	No Of Vehicles	Weight
26/Nov/2012	83	132900
27/Nov/2012	43	110740
28/Nov/2012	56	146400
29/Nov/2012	32	84100
30/Nov/2012	48	115010

Progress Reports



Warangal Municipal Corporation


Clean Cities Championship Campaign


Starts on 10th October 2012

Waste is Good

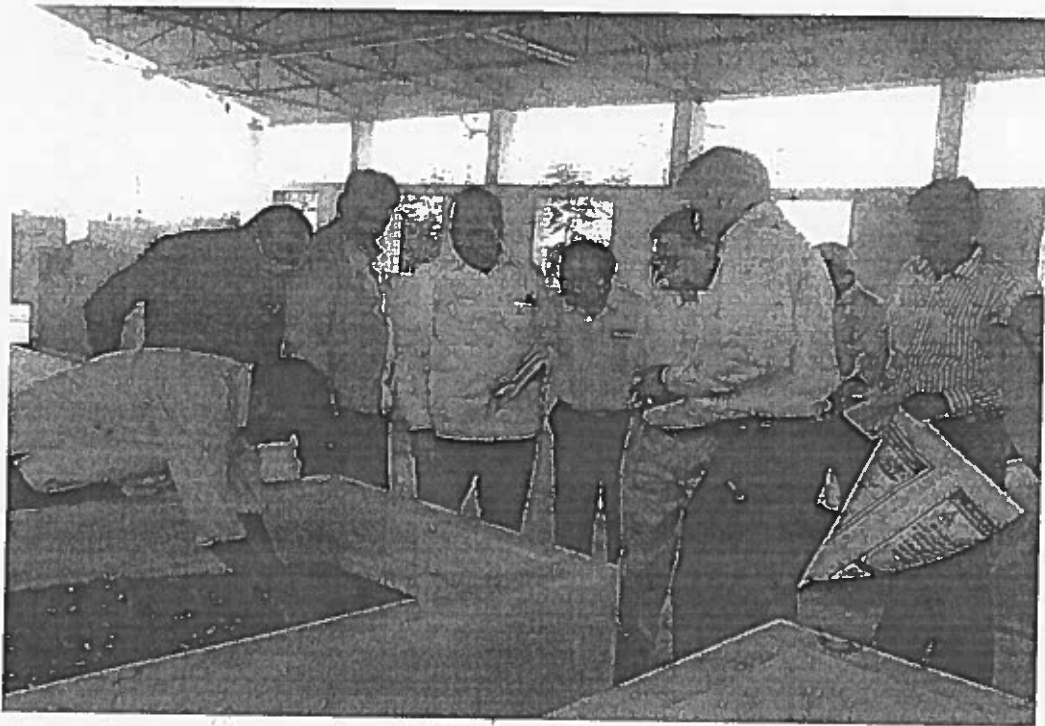
Segregation makes it Better

Our WMC will do the Best

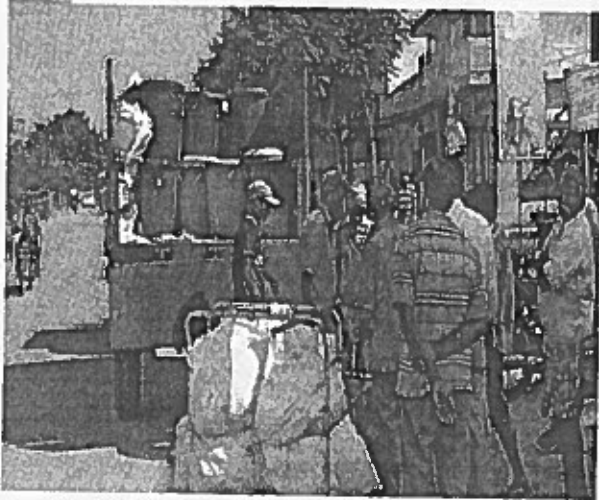




Dr.V.K.Saraswat, Member and Sri.Ashok Kumar Jain, Advisor, NITI Aayog, GOI at Siddipet Municipal Compost Yard on 10-04-2015 observing compost process.



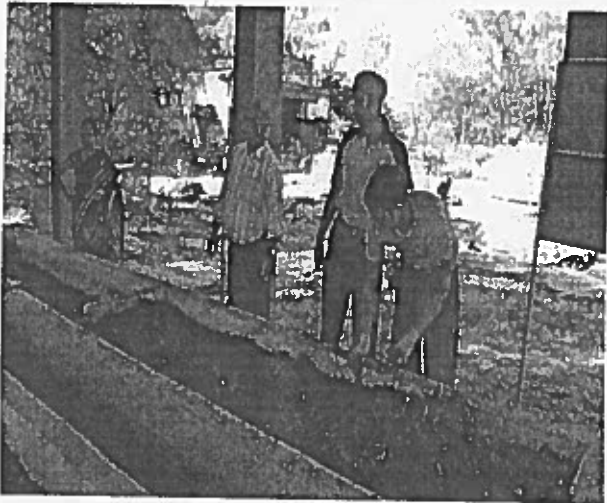
SNAPSHOTS OF CLEAN CITY CHAMPIONSHIP- WARANGAL



Contained Transportation of waste



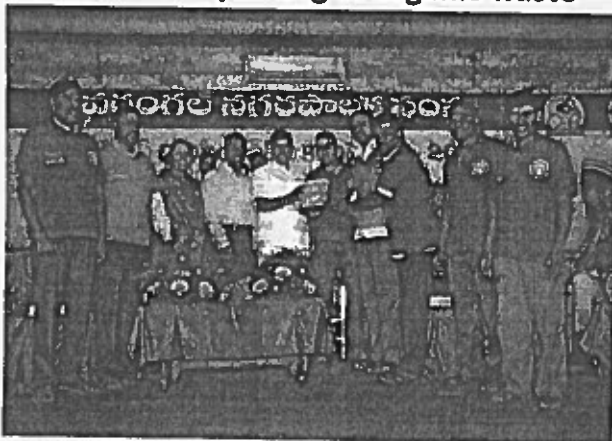
Sorting of Dry recyclables



Vermi- composting of organic waste



Community bins replaced with pots



Felicitiation of Awards for best performers



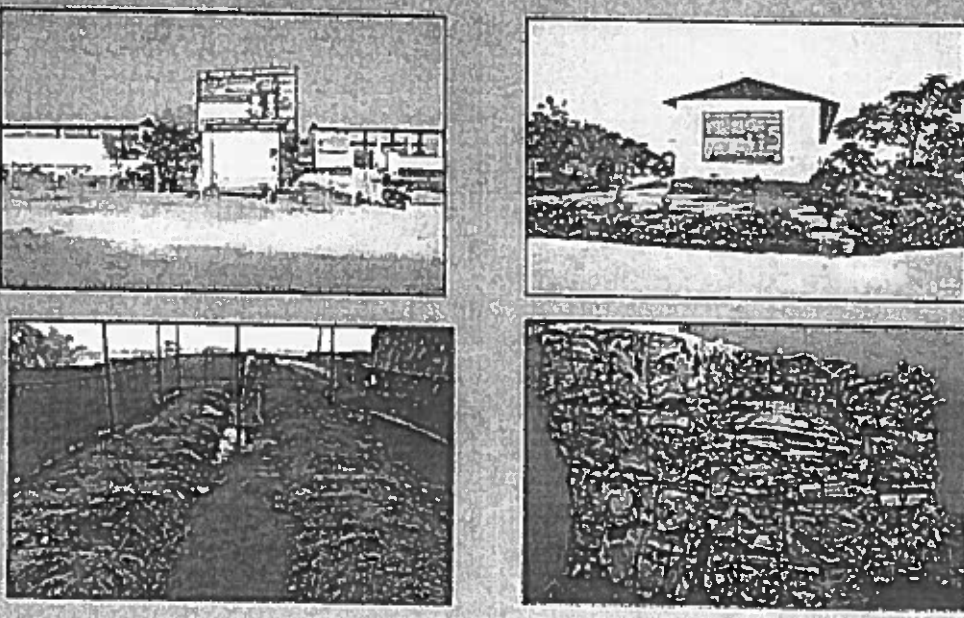
Clean City Champions

Know your Worker - Praichayam

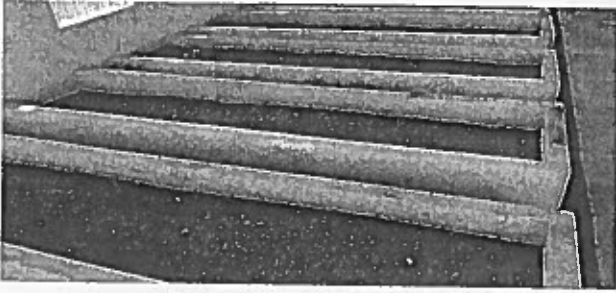


పురపాలక సంఘం - మిర్జాలగూడ .
 వాళ్లలో సహాయ నిపుణులు
 యం.అంజయ్య 9810336094. యం.కాటయ్య,
 పులికొండ: V.లక్ష్మణమ్మ, గిడియమ్మ, P.పద్మ, R. లలిత,
 మునిపాళెం 91-9849008023 సీవాస్ ఏరయ్య. 9866820425
 టాకెట్ ట్రైనర్ 98502735485 క్రెడెన్షియల్: 9666915523 .
 — కమిషనర్.

COMPOST YARD



The block contains four photographs illustrating a compost yard. The top-left photo shows a building with a sign. The top-right photo shows a house with a sign. The bottom-left photo shows a long, narrow compost pile. The bottom-right photo shows a close-up of compost material.



Vermi Composting



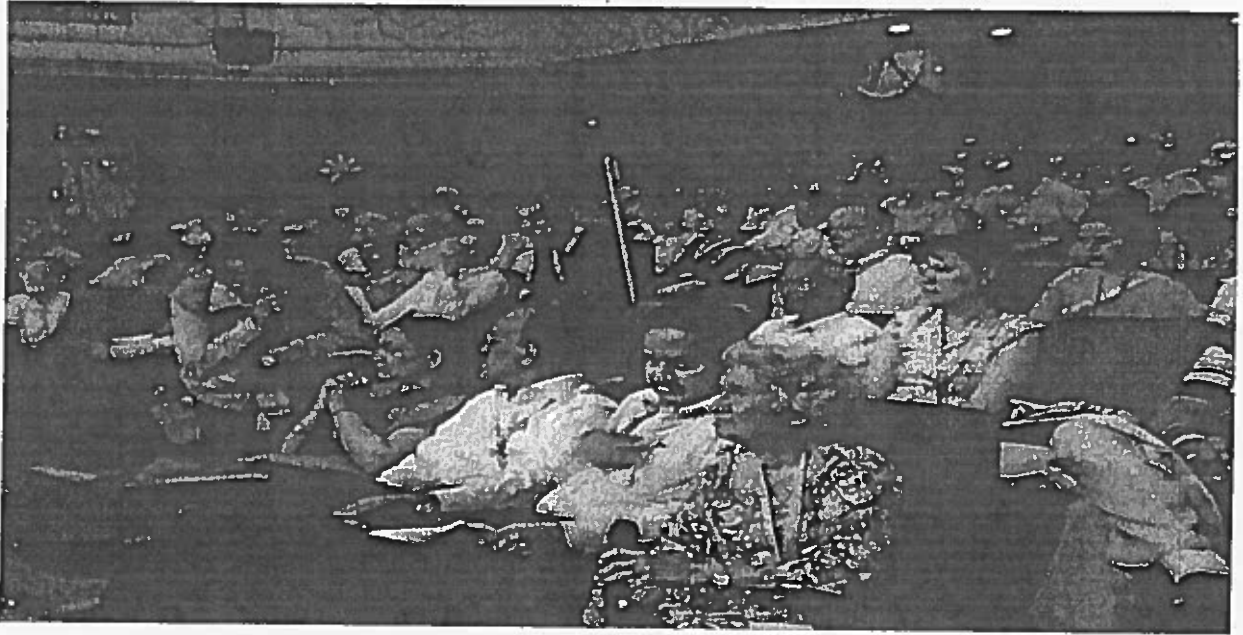
Windrow Composting



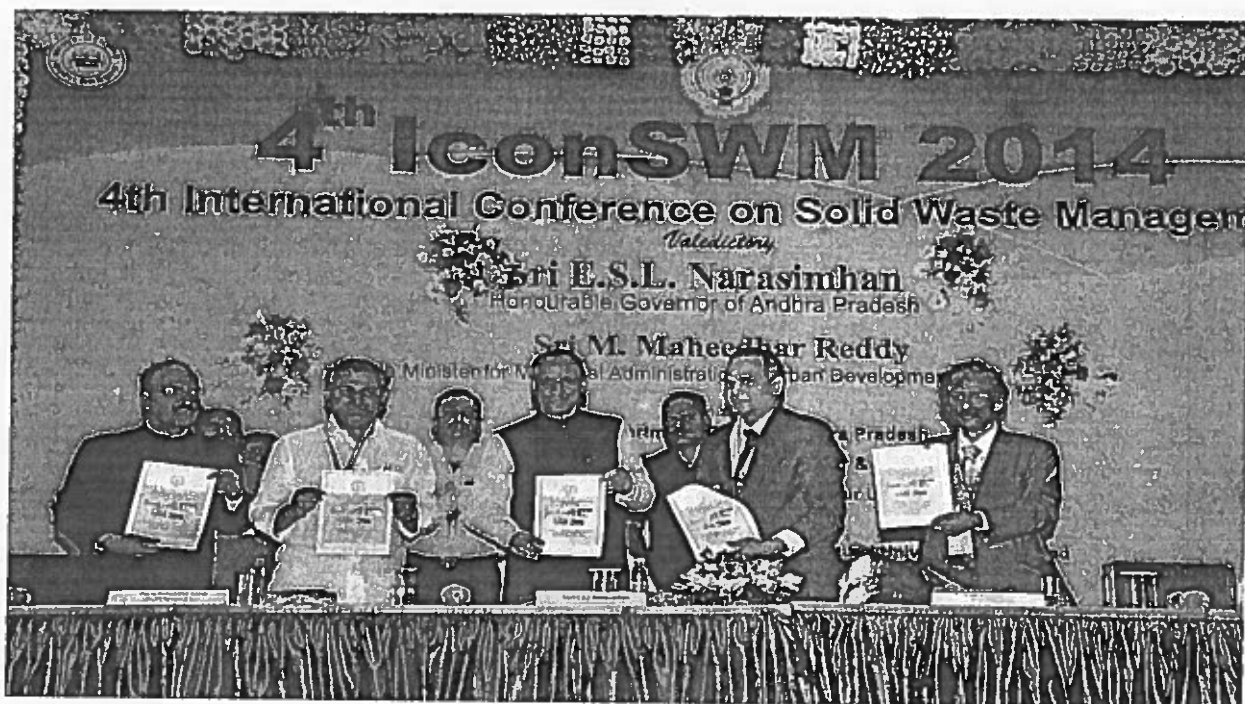
Greenary in Compost Yard

2178

4th International Conference on Solid Waste Management, 28th - 31st Jan 2014, Hyderabad



Release of Municipal Solid Waste Management Strategy by the Hon'ble Governor Sri ESL
Narasimhan, AP & Telangana
States



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**BEFORE THE NATIONAL GREEN TRIBUNAL,
PRINCIPAL BENCH, NEW DELHI**

ORIGINAL APPLICATION NO.199 OF 2014

IN THE MATTER OF:

Almitra H. Patel & Anr.

Applicant

Vs.

Union of India & Ors.
Respondents

AFFIDAVIT

I, M.G. Gopal, S/o. Late Dr. M.B.I. Sarma, aged 57 years, having Office at Hyderabad, State of Telangana, do hereby solemnly state and affirm as under;

1. That I am the Principal Secretary to Government, Municipal Administration and Urban Development, State of Telangana and as such well conversant with the facts and circumstances in my official capacity and on the basis of information derived from the record of the case and hence competent to swear the present affidavit.
2. That I have gone through the accompanying status report prepared in compliance of the direction of this Hon'ble Tribunal and the contents of the same are true and correct.
3. That the contents of the annexure annexed with the report is also true and correct to the best of my knowledge and as per the information derived from the record.



DEPONENT

Principal Secretary to Government
Municipal Administration & Urban
Development Department
Telangana Secretariat, Hyderabad - 22.

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VERIFICATION

Verified at Hyderabad on this the 18th day of April, 2015 that the contents of the present affidavit are true and correct to the best of my knowledge and on the basis of information derived from the record. No part of it is false and nothing material has been concealed there from.

[Handwritten Signature]

DEPONENT

Principal Secretary to Government
Municipal Administration & Urban
Development Department
Telangana Secretariat, Hyderabad - 22.



ATTESTED :

[Handwritten Signature]

K. NARASIMHA RAO, B.A., LL.B
ADVOCATE / NOTARY
Appointed by the Govt. of A.P.
10-1 891/401, A.C. Guards
Khairatabad, HYDERABAD

MSWM STATUS REPORT OF ULBs OF TELANGANA STATE AS PER THE CPCB TEMPLATE

Solid Waste Service Levels in ULBs of Telangana

Component	No of ULBs			
		80 to 100%	60-80%	40 - 60%
Door To Door Collection	68			
Segregation	11 (including GHMC)			57
Collection Efficiency of Waste Generated	68			
Treatment of the Waste	1 (GHMC)			67
Scientific Disposal of Waste - Land filling	1 (GHMC)	-	-	Nil
Preparation of ULB wise DPRs for Solid Waste Management as per the indicative action plan given by the Central Pollution Control Board is under process				

Status and methods of municipal solid Waste processing

Total No of ULBs	No of ULBs practicing Compost / Vermicompost / Sale of recyclables	No of ULBs with Bio-menthaization	No.of Integrated Solid Waste Management Projects	No of ULBs with WTE	No of ULBs without land for dumping yards
68	10 (Miryalguda, Nalgonda, Bhongir, Suryapeta, Tandur, Siddipet, Jagityal, Karimnagar, Warangal, Adilabad)	1 Warangal Corporation	1 Greater Hyderabad Municipal Corporation	30 ULBs are being allotted to waste to energy projects. The M/s Shalivahana MSW Green Energy Ltd has suspended its operations due to non viability of power purchase tariff rate. The M/s Hema Sri Power Projects is expected to commence its operations from July, 2015	23

ULBs wise Generation and Treatment in Metric Tonnes per Day (MTD)

Category Based on Quantity of Waste Generated	Name of the ULBs	Quantity Generated	Quantity Collected	Quantity Treated	Quantity disposed
500 & above	GHMC	4000	3800	3040	760
100-500 MTD	Ramagundam	115	113	0	113

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	Corp				
	Warangal Coprn.	210	210	20	190
	Nizamabad	218	202	0	202
	Karimnagar Corp.	220	200	20	180
	Khammam	130	65	0	65
	Sub Total	4893	4590	3080	1510
50-100 MTD	Miryalguda	50	50	8	42
	Jagitial	50	50	10	40
	Kothagudem	50	48	2	46
	Siddipet	55	54	15	39
	Khagaznagar	55	53	0	53
	Mahabubnagar	56	52	0	52
	Sangareddy	58	56	0	56
	Sircilla	58	57	5	52
	Nirmal	60	58	0	58
	Suryapet	63	63	5	58
	Adilabad	66	64	10	54
	Sub-Total	621	605	55	550
<50 MTD	Ieeja	8	7	0	7
	Kalwakurthy	8	7	0	7
	Dubbak	8	7	0	7
	Gajwel - Pregnapur	8	6	0	6
	Achampet	10	8	0	8
	Kollapur	10	8	0	8
	Narayanpet	10	8	0	8
	Chegunta	10	8	0	8
	Armoor	10	9	0	9
	Ibrahimpatnam	10	9	0	9
	Parkala	10	9	3	6
	Andole - Jogipet	12	11	0	11
	Bhupalpally	12	10	0	10
	Husnabad	12	11	0	11
	Wanaparthi	13	11	0	11
	PeddaAmberpet	15	14	0	14
	Madhira	15	13	0	13
	Badangpet	16	15	3	12
	Peddapally	16	14	0	14
	Vemulavada	17	16	0	16
	Sadasivpet	18	16	0	16
	Huzurnagar	18	16	0	16
	Kodad	18	18	8	10
	Medchal	18	16	0	16
	Narsampet	18	17	0	17
	Manuguru	19	18	0	18
	Shadnagar	20	18	0	18
	Devarakonda	20	18	0	18
	Metpally	24	24	1	23
	Huzurabad	24	23	0	23
	Koratla	25	23	0	23
	Sathupalli	25	23	0	23
	Mahaboobabad	26	22	0	22
	Bhainsa	27	24	0	24
	Nagarkurnool	28	25	0	25
	Jangaon	28	27	0	27
	Jammikunta	28	25	0	25

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	Medak	29	27	0	27
	Vikarabad	29	29	0	29
	Mandamarri	30	28	0	28
	Bhongir	32	32	10	22
	Yellandu	32	30	0	30
	Bellampally	32	32	0	32
	Zaheerabad	35	30	0	30
	Mancherial	35	34	0	34
	Gadwal	36	32	0	32
	Kamareddy	37	35	0	35
	Tandur	40	40	10	30
	Palwancha	40	38	0	38
	Nalgonda	45	43	5	38
	Bodhan	48	46	0	46
	Sub Total	1114	1030	40	990
	Grand Total	6628	6225	3175	3050

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Annexure - II
ULBs Allotted to Waste to Energy Projects -
- Clusters

SI no.	Name of the ULBs	Present Waste Gen (MTD)	Cluster No.	SI no.	Name of the ULBs	Present Waste Gen (MTD)	Cluster No.
M/s Shalivahana Projects Limited				M/s Hema Sri Power Projects Limited			
1	Siddipet	55	15	1	Warangal Corpn	210	18
2	Kamareddy	37	16	2	Jangaon	28	18
3	Armoor	10	16	3	Bhongir	32	18
4	Kagaznagar	55	17	4	Nalgonda	45	19
5	Bellampally	32	17	5	Miryalaguda	50	19
6	Mandamarri	30	17	6	Suryapet	63	19
7	Mancherial	35	17	7	Khammam	130	19
8	Ramagundam	115	17	8	Kothagudem	50	19
9	Karimnagar Corpn	220	17	9	Palvancha	40	19
10	Siricilla	58	17	10	Yellandu	32	19
11	Koratla	25	17	11	Sattupalli	25	19
12	Metpalli	24	17	12	Manuguru	19	19
13	Jagitial	50	17		Sub-Total	724	
14	Nizamabad Corpn	218	16				
15	Bodhan	48	16		Grand Total	1889	
16	Bhainsa	27	16				
17	Nirmal	60	16				
18	Adilabad	66	16				
	Sub-Total	1165					

Total No. of ULBs in the State (Except GHMC) : 67
Total Waste Generation in the State (Excl GHMC) : 2628 (MTD)
Total Waste allotted to WTE Projects in the State : 1889 (MTD)
(Excluding GHMC)
Total no. of clusters : 5
Total No. of ULBs (except GHMC) : 30
SGEL = Shalivahana (MSW) Green Energy Limited : 18 ULBs
HPPL = Hema Sri Power Projects Private Limited : 12 ULBs

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People perception and participation makes difference



KV Ramanachary, MA LLB
Commissioner, Tandur Municipality

By and large, it was hardly 60 percent of the Solid Waste generated collected, transported and disposed off which gave in-sanitary conditions in Tandur before 2010. The Municipalities are responsible for providing the basic services like water supply, sewerage and solid waste management and other amenities to the people but municipalities are finding increasingly difficult to cope-up with the demand due to the fast growth of population, thereby adversely affecting the management of such services to the poor.

Realizing these facts, since 2010, the objectives of the municipality have been reviewed and made efficient garbage collection; transportation and disposal are also among the vital functions of the Municipality. The issue of recycling of solid waste has also been given with due attention. In complex issues of Solid Waste Management, it is inevitable that community participation and change in their perception have developed many collective responsibilities and sustainable results towards management of any programs and interventions. I am proud to mention that the Community participation, and ensuring their partnership in Solid Waste Management Interventions are highly contributed to the intact progress in the municipality and achieved considerable impact towards environment friendly in Tandur Municipality. I am very much happy to present our case study as part of this book let on "Carving Best Prospective in Solid Waste Management" and I believe the information present in the case study is very useful to you.

Intro

Tandur Town is constituted as Grade III Municipality in the year 1953. It is an ancient town and was under the rule of Nizam of Hyderabad. Tandur town was included in Hyderabad district now. The extent of area of Tandur Municipality is 18.25 Sq.Km. The population of the town as per the 2001 census is 57,943 now the population is 65000 and the floating population is around 25000 per day from the nearby mandals and villages.. The Municipality is consisted with 31 election wards and upgraded to IIInd Grade in the year of 2010. The Municipality is located at a distance of 110 KM from Hyderabad and well connected with Bus Route.

Rationale for Selection

This case was selected because it provides information about effective waste management and reduction of waste by ban on use of Plastic / polythene in this municipality.

Case Description

Earlier before 2010, dumping of waste at the roads side in Tandur had created problems for local residents and visitors. Complaints from the local residents regarding waste disposal were severe and the efforts of the municipality to solve the problem were inadequate.

With the vision of safe and healthy municipal area, Thandur Municipality has established a Resource Park near to the Municipality (in a distance of five kilometers) since 2012 and established initial infrastructure such as Segregation Shed, Compound Wall, Water Facility, and Plantation with the received grants of 12th Finance Commission. The Environmental and Sanitation Section is responsible for Municipal Solid Waste Management in this Municipality and the main functions carried out by this section are street sweeping, waste collection in domestic and commercial areas, cleaning of roadside drains, removal of dead animals, Maintenance of waste management vehicles, recruitment

Town Profile

Notified Slums	14	Veterinary Hospitals	1
Non Notified Slums	0	High Schools	4
Government Hospitals	1	Upper Primary Schools	8
Urban Health Centers	1	Primary Schools	7
Parks	6	Vegetable Markets	2
Open Spaces	10	Fish / Meat Markets	2
Play Grounds	0	Tanks	1



and training of waste management staff, Public Awareness and Education. The main objectives in improving the waste management in this municipality is to ensure effective collection of solid Waste from households and minimize and reduce waste by ban on using plastic carry bags which chokes the road side drains.

Earlier Scenario of Solid Waste Management

It was noted from the interactions of various groups of the public that the scenario of Solid Waste Management in this municipality has been improved tremendously after 2010.

It was presented by the public that the awareness and understanding on Solid Waste and its impact on environment was very low among them and the domestic and commercial waste were disposed in and around the dustbins on the roadsides. Some extent the garbage used to be dumped on sides of the main road in few areas.

The dumped garbage including dry and wet used to be mixed up and lifted by municipality and transport to the dumping yard. Segregation, recycling and recovery of Dry and Wet waste aspect was almost nil.

Though there were few special days observed such world environment day the events were limited up to organizing rally with school children and installing of hoardings and banners. Public Involvement in planning and designing Solid Waste Management interventions was not given much priority.

However the grievances on roads and drains cleanings used to be addressed whenever there are complaints received from the general public.

Waste Generation and Composition

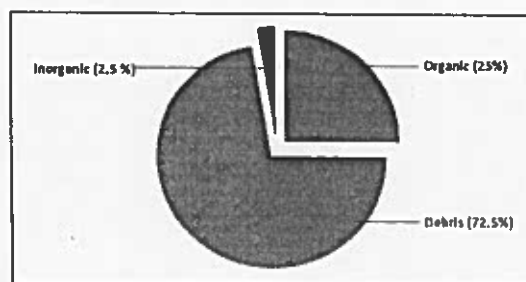
According to the data provided by the municipality and the field survey conducted in December 2013, the average per capita household waste generation rate is 118 grams per head. There are 13216 Households and 2000 commercial establishments in Tandur

Municipality. The total waste generation is estimated as 40 Metric Tons per day.

Official data shows that most of the solid waste is with debris, stone and silt which is around 29 Metric Tons comes from commercial establishments. Tandur town is the main producer and distributor for blue color limestone which can be used for flooring and wall cladding and even for the slabs. There are about 500 units under the name of Tandur Merchants Welfare Association with strong body. The debris / stone waste coming from these units are being transported to the low line areas for land filling.

Around 11 Metric Tons of waste comes from the Households and Commercial Establishments. The official data available with the municipality office is reflecting that 10 out of 11 metric tons is wet waste and rest one metric ton of waste is Dry / day being generated in the municipality.

Chart 1: Composition of Solid Waste at Source in Tandur Municipality



Waste Collection & Segregation

From 2010, the Municipality started implementing the Supreme Court Guidelines on Solid Waste Management in effective manner. Since then, the Municipality had taken up systematic steps for door to door collection, street sweeping, and lifting / transport of the waste to the Resource Park / land filling sites effectively.

The two bin system (Dry and Wet) could be seen in all the wards including small tea shops in this municipality. The households, youth and children were provided with adequate

orientation on categories of dry and wet waste.

School Education Campaigns covering from 5th class to 10th Class students engaging with Debate, Essay writing and drawing competitions on Solid Waste, Community Health and Environment created high level of learnings and awareness in the children. The team of the municipality well utilized these interactions and platforms of the children for creating awareness on source segregation and influence them to act environment friendly. The learnings of the children in turn obviously facilitated their parents on segregation.

In addition, the Community Resource Persons (CRP) strategy worked out well in this municipality. 40 Community Resource Persons have been thoroughly trained up on Solid Waste Management aspects and utilized them in door to door awareness campaigns along with Municipal Staff.

The Collaterals developed for door to door awareness are culturally and traditionally quite good and suits to the municipality.

The Communication Strategy and collaterals that Tandur municipality developed and implemented for building awareness and participation of the public in waste segregation in collaboration with NGOs, Town Level Federations, Slum Level Federation is noteworthy. It was observed that the awareness levels across various target audiences like School Children, Old age group people, households and merchants are considerably high.

Media involvement and collaboration provided good benchmarks to Municipality in generating awareness and publicizing the regulations on indiscriminate disposal of waste in the municipality. The waste collection process proceeds with two workers of the PHW team are ahead of the vehicle (Tractor / Auto / Trolley) and blowing a whistle to inform the residents of the municipality that the tractor for waste collection is coming. The members of the

family then give the segregated solid waste to the Public Health Workers. The transport vehicles all are fixed with audio systems and plays various songs developed on solid waste, waste segregation and community participation. The songs are pretty much connected with community and it was noticed such songs being used as ring tones even in youth mobiles. It was also observed that the collection of waste from the door to door being conducted in the supervision of Jawans most often so as to monitor and assess and level of segregation at household on regular basis. The door to door collection service that is being provided in the municipality is the same in across all the wards. Every day the waste is being collected and the streets are swept according to the defined schedules from 5 am to 10 am and 2 pm to 5 pm.

The monitoring of Road Sweeping and Door to Door Collection is very effective since the Sanitary Inspectors and Jawans are closely supervise the works right from 5:00 am in the morning and report the accomplishment to the municipality on the same day without any deviation. Tandur Municipality is providing a door-to-door collection of municipal solid waste on regular timings for all the residents, markets and commercial establishments. So the littering and burning of municipal solid waste has been reduced at great extent in the municipality area.



"Motivation and developing a feel among workers that we are contributing not only to the environment and also largely protecting the Public Health gives a boost for job satisfaction and turn out into considerable impact"

- Srikanth, Sanitary Inspector



"Our Municipality has been completely transformed in last three years. Our Town Level Federation and Slum Level Federation members are actively monitoring the level of source segregation of each household. We even discuss in our meetings the issues if any group member is not following the regulations of Source Segregation. Contribution to Municipality in Solid Waste Management is now part of our regular meeting agenda.

- Ms Jyothi, the President of Town Level Federation of the Municipality

According to the Municipal Solid Waste Management Rules 2000, the Municipal Authority shall undertake phased programs to ensure community participation in waste segregation. Tandur Municipality had derived to a successful and meaningful community participation in segregation of waste by effective implementation of two bin system while comply the Municipal Solid Waste Management Rules.

It is inevitable that integrating environmental aspects in generating realization is much important to yield sustainable results in Solid Waste Management, rather than limiting the awareness programs only to the waste and health. In a way, Tandur has reached a milestone in generating such impact. However the focus should be continued to further intensify the current education on solid waste management and environment.

Safety tools

It was defined in MSWM Rules 2000 that that the manual handling shall be carried out under proper precaution with due care for safety of workers. The Public Health Workers in this municipality provided with uniform (saris / pant / shirt) combined with a coat and plastic sandals. Although the workers are also given with safety tools such as mouth masks, gloves these tools for collection and segregating municipal solid waste is did not fit well. The Municipality is aware of this drawback and taking up further steps in mobilizing required support from the local agencies and NGOs for acquiring worker friendly safety tools. However using of Surgical Mask while collection of waste has been observed.

Transport

The waste from the households is being dumped in to the transport vehicle which has separate partitions. Once the door to door collection is completed or vehicle is fully loaded with the waste it is transported to the Resource Park which is near by the Municipality with in a distance of 5 Kms.

Table 1: Man Power of Sanitation Wing

Man Power		
1	Jawans	6
2	Workers (Regular)	57
3	Workers (Contract)	185
4	Sanitary Inspector	1
	Total:	249

Table 2: Vehicles for Waste Collection and Transport

Transport Vehicles		
1	Tractors	9
2	Hydraulic Autos	4
3	JCB / Dozer	1
4	Pushcarts	8
	Total:	22

There are 31 wards in this municipality divided into 8 routes. Each ward is allocated

with 4 Public Health Workers, 1 driver and 1 Tractor to cover 415 households on average. It was noticed that the current mechanism with the existing allocated manpower is able efficiently collect waste from 17 - 20 households per hour.

Roads Sweeping and Cleaning of Drainage Canals

While observing the main roads and internal roads of the Municipality, even in the vegetable market, it could be understood that the Municipality is paying all the necessary attention to maintain the roads very clean and litter free.



Picture 1: The Market Road in Tandur Municipality

118 KM road length is being covered under sweeping on day to day basis and 137 KMs length Drains being de-silted once in two days. The collected waste from these two activities is sent to the Resource Park on regular basis for processing.

Litter Free Markets

The existing two Vegetable and Meat / Fish Markets are given with additional care to ensure cleanliness and litter free zone. The current quantity of garbage from these two markets is around 5 Metric Tons per day. A separate crew and vehicles are allocated to the markets for collection of waste and supervision of cleanliness.

Implementation of the regulations on litter free is remarkable in Tandur. The agitations from the vegetable / fish / meat vendors that

It is a New Era Started in our Municipality



Mr Venkata Subbaiah, MBBS Doctor stated that the current scenario has brought a new era in their municipality. He felt the beneficiaries' participation right from the planning till to implementation and monitoring definitely capitulate solid results for which Tandur has a set a live example.

The Task Force Committee, after a detailed orientation, has been made responsible for overall program quality supervision. The Task Force Committee is an informal group that has been formed by Municipality with Retd School Principals, Doctors, RTC, Railway Officials, NGO Representatives, Women Leaders and Environment Activists.

The key of the success in Tandur Municipality is the best engagement of Task Force Committee and utilizing their services in planning, designing and quality control supervision. He further added that adequate phase wise community education made program implementation trouble-free which the municipality applied for its success in this case.

were arisen at the initial stage were addressed by the Municipality Team very strategically with the support of Media and Local Political Team. Getting together meetings with vendors / merchants provided them orientation and further facilitated them to support the environment cause. The Municipality also issued notices to the traders in the market in the cases of violation of municipality regulations observed. After observing the last one year data available, no such situations occurred.

Recovery and Final disposal

The Compost Yard has been established in 6 acres of land, which has been transformed as Resource Park now. The resource park is being maintained by one Jawan and four Public Health Workers. Although the Households are providing the waste in two bins, the Pubic Health Workers also oversee the waste and further segregating most of the municipal Solid Waste on the transport vehicle and this reduces the amount of residual waste. However, current quality of the segregation is 85% due to lack of efficient segregation of inorganic waste on the part of waste generators and lacking infrastructure such as bailer, shredder at Resource Park. The Segregation is given priority for the different waste streams like plastic bottles, covers, carton, metal, glass etc and stored in a separate shack / cells built in the Resource Park.



Picture 2: The Dry Waste Storage Banks

According to the Municipal Solid Waste Management Rules the storage facilities

should be established and maintain in such a manner as they do not create unhygienic and in-sanitary conditions around it. Further the storage banks shall be created and established by taking into account quantities of waste generation and shall be so designed that wastes stored are not exposed to open atmosphere.

Tandur Municipality has built its storage facility comply with the Municipal Solid Waste Management 2000 Rules. The storage Banks are built in the Resource Park in such a way with separate shacks for different waste streams and not exposed to the open atmosphere. These sizes of the shacks also could be altered and modified based on the quantity. Measures for control the menace of the larva / flies / mosquitoes etc in these shacks is also being taken care by the Resource Park Care Takers. Mostly the recyclables are being kept here for a week time maximum Table 3 provides the segregated salable recycling waste streams.

Table 3: Recyclable Waste Fractions

#	Waste	Collected waste in Kg./Day
1	Plastic Bottles	30
2	Thick Plastic	250
3	Gunny Bags	60
4	Cartons	200
5	Glass	285
6	Paper	105
7	Iron	25
8	Radhi (Scrap)	45
	Total:	1000

Approximately once per week the Resource Park Care Taker Team sells the segregated recycling waste to a reseller. The reseller comes to the segregation area and loads all the different package of segregated recycling waste on a truck. At the Resource Park the waste packages are weighted under monitoring of one Jawan and Sanitary Inspector from the Municipality. After

calculating, the Municipality Staff issues a credit invoice to the reseller wherein the reseller pays the value in the municipal office counter. The reseller is paying Rs 4.00 per KG same for all the streams of recyclable wastes. The Municipality is distributing the revenues on the recyclables waste periodically to their workers as incentives. The debris silt and stone waste being collected from commercial units is reported as 29 MT per day. The quantity is being sent to the low line areas for land filling. However there is no scientific procedure is adopted in land filling.

The biodegradable and organic waste is processed by composting through aerobic method in the Resource Park in this municipality. The Resource Park has been built with the 12 Finance Commission funds and the development is still in progress and the composting process started here in this municipality just a year ago. The Resource Park area was used to be as dumping yard before and the now it has been transformed as a Resource Park with basic amenities such as Water, Electricity, Guard Room, Toilets. The compost being produced is used for plantation and developing greenery in this park.



Picture 3: The Resource Park with Segregation / Dry Waste Storage Banks

The Resource Park has been developed and beautified with extra care and absolutely there was no smell / odor is found. The Municipality is also using the park for

conducting their mass events and trainings to their staff.



Picture 4: The Resource Park with Segregation / Dry Waste Storage Banks

Further improvement of Tandur Municipality waste management system could be achieved by setting up of a Shredder / Pulverize and Screener for effective treatment of the biodegradable waste before processing it into the Composting.

Nearly all the different segregated waste streams also can be treated in additional processing steps (such as compact the waste, fuel pellets with the wood waste) with the support of additional infrastructure. However it has to be further analyzed the kind of waste treatments are an affordable and viable technical option for Tandur Municipality.

Ban on use of polythene bags

In many developing countries plastic bags are a significant environmental problem. This is particularly true even in the State of Andhra Pradesh which faces rapid development with un-matched and inadequate waste management systems. In many countries plastic bags have largely replaced the use of re-usable bags and containers for shopping. In India, the share of plastic waste in total solid waste has risen from 0.6% in 1996 to 9.2% in 2005. Over 50% of this waste comprises used plastic bags and packaging. Plastic bag usage can be environmentally very damaging. The bags take hundreds of years to degrade and fill up landfill sites. Plastic litter can also lead to clogged drains, which result in sanitation,

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flooding and sewage problems. In addition, plastic bags can harm animals through ingestion and the incineration of plastic bags pollutes the air and releases toxic substances. Plastic bags are also responsible for using up oil, a scarce natural resource

Earlier Tandur was also facing the serious environmental issues with the indiscriminate use and littering of polythene bags. To address this problem, the municipality passed a blanket ban on use of plastic bags in 2012. Although the ban had produced few agitations from the traders at the early stages however the initiative has got tremendous effective results over a period of time in this municipality.

The Municipality has studied well their local market and imposed the regulations on polythene use. Sensitization workshops in phase wise were organized to the Traders, Dealers, Suppliers, Vendors and Market Leaders on environmental effect by using polythene. Support from Media and Local Political Leaders was also mobilized and oriented them on the regulations of the municipality.

Furthermore the Municipality had also explored for the alternates to the Polythene bags and organized meeting the jute & cloth bag dealers and suppliers and facilitated linkages with the dealers and traders of Tandur.

It was noticed wide communication campaign initiatives were taken up widely in the local Cable Channels, distributing Handouts, door stickers

to the residents, setting up of hoardings in the market places and mike announcements on regulations etc thus the high degree of awareness emerged among the public on plastic ban.



"We experienced a tremendous pressure and influence from Merchants and Traders against the regulations on ban of Polythene use. Educating them intensively on environment aspects and protecting resources for next generation in series of sittings made them realized the need for action. The Ban on Polythene Use has tremendously reduced the load of Solid Waste Management in Tandur."

- Mr Jaleel, Jawan, Tandur

The approaches that followed by the Municipality were the provision of adequate information about the environmental impact of plastic bag use and also the provision of substitutes for plastic bags. Each approach has addressed effectively a different issue that lack of information and education, lack of

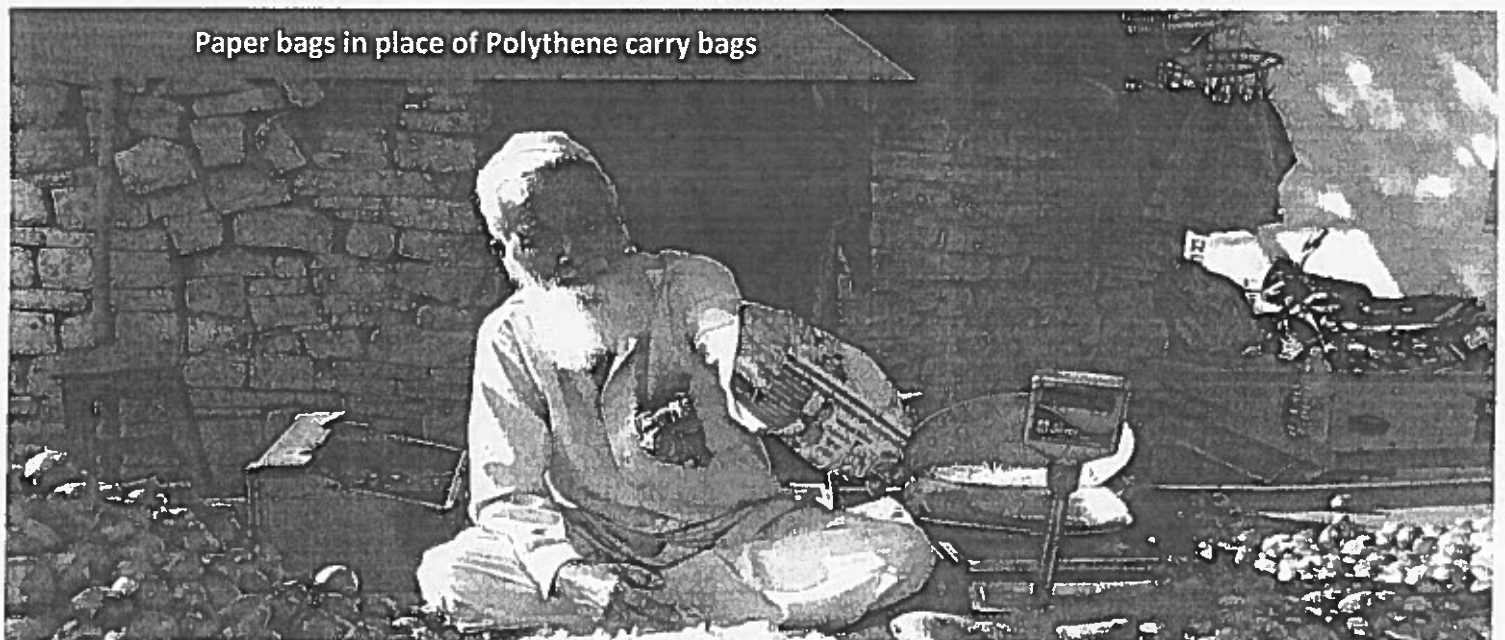
cheap alternatives. It was hypothesized that these two approaches together produced the expected strong effect.

There were few incidents recorded earlier in 2012 Municipality issued notices and levy fine from couple of Merchants for supplying the Polythene Bags to other cities. The stock was taken over by Municipality In such cases and disposed.

It was observed various factors that affected consumer behaviour with respect to the use of plastic bags (and their own bags). These factors included shop types, gender and employment. In the sample of 45 shops in Tandur, 40% were fruit and vegetable shops and 60% were grocery shops. Significantly a higher proportion of consumers brought their own bags for grocery shopping than for fruit and vegetable shopping.

This shows that consumers are comfortable using more reusable bags for grocery items but find plastic bags indispensable some extent for fruits and vegetables, especially soft and small vegetables and wet purchases like meat, fish etc. It was also found that women were more receptive to interventions (the initiatives to reduce polythene bag usage) compared to their male counterparts. However, even in the vegetable markets though the women are opting cheaper cloth bags, women are re-using the same bags more than men.

The Plastic Ban interventions created entrepreneur opportunities to the Slum Level



Paper bags in place of Polythene carry bags

Federation Women Members. The Women in the groups are making paper bags in various sizes and marketing to the vegetable and fruit sellers.

The overall interventions and measures on plastic ban created a maximum impact at a great extent in this Municipality.



"Being a Supplier, I thought how it could be possible once life without polythene bag that too in a typical Tandur Municipality. But Kalajathas and workshops our municipality conducted changed my mindset. All our Merchant Association is committed and passed a resolution against polythene use and to support the cause of environment protection in our municipality. There is no polythene supply and use in our Municipality now.

- Mr Venkataiah, Dealer, Tandur

Other Interventions

The Municipality also paid attention in building up capacities among the Jawans and Public Health Workers on Solid Waste Management Practices which in turn contributed to these successes. However further improvement could be achieved by providing Capacity Building on technical aspects of solid waste management.

It was noticed that the Solid Waste Management interventions have been well received by the Women particularly as though the Municipality had taken adequate care in making the residents aware of their area Public Health Worker by organizing ward level meetings called "Know your Worker" thus

established a rapport with the households effectively. The area Public Health Workers, Jawans and Sanitary Inspector contact number were also published in the wall paintings in respective wards / areas so as to establish a grievance mechanism to address the service complaints.

The provision of Walky-talky system to each Jawan and other staff of Sanitation Department for regular reporting on the work accomplishments and status of complaints resolved is deriving significant results. The overall grievances addressed is being closely supervised by the Commissioner and it was noticed such monitoring and reporting system working effectively in this municipality.

The overall process and methodology of Tandur in MSWM

- Development of Route Map
- Extensive Communication Campaigns and Community Education on Source Segregation and Plastic Ban
- Implementation of door to door collection with partitioned vehicles
- Allotment of sufficient workers and strict implementation of D2D collection schedules working timings
- Reducing of waste generation by implementation of regulations on Polythene Use
- Sensitization of media, Dealers, Traders and Merchant Associations and Collaborations with them.
- School education campaigns on source segregation and environment aspects
- Establishment of grievance mechanism for quality service delivery
- Involvement of Community Representatives, Women Groups, Activists, Doctors, Academicians right from planning till to monitoring of the MSWM Interventions
- Mobilization of resources for Community Education, Dog and Pig menace from other agencies

MSWM Cost in the Municipality

Chart 2: Cost Components of Municipal Solid Waste Management in Tandur Municipality

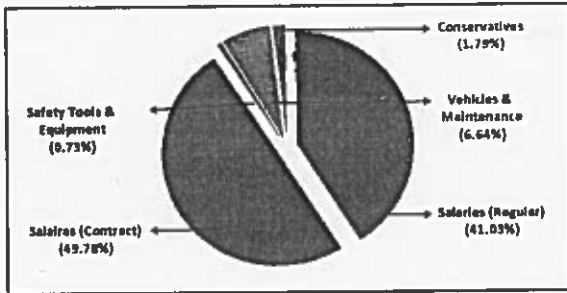


Table 4: Cost Components in detail

#	Component	Amount (INR - Lakhs) /Year
1	Salaries (Regular)	148.22
2	Salaries (Contract)	179.82
3	Safety Tools / Equipments	2.65
4	Transport Vehicle Fuel and Maintenance	24.01
5	Bleach and other Conservatives	6.50
	Grand Total:	361.20

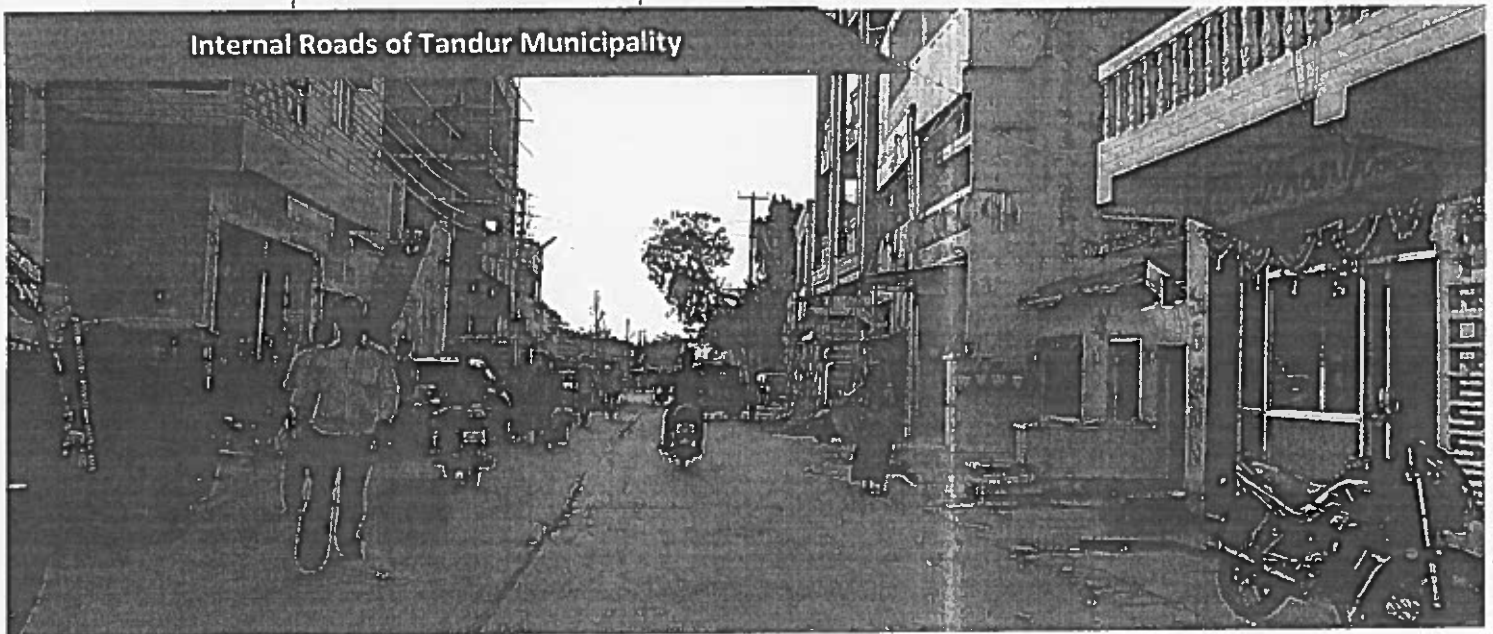
Challenges

The Tandur Municipality, even it got established in 1953 it has not so developed. But the population growth in this municipality is considerably increasing. Since it is also one of the oldest towns the encroachment and

internal roads are very narrow and open defecation still exists in four major outskirts areas. In-sanitary latrines also exist in municipality. The municipal water supply coverage of this municipality is only about 74% and the municipality is yet to be upgraded under the Under Ground Drainage (UGD) System.

Regulations on Individual Latrines (IL) are now imposed in this municipality. According to these regulations the residents who do not have the Individual Latrines should build IL in timeline of maximum six months or an amount of Rs 50,000 would be levied as fine. Knowing the fact that it is an old town and the residents living in the slums having no space to construct the toilets, the Municipality need to explore the possible options to provide them community toilets on pay and use with proper community education. And, also the Municipality should organize / revive the schemes for IL for the poor who are not affording to build an IL in their house. However, monitoring on utilization of the IL Scheme Funds is always a challenge.

The effectiveness of Municipal Sold Waste Management equally relies on disposal of waste which in turn depends on availability of infrastructure. The improvements could be taken place in Tandur by mobilizing equipments for composting the bio-degradable waste. Further the municipality also has a scope to study and analyze the other effective composting procedures such as Vermin Composting Technology and Dry Digestion Technology.



Replicable Best Practice

All the staff of the Sanitation Wing is the local residents hence the resulting knowledge of the areas in which the staff work and their accountability to the local communities are contributing to the effectiveness of the approach. More over the CRP strategy for ensuring the community participation by providing adequate information and education greatly contribute to the success of Solid Waste Management at Door to Door Collection and Segregation levels. Interventions for reduction of waste by implementation of regulations on polythene use with sensitization to all sections stakeholders also supported the overall management of Solid Waste. These approaches can be replicated in other, similar urban municipalities of Andhra Pradesh.

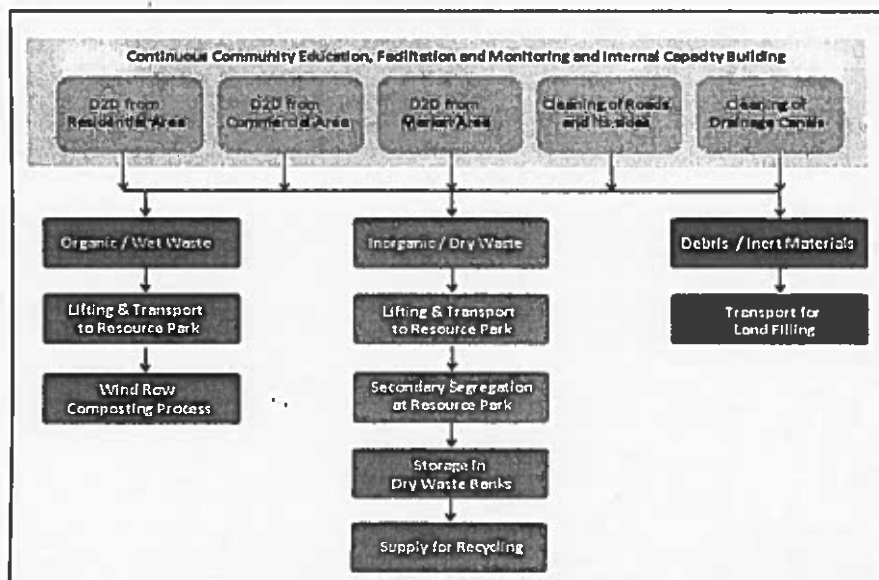
great extent in comply the MSWM Rules 2000 by its interventions with the participation of Community, Media, Traders and other stakeholders.

Facilitation of Town and Slum Level Federations taking active role in creating awareness among the general public on Segregation of solid waste and the active support mobilized from the Media and Politicians to impose regulations on usage of polythene carry bags are the main lesson from this case. The efforts of the municipality to generate revenue from user fees (from the hotels, markets etc), levying fines against violation of municipality regulations on MSWM, its concern to make the citizens accustomed to paying for the waste collection service and follow the municipality regulations on Waste Management. Its approach towards SWM planning is all noteworthy. The municipality has also developed basic facilities for resource utilization, including the collection, transport and composting of organic waste. Assistance from 12th finance commission has played an important role in improving waste management practices. These developments by the municipality are helping to achieve its vision of a clean and neat city.

Conclusions

Building up a sustainable and scientific municipal solid waste management system according to the MSWM Rules, 2000 is a comprehensive task, which demands much more than only a door-to-door waste collection. It starts with responsible action on the part of the waste generators and ends with appropriate waste treatment and correct disposal. In a way Tandur had succeeded at

Overview of Solid Waste Management System in Tandur Municipality



Annexure - IV

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Capital Investment required for Municipal Solid Waste Management for ULBs of Telagana
(based on the High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services report)

Sl. No.	Name of the Station (Established year)	Population 2011 census	Grade	Per Capita cost of Collection & Transportation	Per Capita cost of Treatment	Per Capita cost of Disposal	Per Capita cost for MSWM as per HPEC Estimates	Total Requirement at 2009-10 prices (Amount in lakhs)	Total Requirement at 2014-15 prices @40% of 2009- 10 prices
1	2	3	4	5	6	7	8	9	10
I. WARANGAL District									
1	Warangal Mpl. Corp (1999/1994)	755587	Corp	140	175	115	430	3249.02	4548.63
2	Jangoan (1953)	52394	II	140	175	115	430	225.29	315.41
3	Parakal (2011)	20257	N.P.	140	175	115	430	87.11	121.95
4	Narsampet (2011)	36056	N.P.	140	175	115	430	155.04	217.05
5	Mahaboobabad (2011)	52813	II	140	175	115	430	227.10	317.93
6	Bhupalapally (2012)	59458	N.P.	140	175	115	430	255.67	357.94
II. ADILABAD District									
7	Adilabad (1942)	117167	I	140	175	115	430	503.82	705.35
8	Bellampally (1987)	55841	II	140	175	115	430	240.12	336.16
9	Mancherla (1934)	86911	I	140	175	115	430	373.72	523.20
10	Nirmal (1982)	85433	II	140	175	115	430	360.28	532.37
11	Khajeznagar (1958)	57563	III	140	175	115	430	247.61	346.65
12	Mandamarri (1995)	52362	III	140	175	115	430	225.11	315.18
13	Bhainsa (1963)	49764	III	140	175	115	430	213.99	299.58
III. KARIMNAGAR District									
14	Karimnagar Mpl Corp (1941/2005)	261185	Corp	140	175	115	430	1123.10	1572.33
15	Ramagundam Mpl. Corp. (1995/2010)	229644	Corp	140	175	115	430	987.47	1382.46
16	Jagityal (1952)	96460	I	140	175	115	430	414.78	580.69
17	Sircilla (1987)	75550	II	140	175	115	430	324.87	454.81
18	Koratla (1988)	68504	II	140	175	115	430	285.97	400.35
19	Metpalli (2005)	50902	III	140	175	115	430	218.88	306.43
20	Vemulavada (2011)	33706	N.P.	140	175	115	430	144.94	202.91
21	Peddapalle (2011)	41171	N.P.	140	175	115	430	177.04	247.85
22	Jammikunta (2011)	32646	N.P.	140	175	115	430	140.37	196.52
23	Huzurabad (2011)	37665	N.P.	140	175	115	430	161.96	226.74
24	Husnabad (2011)	22082	N.P.	140	175	115	430	94.95	132.93
IV. KHAMMAM District									
25	Khammam Mpl. Corp (1910/2012)	284268	Corp	140	175	115	430	1222.35	1711.29
26	Kothagudem (1971)	79819	I	140	175	115	430	343.22	480.51
27	Palvancha (1987)	80199	II	140	175	115	430	344.86	482.80
28	Yellandu (1986)	33732	III	140	175	115	430	145.05	203.07
29	Manuguru (2005)	32091	III	140	175	115	430	137.99	193.19
30	Sathupalli (2005)	31857	N.P.	140	175	115	430	136.99	191.78
31	Madhira (2013)	30170	N.P.	140	175	115	430	129.73	181.62
HYDERABAD REGION									
V. NALGONDA District									
32	Nalgonda (1952)	165328	I	140	175	115	430	710.81	995.27
33	Huzumagar (2011)	35850	N.P.	140	175	115	430	154.16	215.82
34	Suryapet (1952)	105531	I	140	175	115	430	453.78	635.30
35	Devarakonda (2012)	29731	N.P.	140	175	115	430	127.84	178.98
36	Miryalguda (1983)	108781	I	140	175	115	430	487.76	664.86
37	Bhongir (1930)	63339	II	140	175	115	430	229.36	321.10
38	Kodada (2011)	64234	II	140	175	115	430	276.21	386.69
VI. MAHABOONNAGAR District									
39	Mahaboobnagar (1942)	217143	Spl	140	175	115	430	933.71	1307.20
40	Gadwal (1950)	65024	II	140	175	115	430	279.60	391.44
41	Narayanapet (1945)	41752	III	140	175	115	430	179.53	251.35

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42	Ammaparthi (1984)	60949	III	140	175	115	430	262.08	366.91
43	Khollapur (2011)	25077	N.P.	140	175	115	430	107.83	150.98
44	Jadcherla (2012)	50556	III	140	175	115	430	217.39	304.35
45	Nagarkurnool (2011)	28801	N.P.	140	175	115	430	115.24	161.34
46	Shadnagar (2014)	54431	III	140	175	115	430	234.05	327.67
47	leeja (2012)	27921	N.P.	140	175	115	430	120.06	168.08
48	Kalwakurthy (2013)	28060	N.P.	140	175	115	430	120.66	168.92
49	Atchempeta (2013)	28425	N.P.	140	175	115	430	122.23	171.12
VII	MEDAK District			140	175	115	430	0.00	0.00
50	Zaheerabad (1992)	60632	III	140	175	115	430	217.29	304.20
51	Siddipet (1954)	111572	Spl.	140	175	115	430	479.76	671.66
52	Sadasivapet (1947)	42950	III	140	175	115	430	184.89	258.56
53	Medak (1953)	44255	II	140	175	115	430	190.30	266.42
54	Sangareddy (1954)	71376	I	140	175	115	430	306.92	429.68
55	Gajwel (2012)	37028	N.P.	140	175	115	430	159.21	222.90
56	Dubbaka (2013)	27500	N.P.	140	175	115	430	118.25	165.55
57	Andole-Jogipet (2013)	23951	N.P.	140	175	115	430	102.99	144.19
58	Chegunta (2013)	21799	N.P.	140	175	115	430	93.74	131.23
VIII	NIZAMABAD District						0	0.00	0.00
59	Nizamabad Mpl. Corp (1937/2005)	311162	Corp	140	175	115	430	1337.95	1873.14
60	Kamareddy (1987)	80315	II	140	175	115	430	345.35	483.50
61	Bodhan (1962)	77573	II	140	175	115	430	333.56	466.99
62	Annoor (2006)	43903	III	140	175	115	430	188.78	264.30
IX	RANGA REDDY District			140	175	115	430	0.00	0.00
63	Tandur (1950)	86116	II	140	175	115	430	279.99	391.99
64	Vikarabad (1987)	53143	II	140	175	115	430	228.51	319.92
65	Pedda Amberpet (2013)	27813	N.P.	140	175	115	430	119.60	167.43
66	Badangpet (2013)	84549	N.P.	140	175	115	430	277.56	388.58
67	Ibrahimpattam (2013)	30993	N.P.	140	175	115	430	133.27	186.58
68	Medchal (2013)	24038	N.P.	140	175	115	430	103.36	144.71
	Total Excluding GHMC in Lakhs	5402753		10080	175	115	30960	23231.84	32524.57
								Grand Total	325.25