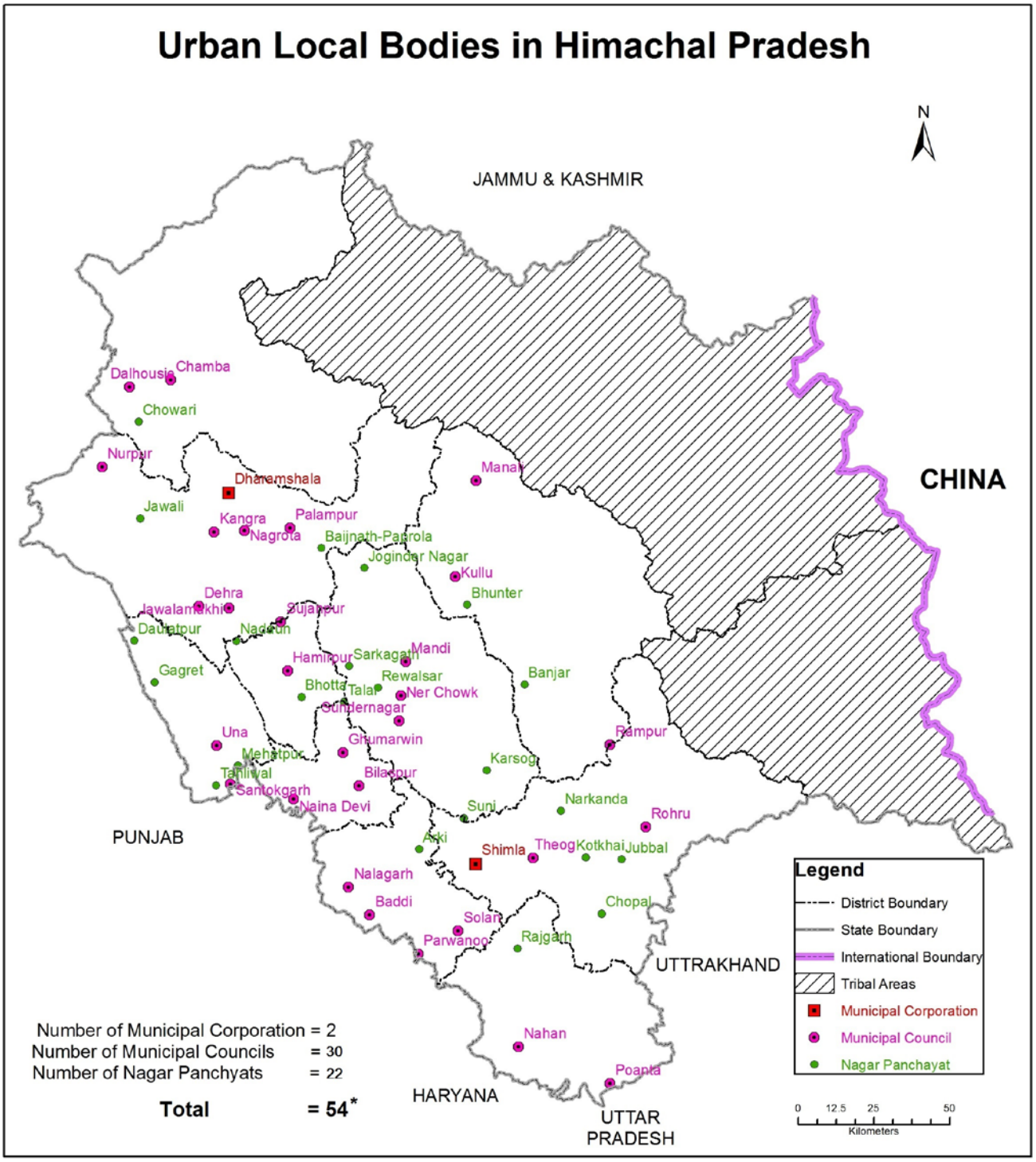
GOVERNMENT OF HIMACHAL PRADESH
DIRECTORATE OF URBAN DEVELOPMENT

ACTION PLAN FOR
MUNICIPAL SOLID WASTE MANAGEMENT
HIMACHAL PRADESH

Himachal Pradesh
February, 2017



*** 4 New ULBs constituted during last 3 years**

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ACTION PLAN FOR MSWM-HP

1. Introduction

It has been a fact that cities and towns are littered with garbage (MSW) and giving ugly look at many places in the city/town. Only important locations of a city or towns are maintained and leaving many other places choking with uncollected waste. The collected waste is disposed on un-attended landfills and it is almost long way to go to ensure that entire waste collected by a city or town is processed and only remnants is disposed through landfill. The municipal solid waste (MSW) management is a complex issue for Urban Local Bodies but essential and important with respect to public health, environment, and the quality of life of the citizens. The MSW (Management and Handling) Rules, 2000 warrant adoption of environment friendly and cost-effective MSW management. The issue of MSW management is becoming sensitive due to various factors such as increase in population, developmental activities, changes in socio-economic scenario and improved standard of living etc. The rate of MSW generation is an index of socio- economic development and economic prosperity of the region. Increasing industrialization and rising income levels lead to greater use of resources which further leads to the increased MSW generation and more complex composition of MSW than earlier. Thus, waste quantities as well as composition are inextricably linked to the vibrancy of economic activity and resource consumption pattern of the society which generates the waste. Further, the technologies to be adopted for MSW management and processing predominantly depend upon MSW quantity, quality and range of variations.

2. Direction of Hon'ble NGT

Hon'ble NGT in OA No. 199/2014 (Almitra H. Patel Vs. Union of India) on 05.02.2015 directed that "the Central Pollution Control Board shall submit independent comments in relation to formulation of a National Policy with regard to collection and disposal of the Municipal Solid Waste as a model policy to be adopted. The Court further directed that every status report will specifically indicate if there is even a single district or village in the entire state / UT where the MSW is collected in its entirety segregated and disposed of in accordance with MSW Rules, 2000. It will also be stated as to how the MSW is being converted to an environment friendly beneficial end product i.e. whether it is totally converted in the usable material /component or is it composted or recycled".

3. Objective

The objective of the MSWM strategy is to create waste free cities/towns and provide clean and pollution free environment in the entire urban areas of Himachal Pradesh.

4. MSWM Principles

- Highest Degree of Community Participation and community led management of MSW
- Segregation at source
- Waste to value through maximizing recycling
- Endeavour to achieve zero land fill status
- Scientific land fill
- Polluters to pay

5. Current Practices of SWM

There are total 54 ULBs and 6 cantonment boards with total of 7 lakh population in the state of Himachal Pradesh. No serious efforts were made in the State before year 2014 to either know the quantity or quality of the waste being generated in the state. However some efforts on waste audit have been made by GIZ in Shimla & Manali. Quality and quantity of waste generated in the state does not remain the same through all seasons but it shows steep variation during different seasons due to massive floating population the State of Himachal Pradesh receives due to touristic activities.

Waste Generation scenario in the ULBs of H.P.

PER DAY WASTE GENERATION IN ULBs

Sl. No.	Name of ULB	Est. Waste generation (TPD)	Sl. No.	Name of ULB	Est. Waste generation (TPD)
1	M.Corp.Shimla	90.00	30	NP Sujanpur	1.90
2	MC Rampur	4.50	31	NP Bhota	0.80
3	MC Theog	1.80	32	M Corp. Dharamsala	18.00
4	NP Narkanda	0.80	33	MC Kangra	6.00
5	NP Suni	0.60	34	MC Palampur	1.50
6	NP Chopal	0.40	35	MC Nurpur	4.00
7	NP Kotkhai	0.45	36	NP Dehra	1.80
8	NP Jubbal	0.30	37	NP Nagrota	4.00
9	NP Rohroo	1.00	38	NP Jawalamukhi	2.10
10	MC Solan	20.00	39	NP Jawali	5.20
11	MC Nalagarh	3.00	40	NP Baijnath	7.80

				Paprola	
12	MC Parwanoo	2.50	41	MC Chamba	8.50
13	NP Arki	1.50	42	MC Dalhousie	2.50
14	NP Baddi	12.00	43	NP Chowari	0.30
15	MC Nahan	10.00	44	MC Mandi	23.00
16	MC Paonta	9.00	45	MC Sundernagar	13.50
17	NP Rajgarh	1.00	46	MC Ner Chowk	8.20
18	MC Bilaspur	4.50	47	NP Sarkaghat	1.50
19	MC Naina Devi Ji	1.00	48	NP Jogindernagar	1.20
20	NP Ghumarwin	3.00	49	NP Rewlsar	0.60
21	NP Talai	0.60	50	NP Karsog	1.00
22	MC Una	6.00	51	MC Kullu	10.00
23	NP Gagret	2.10	52	MC Manali	12.00
24	NP Daulatpur	2.00	53	NP Bhuntar	2.50
25	NP Mehatpur	4.00	54	NP Banjar	0.50
26	NP Santokhgarh	4.50		**Total**	**342.35**
27	NP Tahliwal	1.80			
28	MC Hamirpur	15.00			
29	NP Nadaun	0.70			

5.1 Collection

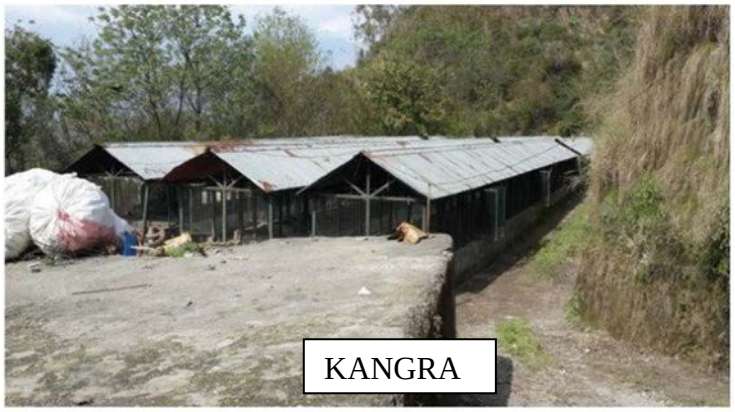
There is no standard system of waste collection in our ULBs all over the state. Some ULBs, during the recent years have started household level collection of waste but it is in un-segregated form. Others are collecting the waste by placing big iron dust bins all over the towns. The ULBs have placed the big dustbins (Dumpers) at different locations without assessing the need, or doing any survey to identify the quantum of waste generation in different waste generating sources. Community has not been involved in how they want to collect or manage the waste generated in different parts of the town. As a result, some people use the dust bins to dispose of their waste but in other cases where waste bins/dumpers are away from their location, they dispose of the waste at un- notified location keeping in view their convenience. In fact the location of these dust bins have been found to be the dirtiest and stinking places in the town. Since the people have not been sensitized about the use of these bins and there is no notice/sign board on or near the dust bins indicating the norms for the use of dust bins, they dispose of both bio- degradable as well as the non-biodegradable waste in the same bins even if they are segregating it at source.

DUMPERS/BINS AND UNDECLARED SITES FOR WASTE DISPOSAL

5.2 Segregation

Whether we are collecting the waste through dumpers or we are collecting the waste from the source (door to door collection), it is in the un-segregated form. **This is where we are going wrong and this is the action/inaction that is failing our SWM efforts.** We presume that we will collect the waste from the entire town and dump the same at dumping site on the platform made at the site (in some places only) for the segregation without realizing that it is an impossible task especially when the waste is in bulk.


DHARAMSALA


KANGRA


SUNDER NAGAR

THE PLATFORM IS AS CLEAN AS NEVER USED

MANUAL SEGREGATION AT MANALI - AGAINST THE HUMAN RIGHTS

5.3 Recycling

5.3.1 Recycling of Bio-degradable waste

We have spent several crores of rupees to construct composting pits all over the State and our municipalities are making unsuccessful efforts to make compost but there very few units where these pits are in use and any compost is being made. At some places, only partial waste is being processed through these composting units. Un-segregated waste reaching the composting yard is the main reason for this failure.

UNUSED COMPOSTING PITS

5.3.2 Recycling of Non Bio-degradable waste

This waste is collected by kabaris through the chain of rag pickers and waste useful to them goes to different places for recycling. Most of the non-biodegradable waste is collected by Kabaris from the source through rag pickers and some waste is collected by rag pickers from the dumpers/waste bins placed by the ULB at different locations in the town. This activity/management is independent of MSWM efforts of ULBs.

6. Strategy for MSWM in HP

6.1 Conducting feasibility study for the State:

In pursuit of making a strategy for the Management of Solid Waste Management in the State the department got in touch with the Embassy of Netherlands which had an MoU with the Govt. of India for providing support in Solid Waste Management in India. Therefore, HE the Ambassador of the Netherlands (Mr. Alphonsus Stoelinga) announced the formation of Dutch Consortium headed by Nexus Novus comprising of experts in the field of waste collection machinery, biogas / CNG, landfills etc to help the state of HP and to conduct feasibility study for establishing state of the art and highly advanced municipal solid waste management system in the state at a cost of about 50000 Euros to be paid by Dutch Govt.

Embassy of the Netherlands assigned this task to Dutch consortia Waste2Value headed by Nexus Novus and the Dept. of Urban Development entered into an agreement with Dutch Company- Nexus Novus to do the feasibility study. The objectives of the study were as under:

1. To analyze the current situation in HP.
   a. To estimate the waste quantity and quality of various locations in HP.
   b. To analyze the various segregation at source drives currently being practiced.
   c. To analyze the current waste collection and management practices in HP.
   d. To analyze waste (quantity and quality) of various dumping sites in HP.
2. To list the various technologies available in collection and management of waste in India and globally.
3. To analyze the marketable products (compost, biogas, electricity, RDF, recyclables etc.).
4. To analyze the techno-financial feasibility for various technologies for the HP and analyze the prospects.
5. To analyze the legal framework.
   -Licenses
   -Compliance
   -Subsidies
   -Incentives
6. To prepare a business plan including discounted cash flow, sensitivity and risk

analysis based on the validated model to estimate financials, gap funding requirements, risks, margins and ROI.

The Nexus Novus conducted feasibility study and submitted its report on 01.06.2015 and recommended following system for end to end solution of MSWM: Underground Waste Bins for collection and transportation of segregated waste: Source segregation and collection system by providing underground waste bins. Underground waste bins would be placed in such a fashion that no person in the town has to walk more than 100 mtrs to find waste bin. There would be separate waste bins for biodegradable, plastic waste and inert / non-recyclable waste with proper information displayed on the waste bins and community is to be consulted for finalizing the sites for installation of bins.

Biogas plant- waste to energy / value: The bio-degradable waste / organic waste collected shall be recycled for the production of Biogas. This biogas shall further be utilized to generate electricity and bottom sludge shall be used as manure, which further can be sold to farmers at subsidized rates. The nearby village areas agriculture waste can also be added up to that waste so as to increase the biomass and ultimately the production.

Refuse Derived Fuel (RDF) - waste to energy: From the dry waste or the plastic, paper, cloth etc. RDF shall be produced which shall be utilized to produce electricity. Feasibility report on RDF to electricity generation is being prepared but till the time our RDF plant is installed, we can send RDF to cement industries for co-processing as these cement factories are already in need of an additive fuel for lowering their coal consumption cost and as a CSR activity.

Landfill site: As whole of the waste being generated cannot be diverted for having biogas or the RDF, we need to have an engineered landfill site to dispose of the reject or the inert waste. Landfill site is proposed to cater to the disposal needs of inert waste.

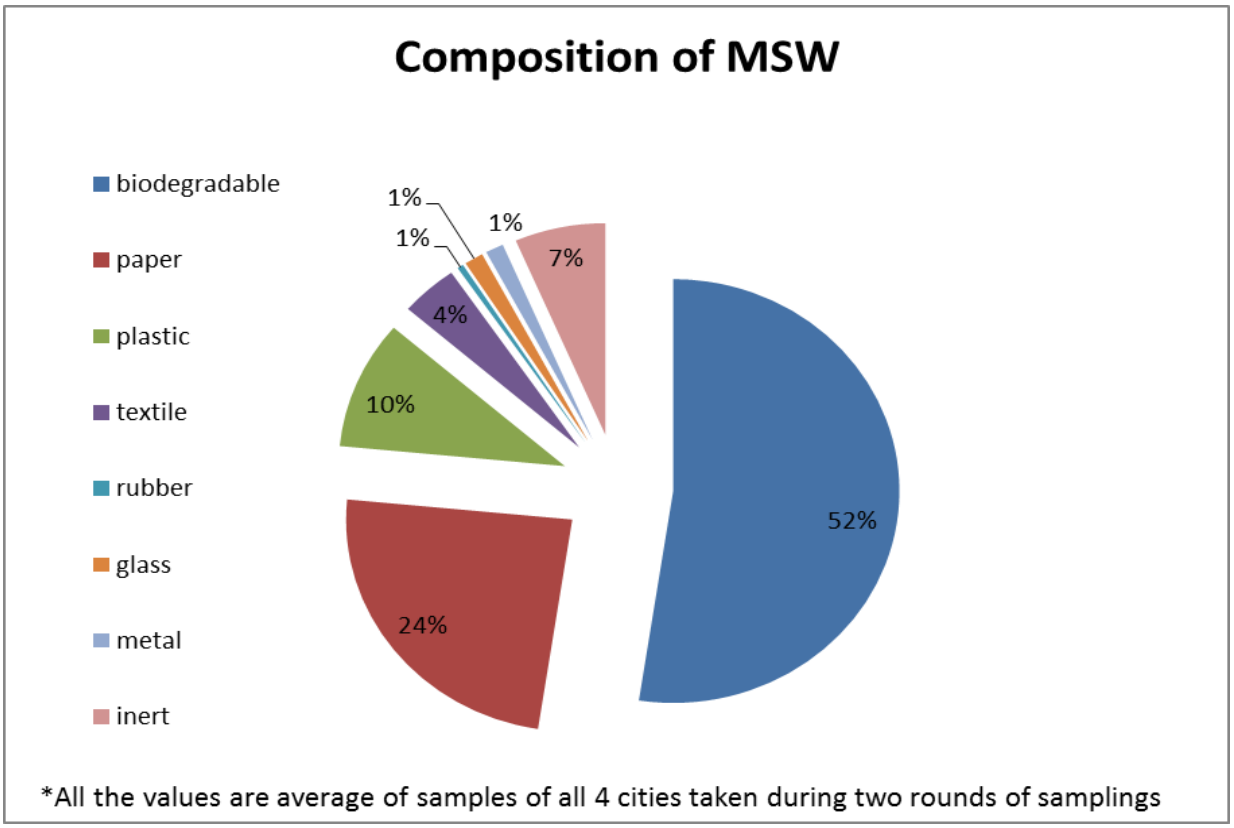
6.2 Waste Audit to ascertain the quality and quantum of waste generated in the state.

The State took its first step to ascertain the quality and characteristics of the waste generated in the State. A waste characterization exercise was conducted by the State through National Environment Engineering and Research Institute (NEERI), Nagpur. It was suggested in the Feasibility study as well that the waste characterization exercise shall be conducted. Four representative towns of State were taken for conducting the waste characterization exercise i.e. Shimla, Sundernagar, Mandi and Dharamshala. NEERI was awarded this work in April, 2015 and 1st round of sampling was done by NEERI in May, 2015. 2nd round of sampling was conducted in November, 2015. The round-I represents pre-monsoon studies whereas post-monsoon studies are represented by Round II. This studies help to know the changes, if any in the characteristics of the waste during different seasons. NEERI then submitted its interim report in December, 2015 and Final report was submitted in Feb, 2016.

Therefore, by now, we are having a fair idea about what is the characteristic of waste generated in the State.

6.3 Types of the Waste

When we view the types of the waste, we would be viewing in terms of its **economic value and recyclability**. As per the waste characterization report the characteristic of the waste generated in H.P. is as below:

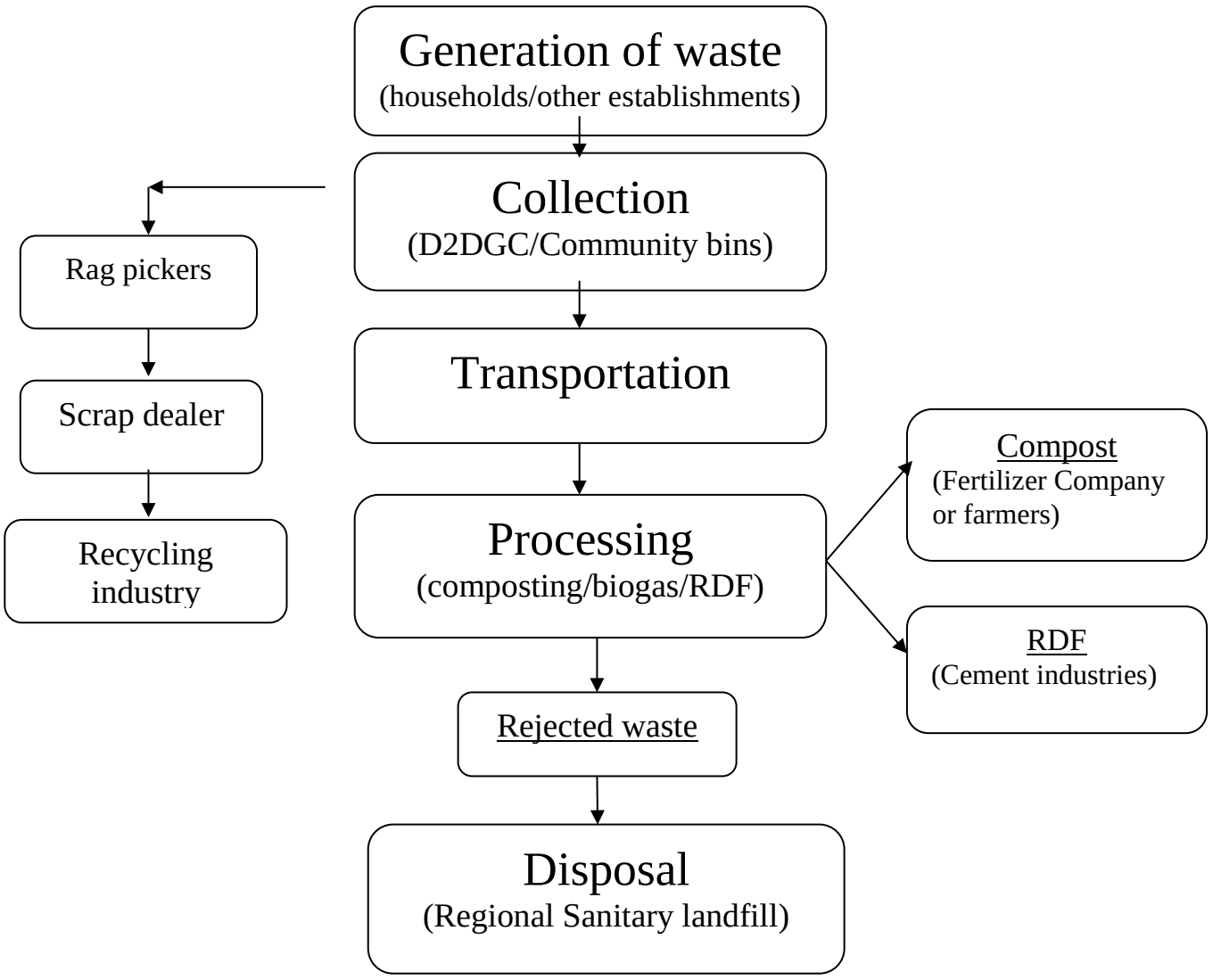


Physical characteristics of waste		
S.No.	**Parameter**	**Value**
1	pH	6.37
2	Moisture content (%)	46.87
3	Loss on ignition (%)	67.27
4	Ash content (%)	32.73
5	Calorific value (Kcal/Kg)	2321.00

Chemical characteristics of waste		
S.No.	**Parameter**	**Value**
1	Carbon	40.24
2	Nitrogen	1.23
3	C/N	34.42
4	Potassium	0.78
5	Phosphorus	0.42
6	Sulphur	0.15

6.4 Strategies for handling Municipal waste

The components of Solid Waste Management System and the flow chart for understanding the process of Solid Waste Management System is illustrated below:



6.4.1 Collection

As per the new/amended Solid Waste Management Rules, 2016, the municipal solid waste is to be collected from door step of the generation point. It is mandatory for the ULBs to arrange for the Door-to-Door Garbage Collection (D2DGC) in the cities/towns.

For the collection of waste Door-to-Door garbage collection shall be started in all the ULBs in phased manner in all the ULBs within one year. D2DGC shall be done through outsourcing the work to pvt. Agency, NGO, society etc. The expenditure for sustaining the D2DGC shall be done through collection of user charges from waste generators. The Door-to-Door Garbage Collection Bye-laws shall be adopted by all the ULBs and user charges will be notified for providing D2DGC services to the citizens.

The registration of rag-pickers will also be done by the ULBs and efforts shall be made to engage these rag-pickers into mainstream waste management through utilizing this manpower in D2DGC work.

6.4.1.1 Modern Underground Waste Collection System:

The state of Himachal Pradesh has also introduced the latest technology for waste collection and underground waste bins are being installed in few pilot cities. These bins are being placed in such a fashion that no person in the town has to walk for more than 100 mtrs to find waste bin. Effective community mobilization is also being carried out simultaneously so that people dispose of segregated biodegradable waste in waste bin meant for it. There would be a set of 3 bins at each location so as to deposit biodegradable, dry waste and the inert waste separately in each bin with

proper information displayed on each waste bins. Community consultations have also been done for finalizing the sites for placing of waste bins.

So the underground waste bin technology that is the latest state of the art technology all over the world has been introduced in the state of Himachal Pradesh on pilot basis. Based on the result and based on the availability of funds, this technology shall be replicated in other towns as well. The provision of underground waste bins would make it convenient for the community to dispose off their waste as per their own convenience and it would save the waste from littering by stray cattle and dogs/monkeys. Therefore, preventing the community bins to be an eye sores of the city.

6.4.1.2 Segregation at Source

It is an accepted fact that our efforts of managing Solid waste all over the country is failing mainly for the want of segregation at the source and so is in the State of Himachal Pradesh. It is not a difficult task at all but it seems an impossible task. It is so because of the fact that community participation is absolutely lacking and currently community and municipality/government are like two opposite poles of the globe or two lines of the railway track that never meet. Municipality has become the sole agency to manage the waste and with the passage of time, community has become the pressure group to just assume the role of criticizing the Municipal Governance failure in the field of MSWM. *We generally presume that community is indifferent but in reality community participation is an integral part of Solid Waste Management. Therefore, we need to approach the community in appropriate manner and*

provide space for community partnership and ownership. With the involvement of community through educating them by various media, segregation at source can be achieved.

As per the provisions of SWM Rules, 2016, it has been made mandatory for every waste generator to segregate and store the waste generated by them in three separate streams namely bio-degradable, non-bio-degradable and domestic hazardous waste and handover segregated waste to authorized waste pickers/collectors only. Therefore, the segregation of waste at source shall be implemented in all the ULBs and the provisions shall be incorporated in the D2DGC Bye-laws as well.

6.4.2 Transportation

The transportation of waste as collected through D2DGC or through the underground waste bins shall be done in segregated manner only. Only the covered vehicles shall be used for transportation of garbage so as to prevent spillage on the roads while transportation.

Specially designed vehicle are being procured for collection of garbage from the underground waste bins. These vehicles shall have mounted crane on them and would be covered from all sides.

Specific type of waste shall be transported to specific waste processing facility i.e. the composting/biogas/RDF/any other facility installed for the processing of waste.

6.4.3 Processing

Though the ULBs of H.P. have been able to achieve some success in collection and transportation of the waste yet there is lot to be done in the processing part. Utilization of waste as a resource and putting it into recycling etc. is minimal in the State. Efforts were made earlier to install composting units in

some of the ULBs. These composting plants were based on the pit composting technology. However, due to various reasons, most of these plants have been rendered non-functional by now. The major reason may be attributed to the low temperature in the State and feeding of non-segregated waste into these pits. Due to this, the pit composting technology did not work and presently, the waste in almost all the ULBs is being dumped into open land or hill slopes as such. Most of these dumping sites are located near to a water body also. Therefore, the dumping of waste is causing air, soil and water pollution in the State.

To prevent this pollution, processing plants are required to be installed in all the ULBs and no waste shall be dumped into the open lands. Maximum utilization of waste as a resource shall be the main objective of installing a processing plant. Right kind of technology shall be chosen keeping in view the particular need and constraints of the town/State.

6.4.3.1 Bio-degradable waste:

As per the waste characterization report of NEERI, organic/bio-degradable proportion of the waste generated in cities of the State is almost 60-65%. Therefore, the composting or biogas generation from organic proportion of waste is a viable solution which would reduce the 60-65% of waste proportion from landfilling. Considering the temperature and land constraint of the ULBs/State, mechanized composting would be preferred. For the biogas production, the biogas so produced shall be utilized for producing electricity.

The Centre Electricity Regulatory Commission has also notified the compulsory purchase of power by all State Electricity Board/distribution agencies.

6.4.3.2 Polythene/paper and other dry material

Though Himachal Pradesh has banned polythene yet there is ample plastic waste that is generated due to sale of several items packed in the plastic. This waste when mixed with bio-degradable or non-bio-degradable waste renders these waste non-recyclable. So there is a need to collect this waste in segregated form. This plastic waste could be recycled or used in road construction or it can be destroyed in kiln of cement factories established in the state.

The recyclables shall be sent for recycling through engagement of scrap dealers and rest to be utilized as a resource. Pre-treatment for utilization of such waste shall be required so that the material suits to be used as raw material. Therefore, the shredding and drying units are required to be installed for the ULBs.

For this purpose tie up with Public Works Department shall be done for utilization of plastic waste in road construction and also coordinate with cement factories for utilization of the plastic, paper etc. as an additive fuel in their cement kilns.

6.4.3.3 Inert waste/domestic hazardous waste

The inert waste, domestic hazardous waste and the rejects emanating from the processing plants shall be disposed of in Sanitary landfills. As the proportion of this kind of waste in the total waste generated is very less, therefore regional landfills shall be constructed across the State to cater to the needs of all the ULBs of State. The landfill site shall be selected and developed in accordance with the SWM Rules, 2016.

6.4.3.4 Establishing Environment Depot

A special yard/environment depot shall be established in all the municipalities and all kabaris shall be allotted adequate space in the yard to collect and store their waste. No kabari shall be allowed to litter the collected/stored waste at any location other than space provided to them in the environment depot.

- They will be provided a space in environment depot where they will handle all waste collected by them from the source
- Adequate space would be identified and Kabari yards would be designed to facilitate them for carrying out their activities.
- The yards would be designed to collect, sort out and dispatch all types of waste collected by them.
- Kabaries thereafter will not be allowed to collect or store their waste anywhere else in the town.
- Such waste depots shall also act as the station for depositing the bulk waste by public. Appropriate mechanism would be set up to provide vehicle on demand wherein people having bulky waste to dispose can ask for same.
- This bulky waste would be then taken to environment depot for further transportation for recycling.

7. Cluster approach

Himachal Pradesh is a hilly state and towns are very small and scattered. Individual town wise SWM Plants may not be financially viable. Hence, cluster approach would be adopted which will be financially viable for the PPP Mode. As the urban outgrowths too have been putting on pressure on the towns therefore, mini clusters are also proposed to be formed with the

inclusion of peri-urban areas adjoining the towns so that a viable project can be established and the problem of waste in the semi-urban areas too is resolved.

ULBs are being consulted for forming cluster or mini clusters for management of Solid Waste in the accordance with the SWM Rules, 2016. The Rural Development department and the District Administration shall also be consulted for formation of these clusters.

8. Financial

The Financing would be met out under the flagship programme of the Government of India, Swachh Bharat Mission (SBM-Urban), wherein the SWM projects would be eligible to avail 35% Viability Gap Funding (VGF). State would adopt innovative approach to involve Gram Panchayats located in peri-urban areas too as these Panchayats already depend upon ULBs for their waste management. These Gram Panchayats would be allowed to participate/join in the cluster through contribution of their share available with them under (SBM-Rural). Besides this the efforts will also be made to arrange the gap funding from CSR (Corporate Social Responsibility) funding from the industry located in the cluster areas.

9. Atmosphere building/IEC

It would be important for the SWM projects to make the community aware of such projects so as to make the projects successful. For this it is required that there is proper environment building to ensure that every resident of the town is fully charged to willingly own the mission of "Zero waste and zero Landfill". This task would be accomplished through mass scale awareness and IEC through the following modes:

- Rallies by school and college children
- Slogan writing and painting competitions in schools and colleges
- Partnership by the media
- Nukkad nataks
- Posters/banners/hoardings
- Any activity that MC feels necessary for the project. MC would be provided with untied funds for the purpose

10. Other Capacity Building initiatives taken by the State

As a part of Capacity Building initiatives, the State through planning department got in touch with the World Bank and the Korean Green Growth Trust Fund (KGGTF) which expressed their willingness to support the State through knowledge exchange program from which the State could get an exposure on learning the best practices adopted by Korea.

Therefore, the World Bank and KGGTF team visited Himachal Pradesh in November, 2016 during which they were taken for field visits and problems of Urban areas of the State were highlighted and solution to these problems were sought. The major areas which were focused on during the visit were:

- Urban Transport
- Solid Waste Management
- Urban Infrastructure

The World Bank and KGGTF assured to support the State through Capacity Building program a detailed proposal of which has also been submitted to the State Govt. to take up the matter further with Department of Economic Affairs. This knowledge exchange program is aimed at developing state of the art infrastructure, secure funding for the same and continual support in the planning as well as execution stages.

11. Action to be taken & Timelines

S.No.	Activity	Action to be taken	Timeframe
1	Formation of State Level Advisory Body	A State Level Advisory Body under SWM Rules, 2016 shall be formed to govern all the matters on SWM in the State. This committee shall meet once every 6 months to review the progress and remove the bottlenecks	Already formed and notified
2	Door-to-Door Garbage Collection Bye-laws	Bye laws shall be framed for all the ULBs. The ULBs shall be free to decide and notify user charges for D2DGC	Within 2 months
3	Door-to-Door Garbage Collection in ULBs	D2DGC shall be taken up in phased manner. Phase-I: ULBs having population <5000	Within 6 months
		Phase-II: ULBs having population >5000 and <10000	Within 12 months
		Phase-III: ULBs having population >10000	Within 24 months
4	Formation of clusters	Clusters/ mini-clusters shall be formed with the consultation of ULBs. The D2DCG bye-laws	Within 6 months

		shall be applicable in peri-urban areas also which will be included in the clusters.	
5	Implementation of segregation at source by the ULBs	Through the extensive IEC campaigns and educating the community, segregation at source shall be implemented into 3 streams i.e. biodegradable, non-biodegradable and domestic hazardous waste	Within 24 months
6	Enforcement of complete prohibition of open burning of waste	ULBs to take necessary steps to train their staff and educate people for not burn the garbage in open in view of the NGT order dated 22nd Dec, 2016. Strict action shall be taken by ULBs as per the order.	With immediate effect
7	Identification of sites	ULBs to identify the sites for setting up of waste processing and disposal facility. The district administration shall allocate such lands identified by ULBs for setting up of SWM facilities	Within 12 months
8	Setting up of processing plants	Processing plants will be setup for processing of waste being	

		generated from all the ULBs and semi-urban areas which are included in the clusters.	
		For District HQ ULBs	Within 18 months
		For all the Municipal Councils	Within 24 months
		For all the Nagar Panchayats	Within 36 months
9	Construction of Sanitary Landfills	Suitable clusters shall be formed for construction of Sanitary Landfill. The sanitary landfill may cater to the need of disposing of waste from one or more cluster also.	Within 36 months

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