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**RESEARCH ARTICLE**

# STATUS OF MUNICIPAL SOLID WASTE AND EFFICIENT MANAGEMENT STRATEGIES IN HIMACHAL PRADESH

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**ABSTRACT**

Municipal Solid Waste in the urban bodies of Himalayan states is increasing rapidly. The urban population increase and tourist influx towards hill stations have added pace to the problem of solid waste management. This exposes the eco-sensitive zones of Himalayas towards the harmful impacts of waste mismanagement on the environment. This paper involves the trend of composition and per capita waste generated in the state of Himachal Pradesh. The study of municipal solid waste management trends in Himachal Pradesh was carried out to focus on the factors affecting the solid waste generation trends and present strategies adopted by the government. This study is concluded with the suggestion for the need for additional policies for waste management in Hilly regions in addition to solid waste management rules, 2016. This outcome of this study will help in mitigating the problem of solid waste management in Himachal Pradesh.



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## INTRODUCTION

Municipal Solid Waste (MSW) is the waste refuse from the residential areas, hotels, restaurants, institutes such as schools, hospitals and other businesses consisting kitchen waste, packaging material, bottle and cans, clothing, paper material, electronic waste, market yard waste and construction debris waste. This waste is obligatory for management with competent scientific techniques of segregation, collection, transportation, treatment and disposal. In waste management, management is the term used for long-term planning, maintenance, monitoring, and financial budgeting. In India, these objectives are empowered to the head of local governing bodies such as Commissioner for Municipal Corporations, Executive Officer for Municipal Council and Secretary for Nagar Panchayats. The need for the Municipal Solid Waste Management (MSWM) is because:

- The waste generation has increased along with development in the past few decades.
- The solid waste pile up in landfill sites of metro cities is creating health and environment problems.
- A lot of capital is required for the management of waste. It can become a point source of wealth if planned accordingly.

India with its government aim to achieve a $5 Trillion economy by 2022 queue up to be gigantic growth engines in the world (MGI Report, 2016). India holds 17.75% population of the world and the annual growth rate of population 1.08% in 2019 (http://www.mospi.gov.in/ ). In a few cities, solid waste collection in India was 60-70% of total generated waste till 2005 (Srivastava *et al*., 2005; Central Public Health, 2000). The annual quantity of urban solid waste generated in India was 141 MT (Million Tonnes) in 2014 and it is expected to reach 300 MT (Million Tonnes) by 2047 (Sharholy *et al*., 2006; TERI Energy Data Directory and Yearbook, 2015). In 2014, out of 141 MT waste generated, 92 MT is left untreated every day. This void has led to the accumulation of extensive waste heaps around the city roads. The annual growth rate of waste generated was 4.25% in 1997 (http://www.cpcbenvis.nic.in/cpcb_newsletter/SOLID%20WASTE.pdf ), 5% in 2001 (Devi *et al*., 2001) which decreased to

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4% in 2016 (https://pib.gov.in/newsite/ Print Release. aspx? relid=138591). Waste Management in the hilly Himalayan states is a serious issue because these areas have ecological importance. But as the population increase and lifestyle have changed the pattern of waste generation these Himalayan zones can get affected adversely.

**Overview of Study Area:** Himachal Pradesh has also seen a trend in the pattern of waste generation. The state of Himachal Pradesh has 12 districts with heterogeneous geographical conditions that extend to an elevation of 6816 m AMSL. The state with the alpine, sub-alpine and temperate region of Himalayas has numerous glaciers and plentiful other water sources (A report by Arvind Bhardwaj, 2014). The 2/3rd area of the total geographical area of the state is under forest area, rich in floral and faunal diversity, different agro-climatic regions and other ecologically rich zones (Badola *et al.*, 2003; Kuniyal, 2014). The present Ramsar wetlands sites in the state are home to around 1.10 lakh migratory species of the bird's species (Bhardwaj, 2014; Kohli, 2015; https://www.business-standard.com/article/news-ians/himachal-s-pong-wetlands-nest-1-10-lakh-birds-february-2-is-world-wetlands-day-1180202009211.html ).

These biodiversity linkages make it a sensitive eco-zone and a concern, if any harm to the environment is done. The urban population of the state was 6,88,852 in 2011 increasing with a percentage decadal growth of 15.95% (Chandramouli *et al.,* 2011). In the future, the migration pattern and rapid urban development in the state can create turmoil in waste management too. There are 54 ULBs (Urban Local Bodies) in the state which have 2 Municipal Corporations, 31 Municipal Councils and 21 Nagar Panchayats (http://www.ud-hp.in/) in which total produced about 370 TPD (Tonnes Per Day), of this 190 TPD is biodegradable solid waste and 150 TPD is non-biodegradable waste (http://www.ud-hp.in/pdf/ Feasibility% 20study%20-Waste-free%20Himachal%20Pradesh.pdf). The efficiency of waste collection is 60-70% which means every day around 100 TPD is left uncollected.

The rapid urbanization has also elevated the trend of municipal solid waste generation (Mufeed Sharholy *et al.*, 2007). The percentage of urban population to the total population from the 33% in 2018 can rose up to 53% of the total population of the country by 2050 (Population Division World Urbanization Prospects 2018). This trend has directly affected environment status all over the world in the past few years (Li, *et al*., 2012; Moore *et al.*, 2003; https://www.iswa.org ).The waste generation pattern primarily depends on the per capita income, the population, geographical location, social status, food habits, industries, and management policies (Late *et al.*, 2013; Chandra *et al.*, 2009; Monavari *et al*., 2012). Here, one of the causes of the increase in urban population is migration from rural and other areas of the country to the urban areas. The reason for the migration of the population from rural to urban establishments is for improved opportunities of employment, healthcare, education, transportation and other businesses in the urban settlements (Migration and its impact on cities, 2018; Mitra *et al.*, 2009; Vinayakam *et al.*, 2013). The increase in the urban population in India has also increased the per capita waste generation (Hoornweg *et al.*, 1999). Therefore, these inter-dependent factors require proper attention and management plan. Besides, the problem with waste dumping lies with landfill management or any other method of waste disposal which is related to open-air dumping, open-pit dumping, ocean dumping, RDF (Refused Derived Fuel) plants, gasification, aerobic digestion, and incineration. In some regions, the failure of these processing plants was due to the non-availability of segregated waste (http:// planningcommission.nic.in/reports/genrep/rep_wte1205.pdf). These generate the harmful gases and leachate from the sites which can further deteriorate environment in a variety of ways such as dump fires, explosions, floral and faunal damage, foul smell, water bodies contamination, air quality degradation and smog formation in the cities (El-Fadel *et al*., 1997; Alam *et al.*, 2013; Tsiliyannis, 1999). These challenges can be resolved if a proper model for the management policies is adopted that will manage the waste in the rural and urban areas.

**Present Status of MSW in Himachal Pradesh:** In Himachal Pradesh, during 2015 the spending per ton of the waste management was found highest in Palampur (INR 10,959) and Kullu (INR 10,275) while it was least found in Hamirpur (INR 548) and Paonta Sahib (INR 457) (Nexus Novus, 2015). This indicates the difference in the budget managed per tonne of the waste in different cities of Himachal Pradesh. In 2018, the door to door collection for both Solan and Baddi was 20% while in Mandi it was 38% of the total waste generated (Sharma *et al.*, 2018). The per capita waste generation in Solan city in 2011 was 0.22 kg/day/person (Pathania, 2011), while in Sundernagar it was found to be 0.54 kg/day/person in 2017 (Sharma *et al.*, 2017). It was estimated in SPCB, 2011 (http://hppcb.nic.in/Publications/AR-2011-12.pdf) report that daily per capita waste generated in the state will be 0.413 kg, 0.472 kg, 0.538 kg and 0.614 kg for the year 2011, 2021, 2031 and 2041 respectively. While this average per capita waste generation in cities of India was 0.2-0.6 kg/day in 1998 (CPCB,1998), which increased to 0.356 kg/day in 2011 (Pandey *et al.*, 2015) and it can increase to 0.7 kg/day/person by 2025 (Bank *et al.*, 1999). The waste generated in state in percent of total weight of waste comprised of components such as Biodegradable (55-75 %), Paper (13-25%), Plastic (5-10%), Textile (2-4%), Glass (1-2%), Rubber (0.4-0.6%), Metal (0.5-1.2 %) and Inert (2-7%) (http://ud-hp.in/pdf/bylaws.pdf). This composition has shown that most of the waste is biodegradable and can be processed as per norms. In the Solan city it was found that the waste was generated from the household (70.18%), Dhabas (17.57%), Hotel/Restaurants (5.4%), hostels (5.33%) and rest from shops, offices, schools and other institutions (Pathania, 2011). A report of State Centre on Climate Change, HP , 2013 (http://www.hpccc.gov.in/) outlined the status of MC in the state which is shown in the following figure:

The scores to each district are mentioned out of the 80 and 100 points as shown in Figure 1. It was found in the report that Kullu (99) and Shimla (86) have the highest score in coverage of households for the SWM services in the state and least was found for Bilaspur (0) and Kangra (4). The extent of segregation of MSW in the waste was found highest in Kangra (78) and Chamba (61) and least for Nahan (0) and Bilaspur (0). The score of efficiency of the collection of MSW was highest for Kullu (99) and Chamba (93) and the least score was for Nahan (21) and Kangra (58). There was less efficiency of the cost recovered from the MSW in the above districts. The extent of MSW recovered from highest in Nahan (100), Kullu (97) and Una (87) out of the benchmark of 80. It has been found that some of the cities in the state dispose of their waste into non-engineered landfill sites around the cities and those are located near to National Highways and water sources such

as Pirdi (non-operational) in Kullu, Rangri in Manali, Solan, Shimla, Sundernagar and Mandi. The accumulation of waste in these open landfill sites often results in the formation of foul gases, leachate production, change in soil moisture content, fire incidents, loss of vegetation, contamination of ground and surface water, unhygienic conditions and health hazards around these sites (Vrijheid, 2000; Nagarajan, *et al*., 2012). In the studies, it was noticed that there was no significant change in soil quality around the landfill sites in the area of Baddi, Sundernagar, Mandi, and Solan (Sharma *et al*., 2018).

But soon, the changes may be seen with increasing development and change in lifestyle patterns. A study done on the occupational hazards of the waste management workers in the 3 cities – Shimla, Solan and Mandi of the State 100 TPD, 22 TPD and 21 TPD waste was generated and it found that workers such as ragpickers, waste collectors, waste processors, street sweepers and drivers of transporting vehicles are under severe stress of the health issues like nausea, headaches, cuts, muscle strain and allergies (Thakur *et al*., 2018). Only in Shimla, it was found that SEHB society provided Health Card facilities to their workers but at the other two sites, this facility was not available. It was also found that there was a lack of literacy, income discrepancies among casual and permanent workers and unavailability of proper types of safety equipment have led to this health issue among the workers (Ravindra *et al*., 2016; Priyanka *et al.*, 2017).

**Feasibility Study by Nexus Novus:** A feasibility study was done by Nexus Novus (Nexus Novus feasibility report, 2015) (Company for urban solutions) in May 2015 for the cluster of ULB Sunder Nagar, Ner Chowk, and Mandi. In the model for integrated waste management plan was described for this cluster with installing Biogas plant at Sunder Nagar, underground bins at Sundernagar and Dharamshala, and sanitary landfill site was proposed at Mandi. The total waste generation at Dharamshala was 16 TPD, at Sunder Nagar was 11.8 TPD, at Mandi 18 TPD and at Ner Chowk it was 1.5 TPD, which in total has 57 % biodegradable waste. This provides a huge potential for biogas generation in this cluster. Also, the concept of underground bins can help in maintaining the aesthetic and environmental values of the city

**Effect of Tourism on the waste generation:** Himachal Pradesh is a tourist hotspot for Indian and foreign tourists which accounted for 8.8 million footfalls in 2007 increasing to 15.1 million in 2011, now it has reached 2017-18 to 19.6 million (https://himachaltourism.gov.in/wp-content/uploads/2019/09/Himachal-Pradesh-Tourism-Policy-2019.pdf). The waste generated from hill spots and trekking expedition is also a challenging part of the SWM in the state. The average waste generation was 200 gm – 300 gm/person/day in hill spots and 200 gm – 288 gm during trekking expeditions during 2003. This waste comprised 65.2% - 83.1% of bio-degradable waste of the total waste which mainly contained vegetable waste, fruits, and other food material. In the case of non-biodegradable waste, its components were majorly glassware, polythene, plastic bottles, and wrappers. Among non-biodegradable waste, it was recommended that 60.68% of waste was able to be recycled if collected and transported properly. In the Kullu and Manali region, the bio-degradable waste generated from the tourist influence was found to be 47.6% - 65.5% of the total waste generated in both cities (Kuniyal, 2003). It was found in several studies ( Kuniyal, 2005; Kaseva *et al*.,2010; Kuniyal *et. al*., 1998) that following were the reasons for the waste mismanagement of the tourist generated waste in the state:

- The unavailability of the suitable waste disposal sites in the route of trekking areas
- The lack of awareness and negligence among the tourists
- The problem in carrying and transporting the waste back to basecamps or stations
- Lack of communication among the local authorities and tourists
- Lack of waste management services provided at higher regions in the state

**Government Initiatives for MSW management in Himachal Pradesh:** Himachal Pradesh State Solid Waste Management Strategy (May 2019) was notified by the HP Government which mainly focused on:

- Certain policies and action plans by government of Himachal Pradesh
- State policy notified on Solid Waste Management
- HP State Solid Waste Management Action Plan
- Draft of Bye-laws on Solid Waste Management
- Registration of rag-pickers and scrap dealers
- Waste characterization study of NEERI
- ULB wise Action Plan & Bio-Composting guidelines

This action plan for solid waste processing and disposal facilities divides the state into 8 clusters of urban local bodies.

**Identified problems with the strategy**

- Identification of large common land for disposal facility in a cluster for ULB is a difficult task in the state.
- Identification, transfer and tendering of land on PPP (Public-Private Partnership) model is a time-consuming process.
- There are a smaller number of developers interested in smaller projects.

**Solid Waste Management Rules, 2016 notifies the duties of waste generators that**

- Segregation at source as per three streams namely biodegradable, non-biodegradable and domestic hazardous waste in suitable bins
- Proper wrapping of diapers and sanitary pads etc., in the pouches provided and placed in the separate or bin for non-biodegradable waste
- No waste generator shall throw, burn or bury solid waste on streets, open public spaces or in the drains.
- All waste generators shall pay such user fees as per notified by bye-laws of local bodies.

**It has further mentioned various strategies for solid waste management in the state**

- ***Biodegradable waste:*** The disposal of biodegradable solid waste in the state should be only performed in aerobic honeycomb model pits for composting. Enzymes/microbes should be used to decompose the waste generated.

- ***Non-Biodegradable waste:*** It should initially go through MTR (Material Recovery Facility) which includes extraction of usable material out of the waste and then to cement plant for co-processing and plastic waste to HPPWD for construction purposes. The sanitary waste should be directed to incinerators notified by the governing bodies.
- ***Domestic Hazardous waste:*** For this purpose, in every ULB's waste deposition centers/Kiosks should be developed where waste generators can deposit their domestic hazardous waste. There is only 1 TSDF (treatment, storage, and disposal facility) in the state at Nalagarh, Solan.

rating). These marks are distributed for its subcomponents such as Collection & transportation, Processing & disposal, Sustainable sanitation, Capacity building, and others. This will help in the competitive pattern of the ULB's in the state which help in mitigating the impacts of waste and sanitary management in the state. The urban development department has also developed online portal (www.sbmuhp.co.in) (www.sbmuhp.co.in) which provides the details of ULB's such as Population, Solid Waste Generated (TPD), No. of Wards, timeline for 100% achievement, user charges collected, no. of litter bins, transportation, disposal site, details of bulk waste generators, details of rag pickers etc. Baseline information of some of the ULB's is shown in Table 1 as follow:

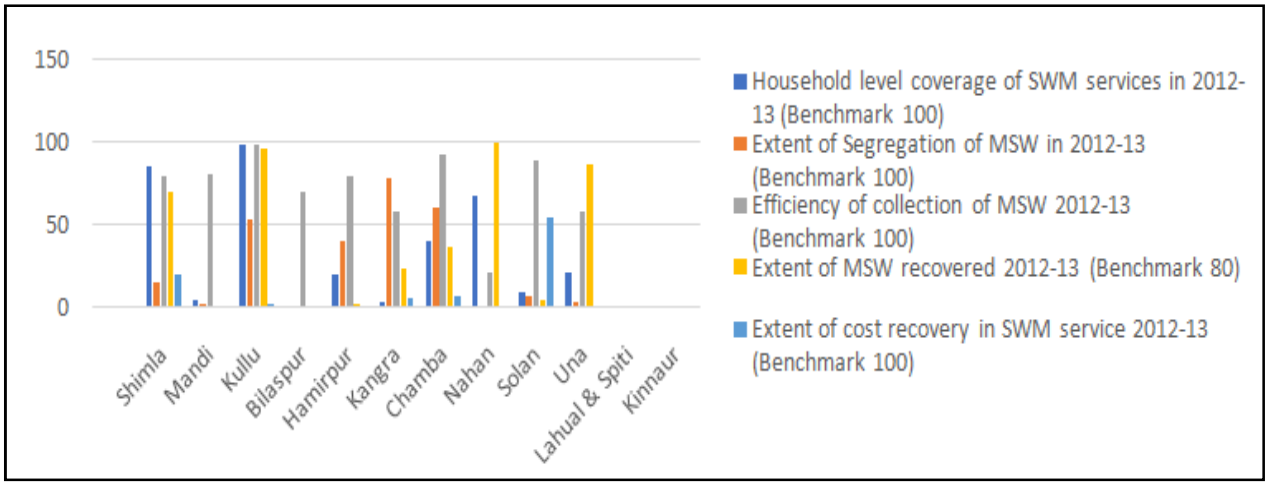


**Figure 1. The MSW Status in Himachal Pradesh (Source: www.hpccc.gov.in)**

**Table 1. Baseline information of ULB's of the Himachal Pradesh**

| S. N. | Name of MC | Total population (no. of peoples) | Solid Waste Generated (TPD) | User charges recovered from Garbage Collection | Litter bins installed in market areas | No. of vehicles used for Garbage transportation | Organic Waste processing technology | *Bulk waste generators | Ragpickers Identified |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Shimla | 1,69,578 | 85.00 | 17,52,477/- | 40 | 42 | Bio-Methanation | 32 | 144 |
| 2. | Kullu | 18,536 | 8.00 | 5,38,000/- | 0 | 10 | Recycler/ Vessel | 16 | 11 |
| 3. | Bilaspur | 13,654 | 4.50 | 80,000/- | 0 | 9 | Aerobic Microbial Pit Composting | 0 | 3 |
| 4. | Hamirpur | 17,604 | 4.50 | 75,000/- | 15 | 8 | Aerobic Microbial Pit Composting | 4 | 15 |
| 5. | Kangra | 9,528 | 5.00 | 17,000/- | 0 | 4 | Aerobic Microbial Pit Composting | 1 | 2 |

** Bulk waste generators = The waste generators generating more than 100kg waste per day. (Source: www.sbmuhp.co.in)*

**Act for Ban on Plastic materials in HP:** The state-imposed ban on plastic carry bags under the Himachal Pradesh Non-Biodegradable Garbage (Control) Act, 1995, and to this complete ban on chemical cups, plates and glasses were also implemented in 2019. In the year 2009, the State launched "Polythene Hatao Paryavaran Bachao Abhiyan", which in total collected 350 MT plastic waste and 144 MT of plastic waste was used to build 175 Km road by PWD during years 2009-2012. The state framed a policy document of Himachal Pradesh rules for plastic waste management in 2018. In Oct 2019 government has notified the policy for Buy-back of Non-recyclable and Single-Use Plastic Waste from Rag pickers and household, providing MSP of Rs 75/- (Rupees Seventy-Five) per kilogram, for its collection and deposit at centers of ULB's.

**Scheme for ranking of urban local bodies in Himachal Pradesh:** The HP Government has started the initiative for the ranking of ULB's in the State in which marks are reserved for the different sectors such as 2500 marks for Service Level Progress, 1000 Marks for Direct Observation and 500 Marks for Certification (Open Defecation Free (ODF), ODF++, Star

The capital of the state Shimla MC has 1,69,578 of the population and there are 40 litter bins installed in the market areas of the city. The organic waste generated from the city is directed to the Bio-methanation process. Under this 144 ragpickers have been identified and registered under this portal. It has 32 Bulk waste generators that generate more than 100 kg of waste per day or any other limit set under the state by Bye-laws.

**Solid Waste Management Advocacy & Communication Strategy (SWACS):** This solid waste management strategy is developed by the Directorate of Urban Development, Shimla with the help of the Embassy of the Netherlands. Its objectives are segregation at source, waste to value and community ownership. This strategy involves participation at a household level, community level, and urban body level. It focuses on IEC- Information, Education, and Communication that would be used to make people/community/ULBs aware of the collection, segregation, and treatment of MSW and advocacy are undertaken for capacity building activities and community participation for waste management. Awareness campaigns,

training programs, mass education programs and legal framework development are the primary branches of this action plan. It will target the individual in adopting a behavioral change of waste management and ill impacts of un-scientific methods used for waste management in the state.

**Himachal Pradesh Environment Leadership Award:** Himachal Pradesh has started the initiative to award the individual/ institutions to recognize the outstanding work done towards environment conservation and sustainable development. The Department of Environment Science and Technology overlooks for the entries from 12 different categories such as ULBs excellence, Hospitals, Hotels/Restaurants, Academic institutions, offices, Industries, Panchayats, Bus stand, etc. This award includes citation, trophy and cash prize of Rs. 50,000/- (1st) and Rs. 25,000/- (2nd). This initiative will help in promoting the practice of environmental protection.

**Success Stories for Solid Waste Management in HP:** Aima Panchayat in Palampur, Kangra has shown an distinct example of solid waste management in the state at the rural level. This village holds a population of 7000, which charges Rs. 300/- from each household. It was funded under the MPLAD program and was provided machinery costing around Rs. 15 Lakh. They are using e-rickshaw for carrying the waste and this waste is scientifically disposed. The plastic waste is used for construction material and organic waste is used to produce organic manure in the modern garbage treatment plant. The NGT and High Court of Himachal Pradesh have appreciated these efforts and directed the government to follow the same model (https:// www.thestatesman.com/cities/ himachal-panchayat-shows-way-efficient- waste-disposal- 1502766274.html; https://www. tribuneindia.com/news/himachal/follow-aim-set-up-own-garbage-plants-panchayats-told/634217.html ). Another example of waste management practices in the state is SEHB (Shimla Environment, Heritage Conservation, and Beautification) Society, an organization registered under the Act,2006. It is responsible for door-to-door collection in the Municipal Corporation in Shimla. It works under the supervision of Municipal Commissioner and Health officer. It has provided green bins for biodegradable waste and yellow bins for non-biodegradable waste in the establishments in the municipal area of Shimla.

The user charges for household waste are Rs 50/- each and it is earning from this user fee collectively is around Rs 25 lac/month. It has reached 86% door-to-door garbage collection and 14% garbage collected from community bins. This society helps in developing a PPP model in the state which has a benefit over governing bodies in better resource management, micro planning, and acceptance among the peoples. It also provides health card facility and periodical vaccination camps for their workers. This helps in upliftment of the health and employment of these workers. This society is also awarded India's best for door-to-door collection in higher terrains by 'Skoch- Order of merit' in 2013 (Bharti *et al*., 2014). In the state, environmental activists and NGOs working towards environmental protection in the past have justified their contribution. 'Waste Warriors' an NGO has collected 4,223 tonnes of waste from Bhagsunag, Kangra from 2012 till 2017 (https://www.thebetterindia.com/162030/waste-himalayas-pradeep-sangwan-inspiring-india-news/ ) and 'Healing Himalayas' also a NGO is reported to have collected 40,000 kg of non-biodegradable waste from 2009 to 2018 (https://www.business-standard.com/article/ pti-stories/himachal-govt-to-provide-funds-to-waste-warriors-117012100798_1 .html) from various trekking destination such as Kheerganga, Manali, Shimla, Shrikhand Mahadev, etc.

These non-governmental organizations can also have a vital role in solid waste management in the state. Such an institution should be promoted in the state towards environmental conservation.

## Conclusion and Suggestion

The problem of waste generation has been a focus of various countries where the priorities of development are on the top of the list. In India, the population density has proportionally raised the bulk amount of waste in landfill sites. The waste pile up in urban settlements such as Delhi has led to accidents related to landfill collapse. It was summarized from the study that the municipal solid waste management in the state is yet not a big concern if managed properly. As the state government has already initiated various efforts towards the management of the solid waste in the state but urbanization, industrial development and hence waste management would be a factor to look after. Also, the performance of the state in solid waste management has provided impetus to goal towards a model state. In 2009, Himachal Pradesh becomes the first state in the country to ban plastic and polythene carry bags. In Swachh Survekshan, 2019, the capital Shimla got 125th rank out of 425 urban local bodies in the country in terms of cleanliness, hygiene, and sanitation. It has scored 2689.5 marks out of 5000 with the national average of 1846. These achievements can help other local bodies in the state to follow the same action plan and develop a better-integrated waste management plan to the state. On the one hand, the difficult geographical terrain in the state is a challenging part of the collection and transportation of the waste while on the other hand there is a problem with the identification of places to set up the landfill site. Similarly, the problem with segregation and collection of municipal solid waste also lies in the state too. The proper source segregation has yet not been achieved in the state and collection in the high terrains of various towns is also a challenging part for solid waste management. As in the MSW rules 2016, the criteria for the establishment of any waste treatment facility should be in perimeter of a certain distance from National Highways and water streams. But for the hilly regions, this can be a challenging part because it is not easy to find any sufficient land for the processing facility which also resides under the rules notified. So, these rules should be specified taking into account the hilly regions where there is a problem of segregation, collection, transportation, disposal method, and site identification.

There is also a need to address the problem of sanitary waste in Himachal Pradesh as there is no separate disposal facility for this component of solid waste. The increasing trend in the tourists (domestic and in-bound) visits to the state should have a proper policy for registration of tourists, garbage management duties for tourists and the polluter-pay principle should be adopted. The towns in the state don't provide segregated waste, of which failure of the Shimla treatment plant is an example. This has led to a decrease in investment through the PPP channel of the state as it is not harnessing that much profit out of the business. Therefore, there also should be a proper mechanism to provide benefits to these private investors in terms of tax rebates, subsidies, loans, and others to work on this model for a few initial years. Although, it will lay strain over the finances of government this can help the waste management for a longer period of the time. To promote the

education, health and living standards of the rag pickers and scrap dealers there should be policy to identify and give proper treatment to these. It was noticed that there was a lack of scientific studies performed on the assessment of the solid waste quantity and quality in all urban local bodies of the Himachal Pradesh. The people of the state must be educated about the ill effects of improper solid waste management with the help of NGOs, SHGs, awareness campaigns and distinguished awards for environment conservation. The curriculum of schools, colleges, and other educational institutes should include information about rules and regulations about solid waste management. The state of Himachal Pradesh in the past has multiple times set an outstanding example towards the environment in the country such as by becoming the first state to ban polythene and second state in the country after the Sikkim to become Open Defecation Free (ODF). It is also placed among high performing states for education, horticulture, tourism, economic progress, industrialization, and other sectors. So, it can also take initiative in implementing a new strategy for Integrated Solid Waste Management practices in the state and providing a policy model for other hilly states in the country.

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