IIP International Multidisciplinary Research Journal
IIPIMRJ

An Online Peer-Reviewed / Refereed Journal
Vol: 02 No. Issue IV, (October-December) (2025)
Impact Factor: GSRD-IF: 5.001
ISSN: 3049-2734 (Online)

IDENTIFYING A SUITABLE DUMPING SITE POST ASSESSMENT OF SOLID WASTE IN PANDHARPUR TOWN OF SOLAPUR DISTRICT IN MAHARASHTRA, USING GEOSPATIAL TECHNIQUES

Mr. Dattatray Karande, Dr. Dhawale Ganesh, Dr. Devne Manojkumar, Mr. Raghunath Sawant
Assistant Professor, Department of Geography, Arts and Commerce College, Madha
Associate Professor, Department of Geography, Sir Parashurambhau College, Pune
Professor, Department of Geography, Sir Parashurambhau College, Pune
Assistant Professor, Department of Geography, Sir Parashurambhau College, Pune

Article Info

Article History:
Received: 26th Sep 2025
Accepted: 10th Oct 2025
Published: 25th Oct 2025

Keywords:
Solid Waste,
Geospatial Techniques,

ABSTRACT

In the present study assessment of solid waste management in Pandharpur town is carried out by using primary and secondary data. Physical components of waste like compostable, clothes, paper, plastic, sponges, polythene bags, glass, and inert material were identified. An attempt is further made to identify a suitable site for dumping MSW in the study area using six decision criteria like geology, population density, land use/land cover, and distance from roads, rivers, and lakes. According to site suitability analysis using Geospatial techniques, the present dumping site at Kasegaon falls in the category of moderately suitable area. In the study area door to door, solid waste collection is 100 percent, in some parts, open dumping is seen, and segregation of solid waste is 70 percent at the source in town.

Plagiarism Check Report:
Tool Used: Turnitin
Date of Report: Oct 09, 2025
Similarity Index: 8%
Remarks: No significant matching text. All citations and matches are properly referenced. The manuscript is considered original.

How to Cite: Karande, D., Dhawale, G., Devne, M., & Sawant, R. (2025). Identifying a Suitable Dumping Site Post Assessment of Solid Waste in Pandharpur Town of Solapur District in Maharashtra, Using Geospatial Techniques. IIP: International Multidisciplinary Research Journal (IIPIMRJ), 2(IV), 669–680.

1. INTRODUCTION:

Municipal Solid Waste (MSW) "includes solid or semisolid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture, and dairy waste, slaughterhouse waste, treated bio-medical waste excluding industrial waste, radioactive waste generated in the area under the local authorities and other entities." (Pandharpur SWM DP report)

Municipal Solid Waste Management (MSWM) refers to a systematic process that comprises waste segregation and storage at source, primary collection, secondary storage, transportation, secondary segregation, resource recovery, processing, treatment, and final disposal of solid waste. (Schubeler P, Wehrle K, Christen J 1996)

2. STUDY AREA:

Pandharpur is a famous pilgrimage centre in western Maharashtra. The town Pandharpur is a tehsil in the Solapur district of Maharashtra (Figure 1). The town Pandharpur is located at 17° 40' 28.3908'' North latitude and 75° 19' 25.4028'' East longitudes at the height of 465.12 meters above mean sea level and has a general slope from west to east. The town has an area of 30 sq. km. As municipal limit and located on the right bank of meandering Bhima River, a tributary of Krishna. The study area is administratively divided into 34 wards. It has a population of 98,923 of which 50,645 are males while 48,278 are females as per Census 2011. By 2022, the estimated population of the study area is nearly 110,000. Pandharpur Municipal Council administers over 23,054 houses to which it supplies basic amenities like drinking water and sewerage, SWM, etc.

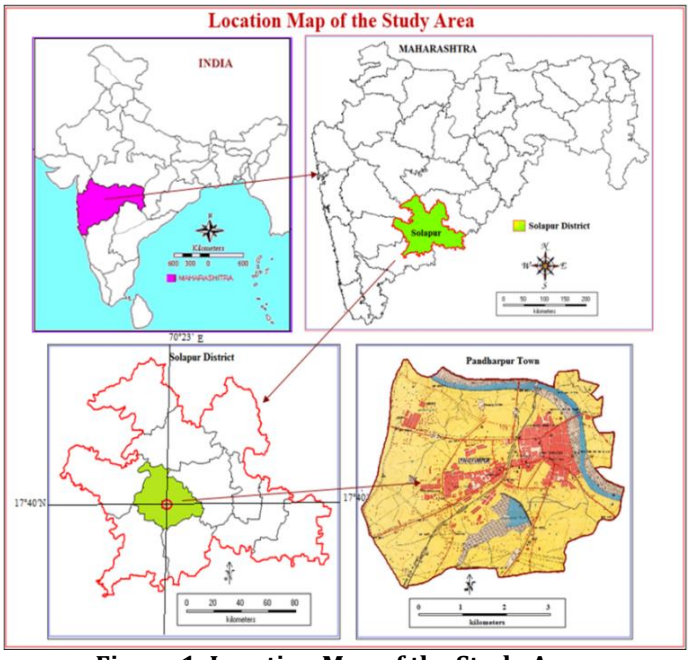

Figure 1: Location Map of the Study Area

There are 4 Yatra's ('*Pilgrimage Mass Gatherings*'– gathering of pilgrims/devotees) per year, '*Maghi*' (Jan-Feb), '*Chaitri*' (Mar-Apr), '*Ashadhi*' (Jul-Aug), and '*Kartiki*' (Oct-Nov) during this period 3 lakh to 15 lakh pilgrims visit the study area from all over India.

3. AIM AND OBJECTIVE:

The aim of this research is to assess of MSW solid waste management in Pandharpur town and Suggest suitable dumping site.

3.1 OBJECTIVE:

1. To assess municipal solid waste management of the study area.
2. To suggest a suitable dumping site for solid waste management.

4. METHODOLOGY AND DATA:

The above aims are studied using both primary and secondary data. The current study is mostly based on fieldwork, observation, and data provided by Pandharpur Municipal Council and local residents. The obtained data were categorised and examined. PMC Pandharpur used the "quartering coning method" to physically characterise the garbage.

While collecting samples using this approach, PMC follows the following procedure/steps:

1) Determining the location for collecting trash samples while taking into account geography and population.

2) Slums, marketplaces, markets (vegetable, meat/fish, mix), and commercial, industrial, and residential areas are among the places where samples are collected.

3) Sampling locations are further categorised according to the locality's economic standing, such as high, middle, and low income (slum) group locales.

4) 10 kg of municipal solid trash are collected from the designated locations, both within and outside the garbage collection receptacles.

5) All of the obtained samples are piled up together and properly mixed.

6) One-quarter of this thoroughly mixed heap is taken out and this quarter portion is again thoroughly mixed and the quarter part is taken.

6. WASTE GENERATION

The amount of MSW produced is influenced by several variables, including food habits, style of living, the intensity of commercial activity, and seasons. Planning for collection and disposal systems can benefit from information on quantity variation and generation. According to estimates, small, medium, and big cities and towns produce roughly 0.1 kilograms, 0.3-0.4 kg, and 0.5 kg of solid trash per person each day, respectively. In major cities, values as high as 0.6 kg/capita/day have been recorded. (2016 CPHEEO Manual)

6.1 QUANTIFICATION OF MSW IN PMC

The average daily solid waste creation ranges from 300 to 450 grams per person. It was seen that the waste produced by the high and low-income groups was in the range of 400–450 grams and 200–250 grams/day/capita, respectively. Due to tourist destination and place of pilgrimage, the average per

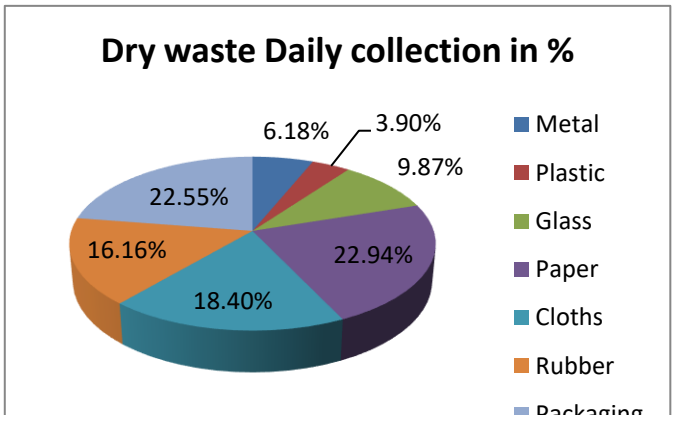

Figure 2: Daily Dry Waste Collection in %

capita generation of MSW is higher than the range above. To estimate the amount of waste generated by each household, the quantitative and qualitative approaches were chosen for the High Income Group (HIG), Middle Income Group (MIG), Low Income Group (LIG), Slums, Commercial, and Institutional areas, Vegetable and Mutton, Fish, and Chicken Markets, etc. After the garbage from various locations has undergone quantitative examination, qualitative and chemical analysis in a lab. A physical evaluation is completed on-site. (Source: Pandharpur SWM DP Report)

6.2 EXISTING SOURCE OF WASTE GENERATION

Around 28.86 Tonne per day (TPD) is the quantity of waste transported by *''Ghanta Gadi''* deployed through Contractors. PMC transports around 14 tonnes per day MSW through the Urban Local Bodies (ULB) vehicles from various commercial and roadside bins (Table no. 2). Total MSW quantity through private and PMC vehicles is around 42 TPD. (Source: Pandharpur MSW DP Report). The waste quantity is also verified based on the secondary data available from ULB, data on city population, number of commercial establishments, number of institutions, and other sources of waste generation. Accordingly, the total waste generation of the city is around 42.97 TPD.

Table no. 2: Waste Generation Point and its Quantity

Waste Quantity Generation (TPD)			
Sr. No	**Source**	**Number**	**Waste generation per day (TPD)**
1	**Present Population (Household -20,007)**	**104874**	**22.02**
2	**Commercial/ Bulk Generation**	**3051**	**4.89**
A	Restaurants	160	0.64
B	Small Hotels/ Hotels/Road side eateries	80	0.16
C	Temple/'ashram'/'math'	350	0.35
D	Banquet/Marriage Halls	56	2.52
E	Shops (below 500 sq.ft.)	800	0.40
F	Shops (500-1000 sq.ft.)	1580	0.79
G	Shops (above 1000 sq.ft.)	25	0.03
3	**Institution**	**77**	**0.24**
A	School	75	0.23
B	Other Institutions, Colleges	2	0.01
4	**Vegetable and Fruit Market**	**3**	**1.75**
A	Indira Gandhi Mandai	1	0.75
B	Navi Peth Market	1	0.40
C	APMC Market	1	0.60
5	**Hospitals**	**56**	**0.28**
6	**Slaughter House /shops (Chicken and Mutton Waste)**	**58**	**0.12**
7	**Street Sweeping (km)**	**295.51**	**0.89**
8	**Road Side 142 Collection Bins in City**	**142**	**12.8**
	Total		42.97 TPD

(Source: Pandharpur SWM DP report)

Table 3: Broad Composition of MSW

Sr.No	Content	Percentage (%)
1	Biodegradable	19.98
2	Dry Waste	77.75
3	Miscellaneous Waste/Inert	2.27
4	Process rejects (20% of MSW to be treated (Biodegradable and Dry Waste))	=(77.75+19.98)x20%=19.54

(Source: Pandharpur SWM DP report)

7. EXISTING MSW COLLECTION SYSTEM

Table no. 4 MSW Collection System

Sr. No.	Collection System	Description
1	**Primary Collection**	Primary Collection includes 'door to door' collection from 34 wards by using *'Ghanta Gadi'* as well as commercial establishments, offices, Institutions, Hotels, Restaurants, Banquets and Marriage Hall waste, Market Yards, *'Math and Ashram',* floral litter waste from Vithal Mandir and Chandrabhaga River Bed
2	**Secondary Collection**	Secondary garbage collection uses tools like compactors and dumper placers. PMC has 50 compactor bins, 40 dumper placer bins of 2.5 Cum size, 52 dumper placer binds of 4.5 Cum size are placed around the more crowded area such as vegetable market, APMC market, fruit market, etc. 18 concrete trash cans scattered across the town.

8. WASTE SEGREGATION

Dry waste, wet garbage, and floral litter waste ('*Nirmalya'*) are to be collected separately in the riverbed and along the bank bins in many colours, including blue, green, and saffron. Source separation of recyclables and biodegradables (organic waste) minimizes pressure and contamination at landfill sites and offers an effective method for resource recovery considerably.

8.1 METHODS FOR SEGREGATION AT SOURCE

For Segregation need to use two separate bins for wet waste and dry waste storage at the household level/ Generation point.

(i) During *'Wari'*:

Due to the high number of people during the 'Wari' time, all PMC services provided to the general public and pilgrims receive additional equipment and staff. During 'Wari', PMC receives backup from the nearby ULB's

Figure 3: Waste Segregation on various compartments at dumping site Kasegaon

(ii) Meat and Fish Markets:

Apart from a few individual isolated stores, the ancient town only has one big fish and meat market. Waste is gathered by PMC and sent to the site's currently non-operational biogas plant.

(iii) Marriage / Function Halls:

In the City, there are 56 wedding and community halls. Waste production peaks between November and March. In general, 200–300 kg of garbage per day is the highest amount of waste creation predicted during this time. The commercial company chosen by PMC is in charge of collecting this garbage.

(iv) Other Government Institutions:

Waste from Government offices, security forces, and police forces from such establishments during 'Wari' period is collected by the PMC and associated Teams.

(v) Waste from an area close to Darshan Route (Foot Over Bridge):

Wheelbarrows are used here for the door-to-door collection of MSW since the Darshan Route Foot Over Bridge residential area is inaccessible to auto tippers and 'Ghanta Gadi'.

9. PRIMARY WASTE STORAGE AT GENERATION

It is the procedure for storing and gathering garbage from the place of generates waste. The town does not implement trash storage at the point of generation. Domestic garbage produced in slums and residential areas is collected every morning. Any leftover rubbish from various sources, pilgrims, and daytime tourist activities is collected in the Dumper placer bins intentionally placed throughout the City.

9.1 STREET SWEEPING AND DRAIN CLEANING

The workers engaged in street sweeping are provided with long handle brooms and uniforms Street sweeping is carried out on a daily basis for type A, alternative days for type B, and once a week for type C road. One sweeper is involved in collecting the waste heaps and transferring them into the handcart. The waste from the handcarts is dumped at the collection point. A municipal vehicle picks up the waste from there. The entire collected waste is transported to a landfill site.

10. MSW WASTE COLLECTIONS AND TRANSPORTATION SYSTEM

This focuses mainly on the mode of collection and transportation of waste, choices of vehicle and equipment, estimation of the vehicle and equipment requirements, and optimal route planning.

(i) Doorstep collection – Households:

Waste collection from door to door is done every day. One auto tipper/'Ghanta Gadi' is allotted for each ward. In order to ensure segregated MSW collection, PMC collects Wet trash and Dry waste in two separate containers positioned in each collection vehicle.

(ii) Doorstep collection – Commercial Establishments:

For large and medium-sized hotels, restaurants, and hostels, a separate and direct collecting system is advised. Wet and dry trash from these sources should be gathered and sent to the centralised facilities.

(iii) Vegetable Market:

The solid waste generated in the town presently transported by different vehicle as tabulated in Table no 5.

Table no. 5: Existing Transportation System

Sl. No	Types of Generator	Types of Vehicle
1	Household	Three wheel Vehicle / 'Ghanta Gadi'
2	Commercial Waste	Three wheel Vehicle / 'Ghanta Gadi' and Truck Tipper
3	Street Sweeping	Street Sweeping
4	Compactor bins and Concrete Bins	Compactor truck

(Source: Pandharpur SWM DP report)

11. EXISTING MSW PROCESSING SYSTEM

(i) RECYCLABLE WASTE:

The municipality does not have a facility for the treatment of recyclable garbage; however, waste pickers do collect recyclables from secondary collection bins and disposal sites and sell them to private recycler vendors.

(ii) BIODEGRADABLE WASTE:

One biogas plant with a 6 Tonne per day capacity is currently available at the site; it was built in 2006. But now it's non-operational (Figure no 4). The remaining MSW is disposed of at the site untouched. The biogas facility often receives garbage from hotels, wedding venues, temples, *'ashram'*s, *'math'*, academies, chicken-and-mutton markets, and other establishments. However, the only operational vermicomposting plant.

Figure 4: Bio-Gas plant at Kasegaon

(iii) NON-BIODEGRADABLE WASTE:

No facility exists to treat non-biodegradable garbage. It includes Refuse Derived Fuel (RDF), recyclables, inputs, and rejections. The majority of the garbage is discarded at the location without any scientific processing.

(iv) CONSTRUCTION AND DEMOLITION WASTE:

Construction and demolition debris, which is mostly made up of inert and non-biodegradable materials including concrete, plaster, metal, wood, and plastics, is thrown out

carelessly and some of it ends up combined with municipal waste.

(v) ANY OTHER WASTE (DOMESTIC HAZARDOUS, SANITARY WASTE):

Since there are no separate special waste collection facilities in the PMC, another waste is hauled to the dump site combined with home waste.

(vi) BIOMEDICAL WASTE TREATMENT FACILITY:

The PMC does not have a separate facility for the treatment of medical waste in Pandharpur; instead, all medical waste from the town is sent to the plant in Solapur.

vii) E- Waste Management:

PMC currently lacks infrastructure and facility for collecting, transporting, and processing e-waste. The majority of the e-waste is collected from secondary bins and landfill sites by rag pickers and sold to the neighbourhood scrap dealer (scrappier).

12. SITE SUITABILITY FOR POTENTIAL WASTE DISPOSAL SITE

Pandharpur is one of the fastest growing town, it generates a total quantity of waste is about 42 tonnes per day. Hence there is need for a suitable solid waste disposal site for the prevention of the environment. In the present work, we find out the most suitable solid waste dumping site using multi-criteria technique. (Bilgehan al 2010) multi-criteria approaches have potential to reduce costs and time (Kontos et al 2005)

Pandharpur Municipal Corporation and surrounding villages within a 10 km area have been considered for the site suitability analysis. The survey of India's topographical maps and sentinel 10 m resolution satellite Image were used to generate various thematic layers, i.e. Land use / Land cover, geology, population density, distance from the road, distance from River, distance from Lakes, etc. (Jaybhaye and others 2014)

Dumping site Kasegaon has total of 80 tonnes per day processing capacity in that wet waste processing plant, windrow composting plant is 10 TPD and Bio-Gas plant has 6 TPD respectively. In Dry waste processing materials recovery facility (MRF) has 50 TPD capacities. The Construction and Demolition waste processing plant has 6 TPD capacities.

12.1 DECISION /RULES CRITERIA FOR SELECTION OF POTENTIAL SITE

The six decision criteria were taken these are geology, population density, land use / land cover, distance from road, distance from Rivers, distance from lakes etc. (Table No 6). Each criteria further classified into four level sub criteria. Having ranking from 1 to 4 which represent unsuitable to highly respectively

Table no. 6: Summary of Ranking and suitability level used in selection of disposal

Criteria	Sub Criteria	Ranking	Level of Suitability
Geology	Upper Ratanghar	1	Unsuitable
	Karla formation	2	Less suitable
	Indrayani formation	3	Moderately suitable
	Diveghat/ Purandarghar	4	Highly suitable
Population Density	> 600ha	1	Unsuitable
	400ha - 600ha	2	Less suitable
	200ha - 400ha	3	Moderate suitable
	< 200ha	4	Highly suitable
Land Use/Land Cover	Land Use/Land Cover	1	Unsuitable
	Built up and Agriculture	2	Less suitable
	Vegetation	3	Moderate suitable
	Scrub and Fallow Land	4	Highly suitable
Distances From Roads	< 250m	**1**	Unsuitable
	250m -500m	**2**	Less suitable
	500m- 750m	**3**	Moderate suitable
	> 750m	**4**	Highly suitable
Distances From Rivers	0m - 250m	**1**	Unsuitable
	250m - 500m	**2**	Less suitable
	500m - 750m	**3**	Moderate suitable
	750m - 1000m	**4**	Highly suitable
Distances From Lakes	< 250m	1	Unsuitable
	250m -500m	2	Less suitable
	500m- 750m	3	Moderate suitable
	> 750m	4	Highly suitable

Table no. 7: Site Suitability Area Hectors and Percentage

Sr. No.	Suitability classes	Area in hectors	Area in %
1	Unsuitable	28247.7	79.75
2	Less suitable	6368.26	17.97
3	Moderate suitable	656.03	1.85
4	Highly suitable	147.44	0.41

To identify the urban solid waste disposal sites using the above nine parameters and subsequently sub-criteria were analysed with overlay analysis. The overlay analysis of the given factors using the raster calculator function in GIS software identified the potential sites for the dumping of solid waste. The results revealed that the 79.75 percent area is unsuitable for solid waste dumping and 17.97 percent Area is less suitable and 1.85 percent area is moderately suitable and 0.41 percent study area is highly suitable for a dumping site.

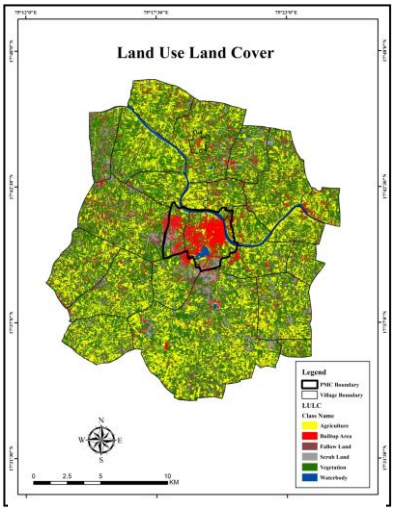

Figure 5: Land Use Land Cover Map

13. LAND USE LAND COVER MAP

The land use land cover map made by using sentinal 2 image having a spatial resolution of 10 m of the month of December in the year 2021 and a supervised maximum likelihood classification (supervised) was manually done.

The area covered by attribute is 29.54 per cent by Agriculture area, it is depicted in yellow colour. 6.45 per cent by fallow land, it is depicted in brown colour. 8.74 per cent by Scrub land, it is depicted in grey colour, 47.96 per cent vegetation and 5.64 per cent builtup area, it is depicted in green and red colour and 1.63 per cent is water body it is depicted in blue colour in figure no 5.

14. POPULATION DENSITY:

Population density is divided in four classes, light pink colour shows <200 population density which is lowest population density. Shirdhon and Kondharki these two villages depicts in this category. light Red colour shows 200-400 population density, Anawali, Kasegaon, Bohali, Korty, Gadegaon, Wakhari, Ajansond, Degaon, Adhiv, Kauthali, Khel Bhalawani, Hole, Gurasale these villages are include this category. Orange colour shows 400- 600 population density. In this category Eklaspur, Shegaon Dumala, Mundhewadi and Bhatumbare villages are included. Red colour depicts > 600 population density which is highest, it includes Venunagar Gursale, Isbavi, Pandharpur (MCI), Takli, and Gopalpur.(Figure 6)

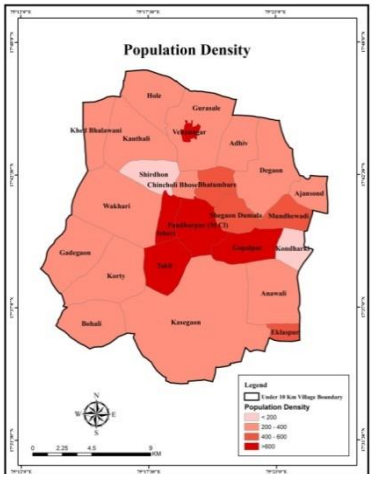

Figure 6: Population Density Map

15. POTENTIAL WASTE DISPOSAL SITES :

Potential Waste Disposal Site were determined by using following criteria Geology, population density, land use / land cover,

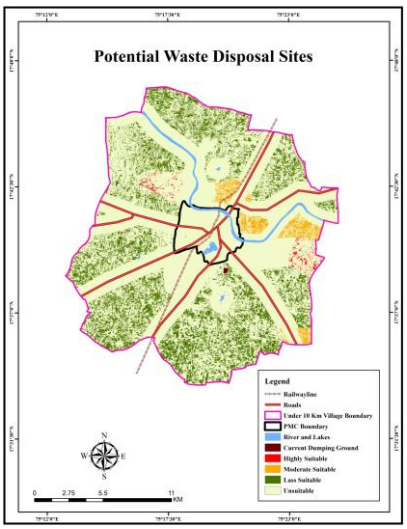

Figure 7: Potential Waste Disposal Sites Map

distance from road, distance from rivers, distance from lakes. Each criteria is further classified into four levels unsuitable to highly suitable respectively. In Figure no 7, Brown colour depicts current Dumping Ground site which is placed in Kasegaon. Red colour depicts highly suitable area. Particularly the village Shirdhon and Kondharki is suitable area for dumping ground. Both villages are highly suitable because both the village fulfill all criterion. Orange colour is depicts moderate suitable area which cover 1.85 per cent. Green colour is depicts less suitable area for dumping ground which cover 17.97 per cent area. White colour is depicts unsuitable area. Particularly the village Takli, Isbavi, Pandharpur (MCI), Gopalpur is unsuitable for dumping ground.

16. FINDINGS:

- In study area daily 42 tonnes MSW generate. Out of that 27.9 tonnes Daily Dry waste generation in the town.(Metal 6.18 per cent, Plastic 3.9 per cent, Glass 9.87 per cent, Paper/ Cardboard 22.94, Cloth 18.4 per cent, Rubber & Leather 16.16 per cent, Packaging Material 22.55 per cent.) and Daily average wet waste 10 tonnes, Daily Total Hazardous waste is 0.016 TPD and Daily Sanitary waste is 0.006 tonnes generated.
- For collection and transportation purpose 43 '*Ghanta Gadi*' used for door to door collection. The town has secondary container bins like compacter bins are place around the city like colonies, slum area and major roads. 40 dumper placer bins of 2.5 Cubic meter (m^3) size as well as dumper placer bins of 4.5 cubic meter (m^3) sizes are place around the market, APMC market, Fruit market, other strategic location.18 concrete bins are placed in the town.
- According to Site Suitability Analysis village Shirdhon and Kondharki is in highly suitable area for dumping ground.(Figure no. 7)
- Village Kasegaon where present dumping site is situated is come under the moderately suitable area.
- Village Takli, Isbavi, Pandharpur (MCI) Gopalpur fall in less suitable category for dumping ground.

17. CONCLUSION:

In Pandharpur town MSW is generates about 42 tonnes per day. door - to - door solid waste collection is 90 per cent but in newly developed area of town, open dumping is more. Segregation of solid waste is 70 per cent at source. In the study area only one dumping site present at Kasegaon. On that site Windrow composting plant, bio gas plant facility is available but currently bio gas plant is non-operational. Dry waste processing plant capacity is 50 TPD. And wet waste processing plant capacity 16 TPD in that windrow composting 10 TPD and Bio-Gas is 06 TPD. Vitthal Rukhmini mandir samiti collects its floral litter Waste (Nirmalya) and transport by tractor trolley within the temple premises and process it at Goshala of temple, near Yamai Lake.

18. SUGGESTION:

According to site suitability analysis the present dumping site at Kasegaon falls in the category of moderately suitable areas. As population density goes on increasing in future, this site is likely to become less suitable for dumping. As per the site suitability analysis the villages of Shirdhon and Kondharki, where population density is < 200 category which is highly suitable areas. These two villages are at a distance of more than 1 km from road, river and water bodies. Hence suggestion is that these two villages should be considered as future dumping sites.

20. REFERENCES:

- Adams, J. B., Sabol, D., Kapos, V., Filho, R. A., Roberts, D. A., Smith, M. O. and Gillespie, A. R., (1995): Classification of Multispectral Images Based on Fractions of Endmembers: Application to Land-Cover Change in the Brazilian Amazon, Remote Sensing of Environment, Vol. 52, pp. 137-154.
- Ahmadi, F. and Toghyani, S., (2011): The Role of Urban Planning in Achieving Sustainable Urban Development, OIDA International Journal of Sustainable Development
- Batty, M. and Longley, P., (1986): The Fractal Simulation of Urban Structure, Environment and Planning
- Bean, E. A., Rovers, F. A. and Farquhar, G. J., (1995): Solid Waste Landfill Engineering and Design, Prentice
- Carlson, T., (2002): Satellite Imagery is used to Predict Urban Sprawl and its Impact on Surface Hydrology, Department of Meteorology in Penn State University
- Central Pollution Control Board, (2000): A Support Manual for Municipal Solid Waste (Management and Handling) Rules.
- Chen, X., (2002): Using Remote Sensing and GIS to Analyze Land Cover Change and its Impacts on Regional Sustainable Development, International Journal of Remote Sensing,
- CPHEEO, (2000): Manual on Municipal Solid Waste Management. URL:http://moud.gov.in/swm_manual.
- **Website**
  - https://moud.gov.in/swm_manual
  - https://en.climate.data.org.in_maharastra.
  - https://mahasdb.maharastra.gov.in_population
  - https://www.pmc.gov.in_swm