iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** IX **Month of publication:** September 2021

DOI: https://doi.org/10.22214/ijraset.2021.38059

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue IX Sep 2021- Available at www.ijraset.com

Design of Integrated Solid Waste Management at City Amanganj Dist. Panna (M.P), India

Aditya Dev Narayan Garg[1], Prof. Devendra Dohare[2]
[1, 2]*Shri G.S. Institute of Technology and Science, Indore 452001, India*

Abstract: ***A study is carried out to design the integrated system approach for the solid waste management for Amanganj area in Panna District. Amanganj is a town and a Nagar Panchayat and a tehsil in Panna District of Madhya Pradesh, India. The information that are used to design the system is gathered from the existing data presented over Madhya Pradesh Pollution Control Board on solid waste management. It has included integrated approach where the recycling, reusing and leachate management as well as landfill areas are covered by not necessary included in the design of the system. Total land area which has been utilized has involved the integrated approach to meet the area of 1000m^2. The requirement of the manpower, waste collection and its compact on the people are eventually covered in the study. It will be reliable to use the solid waste management system at Amanganj as it would help in offering the better facilities and support to the local people.***
Keywords: Solid waste management, Integrated Design, Integrated approach, Composting, landfill and resources.

I. INTRODUCTION

Solid waste management (SWM) is the critical environment problem through which the direct defects of the environment and their conditions can be known. It implicates on the fact that waste management activities carried out by individuals, household, small businesses or institutions might generate solid waste with any form of non-liquid waste. It requires proper control and disposal in the area to meet the requirement of the public health and environmental concerns. The collection of the rates of SW have presented that it differs from one country to another. The low-income countries have been experiencing the waste generation with less than 50% and while the Middle-income countries are collectively presenting 50-80% of the waste generation in the countries. It has been integrated that the rapid growth in the urban population, economies and power consumption has influence the growth of the country. It has combined the failure of the institutional authorities as well as reliable way to meet the city planning for the SWM management and core functional revamping in it. SWM plays a vital role in minimizing the impact faced by municipal and rural areas to meet with the increasing urbanization. It has also become more environmental challenge in the developing countries due to economies growth. The preparation of the expansion in SW generation. SWM systems in most cities of lower middle-income countries. There were underachieving goals with the originating adverse sustainability effects. They increase in the waste creation has caused a severe shortage of landfills and higher costs for waste management. To sustain SW or environmental issues are gradually increasing in the low income and developing countries as they focus on the formal education for sustainable development. It has essentially added on the level of education, able to trigger a whole societal transformation. Thus, it has expected on the review to the improvement in the system schemes in the areas. It might direct the research aims to contribute to determining factors that needs investigation in future research in SWM which are created in developing countries.

A. Solid Waste Management

Waste is an unavoidable and result of the human activity with the unwanted materials. It has been escalated on the fact that human and animal habitat have represented useless or worthless stuff, material and no longer practices for the purpose of the people within the specific locality along with classified into a solid, liquid and gas. It comprises of the sludge, garbage, refuse and other solid materials to the discarded ways. It consists of the household and commercial activities.

It has been pooled that the unwanted solid materials by cities have pointed on the different types of the household activities. It has been believed that severe environmental problems and countries. It is expected that the cost of waste management in developing countries will increase as a major source of concern. It has been indicated that 125 million tons per year of SWM has generated every year. Furthermore, it has directed on the growing economy to which the amount is expected to outreach to 244 million tons per year by 2025. This might be inappropriate to represent that municipalities of developing countries require the pollutant.

©IJRASET: All Rights are Reserved

As the approached practices, the problem of polluted environment due to leachate, contaminated both land and surface areas. It has sound practical with the poor management and waste practices. It might cause other implications like transmitted infections, floods, drains and other issues. The particles resulting in the infrastructure and vehicles to meet with the lack of enforcement and low public awareness have been included in the managing the conflict, political stability and other underlying problems. It has presented the negative impact on the significant health risks regarding human population.

B. City Profile- Amanganj

Amanganj is a town and Nagar Panchayat as an average elevation of 329 meters. It has also added on panchayat to have a population of 13886 in which 7293 are males and remaining are females. It has been escalated that the population of Children with age up to 6 years is 2000 approximately. It can counter on 14.18% of the total population of Amanganj. It can address on Panna Range with region font code with the 334 meters above sea level. It has added on the Panna Hills.

It has been revealed from field observation that the existing environmental conditions of the municipal area is very poor. It has also disposed solid waste in the vicinity of the household, nearby ditches and drains. This adversely impact on the production field, small industries and streets and loading and unloading with the soils and sand measures. As a result, the roads within the municipal area very dirty. It has also added on the planned area under the Chhatarpur Cluster is important with the municipality of the development. At present, there is no planned area to the solid waste disposal system for program related to the work within unplanned way. The situation is creating to meet with the landscape and environmental hazards. It has attained on the territorial jurisdiction has increased more than four times and population density of Amanganj city in the Panna.

II. METHODOLOGY

To evaluate the objectives of the study, it has presented the activities that are considered under the scope of the study those are sequentially managed and briefly described as below:

The information of the Amanganj municipality like jurisdiction area and trend in the infrastructural development has pointed on the current situation and necessities to the future conditions of the solid waste systems.

Integrated solid waste management system might address on the design that are comprised of the waste sorting for the recycled and reuse of the products. This has been designed for a period of 10 years. It might include the features of reuse, recycle and non-biodegradable wastes.

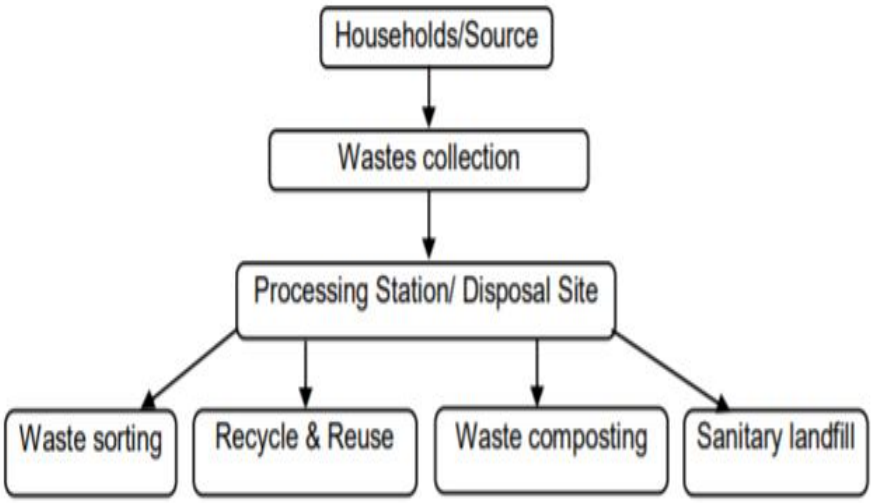


Fig. 1. Flow diagram of Integrated Approach for Solid Waste Management

The solid waste generation of Amanganj under Chhatarpur Cluster for Panna District has presented the details of total waste generation rate. It has pointed on the field investigation with the areas that are conducted to meet with the 62 houses and daily average generated waste with 152.67 kg from some houses. The estimates to the rate of generation of wastes and density of waste and other has to be gathered in the study. It has also directed on covering the composition of generated solid waste, collection of solid wastes and parameters to design integrated approach for the standard methods.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue IX Sep 2021- Available at www.ijraset.com

III. RESULTS AND DISCUSSION

An integrated approach for the designing of the sorted wastes and composting and sanitary landfills at the disposal sites of the Amanganj has been covered. It has also represented on the non-recyclable yet inert material and residue on the compost plants to meet with ultimate disposal site. The flow of the diagram might add on the features to which the composite solid waste management can be taken place.

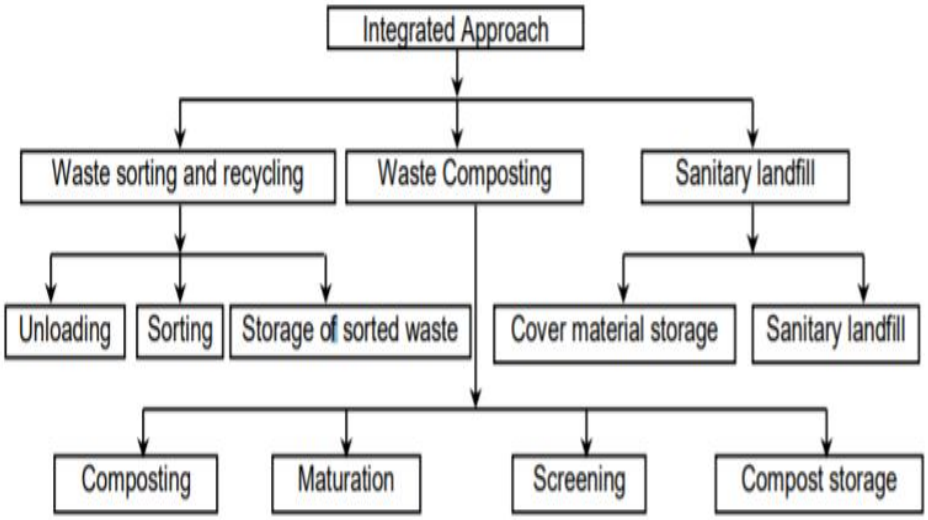


Fig. 2.: Total work execution with integrated approach

Wastes are usually sorting out to the areas where loading and unloading operations are approached. It has sorted on the conditions to meet the accommodated way. This might result on the unloaded waste and sorted waste slack concern with the operations. It might estimate on the total areas to which the waste might be sorting to the shade. It has covered the areas to which integrated approach and composting operations would be performed in the proper manner.

A. Design of Compost Plant

The integrated compost plan covers the operations which would aerobically and naturally manage with the microbial consortium way. The organic waste that has been piled up with the aerator has directed on the process through which the study can be carried out.

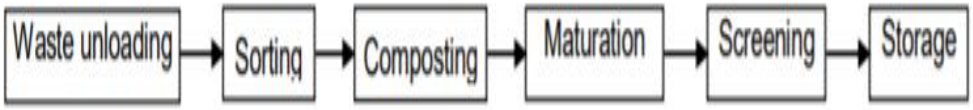


Fig 3. Process of Composting

The field have conducted composting plant with the extensive volume to around 11% for organic waste and can be reduced due to the decomposition. It might also present the density to the compost post production of the stack. The density can be attained with 635 kg/m3 and at 22.5% of the compost rate. The estimated range of the quantities that are profound on the site has presented that the area would remark on the waste in Kg/day. It would also address to the matured compost needed yet screened rates for grading of classes as per requirement. It might show the experience that are to be noted with the enough screening operation in each layer to the composting site. The screening might attain the selling of the consumers. The storage duration has attained on the office room with the sites for the management and keeping the instruments in better space. The required office room is assumed to be 12 m2 in each site. It will help in covering the total land area requirements with the wastes and operations that are compost to the storage that are present.

©IJRASET: All Rights are Reserved

B. Estimation of Manpower Requirement

A person who is capable of sorting out the wastes at 80 kg/hr. Pile of wastes in the composting box of 120 kg'/hr has been escalated for the current location. It has somehow estimated that the requirement of the total composting operations is directing the workers to carry out the work in 8 hours and working efficiency is 80%. It might address on the estimated performance.

Table I
Manpower Requirement For Composting

Site	Raw waste	Organic waste	Compost	Sorting	Piling	Compost unloading	Compost Screening	Total
Amanganj	4174	2541	620	8	4	1	2	15

This has pointed on the workers from different work profile. It has estimated on the functions for composting operation to meet with the waste piling, waste sorting along with the screening and other practices respectively.

C. Sanitary Landfill Design in Integrated Approach

The disposable waste has been added on the inert material to which no resale value to around 8%. It has added on landfill site with 600 kg/m3. It might address on the gross area of landfill site with the calculation to meet 10 years with the design calculation to attain on approximately 350 m^2.

On the design to which estimation of all requirements with the integrated waste management. It has approach on the equipment with the landfill site along with the waste management spread in the compaction in the fill for the making landfill cell.

It can also mention the advantages and disadvantages of the solid waste management system. It approaches on the leachate management system, landfill gas management along with the cover material. The financial return can be achieved on the selling by sellable and recyclable material to attain the fertilizer and soil conditioner. It results on the proposed and designed integrated way to the solid waste management with the economical and beneficial for the Amanganj municipality.

IV. CONCLUSIONS

Solid wastes management systems have designed on the Amanganj municipality for Panna District under Chhatarpur Cluster. It has also formed the existing information and standard methods with the basis of the results and attaining the field investigation as follows:

A. Waste have been collected by gathering the house-to-house wastes collection system in the integrated approach.
B. Total waste generation is directed to around 7826 kg/day
C. It has added organic waste in the biodegradable waste to around 68% for composting on the fertilizer
D. Total reusable waste to be around 24% to meet the sales directly after sorting
E. To attaint he inorganic yet qualified approach for the integration of the site
F. Total manpower and waste collection van would cover the waste management from the city with the produced way to composed way

The analysis has performed on the present study to lead on the conclusion for designing the solid waste management system developed with the Amanganj as a clean area through proper solid waste management.

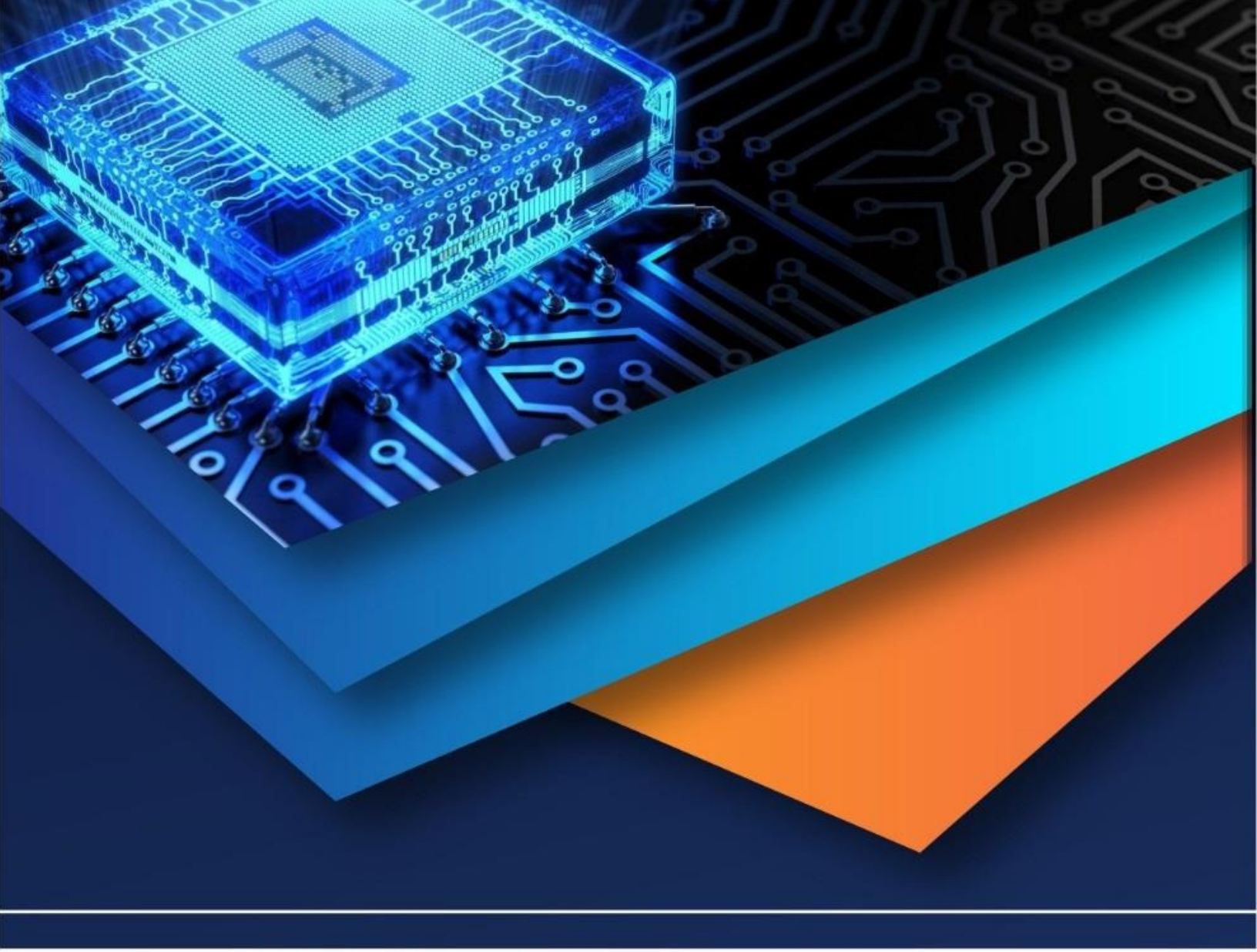
REFERENCES

[1] Brotosusilo, A., Nabila, S. H., Negoro, H. A., & Utari, D. (2020). The level of individual participation of community in implementing effective solid waste management policies. Global Journal of Environmental Science and Management, 6(3), 341-354.
[2] Das, S., Lee, S. H., Kumar, P., Kim, K. H., Lee, S. S., & Bhattacharya, S. S. (2019). Solid waste management: Scope and the challenge of sustainability. Journal of cleaner production, 228, 658-678.
[3] Ganguly, R. K., & Chakraborty, S. K. (2021). Integrated approach in municipal solid waste management in COVID-19 pandemic: Perspectives of a developing country like India in a global scenario. Case Studies in Chemical and Environmental Engineering, 3, 100087.
[4] Gil, L. S., & Maupoey, P. F. (2018). An integrated approach for pineapple waste valorisation. Bioethanol production and bromelain extraction from pineapple residues. Journal of Cleaner Production, 172, 1224-1231.
[5] Ikhlayel, M. (2018). An integrated approach to establish e-waste management systems for developing countries. Journal of Cleaner Production, 170, 119-130.

©IJRASET: All Rights are Reserved

[6] Joseph, K., Rajendiran, S., Senthilnathan, R., & Rakesh, M. (2012). Integrated approach to solid waste management in Chennai: an Indian metro city. Journal of Material Cycles and Waste Management, 14(2), 75-84.
[7] Logan, M., & Visvanathan, C. (2019). Management strategies for anaerobic digestate of organic fraction of municipal solid waste: Current status and future prospects. Waste Management & Research, 37(1_suppl), 27-39.
[8] Mishra, R., Panda, A. K., & Bisht, S. S. (2021). Solid Waste Management Models: Past, Present and Future. In Multidimensional Approaches to Impacts of Changing Environment on Human Health (pp. 277-292). CRC Press.
[9] Pujara, Y., Pathak, P., Sharma, A., & Govani, J. (2019). Review on Indian Municipal Solid Waste Management practices for reduction of environmental impacts to achieve sustainable development goals. Journal of environmental management, 248, 109238.
[10] Rode, S. (2010). Integrated approach to solid waste management in Pune city.
[11] Rodrigues, A. P., Fernandes, M. L., Rodrigues, M. F. F., Bortoluzzi, S. C., da Costa, S. G., & de Lima, E. P. (2018). Developing criteria for performance assessment in municipal solid waste management. Journal of Cleaner Production, 186, 748-757.
[12] Singh, A. (2019). Managing the uncertainty problems of municipal solid waste disposal. Journal of environmental management, 240, 259-265.
[13] Tsui, T. H., & Wong, J. W. (2019). A critical review: emerging bioeconomy and waste-to-energy technologies for sustainable municipal solid waste management. Waste Disposal & Sustainable Energy, 1(3), 151-167.
[14] Vertakova, Y. V. (2019). The integrated approach to sustainable development: the case of energy efficiency and solid waste management. 670216917.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)