IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11214

A SURVEY ON MANAGEMENT OF WASTE

Shreya S Jain[1], S Karuna[2], Anvitha S Badiger[3], Ayesha Tasmia[4], Y U Shreesha[5], Roopa K Murthy[6]

Student, Artificial Intelligence and Machine Learning, K S Institute of Technology, Bangalore, India[1-5]

Professor, Artificial Intelligence and Machine Learning, K S Institute of Technology, Bangalore, India[6]

Abstract: A vital component of both public health and environmental sustainability is waste management. It includes gathering, moving, getting rid of waste, and recycling different kinds of garbage produced by human activity. Efficient waste management tactics strive to reduce pollution to the environment, preserve natural resources, and lessen health hazards related to inappropriate disposal of trash. The main elements of waste management are examined in this abstract, including waste reduction, reuse, recycling, and appropriate disposal techniques. It also covers new developments like the concepts of the circular economy and cutting-edge technology that enhance waste management procedures. Societies can advance toward a more sustainable future while protecting ecological integrity and human well-being by implementing comprehensive waste management methods.

Keywords: Waste management system, Design of smart and IoT waste management system, waste management in different countries, Garbage Management System, SAFA-E.

I. INTRODUCTION

Public health and environmental sustainability both depend on effective waste management. It includes gathering, moving, processing, recycling, and getting rid of different kinds of garbage that are produced by people. In addition to promoting resource efficiency and the concepts of the circular economy, effective waste management systems seek to reduce the negative effects of garbage on the environment, human health, and communities.

Waste reduction techniques that focus recycling, reuse, and waste prevention are the cornerstone of a strong waste management system. Communities may decrease the amount of waste generated at the source, lessen the load on landfills and incinerators, protect the environment, and lessen pollution.

In order to guarantee the prompt and effective removal of waste from residences, workplaces, and public areas, collection and transportation infrastructure are essential.

Waste control is essential for a number of reasons such as

1. **Environmental Protection**: Good waste management contributes in preventing air, water, and land pollution, all of which are essential for maintaining ecosystems and maintaining public health.

2. **Resource Conservation**: It makes it possible to recover and recycle priceless resources, such as metals, polymers, and biological materials, which lowers the demand for energy and raw materials.

3. **Public Health**: Good waste management reduces the dangers to public health posed by inappropriate garbage disposal, such as the spread of illness and contaminating water supplies.

4. **Economic Benefits**: Communities can save money on waste disposal and make money through waste-to-energy and recycling programs by putting efficient waste management strategies into place.

5. **Aesthetic Improvement**: Good waste management improves the aesthetic appeal of parks, neighborhoods, and natural areas, which benefits the general well-being and quality of life of the community.

6. **Compliance with Regulations**: To safeguard the environment and public health, waste management is governed by laws and regulations in many areas. Sustainable growth requires adherence to these rules.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11214

II. LITERATURE REVIEW

SL NO.	YEAR OF PUBLICATION	PROJECT TITLE	DESCRIPTION
1.	2022	Waste Management System [1]	Managing garbage presents a big challenge, particularly in light of the expanding population and the need to preserve the environment. Good waste management helps reduce contamination in the environment, which is important for many sectors of the economy. Poor disposal can damage the environment and create problems for the community. By developing an application for a waste management system, this initiative hopes to make a difference. In order to help enterprises manage their trash, users can report garbage, and the system will evaluate these reports to detect dangers. Reducing the amount of time and money spent on waste management as well as enabling decision-making based on the system's monthly and annual reports are among the anticipated results. This work is essential to keep the ecology intact.
2.	2022	SAFA-E (The E-Waste Management System) [2]	The term e-waste stands for electronic waste which is the waste of discarded electronics like computers, monitors etc. It contains many toxic substances like lead, mercury, lead oxide, cadmium etc. These substances are highly toxic in nature. They can cause pollution of air and soil if it is not disposed in a safe and efficient manner. It also effects the fertility of the soil and it enters the food chain. A software named Safa-e is developed to address this issue.
3.	2022	The Role of Collaboration for a Circular Business Model in Indonesian Household Waste Management [3]	The soft system methodology framework was used to evaluate data from start-up websites and Instagram. The results emphasize how crucial it is for startups, by the government, and other sectors to work together to manage different kinds of waste and extend service regions. Startups worked together to address the difficulties of putting a circular business model into practice by providing facilities for the collection and treatment of waste. The government, new businesses, and other sectors are advised to encourage and assist the implementation of circular economy principles in waste management.
4.	2022	Object Detection Based Management System of Solid Waste Using Artificial Intelligence Techniques [4]	In Bangladesh, where solid waste management is a major concern, adopting object detection-based waste management systems is challenging due to the insufficient diversity of data. Trash generation per person is expected to reach 0.75 kg/capita/day by 2025, resulting in a 21.07 million-ton yearly trash output. A deep learning-based waste identification method has been presented to discover and identify solid waste in real-time photos that are unique to Bangladesh in order to address this problem. A varied dataset gathered from multiple public sources was used to train the model, one-third of the photos were specially gathered and thoroughly annotated for this study. Twelve different categories of garbage can be identified by the system, including paper, plastic, glass, metal, bio, and e-waste.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11214

5.	2021	Internet of Things (IoT) based smart waste management system [5]	These days, a lot of student's waste food in their offices, dorms, and institutions, which could result in future food shortages. Food waste management is difficult; thus, the study focuses on a solution. Measuring individual food waste and rewarding users for lowering it is the concept. For future reference, the device shows real-time food waste on screens and website. Food waste is tracked and reported by the model, which gives management and users access to comprehensive data. Users are encouraged to cut back on the excess food they eat, and those who do so on a regular basis are rewarded. The Internet of Things can be used to automate the procedure or carry it out manually. An Radio Frequency Identification Reader sensor, which can only be accessed with an RFID card given by management, is used to track individual waste.
6.	2021	Garbage management system [6]	In the website or app users can enter their data on e-waste and they will get the guidance on proper disposal and recycling methods. The admin will have the total control. This system will help people to find workers to handle trash, make it easy to buy and sell waste materials. It also provides routes for the garbage collection.
7.	2018	Social and Economic Aspects of Acceptable Risk of Ensuring Ecological Safety at Management of Municipal Waste [7]	The social and economic aspects of acceptable risk in the context of ecological safety in municipal garbage management are examined in this article. The progress of ecological safety measures in this subject is retrospectively analyzed. The study explores how ecological safety in municipal waste management is affected by the use of absolute, allowed, and tolerable risk theories. It also emphasizes the key differences between definitions of admissible and acceptable risk. In general, the paper offers insights into a thorough comprehension of risk management in the context of municipal waste management, taking into account both its social and economic ramifications.
8.	2018	Municipal Solid Waste Management in China [8]	Solid waste management in China. Qing Yang, Lingmei Fu, and Xingxing Liu write in the international journal environmental research & health 15(11),2448,2018, that improper or inadequate waste management is invariably linked to ill health. In order to improve the efficiency to do better waste management China government intensively implemented relevant policies. The ongoing studies and the research aim to compressively analyse the Municipal solid waste management efficiency it implements routes to improve breakthrough of MSWM. This paper introduced 3 stage data envelopment analysis (DEA) into the research and this resulted in Fuzzy c-Means algorithm that was used to cluster analysis of 33 typical cities. After eliminating the external environment interference of environment and random disturbances the mean value of MSWM efficiency declined from 0.575 to 0.544. The pure technician mean was declined from 0.966 to 0.611 while the mean scale efficiency increased from 0.600 to 0.907 and on comparison the Pte of central and north eastern cities was low. Whereas the scale Efficiency (SE) of western was high and the efficiency distribution of eastern region was scattered relatively.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11214

9.	2018	Development of Environmental Management in South Korea: Practice of Industrial Waste Processing [9]	The article about theoretical and practical issues of industrial waste management in developed countries. The optimal policy making for Municipal waste management based on predictive model optimization Shabir Ahmed, Naeem Iqbal, Faizal Jamil, Dohyeun Kim IEEE access with increasing population waste management is a massive issue of grave concern with modern urban scenario. The controlling of disposal wastes are being studied, the modern technologies of South Korean companies in waste processing are analyzed. Several policies have been established by S. Korean government over past few years to tackle the challenges of waste management. Investigating the modern trends and human behaviour is necessary towards waste disposal is needed to devise a policy. The waste profiles of residential grids in Jeju Island and other residential grids have a customised policy by the help of predictive analytics. The policy defined was looking after various conditions like cost of resources and levels of hygiene in different areas. The solid waste data set of 2017-2019 is coupled with prediction algorithm allows to make different waste profiles for different residential grids. The optimization algorithm proposes minimum resources that are enough to make sure hygiene standards of the area based on waste amount and frequency. The grids are analysed and minimum cost is suggested to ensure a green and clean environment by optimal resources.
10.	2018	Social and Economic Aspects of Acceptable Risk of Ensuring Ecological Safety at Management of Municipal Waste [10]	This article examines the social and economic dimensions of acceptable risk within the realm of ecological safety in municipal waste management. It conducts a retrospective analysis of the evolution of ecological safety measures in this field. The study delves into the application of absolute, allowable, and acceptable risk theories to ecological safety in municipal waste management. It also highlights the fundamental distinction between admissible and acceptable risk concepts. Overall, the article provides insights into the detailed understanding of risk management in municipal waste management, considering both its social and economic implications.
11.	2017	Design of smart waste management system [11]	A waste management system that is both economical and energy-efficient, making it appropriate for regions with weak economies was created. Rather than depending on daily collections, the system can pick up trash when the bin is full or when the waste within begins to decompose. To deliver messages, modules like GSM to a basic Arduino Uno board was added.
12.	2017	Waste management using Internet of Things (IoT) [12]	It basically helps to treat solid wastes more effectively and it helps to utilize materials more effectively rather than turning it into trash. Through IoT we can monitor waste levels and optimize processes. There are 8 major waste management strategies. The most basic ones are reuse, recycle, reduce.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11214

III. CONCLUSION

To sum up, efficient waste management is essential for maintaining the health of the people, the environment, and communities as a whole. An exponential surge in garbage creation has resulted from global population growth and urbanization, presenting serious difficulties to governments and municipalities everywhere. However, practical ways to lessen these difficulties have been made possible by developments in waste management technologies, laws, and public awareness campaigns.

Reducing, reusing, and recycling are the three cornerstones of waste management, and they are essential in solving the expanding waste problem. Communities may drastically cut down on trash production by supporting a circular economy and responsible consumption practices. The environmental impact of trash is also reduced by effective waste segregation at the source, effective collection methods, and well-managed disposal facilities.

REFERENCES

[1]. M. M. Rahman, S. M. Rahman, M. S. Rahman, M. A. Hasan, S. A. Shoaib and S. Rushd, "Greenhouse Gas Emissions from Solid Waste Management in Saudi Arabia-Analysis of Growth Dynamics and Mitigation Opportunities", Appl. Sci., vol. 11, no. 4, Jan. 2021.
[2]. N. Uchida, H. Matsukami, M. Someya, N. M. Tue, P. H. Viet, S. Takahashi, et al., "Hazardous metals emissions from e-waste-processing sites in a village in northern Vietnam", Emerging Contaminants, vol. 4, no. 1, pp. 11-21, 2018.
[3]. V. Drabe and C. Herstatt, "Why and how companies implement circular economy concepts–The case of cradle to cradle innovations", R&D Management Conference, 2016.
[4]. A. Jude, D. Singh, S. Islam, M. Jameel, S. Srivastava, B. Prabha, et al., "An Artificial Intelligence Based Predictive Approach for Smart Waste Management", Wireless Personal Communications, 2021.
[5]. M.C. Xenya, E. D'souza, K. D. Woelorm, R. Nii Adjei-Laryea and E. Baah-Nyarkoh, "A Proposed IoT Based Smart Waste Bin Management System with An Optimized Route: A Case Study of Ghana", 2020 Conference on Information Communications Technology and Society (ICTAS), pp. 1-5, 2020.
[6]. Vikrant Bhor, Pankag Moragjkar, Maheshwar Gurav and Dishant Pandya Amol Deshpande, "Smart garbage management system", International Journal of Engineering Research and Technology, March 2015
[7]. A.P. Byzov and A.V. Fomin, About the determination of size of individual risk on the reconstructed hazardous production facilities of the Problem of risk management in a technosphere, vol. 45, no. 1, pp. 61-66, 2018.
[8]. E. A. Primak, Integrated assessment of sustainability and ecological well-being of water bodies thesis for the degree of candidate of geographical Sciences, Saint-Petersburg:Russian State Hydrometeorological University, 2009.
[9]. M. Brown, "Water stress hurting more than 50% of global companies CDP says", Bloomberg, October 2012
[10]. T. Kaverzneva, T. Lazovskaya, D. Tarkhov and A. Vasilyev, "Neural network modeling of air pollution in tunnels according to indirect measurements", Journal of Physics: Conference Series, 2016.
[11]. Santi Phithakkitnukoon and Malima I. Wolf, Tracking Trash, The Open University, pp. 38-48, 2013.
[12]. Sharholy Mufeed, Ahmad Kafeel and Mahmood Gauhar, Municipal solid waste management in Indian cities - A review, 2007.