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## **MUNICIPAL SOLID WASTE MANAGEMENT - COMBINING ECONOMICS WITH ENVIRONMENTAL PROTECTION**

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### **Abstract**

Mismanagement of solid waste can be dangerous for all living things, human health, animal health, environment, and ground water resources. Meanwhile some of the locally way of waste management as the municipal solid wastes dumped in open surface area is a dangerous alarm for human health as well as ground water as well. Moreover, Knowingly and unknowingly we all are causing some damages to the marine life and to the resources. However, much research has not been in the area therefore, this topic is an important step towards management of a sustainable environment protection through municipal solid management with focus on its economics aspect. The management of solid waste is collectively the management of waste from its inception to final stage of disposal but understanding the economic part as well. A framework or a universal concept that encompasses from the collection, disposal, recycling, to which the processes of monitoring and regulation, respectively belong to, along with the legal frameworks that enable the occurrence of solid waste management.

### **Introduction**

Solid waste refers to all wastes produced through residential, commercial, industrial, and institutional activities in any form such as paper, plastic, and glass materials. And one of the topical problems in the environment is management proliferation of waste which is devastating for the planet and all living things. Management of Solid waste and finding an effective conduction of municipal solid waste management is challenging. Finding such concept that will ensure maintaining a certain capacity and reaching its final contours with considering the economic and sustainability aspect is difficult but achievable. In order to manage the solid waste, a proper framework and global concept is needed that can help in management however, there are ways to dump the waste, but it is just residual not properly landfilled and not even half of the waste is collected and disposed, and it is causing a global crisis. On the other hand, there is no environmental protection and control over this kind of dumping waste. Even sustainable development goals are directly connected to the Solid waste management and focuses on recognizing the best way to this global issue. This management can be done in an environmentally sustainable way. The “sustainability” is a popular word today and it is not a new topic. Also, it can consider the economical part. The requirement for a reasonable and sustainable MSW management is one of the most common complaints however, the based on the economics part it can be controlled by considering the different aspects, Waste generation, Waste collection, Transportation, Waste processing, Disposal methods, Location selection. Mainly, this

project aims to examine the changes that have influenced the high per capita rate of solid waste generated and create a universal concept for this common issue. Considering above statements, current study is aiming to evaluate the suitability and effect of solid waste management based on economic aspect. The purpose of this research is to make a model or framework and universal concept that can help in management of municipal solid waste and having a sustainable life. The main research questions for this project will be What are the overall effective solid waste management framework currently being implemented? What kind of new framework will work and would be cheap to us? What are the possible ways of enhancing solid waste management framework considering the current time frame? To answer these questions secondary data analysis is used.

### **Analysis and results Solid Waste Management**

Solid waste management in the context of this research is considered the managing strategies and activities linked with waste collection, its transportation, controlling disposal of solid waste through a companionable management with the focus on the principles of economy [1]. Moreover, municipal Solid wastes management and control is a main problem for many countries is linked to the increasing population, growth of economy, and technology is increasing the problem of municipal solid waste management [2] (Municipal Solid Waste is commonly known as trash or garbage consists of everyday items, we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries [2]). On the other hand, Leachate was collected from the three ports of lysimeter, the samples were analyzed and characterized, PH, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Heavy metal (Pb) concentration present in leachate were found [3]. Therefore, directly, and indirectly this Solid waste is causing some damages to the soil pollution and groundwater pollution [3] it is considered that most of these wastes come from our homes, schools, hospitals, and businesses industries. Therefore, waste collection system and sorting system which is practiced through a door-to-door collection has been effective [1]. Basically, Solid waste is not a new concern as humans have always created and managed garbage in some ways however, it has been a very complex which it comes to its management. As a mismanagement can affect the quality of ground water resources. As given the example of in Mavallipura used the landfill method and due to poor practice during the management affected the water source [4]. Therefore, it has been believed that that the current matter and far is the change in quantity and types of waste, and methods of its management has been affecting the environment and water sources negatively [1]. There are different factors that directly or indirectly effect solid waste management [4].

### **Current issue with municipal solid waste**

Firstly, Urban population growth together with the economic development indicates to increasing production of municipal solid waste. As a case study of Thailand, solid waste is one of the environmental problems in urban areas and its impacting life of health, surface and ground water and many other aspects of the people. As for the huge population of the countries there is insufficient waste disposal management at all levels [3]. Secondly, as many countries face problem about the improper disposal of biomedical waste also contributes to pollution and public health hazards. As More than 90% of the waste produced in Nigerian hospitals are directly inclined inappropriately on the land and hugely contributed to the groundwater sources [5].

Meanwhile due to inadequate information on medical waste control and sorting beside the land filling methods, burning method has been used in many cases which also negatively affects health of the country's populations [5]. The recent reach shows that over 50% of is recyclable organic material wastes are used for getting composites and also processed into biogas. Which really helps the economic stability for the households at the same time prevents landfilling by wastes, and also helps the government officials in their management related challenges [1]. Finally, to discuss the challenges encountered by residents, authorities, and governmental offices in managing solid waste, it is important to identify the key stockholders who directly play role. The educational institution's role has been very important in sustainability waste managements at the social level. Although the amount of solid waste this institution produce is very less however, they contributed to the management at high level [6]. This MSW is the most common and increasing waste stream that needs a good management system. Many researchers attempt to find out the detail process of municipal corporation which starts from collection of waste, storage of waste, separation of waste, transportation of waste and disposal of waste. Basically, this research paper is helpful for to know the actual process of solid waste in order to manage in a proper way [7].

### **Effective solid waste management framework currently in practice**

As per available research there are many ways to manage solid waste using different framework, but it is important to develop a proper method that work effectively considering the sustainable management. The existing disposal practices need a change in order to have a resource recovery system as well while disposing the solid waste. Also, governmental rules and regulation should pay close attention to the management various types of waste and there should be law for protecting environment and action should be taken for the damage to the nature [8]. The environmental protection can contribute to having a better framework which will consider the legal aspect of waste management, legal right of sanitation, health and safe life. It is also important to develop and implement an integrated solid waste management approach taking advantages of existing unorganized sector (rag-pickers) for its cost effective and sustainable management [9]. There is urgent need to promote such disposal techniques which have option for resource recovery as well as energy generation The recent research shows that over 50% of is recyclable organic material wastes are used for getting composites and processed into biogas. Which really helps the economic stability for the households at the same time prevents landfilling by wastes, also helps the government officials in their management related challenges [1]. Meanwhile the rules or laws acted upon by the government for the management of any types of waste which can cause harm to the environment and the people of the nation. Government has taken various actions and passed several rules or laws as per the need of the hour to protect the mankind and the environment initiatives of the government which strengthen the legal framework for waste management in India and contributed to the environment protection as well. It is also reported that in India supreme Court has issued directions, guidelines and the orders to the state government, central government, and the pollution boards for using the attest techniques for the waste disposal and promoted the rights of sanitation, health, and a dignified life [1].

### **Cost effective solid waste management frameworks**

Implementing sustainable solid waste management with cost-effective techniques is initial need for many countries. May countries use the facility of technology for disposal solid waste and use

of technology can reduce the cost of the final disposal. A common method of disposal, open dumping process of solid waste management is an easy and low-cost method however, it can pollute the environment. Despite the problems with the open dumping site, this method is chosen in different places since huge amount of waste can be disposed [7]. Usually, the landfills are always far from the residential area for the safety purpose since the sanitary landfill causes many troubles. However, this distance causes more cost for the management since it needs transportation and other infrastructure from the generation and collection site to the landfill area. Mainly, landfill disposing impact directly or indirectly to the economics of country [8]. The other possible solid waste management method is composting that is most cost-effective and generates significant fertilizer for the soil for the agriculture and cultivation. Also, apart from the positive sides it causes the emission of gases such as methane and the pollution of groundwater [7]. Currently, the Thai national waste management policy starts to encourage the local administrations to gather into clusters to establish central MSW disposal facilities with suitable technologies and reducing the disposal cost based on the amount of MSW generated. MSW Processing and Disposal in Thailand open dumping site can be utilized with the easily fermented, and low cost but it can also cause visual pollution, and odor [3]. The open dumping sites remain a choice for many areas due to its low cost and its effective performance in getting rid of a huge amount of waste. Sanitary landfills are usually located far from sources, resulting in increasing of the transfer costs and additional investments for infrastructure. Direct landfilling of such waste creates the nuisance owing to the generation of highly concentrated leachate, methane gas emission, and extreme waste settlement in landfill. Moreover, composting generates a valuable fertilizer or a soil conditioner for agricultural and horticultural uses. However, composting is not well practiced in Thailand due to the lack of knowledge and the high cost in maintenance [3].

### **Conclusions and recommendations**

Every country has their own method based on their available facilities and considering their economical and sustainability aspect. However, there is need for a legal and global framework which can be implacable all over the world. The other possible way can be recycling the waste without damaging the environment. The recycling of wastes for different purposes is suitable and right method for solid waste management with consideration to the remaining waste is must. The world needs an environmentally friendly, easy process, cost-effective framework which can be implacable for both developing and underdeveloped countries to achieve the integrated and efficient solid waste management [8]. Moreover, research also suggests some of the possible ways through which some of the challenges related to waste management will be solved. Research in idea suggested that educating people of importance of waste segregation to change the waste to recyclable materials, decentralized composting plants will also reduce the labor and transportation cost related to waste management. Government to take initiative to encourage Universities, technical Institution to add waste management in the teaching curriculum [7].

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Резюме

## **МУНИЦИПАЛЬНОЕ УПРАВЛЕНИЕ ТВЕРДЫМИ БЫТОВЫМИ ОТХОДАМИ - ОБЪЕДНЕНИЕ ЭКОНОМИКИ И ЗАЩИТЫ ОКРУЖАЮЩЕЙ СРЕДЫ**

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Неправильное обращение с твердыми отходами может представлять опасность для всех живых существ, для здоровья людей и животных, окружающей среды и ресурсов подземных вод. Некоторые из способов обращения с отходами, которые применяются в

нашей стране, как утилизация твердых бытовых отходов, сбрасываемых на открытой местности, представляют собой опасность – как для здоровья человека, так и для грунтовых вод. Более того, сознательно и неосознанно мы все наносим некоторый ущерб формам жизни и ресурсам в море. Тем не менее, эта область не слишком исследована, поэтому эта тема является важным шагом на пути к управлению устойчивой охраной окружающей среды посредством твердого муниципального управления с акцентом на его экономический аспект. Распоряжение твердыми отходами в совокупности представляет собой управление отходами от их образования до конечной стадии захоронения, но также есть и экономическая часть. Универсальная концепция включает сбор, утилизацию, переработку, а также процессы мониторинга, регулирования и правовые рамки, обеспечивающие возможность обращения с твердыми отходами.

Ключевые слова: утилизация твердых бытовых отходов, сбор мусора, устойчивая охрана окружающей среды, управление отходами.

### **Түйіндеме**

## **ҚАТТЫ ТҰРМЫСТЫҚ ҚАЛДЫҚТАРДЫ МУНИЦИПАЛДЫ БАСҚАРУ- ЭКОНОМИКА МЕН ҚОРШАҒАН ОРТАНЫ ҚОРҒАУДЫ БІРІКТІРУ**

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Қатты қалдықтармен дұрыс жұмыс істемеу барлық тіршілік иелеріне, адам мен жануарлардың денсаулығына, қоршаған ортаға және жер асты суларының ресурстарына қауіп төндіруі мүмкін. Біздің елімізде қолданылып жүрген қалдықтарды басқарудың кейбір әдістері, мысалы, ашық жерге төгілген қатты тұрмыстық қалдықтарды кәдеге жарату адам денсаулығына да, жер асты суларына да қауіп төндіреді. Оның үстіне, біз саналы және бейсаналық түрде теңіздегі тіршілік формалары мен ресурстарына белгілі бір зиян келтіреміз. Дегенмен, бұл сала жақсы зерттелмеген, сондықтан бұл тақырып оның экономикалық аспектісіне баса назар аудара отырып, дұрыс муниципалды басқару арқылы тұрақты қоршаған ортаны қорғауды басқаруға бағытталған маңызды қадам болып табылады. Агрегатта қатты қалдықтарды басқару қалдықтарды пайда болғаннан бастап жоюдың соңғы кезеңіне дейін басқару болып табылады, бірақ оның экономикалық бөлігі де бар. Әмбебап тұжырымдама қатты қалдықтарды басқаруға мүмкіндік беретін жинау, кәдеге жарату, кәдеге жарату, сондай-ақ мониторинг, реттеу процестері мен құқықтық базаны қамтиды.

Түйінді сөздер: тұрмыстық қатты қалдықтарды қайта өңдеу, қоқыс жинау, қоршаған ортаны тұрақты қорғау, қалдықтарды басқару.

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