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Sustainable Solution For Solid Waste Management : A Survey And A Case Study Of Residents Around Kundam, Jabalpur, M.P.

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Abstract - *Increasing population has become a problem around the world. Along with the increasing population, there is a change in the lifestyle, where on the one hand peoples are running a run off the mill life , on the other hand the country is passing through various terrible difficulties. One of the difficulties is solid waste disposal which is we are going to talk about the main focus of the problems. In this research a minor Survey conducted. Existing household solid waste management (swm) is investigated in kundam, (jabalpur,m.p.), we also will discuss about the most economical ,sustainable & eco-friendly methods of solid waste disposal. The purpose of this study was to examine inhabitants' overall perceptions, awareness, practice, and willingness to manage solid waste of residents around Kundam Village. In this research A questionnaire survey conducted for the waste reduction research that was used for the project. A total of 500 survey questionnaires were asked to households in the 'Kundam Block'. Stratified Random Sampling is used for selecting the respondents. Face-to-face interviews were conducted. A member of each household between the ages of 17 and 74 years old was chosen to be interviewed. There are five sections to the questionnaire: environmental health and demographics; household solid waste management; concerns about solid , willingness to participate, solid waste management attitude scale. The findings indicate that the general public's perception of solid waste is unsatisfactory among locals. Furthermore,.*

Key Words: Solidwaste, composting method, compost machine, , minor survey in rural area., domestic waste.

1. INTRODUCTION

After doing any work, naturally whatever things which are no longer useful to us are put in the category of garbage. But this is garbage only for you because your work is done and the left over material is of use for you and in this way it automatically gets included in the category of garbage. and the waste generated from different places like homes, schools, hospitals, markets etc.are broken glass, plastic, paper, wood, peels for vegetables and fruits, etc. For the disposal of this waste, a method that has been in use for centuries, where the waste is buried in a ground away from the cities so that people do not suffer any harm from it. So it has been going on for centuries. The method fine till the population is limited, but now the need for innovation is clearly visible for it due to rapid increase in population. In this research we try to find out the best solution for this waste problem. The household waste is one of the major source of the solid waste generator We are about to discuss the treatment method of solid waste that has been going on for centuries and will also discuss about the innovative method of SWM which are needed in today's era. In this research I try to find out the level of awareness regarding SWM in rural area for which I select a small village known as **Kundam Block** for a minor survey

1.1 About Kundam

Kundam is a town and a tehsil in the Madhya Pradesh state of India's Jabalpur district. Ward There is a very beautiful 'Kundeswar Dham Temple' here, as well as the famed 'Hiran River,' which attracts visitors from all over the world. Garbage stains the charm of what is otherwise a lovely community. This Tehsil has a total of 179 villages. Kundam has a population of 5120 people in the surrounding area. There are a total of 20 Wards. In kundam, wet trash is generated at a rate of 477kg per day, while dry garbage is generated at a rate of 150kg per day. In this study, we want to find out how well-informed households, stakeholders, and scrap dealers are about the SWM.

1.2 The 3 'R's

Refuce, Reduce, Repurpose, Reuse, and Recycle are all words that come to mind when we think of recycling. These five 'R' words are crucial to living a sustainable lifestyle because they help us reduce the amount of waste we produce.

1.Refuse it means say no to that product about which you don't know the proper disposal method i.e. plastic material.

2. Reduse Minimize the quantity of waste you generate.

2. Reuse -Before replacing objects, try to reuse them as much as possible.

3. Reuse items as much as you can before replacing them.

4. Repurpose –try to repurpose the things that u can, for example we can repurpose the Brocken coffee cup as a pot to grow a plant.

5. Recycle as much as possible.

Using the 5 'R's also helps to minimize the amount of space needed for landfill sites, where waste materials are disposed of.

Some of the treatment method of solid waste

1. **1.3.1Open dumps**
2. 2. Open dumps are uncovered sites where solid waste of all kinds is dumped. The waste isn't processed, it's left out in the open, and it's not separated. It's a breeding place for disease-carrying flies, rodents, and other insects. Rainwater runoff from these dumps contaminates adjacent land and water, causing illness to spread. Open dumps are being phased down in several nations. Garbage is strewn about and transformed into a cell. When the landfill is full, the area is covered in a thick layer of mud, which allows the property to be developed as a parking lot or park. Landfills have a slew of issues. In landfills, all forms of waste are placed, and when water seeps through, it becomes contaminated.

Fig -1: Open dump

Problem with open dumping

- Dumping in the open spreads a bad odour.
- Open dumping contaminates groundwater and takes up an unnecessary amount of space.
- Dumping in the open harms vegetation and wildlife habitats.
- Open dumping pollutes rivers, lakes, and streams, and poses the following health, safety, and environmental risks: There was a fire and an explosion. Toxic gases are inhaled.
- **1.3.2 Landfills**

• Landfills are typically found in urban areas where a big volume of waste is created and must be disposed of in a public location. It is a pit dug in the ground, as opposed to an open dump. The waste is deposited, and the pit is covered to prevent flies and rodents from breeding. Each day, a layer of soil is thrown on top of the rubbish, and some mechanism, usually earth-moving equipment, is employed to compress the garbage, which now forms a cell. As a result, rubbish is dumped every day and transformed into a cell. The area is covered with a thick layer of mud after the landfill is full, and the location can then be developed as a parking lot.

Fig -2: Landfills

Problem with Landfills

It causes Ground water poluution, Soil pollution, Leachat problem.

- **1.3.3.Sanitary landfills**
- A sanitary landfill, which is more hygienic and developed in a methodical manner, is an alternative to landfills that will solve the problem of leaching to some extent. These are constructed on impermeable soil and lined with impermeable materials such as plastics and clay. Construction of sanitary landfills is quite expensive, and they come with their own set of issues. According to certain authorities, the plastic liner frequently fractures as it reacts with various chemical solvents included in the trash. In

sanitary landfills, the rate of decomposition is likewise quite variable. This could be because the rubbish is compacted so tightly that there is less oxygen accessible. Some biodegradable materials, it has also been discovered, do not decompose in a timely mnner. Another significant issue is the formation of methane gas, which occurs when there is minimal oxygen present, such as during anaerobic decomposition. Methane produced by sanitary landfills is tapped and sold as fuel in several countries.

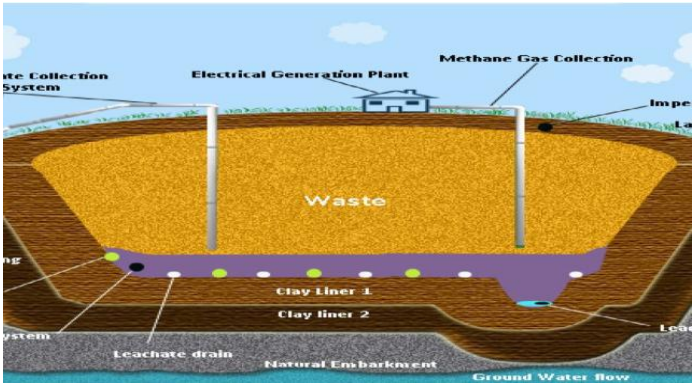

Fig.3 Sanitary landfills

Advantages And Disadvantages Of Sanitary Landfill

Advantages Of Sanitary Landfills Include

• There are various advantages to sanitary landfills. Burying has the major benefit of providing energy, which can be obtained by converting landfill gas.

• Sanitary landfill waste materials can either be burned directly or indirectly converted into another fuel.

• A sanitary landfill is a controlled environment where garbage can be disposed of.

• Once the sanitary landfill is finished, it can be reclaimed and repurposed as parks or farming land.

• Garbage can be treated before closure, and all recyclable items can be disposed of in properly constructed hygienic landfills.

• Organic waste can also be separated from a well-built sanitary landfill and composted or used to produce natural gas.

• The natural gas or methane released by decomposing materials underground can be recovered in sanitary landfills.

Disadvantages of sanitary landfills include:

• Landfills that are improperly built or operated face the same problems as uncontrolled dumping sites.

• The environment in the vicinity of dumps gets severely polluted.

• Landfills harm the environment by polluting the air, water, and soil.

1.4 Classification Of Solid Waste

The solid waste is classified into following categories:

Household Waste: This category includes kitchen waste (fruit and vegetable peels, food waste), garden garbage, plastic, paper, cardboard, metals, and technological waste, among other things. Paper, plastic, wrappers, metals, technological goods, and any other debris that is sitting on the roads make up

Street waste.

Waste from public dumpsters is referred to as municipal waste. Industrial Garbage: Industrial waste is made up of plastic, paper, textile waste, metals, electrical waste, and packing waste, among other things.

Electronic garbage, often known as e-waste, refers to abandoned electrical or electronic gadgets. E-waste includes used electronics that are meant for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal. In under developed nations, informal e-waste processing can have negative health and environmental consequences.

Hospital.-The waste comes from the hospital is called hospital waste

Fig.4 : Classification of Solid Waste

Agricultural Waste : The garbage Agricultural waste is waste that results from agricultural activity. This consists of Manure and other waste from farms, chicken houses, harvest waste; fertiliser run-off from fields; pesticides that enter water, air, or soils; and salt and silt drained from fields are all examples.

Hazardous Waste: A hazardous waste is one that has characteristics that make it unsafe or capable of harming human health or the environment. Liquids, solids, gases, and sludge are all included.

Commercial waste : All solid waste created by businesses engaged in business operations other than manufacturing or construction is referred to as commercial waste. Heavy loads of timber, concrete, bricks, tile, rubble, metal, plastics, plasterboard, cardboard, and paper are commonly used.

Construction & demolition waste: Any construction/demolition activity, such as building roads, bridges, flyovers, subways, renovating, and so on, generates construction and demolition debris. Concrete, plaster, metal, wood, plastics, and other inert and non-biodegradable materials make up the majority of it. A portion of this material is disposed of in the municipal waste stream.

1.5. Composition of municipal solid waste

The composition of waste is influenced by a variety of factors, including eating habits, cultural customs, climate, and income[1]. Food waste, trash, commercial garbage, institutional waste, street sweeping waste, industrial waste, construction and demolition debris, and sanitation waste are all examples of municipal solid waste. Compostable organic materials (fruit and vegetable peels, food trash), recyclables (paper, plastic, glass, metals, etc.), dangerous chemicals (paints, pesticides, used batteries, pharmaceuticals), and soiled garbage are all included in municipal solid waste (blood stained cotton, sanitary napkins, disposable syringes)[2].

Combustible materials include papers, plastics, yard trash, food waste, wood, textiles, disposable diapers, bones, leather, and other organics, while non-combustible materials include glass, metal, and aluminium[3].

1.6 Innovative idea to deal with the garbage

1.6.1 Vellore Model

The Vellore C. Srinivasan (Project Director) management system's best buddy and helper are cows, cocks, frogs, and worms. So, what makes that special? Srinivasan's Garbage to Gold initiative is the ideal solution for the twenty-first century. He put all of the above-mentioned creatures to work doing the work for which they were formed by nature, and he did so without expecting anything in return. All animals in the Srinivasan Vellore Model work 24 hours a day and do not expect to be paid. Everyone's task is predetermined by the model, and they complete it according to their schedule. Ducks and chickens begin working early in the morning, while frogs and maggots are assigned to night duty (worms). They all work 24 hours a day, seven days a week to turn rubbish into gold[9].

Srinivasan is a solid waste management expert who transformed the concept of rubbish into gold. According to him, waste may be transformed into a useful resource that can also earn money using source segregation techniques. For the same reason, he created the Vellore Paradigm of Zero Waste Management, a waste management model (ZWM). He assigns Cows, Cocks, Frogs, and Worms to consume the daily waste garbage, such as veggies and other eatable garbage, and then converts this waste into a usable resource via excreta, which can also create cash. Let's go over each of his ideas one by one.

- **The world's fastest way to make 100 natural fertiliser:**

This, according to Srinivasan, is the world's fastest technique to make fertiliser. According to Srinivasan, no machine or other procedure can produce such a fertiliser in such a short period of time. Fielding and farming benefit greatly from this fertiliser. According to him, if fertiliser is generated using the bacteria technique, it will take 45 days to produce a complete fertiliser, however in this procedure, pure fertiliser can be produced in less than 72 hours utilising vegetable market trash at a low cost[9].

- **Uses other animals for this process:**

Non-edible substances that are harmful to cows Srinivasan disposed of them in the compost pile, where maggots will emerge. The hens' preferred meal is maggots. The next morning, they devour maggots and lay additional eggs. However, Srinivasan understands that chicken will not function at night, so he assigns frogs and worms. Srinivasan had the ideal solution for his job and knew exactly who would be working for him at the moment[9].

How he used Ducks for this process:

Srinivasan's Vellore Model feeds leftover or thrown-away stinking fish from the fish market to ducks. The Municipality is having a hard time dealing with the leftover fish, but the ducks love them. Every three hours, his guys gather those fish from a fish market location and place them in front of ducks. They consume the entire fish in just 15 minutes. Ducks lay 8-10 eggs per month under normal circumstances, however due to their preferred meal, they lay 20-24 eggs each month. It sounds fantastic. He used to have 11 female ducks and one male duck in his operation since more females lay more eggs.

This is how Srinivasan extracts gold from nature without having to invest a lot of money. For this procedure, he just makes clever use of the raw materials to build something that would normally take a long time to make[9].

1.6.2 Tata Institute of Social Sciences technique

developed by Dr. Sharad Kale a scientist at The Atomic Research Centre he said the canteen at the data Institute Tata Institute of Social Science in Mumbai generates waste while cooking food Just like other canteen some food is left over or goes stale. While most conteens hand over the waste to the municipality this canteen saves it, biogas plant has been installed at the backyard of the canteen. The leftover food is put in the plant after some processing. The conteen uses the gas produced from the left over food to cook food again the name the of this plant is NISARGARUNA which means repairing the debt of nature it's profitable too the technique used to assemble this plant has been developed by Dr Sharad Kale a scientist at the Bhabha Atomic Research Centre said **"What You Call Waste This Is Not, Infact Not Use In Dictionary As Waste, The Word Waste Doesn't Exist, Everything Born On Earth Has A Purpose**". **About The "Nisargaruna"** The Biogas Plant Be Installed At Mumbai Tata Institute Of Social Science: They get about 500 kg of garbage which contains leftover food fruit skin the small parts of vegetables. We have disposed off be put all of that in a mixer it produce Methane and the left over material comes out as manure. The 500 kg of waste going in will which give you at least 40 to 50 kg is of manure (composting and you will also get at least 20 kg is of Methane Gas.

2. ABBREVIATIONS

MSW	Municipal Solid Waste
WTE	Waste to Energy
SWM	Solid Waste management
PPP	Public Private Partnership
5 R's	Refuse Reduce Reporpuse Reuse Recycle
KAP	Knowledge, Attitudes, And Perceptions

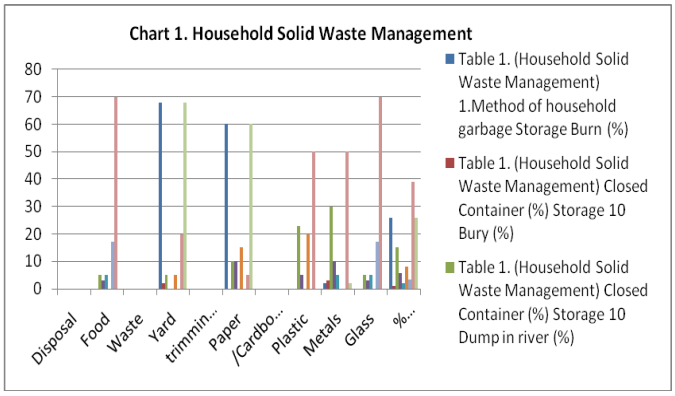

Chart -1: Some respondents (10%) store the majority of their household garbage in a closed container, while others (20%) keep it in an open container, the majority (40%) in plastic bags, and others (30%) pile garbage in the yard.15% of those polled said they usually dump their trash in bodies of water.Concerns.

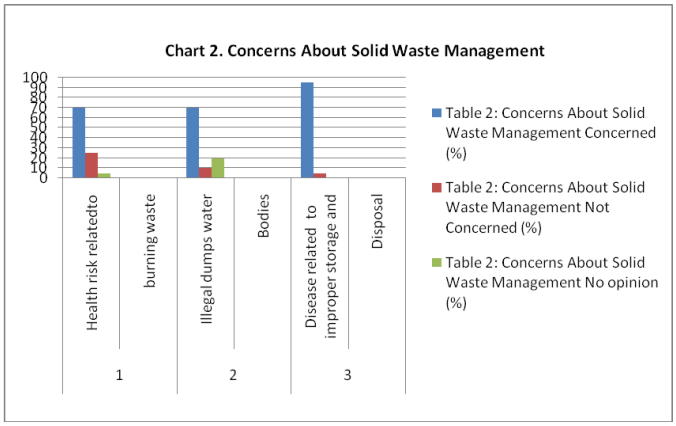

Chart -2 The majority of respondents expressed concern about the issues of solid waste management. Only a small percentage of respondents (8%) were unconcerned about the health consequences of garbage burning..

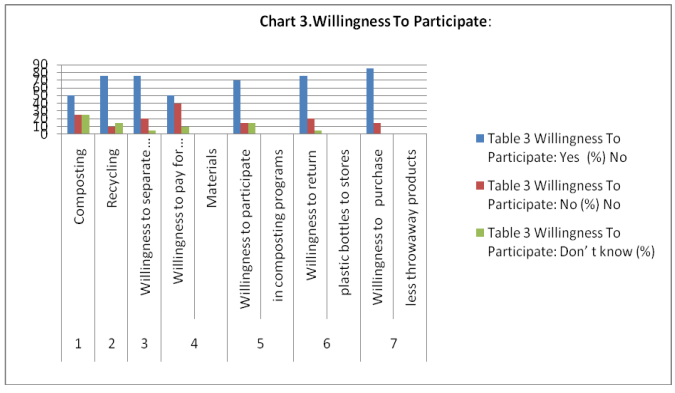

Chart -3: Willingness to Participate

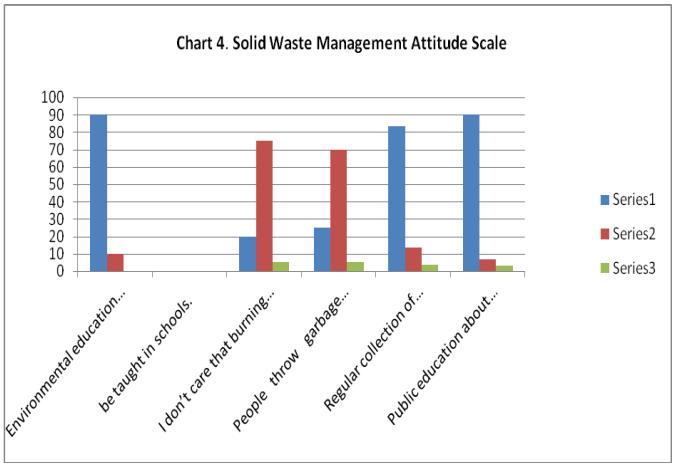

Chart -4: Solid Waste Management Attitude Scale

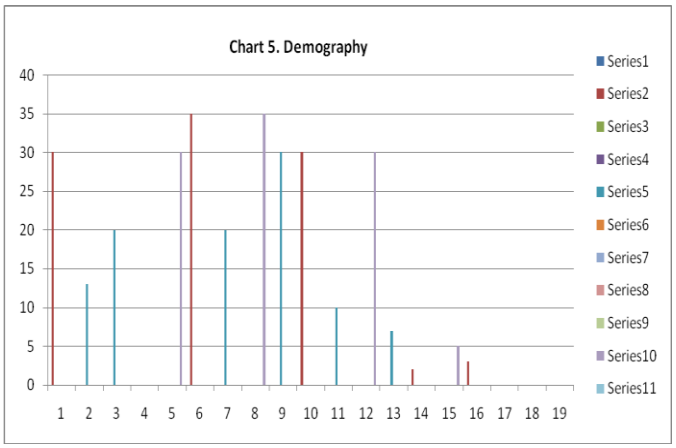

Chart -1: Demography

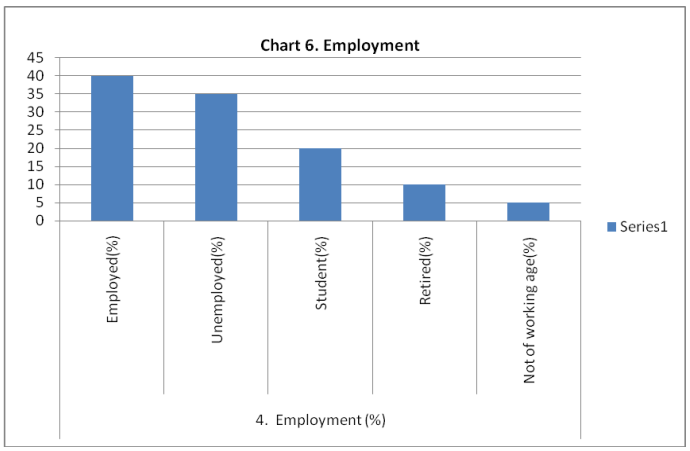

Chart -6: Employment

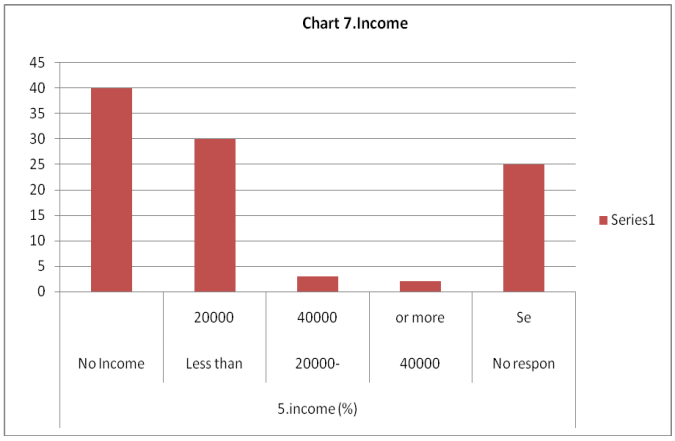

Chart -7: Income

3. CONCLUSIONS

In conclusion of this work i found that we already have very good solutions to deal with the problem of waste. Some of the methods of composting are vermy composting and pile composting which are the best method ever. Some of the innovative ideas for wet waste are discussed in this paper are bacteria and flies method, and vellore model are best solution for reducing the problem of mountain of garbage in our city. The preparation of compost at home for disposal of household waste is also the one of most important step towards the solid waste management .due to this method will definitely reduce the solid waste issue. Composting machine is one of the solutions for those people who really don't have time to manage the solid waste. One of the another best idea for wet waste management for canteens of any institute where the waste is generated in a large quantity is "NISARGARUNA Bio Gas Plant which installed at Mumbai Tata Institute Of Social Science" This method is used in commercial areas as well as domestic purpose. Some modern techniques have also emerged which shows the main role to get rid of the plastic problems, but even after all this, mountains of garbage are growing in cities it's because of unawareness and careless behavior of people which inspire me to pursue and continue this study to find satisfactory answer to my question that is why is it so.

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