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WASTE MANAGEMENT IN INDIA - A CASE STUDY OF DUROGREEN, AHMEDABAD

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ABSTRACT

In 2018, After Diwali, schools were closed in all the locations near by Bhalsva in Delhi region. Reason was little blasts in landfill areas of Bhalsva and heavy air pollution resulted in discomfort for complete Delhi region. After a call to the nation for "swatch Bharat abhiyan" by PM. Multiple campaigns were launched all over the India time to time. But is it really possible to keep clean India from the waste? We may keep our offices, houses, flats etc clean internally but finally the question arises in front of municipal corporations is how to dispose of this waste coming in many forms?

There are some technical solutions available than question marks of how to get rid of the waste generated by we people. Sweden is having recycling policy for 428 kg waste generation per person; do we have any policy related to this? This paper tries to evaluate the waste management solutions given by an Ahmadabad based proprietary firm name Durogreen. Indigenous solution to the Indigenous waste management by an engineer turned entrepreneur, who is selling a make in India product through social marketing approach.

KEYWORDS: *Waste Management, Durogreen, Social Marketing*

INTRODUCTION

Out of the sun family its only planet earth which is having life and incredibly rich in all sense. But in last few decades it seems to be the planet of disasters. Disaster is not something new to us as in Indian mythology we are familiar with word "parlay" which means disaster in English. Interestingly in some of the mythological books it is mentioned that the next "Pralay" would be due to water or so!!! But the most visible disaster we are facing today is due to continuously growing volume of waste in both the production and consumption of goods and services.

There are nearly 7 billion people living on this planet, In the last forty years the population of the world is nearly doubled and still growing continuously without interceptions. Out of which 132 crore are from India. Fortunately or unfortunately we have limited natural resources which are likely to use efficiently. But we don't, a rapid changing climate is affecting our everyday life. Resources like petroleum and minerals are depleting. Our future generation is also going to be affected by it sooner or later

We are facing a problem of fast growing population due to reduction in mortality rates and good medical services. Due to this India are in the end of second phrase of demographic stage of population. It is a situation where a larger individual consumptions, a demand for goods and services which starts an industrial base and a herd of waste generators.

Bitter Reality of Waste Generation-

In the world there is 1.3 billion metric tons of MSW is generated per years expected to increase to 202 billion tones by 2025.the major fact is that the maximum increase is coming from developing countries. out of which 420 million metric tons of MSW suitable of enerkem technology platform. If possible then it is having potential of 160 billion liters or 42 Gallons using enerkem.

About 27.8 % of India's total population of more than 1 billion (as per Census 2001) lives in urban areas. The projected urban population percentage is 33.4% by the year 2026. The quantum of waste generated in Indian towns and cities is increasing day-by day on account of its increasing population and increased GDP. The annual quantity of solid waste generated in Indian cities has increased from 6 million tons in 1947 to 48 million tons in 1997 with an annual growth rate of 4.25%, tentatively 16 crore ton by 2030 and it is expected to increase to 300 million tons by 2047 (CPCB, year?). The annual population growth rate of India is 2.15 % and GDP growth rate is 9.3% (RBI, 2006).

Today only the Delhi, Mumbai, Kolkata and Chennai are producing 1 billion ton waste every year. As per the reports of International solid waste association, India is ranked 3rd in waste generation after USA and china. It is expected that to keep waste in dumping yards we need 1240 hectare land every year

There are total 33 waste to energy management plants in India and 275 megawatt electricity is produced out of it. Still 5 plants are on trial basis. Demand for energy only in Delhi last year was 66.5 mega watts.

Under Swatch Bharat Abhiyaan in 2016, ministry of urban development received 53 proposals from 22 states who are interested in producing energy in their state from waste. The general estimation is 405 mega watt electricity out of it.

How the Waste is Generated?

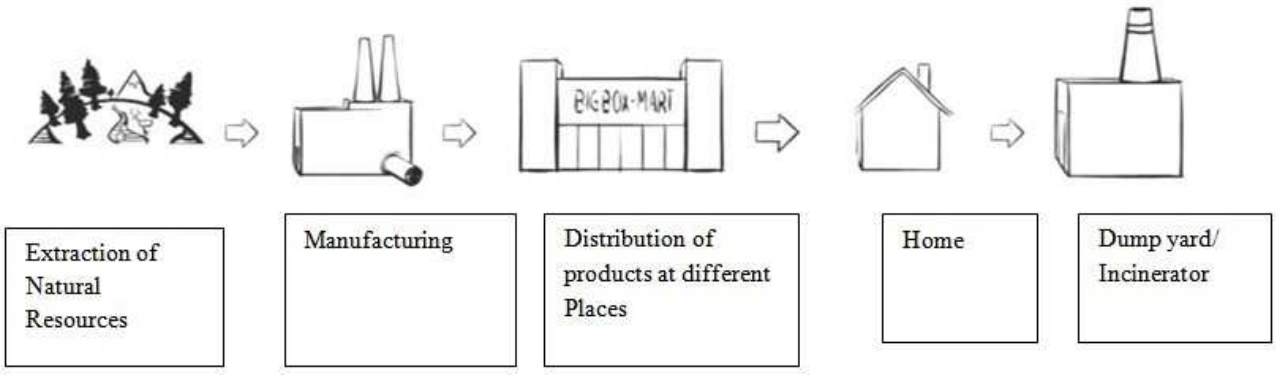

Figure 1: Source-Author's Conceptualization

Waste generation is basically a process. Everything comes from nature in the form of resources and goes to the environment finally like humans do. Made of panch tatva and finally after crimination dissolution to the panch tatva!.But unfortunately man made and demanded goods and services also hit like boomerang but not in a positive form. The general procedure of waste generation is as below-

Many of the firms find opportunity of capitalizing the waste generated out of the above way They offer new and remanufactured product in the market and also generate profit from recycling of these waste. Today we find some individual firms who are attempting or go green concepts reuse component with an environment friendly approach.

Types of Waste-

In every country there are multiple types of wastes on the basis of extraction-

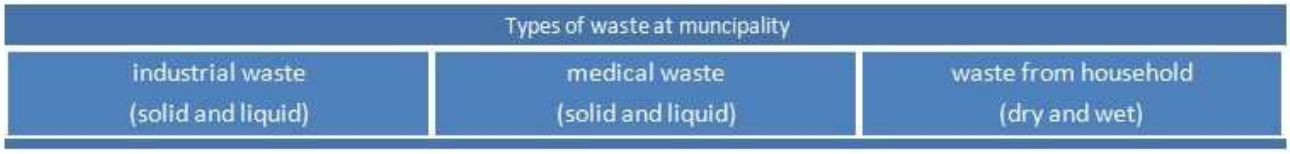

Figure 2

The term municipal solid waste refers to solid wastes from houses, streets and public places,

Shops, offices, and hospitals, which are very often the responsibility of municipal or other governmental authorities. Traditional waste generation is

Figure 3: Flow of Waste Generation in the House Hold

Solid waste from industrial processes are generally not considered "municipal" however they need to be taken into account when dealing with solid waste as they often end up in the municipal solid waste stream. Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the health and the environment. Traditional way of waste collection in municipality is to collect through

- Ø Carts
- Ø Tractors with trailers
- Ø Refuse collectors
- Ø Dumper placers
- Ø Container carriers

Some of the vehicles like dumper placer and container carrier are not functional due to mechanical problems. The spare parts for these two types of vehicles are not available as they are of foreign make and the municipalities does not have adequate budgetary provision to procure the spare parts from abroad. The tractors are very old and need replacement. Bull carts are meant to access those lanes that are inaccessible to larger motorized vehicles.

In last few months local municipalities in Gujarat are changing their way of waste collection. Now a day's no open bins are kept anywhere in residential areas after declaration of swatch bharat. Now a day's only municipal carriers came and collect the waste directly from houses, societies, flats, offices or anywhere else. Later on it is disposed to the dump yards.

Problems in General Due to Waste

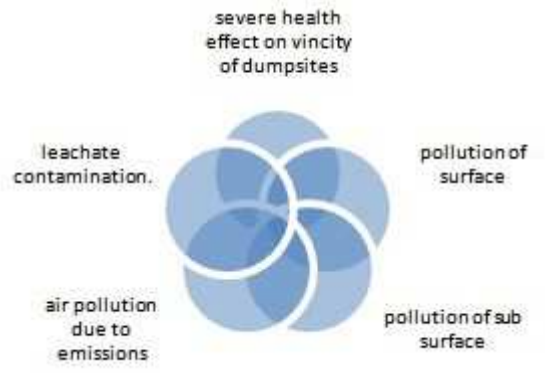

Figure 4: The Vicious Circle of Problems

Problems Due to Waste Generation

In India we have majorly two types of house hold waste i.e. dry waste and wet waste.

The Dry waste is easily Recyclable as it contains card boards, woods, plastic, glasses and aluminum etc which can be separated and this type of waste as we can see often already being taken care by different recycling agencies, Rag pickers etc and is recycled partially. wet waste is more important and critical as it contains sanitary waste, vegetable peels, fruit peels, rotten vegetable and fruits, leftovers, seeds, used tea bags. Egg shells, coffee powder filters, used flowers, leaves after puja, floor sweeping dust, meat and non veg food leftovers, bones, mops and their sticks, mats, bottle of pesticide and what not! In India some companies are working on dry waste but wet waste is generally dropped to the local municipality limits.

Generally the wet Waste mixed with dry waste is thrown into the dustbins creating foul smell and nuisance on the streets and the mixed waste goes to the dump yard.

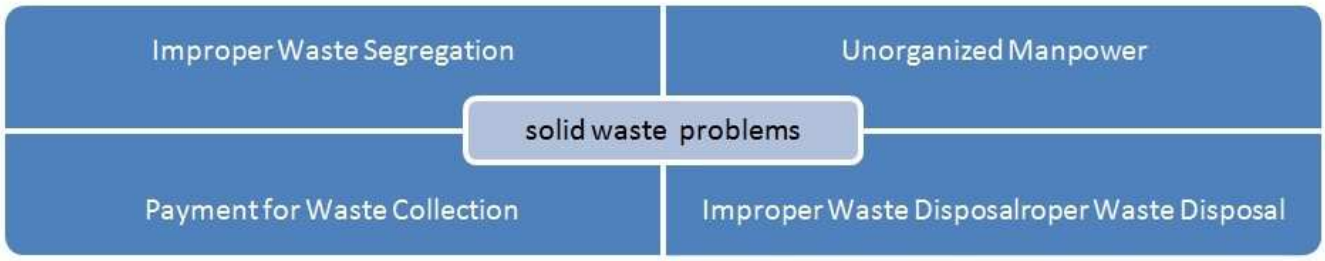

Figure 5: Solid Waste Management Problem at Municipalities

Problems with Municipal Solid Waste

It contains low efficiency of labor, inadequate recourses, and high cost of dumping and passive approach of society too which multiplies the problem of waste management. In Ahmadabad, approximately 110,667 metric tons (MT) of solid waste is generated from the city monthly. Out of which 51.7 % is municipal bin waste, 24.5 % is from door to door, 11 % from commercial markets, 0.2 % from fish and dead animal, 1.4% from hotels and rest is from C&D.

LITERATURE REVIEW-

In 2001, Fleishmann et al mentioned a reverse supply chain network with four levels i.e. Plants, warehouses, consolidation centers and lastly the customers. In Europe Pepsi and coca cola are using this reverse chain of collecting their empty bottles of coke. Even quelle is doing the same to collect mineral water bottles back from the customers. On the one hand it is helping customers financially as they get p-fund for a bottle which is adjusted to their new purchase and on the other hand company collects their old bottles so they need not to spend more money on purchase of new bottles. They simply clean it and refill it. It is a good option in case of bottled brewages. But in there are other types of waste too.

In year 2008, Atasu, sarvary and van wassenhove mentioned in their research that market segmentation is having identical valuation for both the manufactured as well as the remanufactured out of the waste. Sometimes both of the products compete against each other and due to first time use the new product wins the trust of the people or gets the competitive advantage. During this research it was found that some fashion shows are particularly organized for clothes made out of recycled product. Even in exhibitions but the product line is limited to gift cards, greeting cards, wall hangings, calendars or sometimes table accessories but nothing more than that comes out.

Lessons from Sweden are really important. A country with population of 96 lakh generating half of its electricity which is sufficient for lightening 2.5 lakh houses is out of waste. Recently it asked for the help from rest of Europe as the waste to energy machinery needs waste which is no more available in the country. It generated electricity from 461 kg bottles and cans which is comparatively bright and as good as other renewable energy is. Only 1 % of waste is used for landfills. Last year 17 lakh electric equipments were recycled. 49% of total electricity demand is generated out of waste because 3 ton of this separated waste contains energy equivalent to 1 ton of fuel. The daily expenditure on this waste management is only 41 Rs per day per person. There is a heavy tax levied on fossil fuel in Sweden.

RESEARCH METHODOLOGY

Research problem- Can the household waste be managed?

Research design-

Population – infinite

Sample size – 1

Study- Single sample study

Type of research – exploratory

Why Durogreen?

Durogreen is a company which is proprietor firm in nature and owned by Nishank shah. Nishank, a mechanical engineer from GTU, a MBA from EDI, Ahmadabad. During his project work of MBA final year he visited IIMA for waste audit. There he saw food waste board where every day wastage was recorded. This ignited him to do something related to waste management. Particularly the houses hold waste.

During his pre research he found that maximum wet waste is coming out of the households due to individual consumption. Industries are having very strict norm for their waste disposal and it is generally 15 to 22 percent only. The medical waste is also not much but the bulk of waste is generated by individuals in form of consumption of goods and services in 24*365*n. it ignited him to work for waste management of household.

Hi formed a proprietorship firm named Durogreen, in Ahmadabad in 2014 after some trial and error in other fields. The mechanical Engineer designed the concept of zero waste with reverse engineering

How Durogreen is Making a Difference?

Zero Waste means designing and managing the products and processes systematically to avoid and eliminate the volume and toxicity of waste and materials by conserving and recovering them to the maximum level possible.

Durogreen is presently catering to 3200 households with this system all over India and Treating 2 ton/day of wet waste which is equivalent to 262tons/year. The firm already deployed 320 units all across India. Durogreen is a SOP Driven firm which works in an organized way.

Recycling of more than 30000 plastic bags collected from Labors and sent to recycling with simple concept of cloth bags. Ward Level projects, villages & minimizing the waste as much as possible.

Role of the Durogreen

The firm Targets Waste Free Residential, Institute, Organization, Campuses, Industries, villages etc. . .

- •Durogreen only deals into municipal solid waste
- •Managing and treating the waste at source

- • Uses the TIC theory T=Transform I=Innovate C=Collaborate
- • Executes and train People for making places waste free.

Decentralized Solid Waste Management Approach?

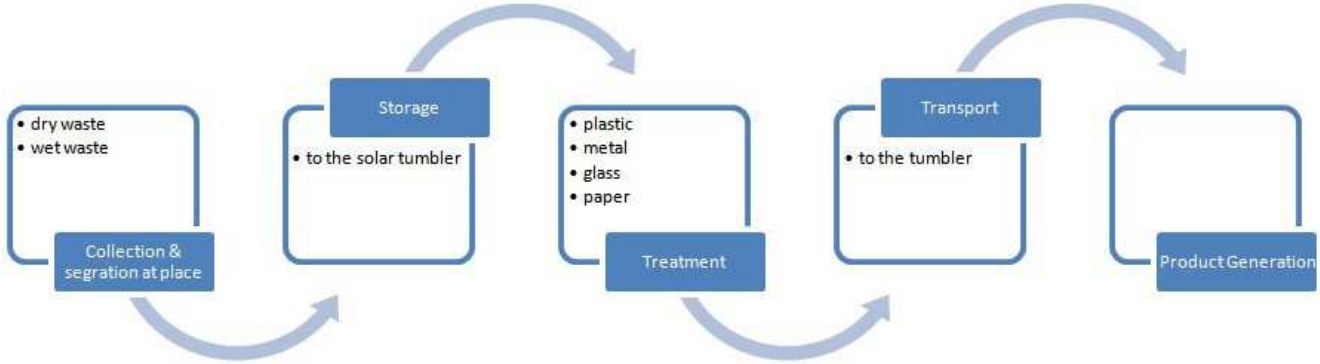

Figure 6: Approach towards WM at Durogreen

During the process the first step is the most important i.e. segregation of dry and wet waste. The labor is trained in such a way that it separates the waste at the point of collection. In fact company gives one container with two compartments where the dry and wet waste is directly collected from the house hold. Addition of 10 Kgs of Food waste Daily + Dry Leaves + Bio-culture is added in the Tumbler (The mechanical Engineer designed it himself with reverse engineering) and rotated nearly 6 times a day Then a bio culture is mixed to it(company denied to name it due to secrecy). The Tumbler is emptied at the 7th day and kept in the vermi-bed.The waste will remain there for next 20 days and then after sieving the manure is obtained. Finally two product are ready out of it- manure and vermin compost. Both of the products will be given to the household from where the waste is collected!!!!

For 50 houses only 250sqft place is needed to plant one tumbler, one composite machine and one vermibed. For dry waste it is even less i.e. 100sqft.vermibed is suggested little far away from the residential area.

Project Executed by Durogreen Till Date

For this work Nishank, the founder owner of Durogreen, met many people in different areas and make them under-stand about the concept and its benefits. Sometimes people do not believe him so he did it on take or leave basis. But an effort does not go to vein. Finally people started co-operating him for this notation. Firm executed corporate project with syntax industries in year 2015.

Residential projects done 4 Mills Segregation of waste was done with 700 Labor Colony,300 Staff Colony, 14 Canteens, mess, 2 Wards of 1000 Houses, Guest houses with a capacity of Waste Generation 1 Ton/day (Mix Waste). Later on Savvy Swaraaj Township with 676 houses. in 2015, Sumadhur Society, Ahmadabad was approached.The Society Consisted of 33 Households 250-400Sq Yard houses. Few Commercial projects done at ‘shapath 4’, in Ahmadabad and at apple global school Ahmadabad.

Contribution to the Society by Durogreen in Last 4 Years

- Ø Recycling of 60% of the waste at the premises itself rest 40% was dumped. It resulted in reduction of surface pollution by 20% in the city.
- Ø Crushing & Storing of Dry leaves instead of Dumping because a Tractor full of dry leaves if crushed and weighed would reduce to 40 kgs approximately which is hardly 3 Cement bags.
- Ø • The Revenue from Dry Waste was generated as it was sold in open market @ Rs. 5 per kg. Rather than municipality was spending for managing the leaves through dumping or digging in the ground.
- Ø • Generation of Manure which is generally sold to the houses, offices, flats or societies to pour in the plants @ Rs 30 per kg. They happily accept the price as it was made out of their own waste.
- Ø • A Systematic approach to Treatment of Waste at source through social marketing.
- Ø Energy consumption is next to zero as tumbler is working with solar energy. So more usage of traditional high cost energy and other expensive equipment
- Ø • Automatic segregation of Biomedical Waste is obtained so proper disposal of sanitary pads, Injections etc can also be done which was a challenge to the municipality earlier.
- Ø All this reduced efforts, costs and man power of can be now used to maintain other activities.
- Ø Easy to handle as it is simple in design
- Ø Daily 5 min's per day is required for turning the tumbler
- Ø Tumbler is emptied after every 7 days.
- Ø Partial digestion happens within 7 days itself. Only 15 days to convert waste in to manure that too at the door step.
- Ø Transportation of Waste Every 7 Days results in Savings in transportation Cost which is approximately 0.85Rs/kg
- Ø Saving on purchase of black bags for waste disposal which is required daily.
- Ø Saving on replacement of plastic 80ltr bins every year.
- Ø A clean, hygienic environment to live in with zero waste.

Future Scope of this Concept

It can be used at a grand level as the unit can be installed Terrace, Ground Floor or even Basement. Company is planning to take some Ward Level projects, villages, Educational Institutes and Minimisation the waste as much as possible.

CONCLUSIONS

There are so many problems associated to waste management. The biggest constraints with the municipalities are deficiency of funds for disposal of all the type of wastes. This

Financial crunch for infrastructure facilities and management is for the local, state or central government. Meanwhile the system is self efficient in managing the funds for all the type of waste, it is recommended to explore alternative arrangements for management of waste by involving private operators like Durogreen who are not doing it for money but for the benefit of society.The public–private partnerships approach can be a good solution in developing countries where government is not having enough funds so citizens are contributing in managing the problems. Durogreen is one them who did it with a decentralized distribution but societal marketing strategy.

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