International Journal of Scientific & Engineering Research, Volume 4, Issue 3, March-2013
ISSN 2229-5518

A Case Study on Management of Municipal and Domestic Waste

Author: Mayuri Runwal

***Abstract*— We hereby present you our work on municipal & domestic waste. It is the project where we aim to control the waste through 100% utilization and to provide new business policy whose benefits are not only money but clean and healthy environment also.**

Municipal & domestic waste can be controlled by implementing a system where contractors will be appointed ward wise between Public (source) & Government to deal with the waste material. Collected material will be separated into bio-degradable, glass, metal, plastic, paper and cloths. This would be sold to the industries like textiles, plastic, metal and fertilizer as a raw material which in turn would process into new finished materials or products. Thus, a new door of employment opens for the people to earn money for their waste.

A case study is also carried out to verify the feasibility of this concept. We have presented waste analysis, cost analysis of Fertilizer, Plastic Industries and small scale Textile developer.

I. INTRODUCTION

A typical solid waste management system displays an array of problems, including low collection coverage and irregular collection services, crude open dumping and burning without air and water pollution control, the breeding of flies and vermin, and the handling and control of informal waste picking or scavenging activities . These public health, environmental, and management problems are caused by various factors which constrain the development of effective solid waste management systems. Taking this into the consideration, a business model is develop here whose basic objective is to earn healthy environment around by creating key human resources, supporting strategic planning and follow-up implementations, developing self-financing schemes, and raising awareness of the public.

II. PRESENT STATUS OF WASTE MANAGEMENT

Municipal Solid Waste Management (MSWM) is a part of public health and sanitation, and is entrusted to the municipal government for execution. These systems exist in most of the urban centres since last few decades. However, these systems have yet to emerge as a well-organized practice. At present the standard of solid waste management is far from being satisfactory, the systems are facing lot of problems due to population explosion Based on the recommendations of the committee set up by the apex court in that Public Interest Litigation (PIL), the Government of India has framed Municipal Solid Waste (Management and Handling) Rules 2000, under the Environmental Protection Act, 1986. The Municipal Solid Waste (Management and Handling) Rules 2000 are as follows:

□□□□□Collection of municipal solid wastes

Organizing house-to-house collection of municipal solid wastes from houses, hotels, restaurants, office complexes and commercial areas, fish markets

□□□□□Segregation of municipal solid wastes

In order to encourage the citizens, municipal authority shall organize awareness program for segregation of wastes and shall promote recycling or reuse of segregated materials.

□□□□□Storage of municipal solid waste

Municipal authorities shall establish and maintain storage facilities such that wastes stored are not exposed to open atmosphere and shall be aesthetically acceptable and user friendly and it should have easy to operate design for handling, transfer and transportation of waste.

□□□□□Transportation of municipal solid wastes

Vehicles used for transportation of waste shall be covered and waste should not be visible to public, nor exposed to open environment and shall be so designed that multiple handling of wastes prior to final disposal, is avoided.

□□□□□Processing of municipal solid wastes

Municipal authorities shall adopt suitable technology or combination of such technologies to make use of wastes so as to minimize burden on landfill.

□□□□□Disposal of municipal solid waste

Land filling shall be restricted to no biodegradable inert waste and other waste that are not suitable either for recycling or for biological processing. Land filling of mixed waste shall be avoided unless the same is found unsuitable for waste processing.

III. BUSINESS MODEL

As can be seen from the above guidelines, collection and segregation of municipal solid waste is a primary requirement for implementation of MSW Rules 2000. Primary collection of garbage is important to prevent littering of waste on the streets. As per the MSW guidelines, waste has to be collected in segregated form so that it can be recycled to the extent possible by adoption of suitable technology. This recycling will minimize the burden on landfills. Our model follows same guidelines.

System to be lead is exactly as per the existing system of paper business. Where people sale their waste paper to a dealer and dealer thereafter forward to a company for

processing & reutilization. Same way municipal & domestic waste can be controlled by implementing a system where contractors will be appointed ward wise between Public (source) & Government to deal with the waste material. Collected material will be separated into bio-degradable, glass, metal, plastic, paper and cloths. This would be sold to the industries like textiles, plastic, metal and fertilizer as a raw material by contractor which in turn would process into new finished materials or products. Thus, Industrial collaboration will be the main source of income for the overall investment. Initially government will also need to invest some money as it is investing for the development of clean surrounding and each and every citizen can become the employee of this project and can earn money for his waste. In this way, a new door of employment opens for the people to earn money for their waste. Poor people can also find a way to get their bread and butter.

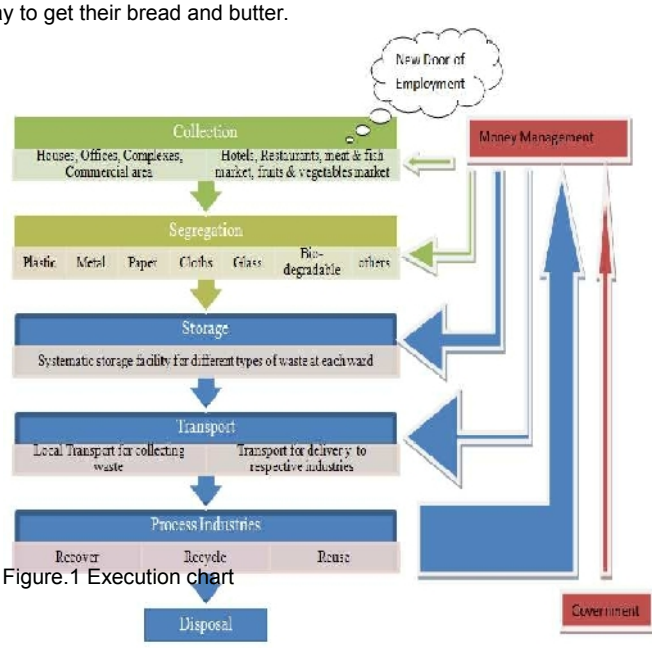

Figure.1 Execution chart

IV. CASE STUDY

By following the basic strategy explained in above business model, a survey has been carried out to study the feasibility of this concept

Steps till disposal

1. People will store the waste as per as possible in segregated form.
2. Contractor will collect it from people after a value on unit (Kg) basis.
3. Contractor then will sale it off to respective processing plant.
4. Plant will then process and reproduce the product which will be easily consumable in that area.

This process is already been working on Metal & Glass products. Local Government will appoint contractor as per ward who will collect the waste from people and dispose off as per the system implemented. Bio degradable waste will be sold to Bio- energy plant or for Fertilizer Company. Plastic, Glass, Metal, Cloths will be sold to respective processing company.

Basic Requirement

1. Investment on Appointing Contractor (Contractor appointed ward wise).
2. Setting Plastic processing industry in area outside the town.
3. Land outside the town for storing the waste till it gets sell out.
4. Public awareness about sorting the waste in different parts as plastic, food, metal ,etc
5. Timely medical treatment on the staff that will collect the waste from source.
6. Plants of all types of processing within 20-30km area like fertilizer industry, small scale cloth developers etc.

A. *Government Investment by today*

Information below is obtained from Niphad Municipal authority.

Table.I Government investment for Niphad town

Cost Element	Amount in Rs.
Maintenance cost	1000 per month
Labour	3000 per month
Number of Labour	28
Total Cost	85000

Population of Niphad is 20000 and area is 1053 sq.km..So, government is investing about Rs.85000 per month. Whereas results are not as effective as investment is.

Industrial Collaboration with Processing Plants

Here we are presenting some concluding numbers and the way to handle waste from the survey of Fertilizer, Plastic Product manufacture, small scale Textile developers whose basic source is only Municipal Solid Waste.

B. *Fertilizer Plant*

Kitchen waste can be disposed off at 3 levels namely Household, Colony, Town.
Procedure:
Procedure of fertilizer manufacturing is very easy and also feasible for individual to process.
Take 7 pots/tanks, fill 25% soil (black), add culture & start filling the pots daily by kitchen waste. Each pot will be named days of the week. After that plant a tree in that or can use the fertilizer for other plants.
Cost: Culture cost Rs.1000 per 1 cubic meter..
Merits:
No insects, smell, or any side effects.
(Note : Collected Waste of City can also be supplied to bio electricity generation plant. E. g Nasik city have such plant & some % of waste is already been supplied to plant . Same procedure can be followed by other cities also)

Table. II Cost analysis of Fertilizer Plant

Cost element	Amount in Rs. (per kg)
Land	0.5
Investment	0.5
Collection Cost	1
Labour	s
Raw Material	4 to 5
Total Cost	7 to 8
Sale Value	10-15

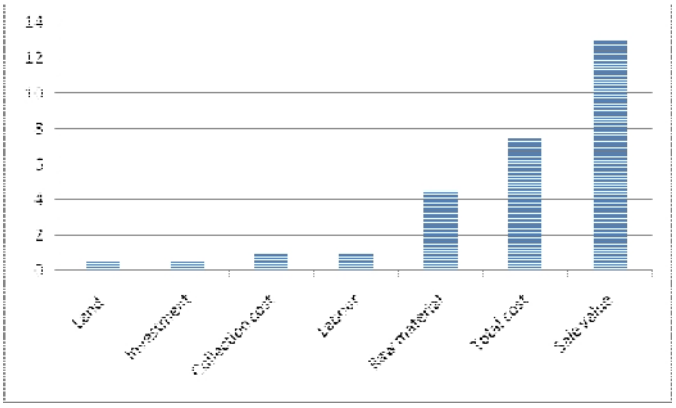

Figure.2 Cost analysis of Fertilizer Plant

The Bar above shows the profit we can get in this business by todays date so if some of this profit is invested on purchasing waste material according to developed strategy then it will be good choice to implement this project.

C. *Plastic Product Manufacturing*

Almost all types of plastic waste can be processed and reused. If we set a plastic industry within 20-30 km area and reprocess plastic waste of that area for consumable product of that area then the problem of waste utilization of that can be solved & usable product can be made available to people at reasonable rate.

We visited one plastic industry which reprocess plastic & produce Oil & Water Cans as the oil consumption is more in that area. We have collected sample of raw material, Processing plastic & Finished Product. They also manufacture semi raw material which can be reprocessed and molded to produce any other product. Table. II shown below gives an idea of cost management

Table. III Cost analysis of Plastic Product Manufacture

Cost element	Amount in Rs. (per kg)
Raw material	1
Labor	2
Manufacturing cost	8
Interest	0.25
Other cost	1.75
Total Processing cost	12.5

Figure.3 Proceesing of Plastic Waste
How waste plastic material is reform into oil drum is shown in Figure.3.

D. *TEXTILE DEVELOPER*

Waste Clothes can also be reused to make mattresses & bed sheets & ropes. There are some of the handlooms which work on it, that to at reasonable cost.

We visited one handloom which work on it and collected sample of their product and also pictures of their machine.

Cost of machine: Rs.10000/-
Sale value: Rs.90/- for one single bed sheet.
Rs.10/- for one rope of 10 meter
Rs.180/- for double bed sheet
Raw material: free of cost
Labour wages: Rs 3000 /month/person

One person can make approximately 4 double bed sheets so, profit for one month will be

Profit = (180*4) 30– 3000 = Rs. 18600

It shows that pay-back period for total system is less than one month.

V. *BENEFITS*

Social

1. Improving social standard of workers by providing training and financial stability.
2. The community is made aware of the consequences of unscientific waste throwing and can participate actively.
3. As the citizens are also involved in the project they develop a sense of belongingness.
4. People appreciate the service and consider it as necessary and essential. This makes the project self-sustainable.

Economic

1. City's image as a "green and clean" city can boost local economy especially in tourism branch
2. Creates new avenues of employment
3. Composting of organic matter and recycling of paper, glass, plastics and metals yield productive outcomes and reduces burden on landfill site
4. Government don't need to appoint any people to clean Public area & Roads.
5. Government can save the money which they are investing on maintenance of cleanliness.

Public Health and Life Quality

1. Waste is handled in a hygienic and scientific manner, so no pollution is caused at any stage
2. As people will get worth value for their waste so they will avoid throwing out.
3. Garbage on the roads is tremendously reduced
4. Drains are no longer clogged with garbage – no smell, no breeding site for malaria spreading mosquitoes, no meeting place for pigs and other stray animals.
5. Problems of diseases arisen from waste Materials can be solved automatically.
6. Quality of life improves as the whole city looks clean and aesthetic

VI. *SUPPLY AND DEMAND BALANCE*

The main source of income for this project to implement is the industries which are taking the waste as raw material for product development. These companies will be the main financial supporter. As we are being contractor, will be buying waste, the volume of waste will be more than municipality collection of today. Initially support of government is very necessary for finance. We may find gold in this waste.

We have not yet arrive with the results that how much waste we can collect from particular area and how people will respond to this change but if well organized, we will be successful in waste business also.

VII. *FEASIBILITY*

This shows that the model is not only a convincing theoretical concept but also a successful intervention in the field of Municipal Solid Waste Management.

We can all help out when it comes to waste management and recycling products. It may not seem effective to recycle products as a household, but put all those households together and you will produce a result. It is each person's responsibility to do what they can to conserve resources, reduce landfill volumes and produce new materials using less energy Deciding to recycle is a simple step and surprisingly easy to start.

Conclusion

From the analysis of three different small scale companies working with waste material, we can say that waste management can be a profit making business.

With help of government policy we can also make it as Public sector open for employment of people and for development of clean environment for society.

Our research is inclined towards resource management instead of waste management which will ignite responsible citizen of today to be a part of clean and healthy environment around.

References

http://envfor.nic.in/legis/hsm/mswmhr.html
http://www.epa.gov/epaoswer/non-hw/muncpl/reduce.htm

http://staging.unchs.org/bestpractices/2006/mainview.asp?BPID=1500
http://en.wikipedia.org/wiki/List_of_solid_waste_treatment_te

chnologies
http://ec.europa.eu/environment/waste/weee/index_en.htm
http://www.epa.gov/rcraonline

http://www.3rkh.net
http://www.recycling.com
http://www.biosanitizer.com
http://www.biobin.net