NIRMALA NAGARAM NIRMALA BHAVANAM– A MODEL FOR DECENTRALIZED AND COMMUNITY BASED SOLID WASTE MANAGEMENT SYSTEM

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ABSTRACT

The realization of sustainable solid waste management is a major challenge for local governments today. Unplanned rapid population growth in both the urban and suburban areas has resulted in serious infrastructural problems making conventional solid waste management practices difficult to implement. Furthermore, many developing countries suffer from challenges like inadequate government funding and capacity, higher initial costs and operation of conventional systems, failure in the creation of new transfer stations and dumpsites, limited community awareness and resulting illegal waste dumping and pollution, etc. While dealing with the issue of waste management. When solid waste management services are not provided or accessible, the responsibility to manage solid waste becomes the responsibility of individuals. The irony is that though every responsible person seems to be worried and anxious about environmental degradation, a meaningful solution is nowhere in sight. It is here that the Mahatma's concept on 'decentralization' becomes a means and hope. The article presented here attempts to highlight the application of a Decentralized Social Engineering approach in Municipal Solid Waste (MSW) management system that has been practicing successfully across the Alappuzha Municipality for the last few years.

***Key Words*:** *Decentralization, Municipal Solid Waste management, Bio-methanation, Nirmala Bhavanam, Nirmala Nagaram*

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Introduction

Man's progress and the road to development have led to the deterioration of nature. In his quest for fulfilling his needs, he has exploited nature to its maximum. In the words of James Mc hall, the human being has become the most dangerous organism that the planet has ever hosted. In developing countries with poor service provisions and a lack of solid waste education, most individuals rely on burning or illegally dumping their solid waste as their management strategy. The results of these practices can be extremely harmful to both human and environmental health including: toxins leaching into the soil and groundwater supplies, build up of waste causing flooding, increased air pollution from burning etc. . A sustainable society has to aim at working in partnership with nature and conserve resources and energy, reduce wastes and avoid degradation of renewable. It should produce goods that are easy to recycle, reuse and repair after use. Hence, resources should be utilized prudently and the basic need of people is to be met without any serous detriment to the environment. In this context Gandhiji's thought, shall always remain relevant for the smooth global development.

Waste management is one of the major issues faced by almost all the Local self Governments in our State. Collection, transportation, stocking etc of waste, especially the bio-degradable waste, is a headache to the authorities. The non segregated waste gets dumped in the yards makes any recycling impossible and poses threat to health security of the state. Solid waste is a mixture of organic and inorganic waste generated by domestic or commercial activities. By source solid waste can be categorized as per the table below:

Table-1: Sources of solid waste and rate of generation

Sl. No.	Source	% to total
1.	Household Waste	49
2.	Hostels, Marriage halls, Institutions	17
3.	Shops & Markets	16
4.	Street sweepings	9
5.	Construction	6
6.	Slaughter house, Hospitals	3

(Source: Malinya Mukta Keralam - Action Plan, 2007, Govt. of Kerala)

By composition, solid waste in Kerala can be classified as follows

Table-2: Composition of Solid Waste

Sl. No.	Component	% to total
1.	Biodegradable	71-83
2.	Paper	3.5-5
3.	Plastic, rubber, glass, metal	5-9
4.	Inerts, earth, domestic hazardous	4.9-11.5

(Source: Malinya Mukta Keralam - Action Plan, 2007, Govt. of Kerala)

The best and ideal solution for solid waste management is to process the bio-degradable waste at its source itself. The domestic bio-degradable waste can either be composted or put to bio- methanation. The chemical and physical characteristics of our domestic waste are conducive for composting or bio- methanation. Family type Bio-gas plant is an ideal solution for managing domestic waste. It has an added advantage that the gas produced in bio-gas plants can be used for cooking. The slurry is good manure, which can be used in the kitchen garden for producing organic vegetables. Considering the hike in the cost and shortage of LPG & vegetables, the biogas plants will be of great relief to the families in particular, and the State of Kerala in general.

The Concept& Campaign

Alappuzha is a coastal Urban Local Body that has the highest population density in the state. The population of Alappuzha as per 2011 census is 197029. As in any other Urban Local Bodies, Alappuzha has been maintaining a centralized waste management plant in a suburban area for more than a half century. Many wards in the municipality are low-lying, wet lands and hence water logged. This throws more challenges to the Municipal Solid Waste management system. Since the waste that reaches the yard is non- segregated, only a fraction of the bio- degradable waste could be composted. The quantity was too high to manage also. The dumped waste started creating environmental and health hazards and the

local inhabitants started agitations demanding closure of the plant. It was at this stage, the programme "Nirmala Bhavanam – Nirmala Nagaram" was initiated in Alappuzha Municipality. As the name of the campaign itself suggests, the strategy of the campaign is to make the homes clean and thus the streets and town. This campaign is aimed at encouraging decentralized waste management and is based on the concept of integrating decentralized systems within urban planning initiatives and centralized waste concepts. This allows communities to meet their needs and micro-manage their solid waste while ensuring it meets the larger waste management strategy.

The campaign aims at promoting Municipal Solid Waste management at source. The strategy is to install either composting units or bio-gas plants at houses to the maximum possible extent. Initially the project started in one ward and later it has been extended to 12 wards. An appropriate project proposal for these 12, including the first one, was formulated and got it sanctioned by Government. Integrated Rural Technology Center (IRTC) Palakkad and ANERT have been identified as the technology participants as well as implementing agencies for the project. The project sanctioned by Shuchitwa Mission, Government of Kerala and by ANERT. During the course of the implementation of the project, Municipal council decided to extend the project to whole of the urban local body and submitted a project proposal to Government of Kerala. Considering the success of the campaign at the experimental phase, Government of Kerala has sanctioned the project for decentralized MSW management in Alappuzha Municipality.

The pilot project sanctioned for the 12 wards is on half the way mark and the project for the rest of the wards is in its initial phase of implementation. Soon on starting the pilot project it has been realized that only a harmonious blend of the social engineering aspect and appropriate technology application can solve the Municipal Solid Waste issue. Trough propagating the social engineering aspect of Reduce, Reuse and Recycle (3 R's), the campaign adopted a sub slogan, "Valicheriyatha Manassukal; Maalinyamillatha Theruvukal" (The minds that do not litter, make waste free streets). During the initial stage strategies like art and cultural proclamation marches, Water and Sanitation clubs in all schools, house campaign by National Savings Scheme Volunteers, mass cleaning involving neighborhood

groups and students police corps etc have been taken to propagate these messages down to the masses.

The Municipal Solid Waste management at source through Bio-methanation and composting at house hold level together with the change in the mind set of the people have brought down the quantity of waste coming to streets. By the turn of this year, the quantity of MSW transported to Sarvodayapuram plant has come down to 5-6 Tonnes per day. With the onset of monsoon this year, the local people resisted bringing even this much MSW to sarvodayapuaram plant and it has been closed down. Instead of getting shocked and paralyzed by these turn of events ,in the strength of the confidence created by Nirmala Bhavanam, Nirmala Nagaran campaign, Allappuzha municipality decided to put the segregated domestic waste to aerobic bin composting with the technology participation of Kerala Veterinary and Animal Science University , and Kerala Agriculture University. Some fifty Aerobic composting bin units have already been installed and the people are moving slowly to the habit of handing over the segregated domestic waste to these units. Municipality is planning to construct 200 aerobic bin clusters in the nooks and corners of the town so that the households that do not have enough space and money to install Municipal Solid Waste management systems can put their domestic waste for composting near their houses. The Municipal contingent workers have become the supervisors of these Aerobic composting Bins. The technology up gradation in MSW management is getting reflected in the status and working conditions of the employees as well. Three of the pilot project wards, Kidangamparambu, Karalakom and Karukayil wards achieved the**"Sampoorna Shuchithwa**" (Total Sanitation Status) status since Eighty percent the households in these wards have installed either bio gas plants or pipe compost units.

The roadside Aerobic Composting Bin Cluster situated near Y M CA junction in Alappuzha is a new experience in the field of waste disposal. WATSAN (water and Sanitation) park at Vazhicherry is a site for the live demonstration of the technologies adopted in the project. Various bio gas plants and composting techniques are demonstrated at WATSAN park. This park was designed by the Kochi – Musaris Binale Team. The ambience and atmosphere of aerobic bin clusters and WATSAN Park are no more nauseating as of the waste processing

yards. The commuters are taking shelter in composting clusters on rainy time. The energy savings in this project is mainly through two ways. One is the through the bio gas production and the other is from saving the diesel for the treks transporting the MSW to the centralized plant at Sarvodayapuram.

Altogether, 874 Portable biogas plants, 290 Fixed Biogas plants and 1234 Pipe compost units have been installed in Alappuzha Municipality up to the financial year 2013-014. These plants generate biogas equivalent to 70894 domestic LPG cylinders annually. The non subsidized price of this comes to Rs100/kg. The calculations are based on the assumption that a 1 m3 portable plant shall generate bio gas required for 1.25 hrs burning in an 8 cubic feet (cft) burner per day and a 1m3 KVIC model shall produce bio gas required for 3hrs burning in an 8 cft burner per day. The average capacity utilization per day is taken as 80%. The bio gas generated in these plants is equivalent to 568793 kgs of fire wood and 101511 litres of kerosene. This results in reduction of 834.24 Tonnes carbon foot print which is considered as criteria for assessing the impact of such projects.

Conclusion

Kerala is a rapidly growing economy in which the sectoral share of agriculture is either stagnant or decreasing and the share of service sector is sky-rocketing. It has got the highest per capita consumption in the country and this will definitely increase the state's waste load. Unless it is managed scientifically through the blend of social engineering solutions and appropriate technology applications, the waste load and the resultant pollution will adversely impact the quality of life that have been achieved through decades. A viable solution has been evading and hence the state and society have been in the dark on management of municipal solid waste. Nirmala Bhavanam Nirmala Nagaram throws a ray of hope in which the waste is converted to wealth by generating fuel and manure from it. It is needless to re assert the need for adhering to the principles of Reduce, Reuse etc. Though environmental problems have surfaced largely in the post-Gandhian era, let me conclude by repeating Gandhiji's famous quotation. ***"The earth has enough resources for our need, but not for our greed."***

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