Rajagiri Journal of Social Development
Volume 10, Number 2, December 2018

Development Practice

Zero Waste Kerala: An Innovative Model for Waste Management in India

Caroline C. Neriamparampil*

Abstract

Increased urbanisation and the subsequent growth in population have made waste management a social issue that raises serious concerns. The grave environmental and health hazards of waste to society became the burden of city administrators across the globe. To address this issue effectively, a close cooperation is needed between government, the private sector and citizens, especially in developing countries. Recognising the importance of waste management concerns across the globe, waste management was the focus at international level in the Millennium Development Goals 2015 and further in Sustainable Development Goals 2030. In this context, this paper discusses the waste management programme initiated in Kerala, the southern state of India, with a special focus on the three "R" principles of waste management – Reduce, Reuse and Recycle. The Suchitwa Mission's initiatives such as green protocol, swap shop and zero waste project for the 3R principle is also discussed in the article.

Keywords

recycling, waste, green protocol, resource recovery

Background

Scientific management of waste dates back to the late 1960s. Until then, nobody had control over waste disposal. With this, waste dumped in open spaces was exposed to varied chemical processes and subsequently impacts on the environment emerged. This has brought serious environmental and health hazards to societies across the globe. Rapid urbanisation

* Dhanya 1st Floor, 5th Avenue, Kaloor-Kadavanthara Road, Kaloor-682017, Kerala, India. Email: caroline.msw@gmail.com

accelerated waste generation and people started finding it difficult to manage. Hoornweg and Bhada (2012) report the status of solid waste generation globally to be about 1.3 billion tonnes per year and it is expected to reach about 2.2 billion tonnes per year. They detail further that in South Asia alone approximately 70 million tonnes of waste is generated per year, with per capita values ranging from 0.12 to 5.1 kg per person per day and an average of 0.45 kg/capita/day.

Across the world, solid waste management is an issue. As reported by Madinah (2016: 57–58) "there are increasing waste generation rates due to population growth and changing lifestyles of people. Municipal services in most cities and towns are already over-burdened and simply cannot cope with the growing demand owing to inadequate capacity, insufficient manpower and materials, resulting in unhygienic and filthy living conditions in the neighborhood". Madinah again alerts the developing countries to the need for close cooperation between government, the private sector and citizens to deal with municipal solid waste management. Failure to do so is often characterised by inadequate coverage of services and economic growth coupled with population growth and increased environmental and economic burdens.

Recognising the importance of waste management concerns across the globe, waste management was a focus at the international level in the Millennium Development Goals 2015, ratified by the 189 countries at the United Nations Summit in the Millennium Summit in September 2000. Although not mentioned explicitly, it implied improving waste management. The seventh goal was aimed at ensuring environmental sustainability (UN, 2013). Since it is found that waste management needs a continued focus, it is also followed in the Sustainable Development Goals 2030. Goals number 6 and 11 seek advancement in sanitation and waste management. Goal 6 aims for access to sanitation and water. It advocates improving the quality of water by reducing pollution, open dumping and the release of hazardous elements (United Nations Organisation, Sustainable Development Goals, Goal 6, n.d). Goal 11 also gives priority to waste management, emphasising building sustainable cities and communities. This goal foresees that urbanisation will place demands on the supply of fresh water, public health, sewage and a livable environment. By 2030, it seeks to reduce the impact on the environment and provision of universal access to a city which is inclusive, accessible, and safe and with green public

spaces. It also pays attention to municipal waste management. (United Nations, Sustainable Development Goals, Goal 11, n.d).

In this context, the present paper discusses the waste management programme in the Indian state of Kerala with a special focus on the three "R" principles of waste management – Reduce, Reuse and Recycle.

The Evolution of Waste Management Programmes in Kerala

In India waste management falls under the authority of local self-government institutions and is regulated by the municipal solid waste management rules. Fast growing urbanisation and the uncontrolled growth rate has added to the inability of local bodies to address waste management effectively. Joshi and Ahmed (2016:4) refer to the planning commission's report that "377 million people residing in urban areas generate 62 million tons of municipal solid waste per annum currently and it is projected that by 2031 these urban centers will generate 165 million tons of waste annually and by 2050 it could reach 436 million tons". As reports presented in the study indicate, no municipal corporation follows a systematic action plan in which segregation, collection and processing of waste is undertaken. To have a successful waste management policy, it is inevitable to have an approach with environment friendliness, cost-effectiveness, and acceptability to the local community. The study also highlighted the need for establishing organised recycling facilities and the upgrading of rag-pickers for the solid waste management process.

Since the early 2000s, the urbanisation process has shown steady growth in Kerala, the southern corridor of India. This has resulted in a change in consumption patterns as well. Along with these, the behaviour of society has also changed, which has in turn stimulated the generation of solid waste, particularly of municipal solid waste. It became a challenge for city administrators that waste generation had gone beyond the management's capacity. Universal Eco Services (n.d.) defines waste management as an essential service of municipal and local government authorities. On average, 6,000 tons of solid waste is being generated across Kerala, in its 999 Panchayats, 53 Municipalities and 5 Corporations. In India, the practice is that waste management has linkages with waste generation, its primary storage, collection (primary and secondary), transportation, recycling,

treatment and disposal. Generally, municipal corporations play an important role in managing these phases.

With the increase in waste generation, the state's capacity for collection, transportation, disposal, reusing and recycling of waste has declined. As a result, the state was confronted with several public health concerns. It was felt that there was an urgent need for planning and implementing a comprehensive system conducive to the socio-economic conditions of the state. The Suchitwa Mission was the result of the state's sustainable approaches and models for the management of waste. It was set up in 2008 for designing the state's waste management strategy. The Suchitwa Mission was formed as a technical wing of the Department of Local Self Government, Kerala. Until then, it was responsible for implementation strategy, providing policy support in sanitation and waste management. As a technical wing, it provides inputs for cities, municipalities and panchayats in sanitation and waste management programmes. It provides leadership in implementing different waste management initiatives, enabling Kerala to create sustainable alternative models for waste management, requiring the people to have a segregation approach from the source level itself.

Wilson et al. (2013: 64) suggest that "for a successful Integrated Solid Waste Management Programme, it is necessary that solutions need to be developed locally and tailored specifically to local needs and conditions". Attempts were made in Kerala, considering the socio-economic and environmental conditions. As a result, a sustainable learning process was initiated in Kerala with the leadership of the Suchitwa Mission.

With the experience of providing leadership to different waste treatment plants in Kerala, the Suchitwa Mission shared a valuable lesson with other parts of the country: Without segregation, waste management is almost impossible and is expensive and futile. Various plants, even the waste-to-energy plants across the country, have failed for this reason. It is here that Kerala is taking a lead. The segregation concept is gaining success here. It was the result of planning and advancement through different phases.

Reduce, Reuse and Recycle: The Three Basic Waste Management Principles

From the experience of waste management, Kerala uses three successful principles, i.e. Reduce, Reuse and Recycle. These are the basic principles

for doing so. Together they will help to cut down the expense of waste management. Vadiwala and Vaghani (2015) point out that the significance of integrated solid waste management systems in recent years has increased due to the growing population and that problems of waste management were affecting the daily lives of people and impacting on the environment. Implementation of the 3Rs will have a profound socio-economic impact. Also the modern 3Rs strategy acts as a sustainable and socio-economic option for solid waste management and is concerned with better resource efficiency.

The first principle of the 3Rs is to "Reduce". The best way to manage waste is to reduce the quantity of waste being generated. Promotion of products with less packaging is best, which we can do. It needs attitudinal change. The reduction of waste generation will surely decrease the burden on collection services and the facilities for treatment and disposal. Vasuki (2015) points out that shop smart first and foremost, buy and use less is the basis of the "reduce principle". The second principle is "Reuse." It promotes people using utilities for the maximum duration. Using old clothes and utilities again and again, and using a reusable cloth bag for shopping can be some of the viable options. The third principle is "Recycle". Recycling is the conversion of materials, which are of "no-use" into useful materials. This can reduce raw material consumption and energy utilisation. Moreover, it reduces the expense of the disposal of waste.

The Suchitwa Mission's Innovative Experience in Three "R" Principles

Green Protocol for Waste Reduction

An analysis of waste management programmes will reveal that "disposables" are the culprit of waste management programmes across the globe. The Suchitwa Mission's innovative experience in waste reduction primarily focuses on cutting down the use of disposables. The Green Protocol is the mission's innovative strategy in promoting natural resources and discouraging the use of disposables. It is essentially a set of measures implemented for the reduction of waste, with due focus on preventing the use of disposables by encouraging alternatives such as glass/stainless steel/ porcelain cutlery. Vasuki (2015: 36–37) comments that the " biggest challenge in implementing green protocol is the use of disposable materials as they

cause the generation of mixed waste, which can neither be composted nor recycled. Currently, this type of inert waste forms 30 per cent of the municipal solid waste. Adherence to the green protocol was implemented for the first time by the Suchitwa Mission at the 35th National Games in 2015". The Suchitwa Mission (n.d: 36–37) shares the story of green protocol implementation. It explains that preparatory measures were planned and major activities carried out in this regard. These comprised of provisions for "green welcome, green cordon, green water supply chain, green catering and green messages". These facilities were arranged with the support of volunteers.

Followed by the success of this, it has started gaining attention as a practice. With the support of the Suchitwa Mission, it is being adopted in various functions across the state and is followed strictly by all local bodies and government departments. A few good examples are the Sabarimala pilgrimage, the Attukal Pongala festival, the Sukapuram Athirathram[1], the Malayattoor Pilgrimage[2], the Chief Minister's mass contact programme and the elections to various local bodies. The election and state arts festival in Kannur district went to the extent of even having campaign materials reduced and encouraging purely eco-friendly practices. It has now become a people's movement and, as the result of effective liaising efforts of the Suchitwa Mission, it is being implemented in marriage functions, ceremonies and other events managed by event management companies and auditoriums. The green protocol is also implemented in government offices. The Kerala Rajaya Bhavan is a good example. According to official estimates, about 60 green protocol functions have been organised so far in the Ernakulum district itself. The Suchitwa Mission received an award for the chief minister's Innovative Best Policy initiative for the year 2017.

Swap Shop: An innovative tool for promoting the message of "Reuse"

Swap Shop as a concept was designed to promote the message of "Reuse" in the waste management sector. It aims at building a public system to facilitate the exchange of reusable goods for the benefit of others. The first swap shop in the state was organised by the district administration of Kannur in the Civil Station Kannur. The swap shop was able to collate used clothes,

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1. A festival in Ponnani of Malapuram district.
2. Christian devotional festival takes place in Malayattoor church, Ernakulam District.

books, shoes and other useful electronic items such as televisions and computers.

The public accepted it well and almost 90 per cent of the items collected were taken up in an hour, although it was planned to function for 3 days. The Suchitwa Mission, (n.d.) explains that this swap shop in Kannur takes credit for being the first swap shop in a Civil Station in India. Taking inspiration from this successful model, it has now been extended to all districts in the state as part of the waste management programme. The responsibility of swap shops is primarily taken by local bodies. As a result, swap shops were organised with active public participation in different urban local bodies. Drop facility centres were also arranged so that the public can drop the reusable permissible items. These collected materials are then segregated and put up in swap shops. As of October 2017, there were 16 permanent swap shops, functioning on a monthly or weekly basis and 62 temporary swap shops.

Operationalisation of Green Army, Material Collection Facility Centres and Resource Recovery Facility Centres

The importance of recycling is well illustrated in the works of Fam and Kar (2016). Recycling starts with the collection of solid waste at homes and ends at the recycling industry. The findings of this study are that the collection of waste for recycling facilitates economic growth by saving energy, reducing emissions and reducing the exploitation of natural resources. It helps the poorest groups in society to become sustainable by creating the jobs and income necessary for their social inclusion. Another study completed by Mickael (2016: 1) presented some interesting findings in that "the success of a waste management policy is largely dependent on the participation of the citizen and the citizens have to learn and respect the categorisation of wastes, defined by the managers. The sorting of wastes as per categorisation may increase with the knowledge sorting instructions and frequency of practice sorting". This study also suggests partnerships with the private sector for an effective waste management programme. Another interesting point discussed in the study is that the waste needs to be increasingly sorted at the source, to separate materials that can be recycled and to reduce the amount of waste requiring collection and disposal. The private sector can contribute well in building the capacities of municipal

bodies in terms of solid waste management, particularly for recycling. Co-operation is required among communities, the informal sector, the formal waste collectors and the authorities. Cites like Kanpur, Varanasi, and Agra are good examples of private sector involvement in waste management.

Thus it is clear that a successful waste management programme requires a good segregation system, recycling facilities, community participation and good association with competent private sector players. Keeping these lessons in mind, the government of Kerala has recently designed a sustainable zero waste management programme under its Haritha Kerala Mission launched in December 2016. The thrust of this programme is source-level segregation, the formation of entrepreneur groups for waste collection, collection facilities, resource recovery centres and networking for recycling.

According to the directions of this zero waste programme, every local body is entrusted with the goal of achieving zero waste. There should be well planned systems for different types of waste, suited to the local socio-economic conditions. For the treatment of organic waste, source level devices are being promoted. The Suchitwa Mission, (n.d) advocates the zero waste programme, giving additional importance to non-biodegradable waste. It seeks to develop a system for collection and treatment. Directions were given in a Government Order No.2420 (Local Self Government Department, Government of Kerala, Government Order No.2420/2017, 2017). It advises local self-government institutions (LSGI) to seek expertise from an expert agency, form a collection force named the Haritha Karma Sena (HKS) at community level, establish a material collection facility (MCF) at every LSGI and resource recovery facility (RRF) centres at regional level, from where different categories of waste are processed for recycling. In this scheme, the state government has also provided the necessary mechanism to give professional training to HKS to ensure a steady income so that the system can be self-sustaining. The user fee will be the revenue for their income. Measures are also suggested for the introduction of a viability gap fund from the plan fund of LSGI for an initial one year. The government order (No.3119/2016) further directs that in the case of plastics reaching the resource recovery facility centres, shredding should be promoted as far as possible and the shredded plastics can be used for tarring. The Clean Kerala Company will collect the shredded plastic from the local bodies and this will be supplied to the public works department as required.

Following government directions, the Clean Kerala Company (CKC) is supporting local self-government institutions in the process of the installation of shredding machines and facilitating the exchange of shredded plastics throughout the state. The latest government directive is that the Clean Kerala Company is the competent authority to handle electronic and hazardous waste. LSGI institutions may collect them in the MCF and transfer them to RRF. RRF centres should hand them over to CKC for recycling. In this programme, measures are also suggested for liquid waste management and market waste management. For implementing this innovative mode of zero waste programmes, every local body has to develop a comprehensive waste management plan (CWMP).

The main components of CWMPs are the formation of the Haritha Karma Sena[3], establishing systems for engaging with the Haritha Sahaya Sthapana[4], collection of user fees at household level for dry waste management, establishment of a material collection facility[5], a resource recovery facility[6], establishing swap shops, repair shops, ensuring the presence of community composting facilities, source-level composting devices and pits for the treatment of organic wastes. Other components include the market waste management facilities, liquid waste management facilities, public toilets and institutional sanitation support projects. Communication components may include the training of varied community based organisations, an information education and communication campaign and behaviour change education programmes and the implementation of a green protocol.

According to non-official estimates, 45 LSGIs have already formed Haritha Karma Senas and 74 have their MCF. In the year 2017–18, 286 institutions have also planned RRF. This is an achievement accomplished in only one year. There are institutions which show exemplary performance as well, where successful models already exist. Case studies of Perumbavoor and North Paravoor Municipalities in the Ernakulam District are recognised as good models throughout the state. Both these institutions have HKS, MCF and RRF functioning well. In Perumbavoor, the programme is supported technically by the socio economic unit foundation (SEUF). In

3. A green army at LSGI level.
4. A technical agency.
5. Facility arranged at LSGI level for the storage of dry waste collection.
6. Facility arranged at the regional level for facilitating sorting and recycling.

North Paravoor, Plan@Earth supports the programme. In both places, the HKSs are being used as resource groups supporting other waste management activities, especially for organising campaigns and identifying beneficiaries. A fixed date is marked for collection and the agency uses the service of a bulk messaging service, two days prior to the collections. Every enrolled household is marked with the sticker and households get a pass book as well, which serves as a proof for waste processing. North Paravoor, where the programme has been running for the last two years, has about 45 per cent coverage and in Perumbavoor, where campaigning activities started a year ago, the coverage is about 23 per cent of the population of the local body.

Conclusion

If reduce, reuse and recycle principles and segregation of waste at source are effectively practised, it can solve the lion's share of waste management issues that Kerala faces today. The use and throw out culture that is flourishing at a dangerous pace needs to be addressed immediately. The number of people depending upon disposables daily is skyrocketing. Items used once and then thrown out or disposed of carelessly results in a large volume of scientifically unmanageable waste. It is here that the significance of green protocol and the three R principles comes in. People need to be educated on a large scale in order to make them practice reduce, reuse and recycle principles as routine. Thus, once we address the problem of disposables, the next step is to educate the masses on the source-level segregation of dry and wet waste. Mixing up the two leads to the failure of any scientific waste management system. Kerala has some good examples like Vilappilsala showcasing the after-effects of the mixing up of biodegradables and non-biodegradables. The long-lasting hazardous impact of non- biodegradables, if unscientifically managed, should be made clear to all. When encouraged to practice source level segregation they can be motivated to practice source-level waste management. Some coercive measures like the strict implementation of existing laws against littering / dumping of waste in public places, forest areas or water bodies will also help tremendously. In order to elicit all these behaviour changes in the public, a variety of target-oriented information education communication campaigns are needed in Kerala. With the launch of the Haritha Kerala

Mission, the goal of attaining zero waste is made achievable. The state administration is hopeful and this programme is its way of producing a change-inducing process. This is going to be another trendsetter model from Kerala after Kudumbashree's Kerala model of poverty eradication.

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