GREENING KERALA

The Zero Waste Way

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ZERO WASTE CITIES ASIA SERIES

Thiruvananthapuram, India

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The Zero Waste Way

Dry leaves collection facility is placed around Trivandrum city to prevent burning in public places and to procure leaves for use in aerobic bins. The collected dry leaves will then be shredded, compressed, and taken to aerobic bins in various wards for composting. © THOMAS VARGHESE

Thiruvananthapuram (also Trivandrum), the capital of the State of Kerala, India is a swanky metropolis known for its cultural charm, sacred temples, and mesmerizing beaches. In 2011, the city was in the eye of the storm when the city's only municipal dump yard at Vilappilsala was forced to shut down following local protests over the mismanagement of the waste in the site. Facing public pressure, Thiruvananthapuram Municipal Corporation (TMC)[1] has introduced a decentralised system for waste management, which later resulted in a successful model where waste is neither burned nor buried. The decentralisation in Thiruvananthapuram offers an excellent lens to understand the implementation challenges, politics of priorities, and the roles of different stakeholders in the road towards zero waste.

AN ENABLING ENVIRONMENT

Kerala Suchitwa Mission

With each passing year, the quantum of waste that is being generated is increasing, while our capacity to collect, transport, and dispose the waste is going down. As a result, cities, especially those in developing countries are drowning in their own waste. This, in turn, has serious impacts on the environment, public health, and the economy. There is an urgent need to

find approaches and models of waste management that are affordable, sustainable, and most importantly, replicable and scalable.

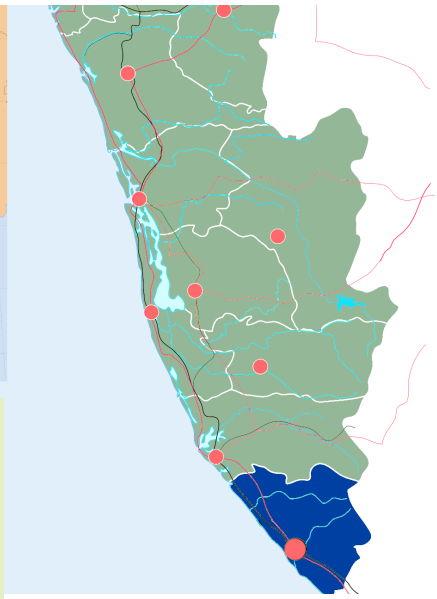
The state of Kerala has done important work in this direction. In 2008, long before the waste crisis assumed gargantuan proportions, the state had taken leadership to set up 'Kerala Suchitwa Mission' to 'achieve waste-free Kerala with unpolluted environment, public hygiene and cleanliness leading to improved health and general wellbeing, economic gains, better aesthetic surroundings, and overall environmental upgradation.'

However, even after a decade since its inception, waste remains a challenge as well as a priority for the mission. In its most recent campaign launched in 2017 called the 'Freedom from Waste' campaign, the state has reiterated its commitment to waste management and making Kerala a waste-free state through a comprehensive action plan and guidelines.

Under the aegis of the Kerala Suchitwa Mission, TMC has been following decentralised solid waste management and encourages on-site management of biodegradable discards since 2013. Since the closure of the municipal dump yard, the Corporation does not have access to any centralised solid waste management system, landfill or waste dumping yard, making decentralised waste management the only option.

Green Protocol

Green Protocol is an innovative concept by TMC to reduce the use of single-use plastics. This multi-sector initiative started off with a regulation on plastic carrier bags and later expanded to a blanket ban in 2017 that includes non-woven polypropylene bags. TMC has since applied Green Protocol in public events and festivals, replacing single-use cutlery, cups and plates with stainless steel materials. The ban also covers PVC flex banners, bottled water, Styrofoam decorative materials, and food containers. In one of the true tests for Green Protocol, TMC implemented this plastic-free initiative Attukal Ponkala, one of the largest religious festivals in the world in terms of participation of women. Atukkal



Thiruvananthapuram

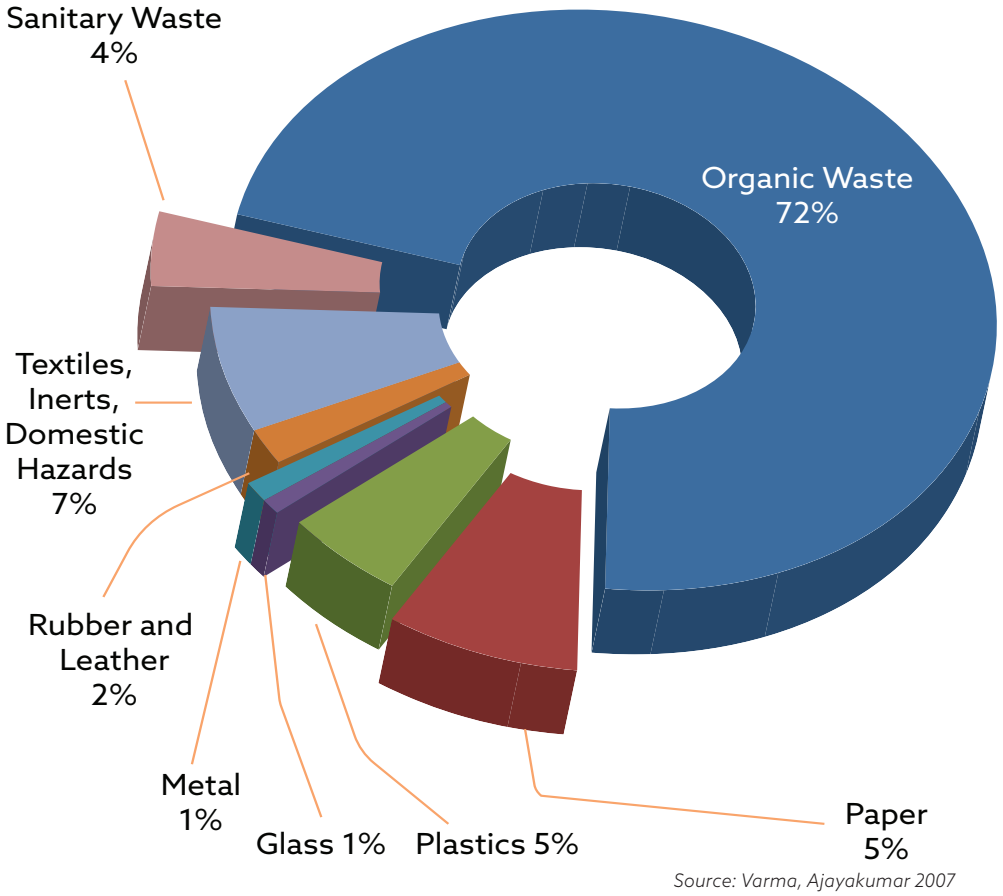
Population: 969,298 (2011)
Land area: 214.86 km^2
Population Density: 4,511/km^2
Waste generation: 0.36 kg/day
Households Sorting at Source: 79.96%
Businesses Sorting at Source: 88.57%

Ponkala draws 3 million women pilgrims every day but leaves behind 400 tonnes of waste. In this year's Atukkal Ponkala, waste was down to just 65 tonnes.[2] Green Protocol has also been observed in Onam Week celebrations, sporting events (Nehru Trophy Boat Race and India-New Zealand T20 cricket match) and swearing-in ceremonies, among others.

PROCESSES

It is estimated that Thiruvananthapuram city generates about 350 tonnes of waste per day. Out of this, about 49% is from households, 11% from commercial centres, 10% from hotels and restaurants, and the rest is from other segments. About 83% of the total waste generated in the TMC is compostable, 11% consists of inert, 7% forms paper, 5% makes for plastics and the rest comprises other dry waste.

Characteristics of Waste Generated



Source: Varma, Ajayakumar 2007

Organic waste comprises 72% of the total waste generated in the city. Under its decentralised system, households are encouraged to manage kitchen and garden waste at home. Bulk generators such as housing societies and businesses, meanwhile, are required to handle their organic waste.

To support these efforts, TMC offered subsidies to households for setting up residential composting and biodigesters or biomethanation facilities. Thanks to TMC's extensive door-to-door campaign, 40% of households are properly managing their organic waste at source, either through individual compost units or cluster-level facilities. Alternatively, households can pay authorized service providers for handling organic waste, or utilise TMC-operated composting facilities. The table below shows a list of solid waste infrastructure in the city that households and commercial establishments alike can access.

Decentralised Waste Management Facilities in TMC

Infrastructure	Units	Capacity (TPD)	Utilization (TPD) %
Kitchen Bins	19000	19.00	**80%**
Bio Bins	109	2.72	**60%**
Biogas Plants	3982	3.98	**60%**
Pipe Compost units	87000	87.00	**50%**
Organic Waste Converters	2	0.50	**100%**
Aerobic Bins	383	11.49	**100%**
Mobile Composting Units	154	4.62	**100%**
Community Biogas Plants	23	23.00	**80%**
Dry Waste Collection Bins	2	0.20	**100%**
Dry Leaves Collection Bins	3	0.30	**100%**
Material Recovery Facilities	44	44.00	**100%**
Resource Recovery Centre	2	10.00	**100%**
Facilities in the Private Sector (Rendering Plants, Farms, Piggeries)	19	150.00	**60%**
Total		356.8	**67.89%**

Community composting facility where residents bring their biodegradable waste © THOMAS VARGHESE

The entire process of waste management is based on the principle of proximity which ensures the least amount of displacement of waste. Bulk generators or commercial establishments, meanwhile, are required to take responsibility for their own waste. Bulk generators include hotels, restaurants, commercial establishments, community halls, and institutions. For residential flats and gated communities, the TMC offered a 50% subsidy for setting up organic waste management in situ.

For low-value non-recyclables such as laminates, households are encouraged to drop them off in TMC collection centres. TMC also organizes periodical collection drives for specific types of non-recyclable discards. The materials will be sent to the authorized recyclers. TMC runs a resource recovery centre which is operated by Clean Kerala Company, a state-owned enterprise that processes low-value plastics for road construction and recycling. The agency is also responsible for managing and processing electronic and domestic hazardous waste.

Further, the Anti-Littering Enforcement Team (ALERT) launched by the civic body ensures that citizens do not litter public places or water bodies. The team functions 24 hours under the watchful eyes of a patrolling squad which comprises officials belonging to the corporation's health wing. The public is also empowered to alert the squad if they come across instances of waste dumping at night.

The information about the Solid Waste Management (SWM) service delivery is also made available to the citizens through the Smart Trivandrum application. Besides providing periodical alerts on collection of segregated dry waste, the app also helps users locate the SWM infrastructure such as the nearest material recovery centre or community composting/biogas plants.

PEOPLE

Governance Structure of SWM

Service delivery has a robust and efficient institutional mechanism to

One of the many types of home composting units in Kerala. © THOMAS VARGHESE

design, plan, implement and monitor solid waste management in the city. The institutional mechanism of TMC comprises four important stakeholders:

1. ***Elected Representatives:*** The City Council headed by the Mayor is on the top of the hierarchy in terms of governance of the City. Standing Committee on Health and Sanitation is again a forum of elected representatives who take care of solid and liquid waste management, and health and sanitation programmes. The standing committee is supported by ward-level (village level) Sanitation and Health Committees which is formed with representatives of local residents, supported by TMC official and headed by ward councilor.

2. ***Officials:*** The city is divided into 25 circles across 4 zones and 100 wards. The secretary of TMC heads the officials of Health wing. The Health Officer (doctor) oversees the day-to-day management of all zones. He is assisted by health supervisors who control each Zone of TMC. Health inspectors assisted by junior health inspectors manage the operations related to solid and liquid waste management, health and sanitation in the circles. There is an army of about 2,000 contingent workers and contract labors to support at the grassroot level.

3. ***Volunteers:*** Volunteers with skill and technical expertise assist TMC in Planning Committee, Technical Support Group, Campaign Cell. Student and youth volunteers support the campaigns through Green Army – a platform for environment education.

4. ***Private entities:*** There are 20 service providers in the city who provide door-to-door services for waste collection, treatment, transportation and disposal.

A resident about to pour kitchen waste to the pipe composting unit © THOMAS VARGHESE

A simple anaerobic digester used in households. In this type of biodigester, waste is fed directly to the digester which then converts it to biogas and slurry through bacterial degradation. The biogas produced is used for cooking, and the slurry is used as soil nourishment.

LEFT PHOTO © SHERMA BENOSA/GAIA
RIGHT © THOMAS VARGHESE

Zero Waste Enablers

Green Army

Green Army is part of the campaign wing of Thiruvananthapuram Municipal Corporation's "My City Beautiful City" project. Many NGOs, volunteering organisations, students, working professionals and retired officials serve as the mentors of Green Army. It is a platform where individuals and groups with similar vision work with school students to educate them about segregated waste management and other sustainable living practices in an urban environment. Green Army provides orientation to school children on segregated waste management, green protocol and disposable plastics to start with. Further, mentors are allotted to each school to guide them further to take up green initiatives in their respective schools. Students are enrolled into Green Army units and they help the school neighbourhood to compost and segregate. Members from organisations like Thanal, Upcycle, Sahridhaya, MAD (Make a Difference), Care Others Too (CO2), Prakruthi, Kerala Shasthra Sahithya Parishad, SARSAS (Save A Rupee Spread A Smile), Green Village, Indus Cycling Embassy, RecycleBin (a group of Architects), Helping Hands Organization (H2O), members of National Service Scheme, National Cadet Corps, etc volunteer as Green Army mentors. More than 100 individuals are active as Green Army volunteers in the city.

Thanal

Thanal is an action research Non-Governmental Organisation (NGO) based in Thiruvananthapuram working for people, the planet, and sustainability.

It focuses on promotion of sustainable resource use and management for ensuring equitable development and toxic-free world. Over the years, Thanal's work has diversified to include work on Zero Waste, clean production, extended producer responsibility, and resource recovery.

Malinya Mukta Keralam (Waste-Free Kerala) is a movement by Kerala Suchitwa Mission, a state government entity under Department of Local Self Government entrusted to conduct awareness campaigns, massive consultative processes for baseline studies, projects and programmes for solving the issue of waste. Thanal is involved in the process and contributed in shaping the processes, programmes, and policy.

Thanal has been instrumental in

2008
Total Sanitation Campaign (TSC), Kerala Total Sanitation and Health Mission (KTSHM) and Clean Kerala Mission (CKM) were integrated to form Suchitwa Mission

2011
Thiruvananthapuram's dump yard at Vilappisala was closed down after protests

2013
Decentralised waste management instituted in Thiruvananthapuram

developing a plastic litter index across many locations in Kerala including along its coast and in Peppara Wildlife sanctuary through the Zero Waste Cities, a collaboration coordinated by GAIA Asia Pacific. Through this programme, Thanal has also supported TMC by conducting home composting awareness sessions across many wards in the corporation. Thanal has also been supporting TMC by conducting capacity building workshops for various stakeholders from time to time. The Zero Waste Fellowship launched by Thanal with the support of GAIA has been providing extended support for Green Army and other city programmes on SWM.

PIONEER

Owing to its high population density, high rates of literacy and growing environmental awareness, Kerala's cities have the right conditions for change. The work in the state, especially in Thiruvananthapuram, to look for alternative models of waste management at the face of adversity are models for the entire country.

Thiruvananthapuram's decentralised model of managing the waste — at source — as far as possible is also the lesson for other parts of the country and the world, where waste-to-energy plants are failing because of the lack of segregation. It is also clear that if segregation is not done, then any effort towards management will be reduced to mere displacement finally resulting in burning or burying. In this situation, segregation at source becomes the imperative of successful solid waste management strategies. This is where Thiruvananthapuram has become a pioneer to treat the waste at its source or proximate to its source. This model of waste management, which incentivizes segregation at source and in-situ management mitigating the negative impacts of waste on environment, human health and the economy is the only way ahead for developing countries.

NOTES

1. In India, administration in the urban areas India- for local planning and development is carried out by Urban Local Bodies also known as Municipalities. As per the Constitution of India, there are three types of municipalities-larger urban areas are governed by Municipal Corporation while smaller urban areas are administered by Municipal Councils and Nagar Panchayats are for areas in transition from a rural area to an urban area.

2. http://www.newindianexpress.com/cities/thiruvananthapuram/2019/feb/22/adherence-to-green-protocol-higher-this-year-green-army-1942041.html

2014
Swacch Bharat Mission was launched

2015
Green Protocol was introduced and first implemented during the National Games

2017
Compliance with Green Protocol made mandatory for weddings in Thiruvananthapuram and new standards were set for conducting international cricket tournaments in the most eco friendly way

'Freedom from waste' campaign launched to make Kerala completely free waste

Green Army, the campaign wing of Thiruvananthapuram Municipal Corporation was launched

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