

Study Trip to Thanal, Trivandrum, Kerala October 15, 2017

This is a short report documenting our visit to Thanal. As members of the Zero Waste Team at CAG, we were keen on understanding how this organization had been instrumental in helping Trivandrum set up an effective zero waste management system in place. The following are a series of short notes written by the team capturing the essential points of the different sites and stakeholders we visited during our field visits.

It is unfortunate that our two and a half-day's trip was disrupted by a *hartal* (strike), which meant that we could not cover everything on our list of people and places to visit. Despite this, we returned from Thanal with plenty of information and insights to implement in our projects here in Chennai. The report is arranged as follows:

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1. Setting the context and the agenda

A team comprising Ariel, Durga, Kripa, Samantha, Sriram and Sudipta visited Thanal in Trivandrum between October 14 and 16, 2017. The delegation primarily visited the city to undertake an engaged learning in sustainable waste management practices. The team was exposed to the nuances of working with different stakeholders, understanding their attitudes, the challenges they pose, and the opportunities they create.

(Appendix A: Team CAG with team Thanal at their office in Trivandrum)

1.1 The Thanal Story

The visit started with Mr Shibu's talk on the work of Thanal, its journey, what it stands for and how it was able to achieve what it has, over two decades. Most of all, it was about how Thanal has been able to reinvent itself in response to new and emerging environmental challenges.

We learnt that Thanal was started in 1986 as an informal network of young people /nature enthusiasts interested in environmental studies with a focus on natural history. A lack of formal environmental education in schools and colleges gave Thanal the space to organise several events to mobilise those interested to learn and eventually speak up for environmental causes. The first of such successes came in the form of recognising 'Project Tiger', which merely started as a student movement in Kerala organised by Thanal. Over the years, they have come to be actively involved in environmental activism with focus on anti-pesticide, especially the 'dirty dozen' and endosulfan, sustainable eco-tourism, and municipal waste incinerators. Over the last decade, they have worked extensively around zero-waste-municipal waste management, local self-government, local stakes, and participatory, upstream

management of waste, segregation, and decentralisation. In recent times, they have also been active champions of climate change mitigation and adaptation.

1.2 Social engineering for starters

Before we began our visit to specific stakeholders' sites scheduled for the day, Mr Shibu indulged us with his invaluable experience in working on social sciences research, both on and off the field. According to Mr Shibu, three principles lie at the core of Thanal's successful social science research and practice and they can be squarely applicable to most organisations.

- 1) Social engineering: Understanding the Strength, Weakness, Opportunities and Threats of every stakeholder- from grass-root level to governance.
- 2) Democratisation: Do nothing that would weaken the institutions.
- 3) De-education: Invest in social skills and impart relevant skills so you can export skilled people.

After showing us around the Thanal campus, the different teams it houses, different projects they work on, and all the team-members present, Mr Shibu concluded the session by giving us the following *mantras* for successful social engineering as tried and tested by Thanal.

- 1) Be visible - leave your footprint;
- 2) Build and leverage networks;
- 3) Stay updated at all times like an operating system (OS);
- 4) Build mutual trust
- 5) Show your substance and passion at all times;
- 6) Empower people you engage with through information;
- 7) Play the role of a facilitator; and
- 8) Do not monopolise information; share it generously

Thanal has not only been at the forefront of sustainable waste management in thought but also in action. We visited the two enterprises set up by Thanal in furtherance of its zero-waste vision in addition to the other facilities and institutions that play an integral role in shaping Trivandrum as a near zero-waste city.

2. Field Visits

2.1 Zero- waste centre

Thanal's resource recovery centre or zero-waste centre works on a total systems approach that goes beyond just segregate - reuse - reduce - recycle. It is a logical planning approach incorporating principles of effective human and material resource utilization to avoid the conversion of discards into waste in a manner that revitalizes the local economy. The centre provides training in resource-use, education and livelihood, entrepreneurship development and marketing, and organic farming. The centre currently functions as a school for women who are trained in tailoring, craft making and entrepreneurship. It also has a small retail outlet of hand-made sustainable and organic things that are being produced by the women in the centre.

(Appendix B: An eco-friendly customised banner made by the women trainees at the ZWC)

2.2 Organic Bazaar

The Organic Bazaar was launched by Thanal in 2003 to bring together organic farmers, producers, and consumers. At that time, it functioned only once a month and was called "Second Saturday Bazaar". Later the frequency of the bazaar was increased. This was made possible through consistent and persistent extension work, capacity building, and sensitization of marginal farmers in different pockets of Kerala to enlarge the supply base.

(Appendix C: Organic Bazaar set up by Thanal that supports several small organic farmers)

Consumer sensitization and awareness programmes played an important role in getting more consumers to support the Organic Bazaar. Today, the Organic Bazaar not only has a sizeable turnover, but also has a large customer base.

2.3 Haritagramam

Haritagramam is a three-year-old social enterprise that was started by a few individuals with the help of CSR funding. They broke-even after they attained an outreach of a 1000 households. Now they are a for-profit company catering to a range that has fluctuated up to 3600 to its current number of 2800 households. To encourage households to do organic farming in their backyards, they created the slogan "*Surjitha Bhavanam, Surakshita Bakshnam*", which means "hygienic houses, safe food".

This is impressive considering they started with just one ward of about 200-250 households. It took a combination of door-to-door campaigning and support from NGOs and political leaders to convince members of this ward to adopt a different method of waste management. School children and political leaders or senior government officials such as IAS officers were particularly effective campaigners to

break the stigma around waste. This was no mean feat considering the Indian perception of waste as something dirty and undesirable and that it is the responsibility of the government and not the individual. Undoubtedly it helped that the existing centralised system had come to a standstill: the corporation at that time discontinued all services to manage household waste. This made the citizens more willing to try the alternative offered to them.

Haritagramam started by doing “pipe composting”, but due to issues of maintenance, it did not work out. Therefore, they came up with the first generation of kitchen bin, which was installed in about 300 households. It was so successful that they installed it at the previous ward that they had done the pipe compost with. However, there were a few flaws with the design of the kitchen bin; for example, worms would come out if the lid was a bit loose. To improve these defects, the second-generation kitchen bin was developed. Initially, Haritagramam was providing bins free of charge but now it is incentivised by the Corporation of Trivandrum. These bins have three layers and a groove to put oil and water to prevent bugs and cockroaches. A team of four cater to twenty-one of the hundred wards existing in Trivandrum. They check in on the households once in two weeks to provide support and advice.

(Appendix D: Different models for composting)

The subscription charge is Rs.250/month, this includes 10kg of a special mix of coco peat engineered and patented by Dr. Joshi from Bangalore. This is a mixture that helps accelerate the process of degeneration. The compost generated by the second-generation kitchen bin is ready to be used after ninety days. It needs to be kept at a place with light and air circulation. It should not be placed directly under the sun, the rain or wind. The manure in one bin can fill up three grow bags with each bag amounting to Rs. 90. Considering that most apartment gardens need very little manure, if a household has no use for the manure, three to four times every month, a team of four would come to collect it. It is important to note that one team should cover at least 750 households to break even.

2.4 Manacaud Biogas Plant and Kudumbashree

Kudumbashree, or “family prosperity” in Malayalam, is a programme that was initiated by the Government of Kerala in 1988. It consists of the government supporting and funding micro-enterprises run by women - either individual businesswomen or self-help groups - with the aim to make them financially independent. This endeavour to empower women has been praised for its contribution towards community-based projects. We heard of Kudumbashree during our visit to Manacaud’s Community Biogas Plant. The Corporation is collaborating with a self-help group of 200 women that covers four wards. This particular biogas plant runs on the collection of segregated waste of just one ward manned by thirty-odd workers. The material collected generates enough electricity to run an office located on site. The residual solid from this process is rich in nutrients and can be used as fertilizer.

(Appendix E: Two extraction possibilities from anaerobic digestion)

For a biogas plant to work successfully it requires only biodegradable material; therefore it becomes vital for the citizens to segregate their waste and for the waste collectors to ensure that there is no mixing of waste. Only then can the plant provide a renewable energy source.

In a process called anaerobic digestion, microorganisms break down biodegradable material such as carbohydrates, fats, and proteins in the absence of oxygen. This is a four-step process of decomposition resulting in methane and carbon dioxide which are the ideal composition of biogas for producing electricity or combusting in a cooking stove.

There are several advantages of building a biogas plant. First, it is eco-friendly. Biogas reduces greenhouse gas emissions by capturing methane as fuel. Second, it is economical. Organic waste can be converted into cooking fuel or electricity, which could save up to 80% of a household's cooking expense. Third, it is sustainable. Not only does biogas reduce household waste, the by-product (residual material) from the process can be used as organic fertilizers.

(Appendix F: Manacaud biogas plant)

2.5 Muttathara Resource Recovery Centre and Shredding Unit

The Muttathara Resource recovery centre is an initiative by the Clean Kerala Company.

(Appendix G: Thiruvananthapuram Corporation Plastic Shredding Unit)

The Clean Kerala Company Limited, under the Local Self Government Department, Government of Kerala, was formed with an objective to ensure the management of hygiene for the state through the adoption of innovative and scientific methods. The company aims to ensure comprehensive management of all harmful rejections in the state, thereby ensuring that hygiene in the state is never compromised.

In a day, the shredding unit at Muttathara receives 250 kgs of plastic for shredding. Apart from this, 1000 pieces of glass bottles arrive daily at the Muttathara resource recovery centre.

The company ensures that the plastics received are dry and clean. If found dirty, the plastics are passed through a dust removing machine. The glass bottles are broken down into a simpler form of glass using a bailing machine.

(Appendix H: Resource recovery machines: dust removing machine and bailing machine)

2.6 Jagathy Aerobic Composting Unit

This facility is a project of the corporation and was inaugurated by the finance minister, Dr. T. M. Thomas Isaac. The composting unit is made of concrete slabs in the form of a square with the dimensions of 4x4x4 feet with gaps for aeration. The concrete basement of the structure is sloping in nature to allow for the easy flow and disposal of leachate. At the centre of the basement there is a hole through which the leachate finds its way into the sewage line. The concrete slabs are removable and re-fixable providing easy access for the installation of the unit, convenient operation and harvesting of compost. The inner edges of the unit are covered with a net to facilitate aeration and ensure closure of feeds as well. This aerobic composting facility takes in organic/ kitchen waste from households. The nature of waste should be dry such that there is no oozing out of water.

People residing around the facility bring in their waste usually during their morning walks. The facility is open from 5 am to 9 pm to ensure that people with differing routines may have an occasion to drop their garbage at a time that suits them. The compost harvested at the end is given free of cost to those interested.

(Appendix I: Aerobic community composting facility)

(Appendix J: Base of the composting unit with provision for leachate disposal)

Steps:

1. Spread dry leaves at a height of 6 inches at the bottom of the unit.
2. Place plywood of the length/breadth/height of 36x36x7 inches concentric to the slab. Fill the gap between the two with a layer of dry leaves such that it does not exceed the height of the plywood.
3. Before feeding in the waste, make a mix of cow dung slurry with the ratio of one part cow dung and three parts water. Sprinkle this slurry on the leaves.
4. Feed in the dry food waste leaving just an inch short of the plywood height.
5. Remove the plywood once the waste is filled till the brim.
6. Above this layer, sprinkle the cow dung slurry once more.
7. Continue with this sort of sandwiched layering until the unit is filled up.

Roles:

1. Dry leaves:

Dry leaves are a source of carbon and absorb moisture content of the waste during composting.

1. Plywood:

The plywood is used here as a scale of measurement for filling waste into the unit. It also holds in the heat required for composting and when removed, allows the heat to pass to the outer layer of dry leaves.

1. Cow dung slurry:

Cow dung slurry works as the source of natural inoculum for composting.

1. Sandwich structure:

The sandwich structure facilitates uniform structuring of the aeration, microbes and temperature that is to be maintained for effective composting.

The four main requisites for composting are air, optimum moisture, carbon, and inoculum. If these four requirements are successfully balanced then compost should be ready within ninety days. This does not hold true for bones since they take a longer period to be processed. Another thing to treat differently are lemon or orange peels that can be fed only after they are carefully dried since the acid from will adversely impact the microbes.

(Appendix K: Plywood structure and compost)

The dry leaves, collected from street sweepers, are stored to ensure that there is sufficient quantity for the rainy season as well. At a time, a minimum of two such units is necessary; one to take in the next set of waste once the first one is filled to capacity.

2.7 Bulk Waste Producer: Trivandrum Club

Trivandrum Club traces its history back to the 1890s when it was known as the European Club. The club has evolved through different periods and has always been in the forefront for providing healthy pleasure and leisure to the Ananthapurians. The club has multiple recreational activities, marriage halls and resorts, all buzzing with activities. Insofar as the number of people that stroll in and out of the club, an equal amount of waste is generated at the club.

The Trivandrum Club is a bulk waste producer producing at least a ton of waste a day. Due to the strict regulations laid out by the Trivandrum Govt., the club manages its waste efficiently. In order to deal with its waste, the club practices composting and uses waste to produce biogas.

At present, the biogas plant is not functioning to its fullest capacity. Hence a separate composting shed was built within the premise to carry out the composting of food waste. The food waste or putrescible goes through a series of processes before it becomes fresh compost that is ready to supply nutrients to the plants in their garden.

To speed up the process of composting, a composting machine is used to break down the food substance into a fine paste. The simpler substance of food waste obtained is then mixed with coco peat and is left to decompose for 15 days.

(Appendix L: Composting machine used to break down food waste)

A shredder is used to break down complex materials like large amounts of banana leaves. The substance that is broken down is then sent for composting.

(Appendix M: Machine used to shred banana leaves)

The compost material is used as manure for the terrace garden that is maintained by the club. In the terrace garden vegetables such as tomatoes, chillies, brinjals, and lady's fingers are cultivated. The produce is then distributed among the members of the club or is sold at a subsidized rate to outsiders.

(Appendix N: Composting material derived after 15 days)

(Appendix O: Terrace garden at Trivandrum club)

When we enquired with other hotels and restaurants in Trivandrum city on how they deal with their waste, we were told they send their waste to private corporations that forward the waste to piggeries. The recyclables are sent to scrap shops or waste paper marts in the city. Plastics are collected by private corporations and are sent for shredding. The shredded plastic is used for road construction.

(Appendix P: Waste management flow chart for BWPs)

2.8 Resident Welfare Association: Kowdiyar Manor

Kowdiyar Manor is a residential apartment with about sixty households that contribute toward composting. A composting pit was created to manage the garbage generated by these households. . Initially a pit was dug and was six feet below ground level. Due to the lack of aeration, the compost began to emanate a foul smell. Rodents and cockroaches also destroyed it. Hence, another pit was dug, this time 3 ft. deep with pipes inserted to provide air the space to circulate in the pit.

(Appendix Q: Composting pit with and without pipes for aeration)

It takes over thirty days for the material to compost. The composting material is used as manure for the garden where vegetables and ornamental plants are grown. The apartments' recyclables are stocked separately in the campus and sold after a month or two, while the sanitary waste that is generated every day is burned.

(Appendix R: Area for burning sanitary waste + collecting dry waste and manure)

3. Concluding Thoughts

The visit to Trivandrum has given us a glimpse of the complex and layered planning involved in bringing about a complete overhaul in the current waste management system. What we witnessed was a product of years of hard work. Thanal followed a

process of first researching and creating a repository of accessible information, then making themselves visible as an authority on waste management by constantly showing up wherever there was a discussion on waste management, and finally engaging with every stakeholder strategically and persistently until all the pieces fell together into a sustainable waste management.

A major difference between Trivandrum and Chennai is the starting point: since Trivandrum at that time had no functioning system of waste management at all, people were more willing to attempt to try out a new one. In the case of Chennai, we will have to deal with the challenge of opening the government's, businesses' and residents' eyes to the fact that there is a serious problem in Chennai's waste management and it is one that is everyone's problem.

The most inspiring takeaway will definitely be the spirit with which people in Thanal work; we hope to infuse in our own work some of this unique mixture of single-minded focus for sustainable waste management and a compassion for the stakeholders that we work with.

4. APPENDIX

4.1 Appendix A :Team CAG with team Thanal at their office in Trivandrum



4.2 Appendix B: An eco-friendly customised banner made by the women trainees at the ZWC



4.3 Appendix C: Organic Bazaar set up by Thanal which supports several small organic farmers



4.4 Appendix D: Different models for composting



Image 1: Pipe compost that was discontinued due to leaching and aeration problems



Image 2: Model of the first generation bin

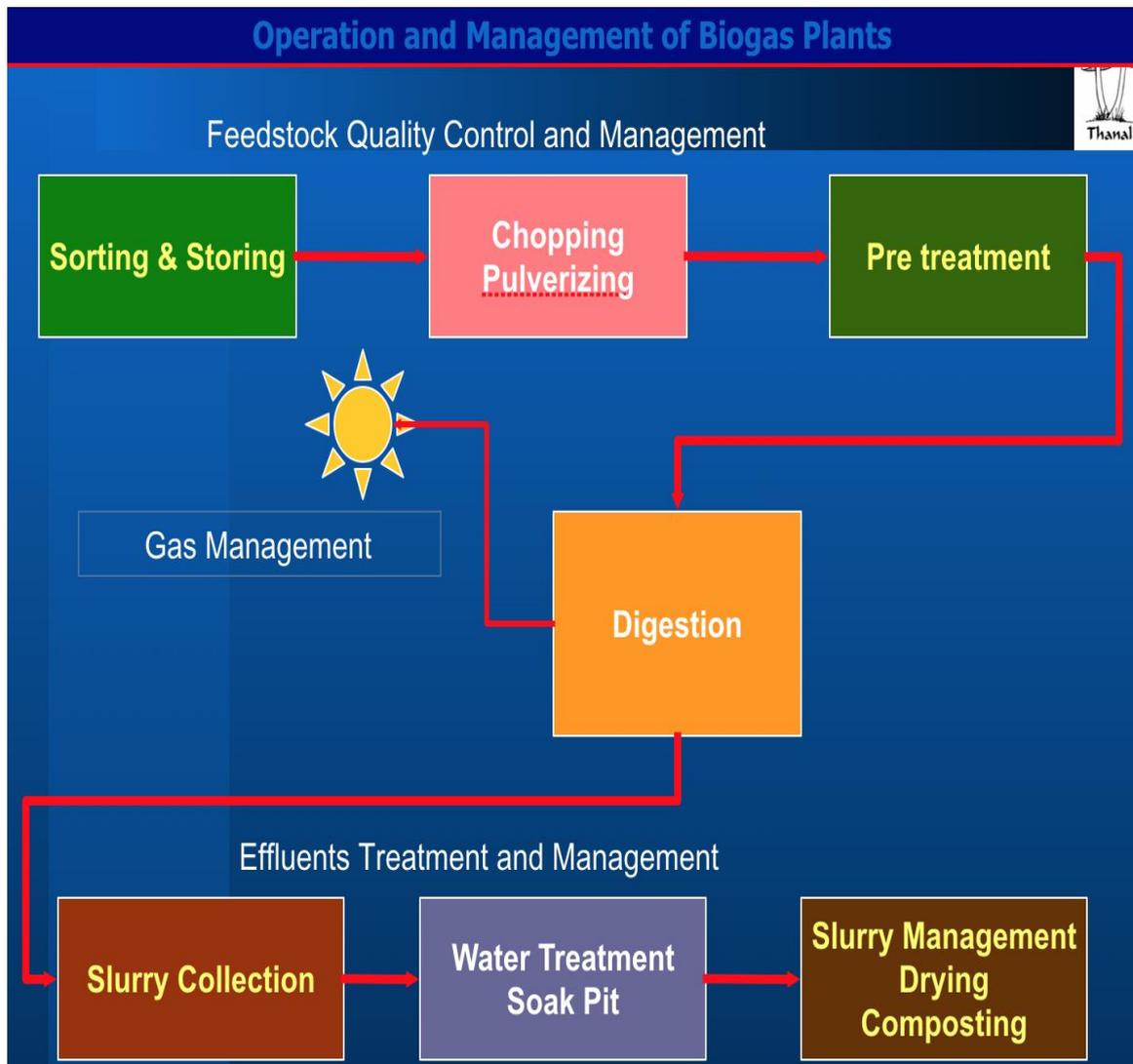


Image 4: Groove to put oil and water to avoid bugs and cockroaches



Image 3: Model of the second generation bin to improve design flaws of the first

4.5 Appendix E: Two extraction possibilities from anaerobic digestion



4.6 Appendix F: Manacaud biogas plant



4.7 Appendix G: Thiruvananthapuram corporation plastic shredding unit



4.8 Appendix H: Resource recovery machine: dust removing and bailing machine



4.9 Appendix I: Aerobic community composting facility



4.10 Appendix J: Base of the composting unit with provision for leachate disposal



4.11 Appendix K: Plywood structure and compost



4.12 Appendix L: Composting machine used to break down food waste



4.13 Appendix M: Machine used to shred banana leaves



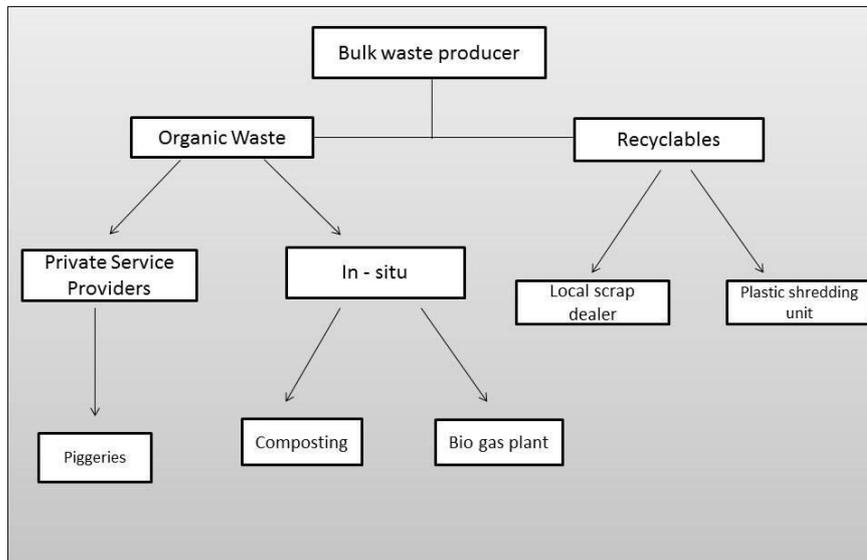
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4.17 Appendix R: Area for burning sanitary waste + collecting dry waste and manure

