

Historical Waste & Garbage Mining

(A way to clean up long-time garbage dumps)

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Historical Wastes

There are Gram Panchayats in various places of the country making efforts to put in place proper waste collection, and disposal methods. When it comes to dealing with wastes, making arrangements for collecting and handling the current wastes generated by households and others must be construed as addressing only a part of the problem. The other dimension to this issue is, *waste generated for years, and dumped in some designated locations (dump yards), and forgotten once and for all.* The size of such garbage dump yards keep growing and expanding as years go by. This is what some garbologists call ‘*historical wastes*’ - huge heaps of wastes dumped away and forgotten, which often is growing due to daily dump. The age of this garbage dump could be not less than 10 – 15 years in some places, and more than 20 years in others. At this moment we are drawing up plans to deal with various types of wastes generated by households, communities and marketplaces today and in the future. The question now is about the historical wastes? What do we do with them? How do we reduce the size of such dump yards so as to gradually recover the space it occupies?

Problems of Historical Wastes

- The space that dump yards occupy generally keeps growing rendering such places / area unacceptable or unbecoming for other use.
- Historical wastes are often mixed wastes of all types. Therefore, any attempt to lay hand in them is like taking the lid off a can of worms.
- Long-time dumping leads to accumulation / emission of poisonous gas in such areas rendering such area unhealthy and unlivable.
- Long-time dumping leads to leaching to take place causing contamination of ground water / water bodies in the vicinity.

Therefore, it makes sense to plan for cleaning up such historical wastes as well, as part of waste management efforts. It's sensible to make a separate plan that will be carried out simultaneously to clean up historical wastes, while a parallel plan is in place for dealing with day-to-day waste collection and management. Most of the Municipalities / Town Panchayats / Gram Panchayats plan to deal with wastes generated daily [currently]. Thus far, a plan being executed for dealing with historical waste is something unheard of. Practically, it might offer valuable lessons in waste management. Hence, this case study was taken up. During our field visit to Samayapuram near Thiruchirapalli we came to know (like in a snowballing exercise), of another Town Panchayat nearby viz. Manachanallur doing similar exercise in historical waste / garbage mining. We studied both of them.

Dealing with Historical Wastes

Some Town Panchayats in Tamil Nadu (e.g. Samayapuram, and Manachanallur) serve as exemplar in demonstrating how to deal with such historical wastes. The main challenge lies in removing residual wastes or final reject that are unfit for treatment, from wastes that can become compost after treatment. This takes time, and it is a long-drawn process. But it is worth the time spent. We recover the land, and salable manure from such historical wastes. The process starts with windrow composting method.

Generally garbage is dumped in heaps making it look mountainous as years go by. In a given site (e.g. Samayapuram, Manachanallur, in this case) it could be several tons – say, 100 tons in a garbage dump. The plan is to clear up 0.5 ton per day and recover the dump yard as a clean place in about 200 days or in the worst case scenario it might take a maximum of one year. They are following windrow composting method to deal with this kind of aged waste. The sieved manure – packaged in 25 kg bags - is sold at Rs.50/- The newer garbage collected is handled separately. Heaps of wastes are arranged in long rows for aeration. The garbage in rows are turned and tossed over frequently – at least once a day, after applying EM solution or inoculums. The workers who go for door to door collection of waste on a daily basis are engaged in 'old garbage mining' after their regular work of waste collection, secondary segregation, and composting are over for the day. Teams of sanitation workers (5 – 6 of them) on rotation basis involve themselves in garbage mining at least 2 – 3 hours daily to be able to reduce the dump.

Windrow Composting

Samayapuram, Manachanallur Town Panchayats follow Windrow Composting Method.

Box – 1: What is Windrow Composting?

This is one of the simplest methods to compost wet waste. This is converting wet waste it into a stable mass by aerobic decomposition method. In areas/regions, where we have higher ambient temperatures, composting in open windrows is preferable. In this method, segregated wet waste is delivered on a paved/unpaved open space. It is good to have a roof (made of thatches or tin sheet) in order to prevent rains spoiling the heap. In this method, garbage is kept on levelled and well drained platforms in 10 – 12 rows with each row 3 m long X 2 m wide x 1.5 m high, with a total volume not exceeding 9.0 cu.m. Once in five days, the heap is turned upside down so as to provide aeration, and to keep under control, the multiplication of insects and larvae. During the first two turns, there is EM solution sprinkled on the heap so as to accelerate the decomposition process. During the subsequent turns, if the heap is found to be dry, water is sprinkled in order to provide sufficient moisture for proper decomposition to take place. Sprinkling water should serve the purpose of maintaining moisture levels – just enough. If we found water oozing (called, leachates) from the rows, the indication is too much water has been sprinkled, causing release of leachates. Thus, in about a month's time the garbage turns into manure. The quantity of compost after decomposition becomes normally around 1/3 of the original mass. Then the manure is passed through a sieve (with holes to the size of 1.5 mm to 2 mm) to remove oversized particles. The oversized particles can go back into the garbage rows again - along with a fresh heap of wet waste. As no odourous gases are generated in this process, it is easy, environment friendly and hence commonly preferred.

Box – 2: What is EM Solution?

E.M. is an abbreviation for Effective Micro-organisms. It is available in the market (or in on-lines stores such as Amazon.in). EM solution is applied to the compost heap so as to reduce troublesome odours and flies as well as to improve the compost process and quality. Preferably spray on with a hand sprayer to prevent over wetting the compost heap, and it is good to apply it at each addition of fresh material. Apply at the rate of one litre per square metre, without making your heap too wet. EM solutions helps in many ways viz. EM cultures can suppress soil-borne pathogens, accelerate the decomposition of organic wastes, increase the availability of mineral nutrients and useful organic compounds to plants, enhance the activities of beneficial micro-organisms, e.g., mycorrhizae, nitrogen fixing bacteria. EM helps to increase beneficial soil micro-organisms and suppression of harmful ones.

Outcome

- The place recovered from the dump yard provides additional space that can be used for better handling of the current wastes. The Waste Management Unit can be maintained neat and clean.
- Usable compost sifted from the [historical] waste is available for sale. This can be used as manure in the garden developed within the premises of Waste Management Unit.
- Compost can be sold too.
- Inert wastes (residual waste) that must be treated like Resource Derived Fuel (RDF)
- There is neither dump yard nor any historical waste accumulation.

Conclusion

This is about the biodegradable wastes only. From these wastes, recyclables have been taken away by the rag pickers over the years. There are residual wastes (at least about 25 – 30%) from the old garbage heap. The problem these Town Panchayats face now is how to deal with this ‘residual waste’ without burying or burning them. In actual fact that they Panchayats have managed dealing with up to 70 - 75 per cent of the historical waste in itself is a great thing. Samayapuram and Mannachanallur Panchayats are places to learn from, when it comes to dealing with aged dump yards that occupy space and pollute the environment.

Do not bury wastes (dump) – Why?

Whenever mixed waste containing multiple streams of waste is dumped in one place, the organic and inorganic content of the waste interact chemically and give rise to what is called 'leachate'. Leachate from purely organic waste cannot be toxic. But leachate contaminated with non-biodegradable waste contain high levels of nitrates, sulphates, etc. and thereby loaded with pathogens. In other words, they contain some of the most toxic chemicals mainly heavy metals. When leachates loaded with such toxic chemicals and heavy metals reach the soil and water, they enter the plants, animals eat these plants; ingestion of plant and animal-based foods thereby become the largest sources of toxic heavy metals in humans. Also, rain can wash the ash (from burning the waste) into groundwater and surface water, contaminating drinking water and food.

Do not burn wastes – Why?

Because what goes up has to come down. Just like newton's apple. But what comes down from burning is not as sweet as an apple. They are the most toxic chemicals produced. Many dangerous health conditions can be caused by inhaling or ingesting even small amounts of these pollutants. Small children, the elderly, or people with pre-existing respiratory conditions can be easily vulnerable to some of these pollutants.

Backyard burning is of particular concern because it produces significant quantities of dioxins and furans....Currently, however, the largest quantified source of their emissions is the uncontrolled burning of household trash (backyard burning). Studies have shown that only small amounts of chlorinated materials in waste are required to support dioxin formation when burning waste. That means that even when materials containing high levels of chlorine, such as PVC, are removed from household trash, burning the waste still creates dioxins because nearly all household waste contains trace amounts of chlorine. It can cause several diseases including cancer, skin disorders, liver and kidney problems, impairment of the immune system, infertility, reduced sperm count, birth defects when pregnant women are exposed.

Much of the dioxins and furans created and released into the air through backyard burning settle on plants. These plants are, in turn eaten by meat and dairy animals, which store the chemicals in their fatty tissue. People are exposed to dioxins primarily by eating meat, fish, dairy products. Plant based foods and direct inhalation are also other routes of exposure.

Dioxins and Furans are classified as Persistent Organic Pollutants (POPs) are carbon-based organic chemical substances. They possess a particular combination of physical and chemical properties such that once, released into the environment, they remain intact for exceptionally long periods of time; they become widely distributed throughout the environment as a result of natural processes involving soil, water and most notably in air; accumulate in the fatty tissues of living organisms including humans, and are found at higher concentrations at higher levels in the food chain (bio-accumulative); and are toxic to both humans and wildlife.

Source: *United States Environmental Protection Agency & Suchitwa Mission, Kerala.*

August 2017