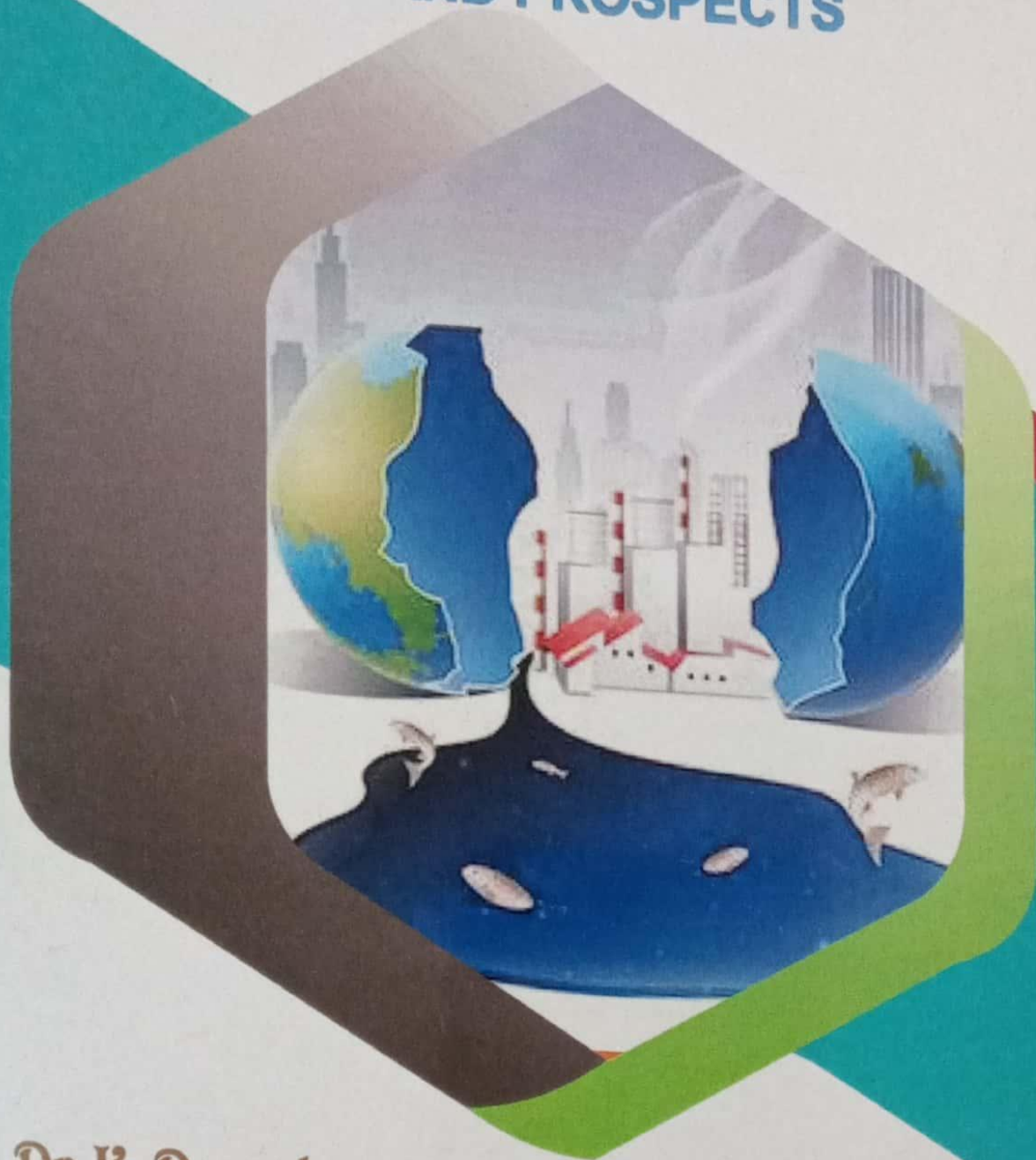


# ENVIRONMENTAL MANAGEMENT ISSUES AND PROSPECTS



**Dr. K. Damodaran**

Dr. D. Manimashu

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## CONTENT

S. No.	Chapter	Page No.
1	Water Pollution: A Special Reference to Water Borne Diseases in India <b>Dr.V. Mallika &amp; Dr.D. Kandasami</b>	1
2	Water Pollution and its Impact in Tamilnadu <b>Dr. J. John Adaikalam</b>	9
3	Noise Pollution - Effects and Remedies <b>Dr.S. Sripriya</b>	15
4	Land Pollution in India-an Overview <b>T. Sathishkumar &amp; Dr.P. Veerachamy</b>	21
5	Impacts of Water Pollution <b>C. Praveen Sampath Kumar &amp; Darling B. Suji</b>	25
6	Environment Problems and Sustainable Development in India <b>Ms.V. Kasthuri</b>	37
7	A Study on Ground Water Pollution Contaminants and Control Policy <b>Dr. A. Gayathri</b>	46
8	Adverse Effects of Pollution in The Elderly Population <b>Dr. S. Pichaipillai</b>	57
9	Effect of Global Warming and Climate Change in Human Health <b>P. Venkatachalam</b>	63
10	A Case Study of Wastewater Treatment and Management in Urban Areas Vellore District, Tamil Nadu, India <b>M. Arulmurugan &amp; Dr.T. Saravanakumar</b>	78
11	Climate Change and Human Health in India: an Overview <b>K. Nagendiran &amp; Dr. C. Sivakkolundu</b>	84
12	Waste Water Management and Treatment <b>Dr.C. Bagyalakshmi</b>	91
13	Incidence of Vector-Borne Diseases in Tamilnadu <b>P. Arthi, D. Dineshkumar, G. Prithi &amp; K. Thamizharasi</b>	103
14	Manifestation of Climate Change on Public Health in India <b>J. Geethamani</b>	108
15	Pollution Control Techniques <b>Dr.M. Senthil Kumar</b>	115
16	Solid Waste Management at Chinnaverampatti Panchayat, Tirupur District, Tamil Nadu <b>Dr.(Mrs).D. Manimozhi</b>	121



**SOLID WASTE MANAGEMENT AT  
CHINNAVERAMPATTI PANCHAYAT, TIRUPUR  
DISTRICT, TAMIL NADU**

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**Introduction**

Managing the domestic refuse (solid waste) generated by households in the Gram Panchayat that are located especially in the vicinity of towns and cities is increasingly becoming a matter of serious concern in India. A comparative glance of the type and amount of waste generated in Indian villages that are remotely located and villages that are close to cities and towns make us infer: that in the villages that are remote the type of waste generated is mostly biodegradable, and the amount of waste generated is manageable because of the biodegradable nature of waste generated; whereas from the villages that are close to cities and towns, people frequent to towns and cities and adopt a consumerist lifestyle, which results in generation of more wastes - and mostly waste of non-biodegradable nature including plastics, and carry bags. When it comes to solid waste management, villages that are close to cities and towns require being paid attention on a priority basis.

**Profile of the Study Village**

Chinnaverampatti Gram Panchayat is located very close to Tirupur city in Tamil Nadu. It has 09 wards, with a population of 16,000 that make into 8,500 households. There are marriage halls, restaurants, shops, schools and so on. The amount of daily waste generated is not less than 650kgs per day. The practice that existed before the introduction of solid resource management system in Chinnaverampatti was 'discarding domestic refuse in street corners, and in the open drains'. The problem of wastes was raised for discussion at Chinnaverampatti Gram Sabha meetings, often enough. But going by the enormity of the problem, and pushed by other developmental priorities the matter was never taken to the level of



initiating a practical action. All the elected ward members heard the idea with indifference. Not many found the idea of collecting and handling garbage attractive.

There are 26 workers involved in solid resource management in Chinnaverampatti - most of them are women. They have been formed into SHGs. Establishment of this Solid Waste Management (SWM) unit has taken more than five million Indian rupees as capital cost, which does not include the cost of the land. Funds have been raised from both government and private sources (CSR).

### Approach to Solid Waste Management

The basic approach to solid waste management in Chinnaverampatti is that there is almost nothing that can be called 'waste'. This is based on the premise that any waste can be converted into resource that can provide utilitarian value as a useful product. It might require changing the form through certain amount of processing, and presentation of the same, in a manner acceptable in the market. Any waste can be converted into a socially useful product. Hence, the usage 'Solid Resource Management' in Chinnaverampatti and not 'Solid Waste Management' as it is addressed in most other places. Precisely, it is not about solid waste management in the minimalist sense; rather it is about scientific management of solid waste in its entirety.

We shall analyze the definitional issues of solid waste and solid resource from environmental, economic and utilitarian standpoints later in this paper. As of now, we admit the expression, 'solid resource management' and move on to understand the approach adopted in Chinnaverampatti covering the practical / operational sides of it.

### The steps the scientific management entails

**STEP - 1: Community Education and Provision of Dustbins:** At least two weeks before the commencement of the SWM Project (i.e. actual collection of waste from the door steps of households), ward-wise community education took place on types of wastes; and how community cooperation in waste-segregation at the household level can ease waste management at the GP level. The GP campaigned with the community to cooperate with the arrangement in their personal interests, and in the interest of community well-being. Each household was provided with two dustbins - Green for dry waste; and Red for Wet Waste.

**STEP - 2: Collection:** Chinnaverampatti engages 8 battery operated tri-wheelers (vehicles) for daily collection of waste from households and market area. The vehicles make two trips daily - one in the morning from 7.00 to 10.30 am; and again in the evening from 4.30 to 6.00 pm. The vehicle has two compartments - one for collection of 'wet wastes' and the other for 'dry wastes'. Each vehicle has a driver (mostly a woman), and a genitor who empties the dustbins into the vehicle handed by residents at their door steps. The idea of collecting two times a day is part of their planning. It feels easy to touch 'the wet waste', when it is still fresh / or when it has not started decaying. It is a well-thought out plan, they have made it a point to collect wastes within 8 to 10 hour interval. The unit attempts handling any type of waste of any quantity generated within the Panchayat.

**STEP - 3: Segregation - Primary - Secondary - Tertiary:** The households are supposed to segregate wet waste from dry waste at the household level, before handing them over to genitors. This is primary segregation. The genitors after collecting the waste from households, restaurants, marriage halls etc. bring them to the SWM unit and do secondary segregation. Secondary segregation is reported to be necessary because - all said and done - many a household do only a rough segregation into two different bins. The genitors do a secondary segregation and shift the wet waste fit for vermi-composting, and others go for tertiary segregation. Practically, tertiary segregation involves sorting dry wastes of different types - such as plastics, bottles, pet bottles, iron pieces, papers, card boards, cloth pieces, carry bags, tetra packs etc.

**STEP - 4: Treatment:** Wet wastes that are easily digestible / decomposable go into making vermi-compost; and wet waste of assorted nature go into plain composting covered with a plastic sheet. Like letters are sorted and posted to their destination boxes in a Post-Office, the non-biodegradable wastes are classified and kept separately for different recycling use. There are buyers for each type of waste - be it papers, card boards, bottles, pet bottles, bottle caps etc. Each type of bio-degradable waste has some utility. Some of the items like orange peels, lemon peels, eggshells etc are processed by the SWM Unit itself and are converted into bio-products.

**STEP - 5: Store Keeping:** Each type of dry waste is kept in one compartment each after segregation. There is a long tin-shed compartmentalized for this purpose. These items (bottles, pet bottles, papers, card boards, worn out cloths/footwear etc.) cannot be sold on a daily basis. So, they let them accumulate over a period of one or two months so that it becomes economical for recyclers who deal in such

waste materials to buy and transport to their places. They are sold to recycling agents who visit this SWM Unit periodically.

**STEP - 6: Sale as recyclables:** These items (bottles, pet bottles, papers, card boards, worn out cloths/footwear etc.) are sold to traders who deal in recyclable waste materials. They go for reprocessing, and they may arrive in the market in several different forms.

**STEP - 7: Sale after recycled products:** Some of the wastes such as orange peels, lemon peels, egg shells are processed by the SLWM Unit. They become salable commodities. For instance, orange peels / lemon peels are dried up and powdered to be added in making scouring powders used for vessel cleaning. Similarly, egg shells are powdered and sold for use as organic fertilizers in rose gardens. They are presented as 'resource recovery from wastes' below.

### Resource Recovery from Wastes

We broadly classify waste into Wet Waste and Dry Waste. The following table lists out the type of wastes and what (products) they are made into.

Sl. No.	Type of Waste	What they are made into (Products)
1.	Wet waste	Vermi-cast, Vermi-compost, vermi-wash, Organic compost
2.	Cow dung	Biogas, Scouring powder,
3.	Orange peels & lemon peels from juice stalls	To scent the scouring powder
4.	Egg shells	Egg shell powder used in rose gardens
5.	Cow urine	Panchacavya used as fertilizer, and pest repellent)
6.	Coconut shells	Sold as such
7.	Chickens	Sold as such
8.	Dry wastes Bottles / glass Pet bottles Plastics of different types Iron pieces Papers / magazines / old books Cards / cardboards Aluminum tins / spray bottles / caps Milk cover / Oil cover Plastic covers of above 40 microns	Recyclables sold to recycling agents

These are the products made from wastes. Those that are recyclable are sold to traders who deal in waste materials. These two sources of income (viz. sale of products and sale of recyclables)

contribute to meet 20% of the operational expenses of SWM in Chinnaverampatti GP.

### Cost of the Unit

The Chinnaverampatti Panchayat SWM Unit has been set up, reportedly, with an investment of nearly fifty million. This includes the construction of segregation sheds, purchase of tri-cycles, solar ports for charging the solar batteries etc. The funds required for the capital cost has been partly collected as donation from friends and well-wishers of the Panchayat President, and partly as grant from the SSS scheme of the State Government of Tamil Nadu. The Project Officer DRDA has been very supportive. The District Collector, after a visit, has offered additional funds from the Collector's Discretionary fund. The unit has been set up in a rented land. Therefore, minus the land everything else has been mobilized this way. The infrastructure include: Many long tin-sheds with compartments, one covered area spacious enough to empty the loads from tri-wheelers and do secondary segregation, one office room, one sales depot, cleaning machine, shredding machine, 8 battery operated tri-wheelers, uniform and gears, solar power generation ports for recharging the battery operated tri-wheelers.

### Operational Expenses

The monthly operational expense of the Unit is reported to Rs.2.0 lakh to 2.5 lakh. The following table gives the operational expenses, and the sources of monthly income as provided by statements given by the GP.

Items of (recurring) Expenditure	Sources of Income
Salary of supervisors and genitors	User fees collection from households
Production expenses of organic products	User fees collection from shops / market
Cattle maintenance	User fees collection from Marriage halls
Vehicle maintenance	Sale proceeds of organic products
Rent for land	Sale proceeds of recyclable items (to scrap dealers)
Electricity bill	Visitor charges
Fuel & Transport	Bio-gas production from cow dung
Stationery	CSR Contribution



### The Income and Expenditure

An analysis of financial statements produced by the SLWM Unit of Chinnaverampatti reveal that the items of expenditure far exceed the income from the operation. The sale proceeds of recyclables and bio-products covers about 20% of the expenditure incurred in running the Unit. The user fees collected from residents, shops, and marriage halls contribute 60% and other income such as visitor charges, and CSR contributions help meet out the remaining 20%. The Unit was initially incurring heavy loss month after month for various reasons. There was no proper accounting system followed either. In the past one year (July 2015 onwards) proper accounts are being maintained.

### Sustainability Plan

Financial sustainability plan is not in place yet. There are also ideas being worked out like the SHG women receive orders for food supply. The profit earned out of the food sale can be used to make up the loss incurred in running the SWM Unit. They are also hopeful to make the sale of products from waste, and sale of recyclables to fetch up to 30-40 per cent of the expenditure in the days to come.

### Analysis and Discussion

We mentioned earlier, that the SWM Unit at Chinnaverampatti attempts handling any type of waste in any quantity within the Panchayat. It seems to communicate that generate any amount of waste we are here to take them from you for treatment and recovery. In other words, 'the more the waste generated, the more is the resource recovery for the Unit'. The concept of Refuse and Reduce are not given importance. Any GP wanting to implement SWM should, first of all, promote the idea of 'waste reduction'.

Is it 'solid waste' or 'solid resource' is an argument that still stands. For some 'waste' is a constructed-image and so 'waste' is a forbidden word. Viewing waste as a resource is, in fact, a healthy stance. We can certainly appreciate the spirit behind such a thought. But, in what sense one calls 'waste a resource' needs to be clarified. Is it practically possible to put forth a brilliant resource recovery argument, sticking to the bare facts of the matter. One viewpoint could be from the environmental economics, and the other standpoint could be from monetary value.

Waste as a resource makes an economic sense, only if we can recover a considerable amount of operational expenses incurred in

converting waste into wealth / cash. Such an income can partly help sustain the operations, assuming it is partly supported by the user fees, and incentives from the state government through Performance Grant etc. The gross recovery made by converting 'waste into resource' is hardly 20% [of the expenditure incurred for SWM]. This does not include the expenditure incurred for converting the waste into usable products. But the amount of efforts put in to run and sustain the unit is unbelievably enormous. The 'waste into wealth' argument holds good only from the stand point of 'environmental sustainability'. It makes little sense as a 'financial sustainability' argument.

Another dimension to this issue is, it often happens, in solid waste management projects, there is very high attention paid on the technology side of it - i.e. especially on how to treat each type of waste, and what products you make etc. This is perhaps because, most often, we tend to exaggerated emphasizing on technologies, and insufficiently on building up a local management system to manage and sustain the task. We elaborate on vermi-compost, vermi-wash, NARDEP compost, bio-gas, use of bio-gas slurry, duck rearing, chick rearing, fish rearing and so on, while paying very little attention on building up a local management system to sustain. Very few of the GPs seem to have thought about meeting the operational expenses (month after month) involved in running the unit, until when they got their fingers burnt - unable to meet the operational expenses. In our attempt to recover resource from waste, one should not lose sight of the purpose. The purpose is clean village, and not making products from wastes. Making products and marketing is not a comfortable forte for any GP. The best and the simplest is to go for windrow composting of the wet waste, and sell the recyclable waste to the local scrap dealers.

The point is we should not mystify the technology side, brushing aside and ignoring the local management system that requires to be built. Solid waste management is not merely about employing certain technologies for treatment of waste - biodegradable - non-biodegradable and so on. The success hinges on establishing at the GP level a local management system. from logistics to cash inflow to final disposal. It requires massive efforts in aspects like educating the community; training the janitors who go door to door collecting garbage; meeting the operational expenses; user fees collection system and so on.



We must do away with the unnecessary (and often scary) technological frills that complicate SWM at village level. It could be handled with no much complexity, if our plans are simple scientific disposal of solid waste. On the pretext of converting waste into resource we are imposing heavy financial burden on the Panchayat. This scares away some Panchayat Presidents from giving it a try at all. This is not to oversimplify the SWM nor to overemphasise the economics of it underplaying the clean environmental benefits. This is about practicability or sustainability of the idea in rural areas, where Panchayat have very few sources of income to manage provision of drinking water and environmental sanitation related services.

This analysis comes from one of the best run Solid 'Resource' Management Unit in Tamil Nadu namely Chinnaverampatti GP, where the amount of resource recovery made is 20% of the operational cost, which this does not include the interest for the capital expenditure made. There is just one argument we can buy from 'waste into resource' argument. That is the more you convert waste into usable commodities, and recyclable items etc. the less you demand from the fresh resources of the earth. A student of Environmental Economics may admire this idea, but no Panchayat President who is supposed to practically manage the day to day affairs of a Gram Panchayat shall be willing to pay heed - especially if one gave a thought about long-term sustainability of solid waste management activities. User fees must be collected from residents, shops and other establishments. There must be some financial support from the state government to meet the operational expenses, like it is done in the case of primary health care expenses. Otherwise, Chinnaverampatti model is a bank of SWM ideas to draw and customize / contextualize to one's requirements, and not for complete replication.

### Conclusion

The 'resource recovery argument' may be hold good making an economic sense. However, it makes an excellent environmental / earth saving idea, one needs to give serious consideration about. The caution is one should not misread or wrongly get guided that the sale proceeds of the products made from wastes, and the recyclables are going to meet the expenditure incurred by an SWM Unit in any considerable proportion. If done meticulously, it might help to meet at the maximum one-fifth of the total expenditure. User charges collected from various

waste generators in any given village such as households, vegetable markets, restaurants and tea stalls should be able to meet the remaining four fifth of the expenditure. It could be noted that there should be no expectation in terms of return on the investment for the capital cost invested on items such as the land, waste collection vehicles, the segregation shed, shredder machine etc. A Gram Panchayat cannot get stuck in solid waste management, when the duties and responsibilities of a GP are many more.

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