

WASTE CHARACTERISATION DATA

WASTE DATA AVAILBILTY AND QUALITY

One of the limitations of the current solid waste management system in Auroville is the lack of sufficient data on waste composition and waste generation. In an attempt to quantify the composition and generation of wastes in Auroville, the following data sources were used:

- Physiochemical solid waste data – Oulgaret Municipality, Kampsax November 2000
- A composition analysis of Auroville's residual wastes – Willis Chirgwin April 2000
- An examination of Eco-Service data collection sheets 2000-2001
- Estimates provided by Eco-Service for use in the Auroville Master Plan 2000
- NEERI Strategy Paper on SWM in India Feb 1996
- NEERI Reports and Strategy paper on SWM in India Aug 1995
- Site visits to Eco-Service sorting facilities
- Interviews with Eco-Service collectors.

A number of suggestions are made in the Auroville SWM Strategy for improved data recording and collection. By modifying the Eco-Service data collection forms, materials collected and recycled can be tracked accurately over time (See Appendix A for new data sheet proposed). This measure will provide improved waste composition and generation data for Auroville's waste managers, planners and micro-enterprises. Accurate data will enable a clear assessment of the effectiveness of the various waste minimisation initiatives, the design of future waste management facilities and the feasibility of proposed waste and recycling technologies.

WASTE COMPOSITION

The most relevant data available in respect to waste composition is the data collected by Kampsax India during their study for the development of a composting and final disposal facility at Mettupalayam in Pondicherry in November 2000. The table below from the Kampsax report summarises the findings of the study.

Table 1. Physiochemical characteristics of waste in project areas - Pondicherry

Parameter	Pondicherry	Oulgaret	Ariyankuppam	Villianur
	% total Weight			
Bulk Density, kg/ m ³	394.00	432.67	400.67	363.67
Physical Characteristics				
Plastics & Recyclables	4.63	4.50	4.07	0.93
Rubber and others	0.73	0.83	2.00	0.00
Papers and others	5.50	5.23	3.87	1.13
Textiles & Cloths	5.20	3.17	4.87	0.50
Wood, Coconut, etc.	1.53	2.30	3.40	1.00
Stones & Inerts	3.20	5.13	0.87	0.00
Metal Scrap	0.00	0.00	0.00	0.00
Organic Matter	39.03	38.83	36.97	34.87
Organic Matter with soil	40.50	39.93	46.63	61.57

The sampling indicates that the pure organic fraction from each of the project area averages out at 37.4%, while organic material mixed with soil averages 47.16%. The total of these two components combined gives an average of 84%.



In the survey of the Auroville residual waste conducted in April 2000, the organic fraction was limited to dry organic material such as straw. There was a

complete absence of wet organic material, which is thought to be one of the main component of the Kampsax study.¹

The table below shows the results of the residual waste survey that was conducted by Willis Chirgwin in April 2001.

¹ Part of the Kampsax study was carried out at the major dump sites where the waste is delivered by tip trucks. A visit to the Pondicherry dumping ground in March 2000 by the authors revealed that the composition of waste being transported by these trucks contained predominantly market waste and wet organic waste from municipal waste bins.

Table 2. Auroville Residual Waste Survey

Material	Weight	% of Waste Stream
Mixed Plastics	1.9	18.34%
Paper	0.86	8.30%
Textiles	2.28	22.01%
Mixed Sweepings	1.48	14.29%
Dry Organic Waste	1.1	10.62%
PET Bottles	0.36	3.47%
Ceramics	0.04	0.39%
Household Hazardous Wastes	0.34	3.28%
Laminated Materials	0.36	3.47%
Cardboard	0.3	2.90%
Polystyrene	0.1	0.97%
Metal	0.2	1.93%
Rubber	0.78	7.53%
Leather	0.26	2.51%
Total	10.36	100.00%

A significant proportion of Auroville's residual waste could be reduced.² Using a composition analysis, it was determined that up to 50% of this waste stream could be avoided, as it is fully recoverable. The findings of this survey demonstrate the need for more diligent source separation.

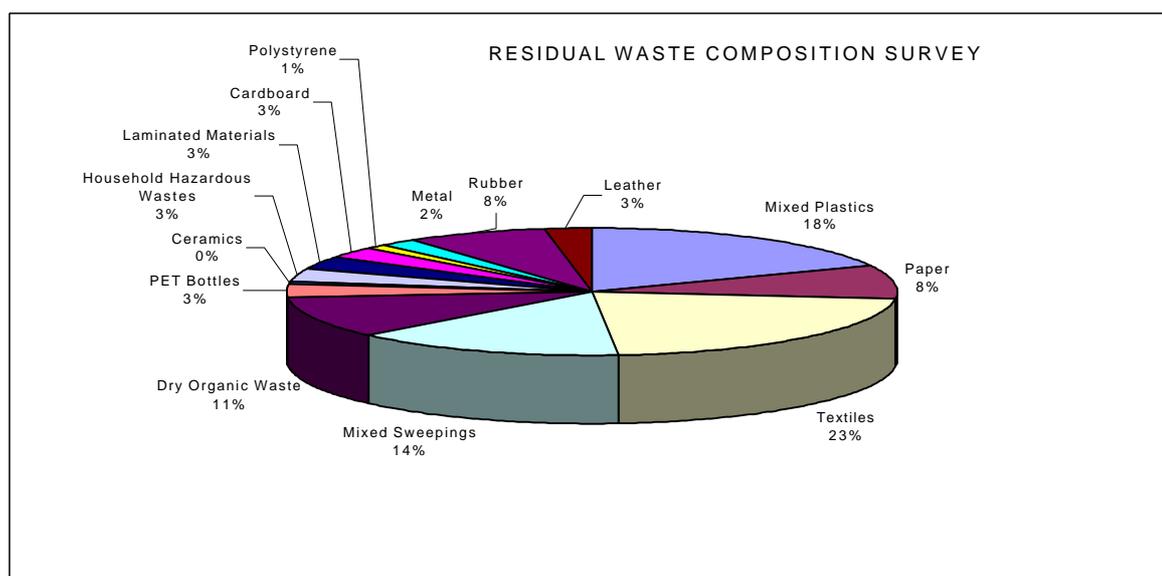
Table 3. Materials in the Residual Waste Stream which could be Recovered

Material	Percentage of total waste surveyed by weight.
Fabrics and textiles which are petroleum based mixed synthetics	16.5*
Mixed plastic	9.17
Laminates plastic-paper-foil combinations	3.47
Batteries - solvent containers	3.28
PET plastic (polyethylene terephthalate)	3.37
Mixed sweepings	14.82
Total	50.61

*Total textiles 23% of which 6.5% were characterised as being natural fibres.

² It is expected that the composition of residual waste will fluctuate over time and regular sampling should be undertaken to track these changes.

Pie Chart - Percentage of Components of Residual Waste Stream - Auroville



WASTE QUANTITY

Table 4. Estimated Quantity of Wastes generated in the City of Auroville

Waste Type	Est. Tonnes/Year	Est. gms Person/Day
Recycled Materials	12	0.016
Organic Materials	104	0.142
Soil, construction and dry organic materials.	120	0.164
Residual Waste	6	0.008
Total	242	0.330

The total volume of residual waste collected by Eco-Service in the 12 month period up to April 30th 2001, is estimated to be 102 cubic metres.³ The density of this material is approximately 60 kgs per cu.m. This quantity does not include waste that is being burnt or buried at various communities throughout Auroville, the extent and quantity which is unknown at this time. According to Eco Service this is believed to be minor, as most Aurovilians support the Eco-Service collection service. As of May 2001, Eco-Service collectors will bale all residual waste and weigh prior to disposal.

Recyclables such as newspapers, glass, cement bags and metals are estimated to weigh approximately 8 tonnes based on interviews with Eco-Service collectors. Improved reporting through the Eco-Service data sheets will provide more accurate information in respect to the total recyclables collected each year.

³ Based on volumetric survey of waste stored at central store room and Kuilapalayam gully fill.

There were difficulties in ascertaining the exact amount of organic and construction wastes produced in Auroville as there have been no detailed studies completed to date. However, local data is available through the Kampsax study for the Union Territory of Pondicherry.

In Pondicherry, it is estimated that each person generates approximately 434 grams of solid waste per day⁴. In comparison, it is estimated that people in Chennai are generating approximately 657 grams per person per day⁵.

In determining the organic fraction of the waste, as characterised by pure organic materials not mixed with soil, it was estimated that 39.03% of waste produced in Pondicherry is organic⁶ by weight. A further 49.45% has been classified as organic with soil and inert materials such as construction wastes.

Using the same assumptions for Auroville, based on a population of 2000 people⁷, it is estimated that 663 kgs are produced on a daily basis in Auroville. On a per capita head basis generation equals 330 gms per day. This figure is offered as an estimate only, as there are significant demographic differences between Pondicherry and Auroville. In addition, agricultural and horticultural activities in Auroville would add significantly to the organic materials generated in Auroville.

⁴ KAMPSAX: *Development of Scientific Solid Waste Management Yard at Mettupalayam* 2000.

⁵ The Hindu: *All corporations asked to curtail use of plastic items*. March 8th, 2001

⁶ KAMPSAX: *Development of Scientific Solid Waste Management Yard at Mettupalayam* 2000.

⁷ This includes an allowance of approximately 25% in addition to permanent residents to allow for guests, staff and tourists. (Based on data from AV Master Plan)

APPENDIX A – NEW ECO-SERVICE DATA SHEETS

ECO-SERVICEE-mail: Ecoservice@auroville.org.inOR Stefano@auroville.org.in

Phone: 622 912 (Stefano)

Month

Name of Eco-Service
Collector

Statement No

** Please complete all columns

** All payments through Financial Services only

** **NO CASH TRANSACTIONS**

Date	Name of Person	Community/Unit	Recyclables No of bags	Residual No of bags	Material purchased, eg glass	Weight (kg)/ Amount (Rs)	Amount to be DEBITED for collection	Amount to be CREDITED from sale of glass etc	P.T. ACCOUNT NO	Signature
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TOTAL

Payment made to Eco-Service Collector	Total Coll.	50% of Coll	- Materials	= Balance

