

VILLAGE SOLID WASTE MANAGEMENT STRATEGY (AUROVILLE AREA)



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EXECUTIVE SUMMARY

The Village Waste Management Strategy (Auroville) has been written to provide a co-ordinated approach to solid waste management (SWM) in the village environment. In the area directly surrounding Auroville, there are some 25,000 Tamil villagers who in total may produce up to 7500 kgs of solid waste per day. Based on figures from the nearby Panchayat of Villianur, 34.87% of this waste is either organic, and 61.57% is organic waste mixed with soil. Some of the organic fraction of this waste is fed to animals or composted close to the site of production and spread on surrounding fields.

The remaining 4% (300kgs per day) is a different matter. This residual waste which consists of primarily waste plastics can be seen on roadsides, vacant land and on the outskirts of villages. These non biodegradable wastes cause a number of problems for the environment and include:

- Hazardous emissions when waste is burnt
- High visual impact
- Incorporation of waste into the soil in large volumes causes suffocation of soil biota
- Waste is often contaminated with biologically hazardous wastes such as medical wastes and additional contamination occurs through materials such as heavy metals from dry cell batteries

The volume and variety of non bio-degradable wastes will increase dramatically as average incomes rise and consumer items, particularly processed foods become more widespread. This will predominantly occur in lightweight packaging materials, which are not collected for recycling.

The legal responsibility for collecting, storing and disposing of these wastes lies with the local municipal authority. In the area surrounding Auroville this responsibility falls to the local Panchayats. Unfortunately providing SWM services to village residents has not caught their attention to date. However this may change in the in the short to medium term. In the meantime residual waste continues to be indiscriminately dumped throughout villages and surrounding farmlands.

Despite the difficulties in the past with the management of solid wastes there exists a real opportunity to redress this as a result of a number of new initiatives being undertaken by local NGO's. The first is a small pilot project in the village hamlet of Lakshmi Puram in Kuilapalayam, which is being managed by Auroville Clean and Beautiful. In this project community bins are being provided for the collection of residual waste. The second project is another pilot being launched in the village of Thuruvai where Exnora and AVAG will look at the feasibility of introducing a door to door collection system.

The third major initiative is being project managed by the Auroville Building Centre (CSR). The project is being funded by the Indian government, Danish agencies and Edayanchavadi Village. The project looks to establish a “model village” with a focus on improving water and sanitation in the village. Consequently there exists an ideal opportunity to integrate an innovative solid waste component into this project. The project also offers an excellent opportunity to involve Panchayat leaders and local village NGO’s in the successful implementation of waste management services and infrastructure development.

While waste management services and infrastructure comprise an important component of any SWM system, it is ultimately the participation of individuals that will ensure its success.

Non Government Organisations (NGO’s) such as Exnora based in Chennai, have developed specific programs which ensure the full participation of residents in SWM. The advantage of the Exnoran model is its inherent sustainability when maintained correctly by the users of the system. This Strategy fully supports and endorses a community-based approach to SWM in the villages around Auroville.

The implementation of these programs will require a co-operative joint venture between a number of established organisations that work in the villages around Auroville. The organisations are:

- The Auroville Health Centre
- Auroville Village Action Group
- Auroville Clean and Beautiful

Auroville’s Eco-Service, will also play a role in supporting the work of Exnora and Auroville NGO’s. The strategy proposes that a working group be established which will consist of members of the three key village based organisations and members of Exnora. A member of this working group (Gillian - AV Clean) will also be represented on Auroville’s SWM Task Force where additional resources may be tapped.

The key to sustainable waste management in the village environment is to ensure real ownership of the projects and infrastructure. This can only occur if the initiative comes from local residents, and the commitment to contribute financially occurs on an ongoing basis. The role of the Auroville organisations and Exnora is to raise awareness, motivate change, assist with project development, and support the initiatives established in the villages. This needs to occur in a strategic and considered manner, as outlined in this Strategy.

1. INTRODUCTION

1.1 PURPOSE OF STRATEGY

The Village Solid Waste Management Strategy (Auroville Area) has been compiled to specifically address waste management in the greater Auroville bio-region in a strategic and sustainable manner. The township of Auroville is set in the vicinity of a number of Tamil villages. The solid waste management practices within these villages are inadequate, leading to potential health problems, significant environmental impact, and general loss of amenity. The problems are common to villages throughout India, and waste management is emerging as an important environmental issue.

The purpose of this Strategy is to provide an overview of the main problems, and suggest pathways for improving the present situation.

An important point to recognise is that Auroville itself does not currently practice sustainable waste management. For this reason, the emphasis of the work we have undertaken is on improving Auroville's capacity to manage its own waste sustainably. The Auroville Solid Waste Management Strategy (2001-2005) provides a clear and detailed set of prioritised actions to strengthen the human resource capacity of Eco-Service, and improve current systems and infrastructure. Once these fundamental changes have commenced, Eco-Service can begin to participate more fully in waste management programs in the villages. This Strategy provides background information for this task, and develops a strategic framework for the work to be undertaken.

1.2 METHODOLOGY

The outcomes of the waste management research and planning process undertaken by *Willis Chirgwin* from February to May 2001, are presented in three documents:

- The Auroville Solid Waste Management Strategy - May 2001
- The Village Waste Management Strategy (Auroville Area) - May 2001
- The Auroville Solid Waste Management Research Document – May 2001

The Research Document is provided as a primary information resource to assist Auroville's waste managers to implement the Strategies. The research document will also be useful for planning Auroville's future long term waste management system.

The following methodologies formed the basis for compiling the Village Waste Management Strategy (Auroville Area):

- Interviews with Auroville community members involved in working in the villages, eg Auroville Village Action Group, Auroville Health Centre
- Interviews with Tamil Nadu Pollution Control Board
- Interviews with various people within Pondicherry Municipal Authority.
- Site tours of waste management programs developed and managed by Civic Exnora groups in Chennai
- Interviews with Exnora founder, and other Exnora advocates in Chennai and Pondicherry
- Literature reviews.

2. BACKGROUND

2.1 WASTE MANAGEMENT CHALLENGES IN THE VILLAGE ENVIRONMENT

Traditionally, waste in rural India was managed well within the environment's assimilative capacity. The waste stream was biodegradable, reusable or recyclable; and careful resource management ensured a closed loop system. Industrialisation and the growth in consumerism have dramatically impacted on this traditional system. In the last fifteen years, India has witnessed an explosion of non-biodegradable waste materials. With the introduction and rapid spread of these non-biodegradable wastes, particularly plastic packaging, the traditional means of disposing of waste are no longer sufficient.

The major challenges in the village environment are:

- Lack of responsibility, action and applied resources by local Panchayats, who are legally responsible for providing for the collection, storage and disposal of waste in the villages.
- Lack of waste disposal infrastructure
- The widespread practice of keeping private spaces very clean, but using public spaces as dumping areas for waste.
- Perceptions that waste management work is of low value and low status, and therefore is not a priority.

- Organic wastes used in fields are often contaminated with plastics, hazardous wastes such as dry cell batteries, and medical wastes.
- Limited awareness that there is a solid waste problem, and general apathy towards making positive changes

While these problems are common to most of India, Government resources to provide solutions are usually directed to urban environments, where higher population densities and rapid urbanisation creates more urgent situations. Rural areas receive little attention, despite the reality that approximately 75% of Indians are living in rural village environments.¹

The result of the above situation is that the villages surrounding Auroville are littered with indiscriminate waste dumps throughout the various settlements. Stock and dogs forage this waste for food, spreading it further. Anecdotal evidence suggests that there have been some stock losses through the ingestion of plastics, and some incidents of bloat through stock eating discarded piles of fermenting vegetables and fruit².

The current practices are polluting and impact on the long term environmental assets in the area. The potential effects of indiscriminate dumping are:

- Water pollution from the leaching of chemical residues from dyes etc.
- Air pollution occurring when waste dumps are burnt, as is a common practice.
- Windblown litter and loss of visual amenity.
- Non-degradable nature of many of the residual wastes, in particular plastics, leaves a long term legacy within the soil.

The environmental impacts listed above are likely to increase substantially over the next decade. Village populations are growing rapidly, along with rising incomes leading to a growth in consumer culture. The relative wealth of some segments of the community will lead to greater quantities of waste being generated.

¹ 1991 census as quoted in Report of Committee constituted by the Hon, Supreme Court of India (1999): *Solid Waste Management in Class 1 Cities in India*

² Joseph (1999): *A Study on Environmental, Social and Economic Aspects of Municipal Solid Waste Management in Bangalore* p.30

2.2 DEMOGRAPHICS OF VILLAGES – CURRENT AND FUTURE

In the immediate Auroville area, there are thirteen villages with a population of approximately 40,000 people. There are a total of 40 villages in the bio-regional area of Auroville.³

Population growth in the villages is difficult to determine. In the villages surrounding Pondicherry, growth rates are predicted to be in the range of 33-36%⁴.

The following table shows population figures for the 19 villages in which the Health Centre is closely working.⁵

Village	Population
Alankuppam	982
Annainager	538
Apirampettu	1171
Bommayapalayam	4142
Cinnamudaliager Chavady	882
Edayanchavadi	3096
Irumbai	656
Kottakarai	1447
Kuilapalayam	2687
Manavelly	677
Mattur	1497
Morattandi	1286
Pattanur	297
Periamudaliyerchavady	1410
Putthurai	2158
Rayapettai	568
Rayapudupakkam	1349
Sanjeevinagar	1158
Thuruvai	771
TOTAL	26,772

³ Auroville Master Plan

⁴ KAMPSAX (2000): *Development of a Scientific Solid Waste Management Yard at Mettupalayam*, p. 9.

⁵ Statistics from census work being undertaken by Auroville Health Centre as of April 2001.

2.3 LEGAL RESPONSIBILITY FOR WASTE MANAGEMENT IN THE VILLAGES

The management of solid waste is an obligatory duty of the relevant municipal authority, which in the area around Auroville is the responsibility of the local Panchayats.⁶ The Panchayats surrounding Auroville are:

- Bommayapalayam
- Kottakkuppam
- Irumbai
- Rayapuduppakkam
- Mattur

There is also a parcel of land on the western side of Auroville, which is part of the Union Territory of Pondicherry.

While the Panchayats are legally responsible for providing waste management, street cleaning, collection and disposal services; they do not currently fulfil this function.⁷ There are a number of reasons for this but it is mostly limited to the fact that solid waste management has not been considered a priority in the minds of local Panchayat leaders. Local Urban Authorities all over India have failed dismally to provide basic waste management services for their residents.⁸ It is likely that the rural areas of India will be the last areas to be provided with such services.

Under the Tamil Nadu Panchayats Act with Rules 1994, the local Panchayats also have the power to authorise landfills, but they must do this within an approvals process under the Tamil Nadu Pollution Control Board (TNPCB).

The current situation necessitates alternative strategies for providing solid waste management services in the villages surrounding Auroville. An approach where NGO's work directly with villagers, combined with Government and Panchayat sponsored projects is suggested.

2.4 PAST WASTE MANAGEMENT WORK IN THE VILLAGES

In March, 1985, the Auroville Health Centre became involved in composting organic waste with the intention of supplying clean organic material to cashew farmers in the Kuilapalayam area. The project was developed in response to local farmers using contaminated organic material from the Pondicherry dump-site as a nutrient input into the cashew fields. The material was contaminated with 30 to 40% of non-biodegradable waste, toxic chemicals and hospital waste;

⁶ See Appendix A for map showing Panchayat boundaries

⁷ Report of Committee constituted by the Hon, Supreme Court of India (1999): *Solid Waste Management in Class 1 Cities in India* p.44

⁸ Down to Earth (January 31,2000) *Garbage: Your Problem*

creating environmental pollution and health hazards⁹. The composting project ceased in 1998, due to the inability to meet the tonnages required by local farmers, and the relatively low price of the so-called compost from Pondicherry being difficult to compete with.

Auroville Clean and Beautiful have undertaken further work in waste management in the villages. This organisation has been involved over the years in efforts to improve the amenity of public spaces. Projects include the construction of public toilet facilities, gardens, and undertaking some street cleaning work. Gillian, who was the instigator of these projects, was often working in isolation in difficult circumstances. The efforts to clean the waste from the villages were not sustainable, as littering and dumping practices continued unabated.

2.5 CURRENT WASTE MANAGEMENT SERVICES AND INFRASTRUCTURE

Currently no viable waste management infrastructure exists within the villages surrounding Auroville. There are no primary or secondary collection systems, and no controlled dumping grounds. There is some waste separation and recycling occurring on an informal level by rag-pickers and villagers.

In the past, concrete ring bins have been placed in some public spaces such the main trading area of Kulapalayam. However, these have not been successful due to:

- Lack of idea initiation or ownership within the village
- Lack of adequate maintenance leading to overflowing bins
- Lack of a disposal facility where waste can be buried.
- Lack of an adequate public education campaign.

It is believed that the factors listed above can be substantially mitigated by new projects which are designed to avoid these pitfalls.

⁹ Dengel, L (2000): *Solid Waste Management and Alternatives for Pesticides Use in the Pondicherry Region*

3. WASTE CHARACTERISATION

3.1 WASTE DATA

There is currently no specific data available on the composition and quantity of waste in the villages surrounding Auroville. During the development of waste management programs for the villages, this data should be ascertained as a matter of priority. One method is to take samples from various roadside or village dumps, and sort the waste into its various categories (eg plastic, glass, mixed sweepings, organic waste etc). While this provides a snapshot, a survey will clearly identify the problem waste streams, and determine where energies need to be directed in terms of market development for these materials.

Varying levels of economic development is an important factor in determining waste generation rates and composition.¹⁰ As such, there will be various village areas that will produce different waste streams and it is important to undertake some initial waste stream analysis as a part of the planning process for individual waste management programs.

The following table summarises waste composition data recently compiled for the Pondicherry region. Specifically it is for the commune Panchayat of Villianur, which is classified as being predominately rural. The Villianur data can be used as indicative data for the villages within the Auroville area.

Villianur Commune Panchayat Waste characterisation Data¹¹

Material	% by total weight
Plastic & Recyclables	0.93
Rubber & Others	0.00
Papers & Others	1.13
Textiles & cloths	0.50
Wood, Coconut etc	1.00
Stones & Inerts	0.00
Metal Scrap	0.00
Organic Matter	34.87
Organic Matter with soil	61.57
Total	100

This data demonstrates the organic waste fractions are very high. If separated from other materials, this could become a local resource for the villages.

¹⁰ Schubeler (1996): *Conceptual Framework for Solid Waste Management in Developing Countries*.

¹¹ Kampsax India Limited (2000): *Development of Scientific Solid Waste Management Yard at Mettupalayam* p.47

3.2 WASTE IN VILLAGES FROM EXTERNAL SOURCES

In recent years, waste from Pondicherry has been imported into the agricultural areas surrounding Auroville. This has dramatically increased the environmental impact of solid waste in the region.

Cashew farmers require fertiliser in order to increase yields. Farmers achieve this by applying uncomposted organic material directly to their fields where it is incorporated into the soil by ploughing. Once mixed into the soil, the organic material breaks down rapidly under mesophilic conditions.

There is, however, a real shortage of manures and organic wastes for this purpose. The urban dumpsite in Pondicherry has become a significant source of compost materials for farmers. While the material may be free, the transport from the dump site to Auroville is approximately Rs 300 per load. As mentioned above the waste is spread directly onto the fields, yet 30-40% of the material is contaminated with non-biodegradable as well as hazardous wastes¹². Contaminants include untreated medical waste as well as hazardous substances such as dry cell batteries. There is no segregation at the dumpsite, and farmers are applying biologically hazardous wastes into the local soil.

The use of contaminated organic material has been the source of conflict between Aurovilians and the local farmers in the past. It is important that viable alternatives are provided so local farmers do not continue this practice. It is also important to continue working with the Pondicherry Municipality in developing solutions to the problem.

At the proposed new waste management site at Mettupalayam, the Municipality is planning to change current management practices. It is proposed that the site is secure, with active management to prevent contaminated waste being removed from the site. The facility will also undertake composting of all organic materials, at which point there will be a low cost and safe alternative for farmers¹³.

¹² Dengel, L: *Solid Waste Management and Alternatives for Pesticides use in the Pondicherry Region*.

4. SUCCESSFUL NGO OPERATED WASTE MANAGEMENT MODELS IN INDIA

An example of a successful waste management program is carried out by a Chennai based organisation, Exnora. Faced with inadequate collection systems and the city being swamped with garbage, Exnora instigated a program of collaboration with rag-pickers, local communities and the Municipal Authority. Employing rag pickers as "street beautifiers", door to door waste collection and recycling was implemented in regions within many cities.

Following the success of this project, the movement of Civic Exnoras was born, resulting in approximately 900 clusters or Civic Exnoras operating today. Each Civic Exnora comprises 75 to 100 families and is affiliated to the parent body, Exnora International, which provides grass roots organisations the support of a well co-ordinated and respected over-arching body. Each household contributes from Rs 10 to Rs 25 per month as salary for the street beautifier, and for maintenance of any infrastructure.¹⁴ Exnora has expanded its programs to include vermi-composting of organic waste, as well as broader environmental education, tree planting, water harvesting and other environmental management issues.

The key to Exnora's success is their participative approach. The first step is to talk to local residents, quantifying the problems, and together developing the solutions. There is no one formula applied, but a system where experienced Exnora volunteers work with local residents to develop a program suitable to local parameters. Each Exnora branch has developed its own solutions, ensuring the residents have a strong sense of ownership of the project¹⁵.

There are other very successful NGO's operating in the area of SWM who have also developed sound methods for motivating local communities to manage their waste more sustainably. Vatavaran began work on SWM in New Delhi in 1992 by launching units called the *Cleaning Brigades*. The community based system operates in 27 different regions of the city as well as units in the city of Noida in Uttah Pradesh.¹⁶ Like the Exnoran model, Vatavaran operates on the principle of full community participation, which is developed and nurtured to produce sustainable and enduring results.

¹³ Kampsax India Limited (2000): *Development of Scientific Solid Waste Management Yard at Mettupalayam*

¹⁴ Exnora Home page <http://www/exnora.org>

¹⁵ Nirmal, MB (1996): *People's Participation in Environmental Management – Civic Exnora Guidelines*.

¹⁶ Down to Earth (January 31,2000) *Garbage: Your Problem* p.38

5. FINANCIAL SUSTAINABILITY

5.1 PARTNERSHIPS VS CHARITY

A major issue to be determined is to what extent residents should support waste services within the villages. AVAG uses a model that requires a one third contribution of the value of a given service or project. This contribution may be given in money, or through in-kind contributions such as labour. The Health Centre's services in the villages also require a financial contribution from the users. The underlying philosophy is that to develop genuine ownership and responsibility for a particular issue or project, the users must have an economic stake. We recommend this same philosophy be applied to the implementation and ongoing management of village waste management programs around Auroville.

To actively participate in waste separation and collection systems is a major change that will require the co-operation of every person in the community. To achieve this, the residents must firstly see proper waste management and clean public spaces as a desired state of affairs. An indicator of the importance of the issue is whether or not people are prepared to financially contribute to a program. While this may prevent participation in some areas, over the longer term, it will ensure that services and programs are sustainable. A charity based approach that offers free infrastructure and services risks being undervalued by village communities. Organisations such as Auroville's Eco-Service must operate on a fee for service basis to ensure ongoing financial viability.

Each scheme will need to be carefully planned on a community by community basis, within the parameters being set at a strategic level. Some villages may be willing to undertake emptying bins and transport of waste to disposal facilities as their primary contribution. Others may wish to pay Eco-Service, Exnora, or private collectors for this service. While the formula may vary from place to place the same principles will apply.

5.2 WASTE AS AN ECONOMIC RESOURCE

The waste dumped on roadsides and within villages contains those materials with very little or no economic value. Glass bottles, metals, and clean paper are rarely found at the uncontrolled dump sites. Where a sound market for recyclable materials exists, the problem of indiscriminate residual waste disposal does not exist. Ultimately, the problems of open uncontrolled dumping can be largely resolved through provision of markets for these unwanted materials.

There are technologies available that can transform mixed low grade plastics into extruded products such as railway sleepers, fence posts, and inert building materials. However, many of these technologies require high capital

expenditure (approximately US\$980,000). One company looking to establish this technology in India, Ompol, claims an investment pay back period of 18 months. Ompol would purchase discarded mixed plastic, creating a sustainable market for this material. Such a plant would be established close to a large urban centre such as Chennai.

Alternatively, there are low technology methods of recycling plastics. However, it is important to determine whether plastic recycling initiatives will create environmental and health hazards. Polluted work areas with limited safety procedures create major health hazards for workers as well as people within the surrounding area. The environmental and health risks arising from plastics recycling are different for various stages of reprocessing, but generally, plastics contaminated with unknown substances and mixed plastic wastes pose the greatest dangers to human health and the environment.¹⁷

One of the recommended actions within the Auroville Solid Waste Management Strategy (2001-2005) is to research and develop appropriate technologies for value-adding to waste plastic. Development of a micro-enterprise in partnership with Eco-Service will not only create longer term markets for plastic waste, it will also generate employment and funding to the broader waste management program.¹⁸ This project will involve the investigation of existing technologies, particularly those operating in other less economically developed countries. It is envisaged that the micro-enterprise will become a purchaser of plastic resources from the village collection schemes.

6. FUTURE WASTE MANAGEMENT PROGRAMS

Despite the lack of solid waste services and infrastructure in the villages around Auroville, there are three projects that have the potential to change this situation quite substantially.

In Lakshmi Puram, a village hamlet of some 55 families in Kuilapalayam, a pilot program aiming to introduce a waste collection service is about to commence. The scheme is to be implemented by Auroville Clean at the request of village leaders. A large fibreglass waste bin has been constructed locally and placed centrally in the hamlet. The plan is to place 12 bins throughout the hamlets and business area of Kuilapalayam. The bins are highly visible and easily recognisable.

¹⁷ *Plastics Recycling in Developing Countries* http://gate.gtz.de/gate_mag/gate_95_3/

¹⁸ For more information on Micro Enterprise development see AV SWM Strategy 2001-2005

The project has gained in principle agreement for funding through the State Bank of India. However, the project needs to be further developed, looking at issues such as how the servicing of the bins will be paid for on an ongoing basis. At this point there are discussions with Eco-Service to collect waste from the bins on a regular basis. However, the Eco-Service collector will need to be paid on a per empty basis. A price per bin empty has not been established at this stage.

The Lakshmi Puram residents are not being asked to contribute financially to the maintenance of the program in the initial stages. At the time of writing, Gillian from Auroville Clean who is leading the project is looking to involve Exnora. Following discussions with local residents and Exnora, the project may adopt the Exnoran model of door to door collection rather than public space rubbish bins as the basis for the project.

Auroville Village Action Group (AVAG) has suggested the Exnoran model be trialled in the village of Thuruvai (population 771). Thuruvai has active youth and women's groups who work in partnership with AVAG on a number of village improvement projects. AVAG believes that the small size of the community and its willingness to participate in new initiatives makes it ideal to introduce the waste management program. Discussions between Exnora and AVAG are due to commence in early June.

The third, and by far the largest of the proposed projects is the "Model Village Scheme" which is funded by the Housing & Urban Development Corporation (HUDCO).¹⁹ The scheme looks to provide funds to communities that have a desire to substantially improve village infrastructure, services, and quality of life for their residents. In particular the scheme looks to improve water and sanitation, which would include a solid waste management component.

The village leaders of Edayanchavadi (population 3096) have expressed a strong desire to implement the scheme in their village. The project is being co-ordinated by the Auroville Building Centre²⁰ with the co-operation of AVAG and Auroville's Water Harvest. The project is valued at 35 lakhs of which 17.5 lakhs has been provided by HUDCO, 7.83 lakhs by DANIDA and 1.3 lakhs by Edayanchavadi Village.²¹ The remaining funds are being sought from a number of agencies including the Tamil Nadu Department of Rural Development.

At this stage there have been no provisions made within the project to specifically address solid waste management. AVAG has suggested that if the pilot program in Thuruvai is successful, then this could provide a component of a larger project which can be integrated into the Edayanchavadi Model Village Scheme.

The solid waste component would require additional funding to fully develop the project, which would consider all phases of solid waste management

¹⁹ A Central Government of India Enterprise.

²⁰ The Auroville Building Centre is a division of Auroville's Centre for Scientific Research (CSR).

²¹ See attached budget for full details.

including primary and secondary collections, source segregation, resource recovery, and final disposal. The concept of a zero waste township would be the ultimate aim of the solid waste management program. The question of final disposal will be an important consideration as the development of a sub regional landfill is urgently required for the 50,000 people who now live in the Auroville area. Possible sources of funding for the solid waste component could be local MLA's, MP's, Tamil Nadu Pollution Control Board and corporate sponsors.

7. SERVICE DELIVERY - EXISTING NETWORKS AND ORGANISATIONS

7.1 EXISTING NETWORKS

In implementing waste management in the surrounding villages it is important to tap existing community and village based networks. The networks and institutions developed by AVAG include women and youth clubs. Also, Village Councils can present an ideal vehicle for the development, marketing and implementation of waste management programs. These village institutions are already involved with community development issues, and are often motivated to improve the environment and infrastructure of their villages.

Complimentary to the activities of AVAG, is the work of the Health Centre and its Health Workers. The Health Centre works closely with residents of the villages to raise awareness on such issues as basic sanitation and hygiene. Many of the illnesses and diseases that arise out of the village environment have direct causal links with poor solid and liquid waste management practices.

Auroville Clean and Beautiful has worked closely with local village leaders over the past several years in order to improve sanitation in the villages around Auroville. In particular AV Clean has overseen the construction of toilets and the provision of street sweeping service at Kuilapalayam. Auroville Clean will be represented on the Auroville Waste Management Task Force and as such, will act as the bridge between village waste management programs and Auroville's Eco-Service. Auroville Clean will also liaise with external organisations such as Exnora, to ensure established expertise is utilised and projects are well supported.

7.2 ROLE OF ECO-SERVICE

At present Eco-Service is operating at full capacity simply providing the collection service from approximately 800 collection points in Auroville. In the near future, a full time waste management co-ordinator will be employed. The role of an expanded Eco-Service in the development and implementation of village waste management programs could include the actions listed below:

- Assisting the waste management project teams²² determine the quantity and type of garbage produced locally.
- Assist in the development of a management plan for all parts of the waste stream.
- Ensure that project teams are operating in the appropriate cultural, economic and legislative frameworks.
- As a local repository of waste management information and data.
- A possible link to funding bodies and submission writing expertise.
- As a source of educational materials
- As a regional co-ordinator of village waste management programmes in partnership with waste management project teams.
- As a primary and/or secondary collector of residual waste which will be landfilled at a suitable site to be established in the Auroville area.
- As a collector and/or purchaser of recyclable materials direct from residents or primary collectors.

As Eco-Service becomes more profitable over time, the organisation could provide a central office facility from where local project team operations could be based.

7.3 UTILISATION OF AV WASTE STORAGE FACILITY

A key issue to consider when planning primary and secondary collections in the villages is the question of final disposal. Whilst all measures will be undertaken to recycle or compost recoverable materials, there will be residual wastes for which there are no markets. The question is where this residual waste should be directed. It is vital that waste collection programs do not simply shift the residual waste problem from one location to the next.

²² Waste management project teams refer to various groups undertaking waste management programs in the village environment.

Each program will need to consider the impact and costs of transporting residual waste to the final collection site. For this reason residual waste should be baled and compressed to minimise transport costs. In the short term, the Auroville Storage Facility in the Industrial Zone may provide the most environmentally sound interim storage option. The development of a secure landfill in the Auroville area within the next 12 to 18 months will need to take a present population of 50,000 into account when designing the facility.

It is anticipated that the proposed scientific landfill and composting facility at Mettupalayam in the Union Territory of Pondicherry will be operational within the next five years. This may provide an alternative landfill destination, however disposal fees for this facility are still unknown and may be cost prohibitive when transport costs are taken into account.

7.4 ROLE OF EXNORA

Exnora has a relatively new branch established in Pondicherry. There are also resources accessible through the Chennai based Exnora. At meetings with both of these groups, there was a genuine willingness to work co-operatively with Auroville to implement waste management programs. Exnora also have a board of technical experts who are available for solving specific problems.

The following are the types of services Exnora can offer:

- Initial consultation with villages to determine needs and to assist in establishing the waste management program.
- The ability to act as an umbrella organisation, supporting new Civic Exnora branches that develop in the villages
- Program monitoring and assistance, with an ongoing role in trouble-shooting and providing motivation to local residents.
- Training packages developed for Tamil house-workers and gardeners within communities in Auroville. If Aurovilians are unsuccessful in training their employees, they have the option to engage Exnora for this purpose.
- A training package for workers at the Health Centre in source separation and safe handling and disposal procedures for medical waste

Exnora are also very successful in acquiring funding for the start up or infrastructure costs of various programs. Their funding networks and expertise would be an invaluable asset in establishing programs within the Auroville Bio-Region.

Exnora is operated on a volunteer basis. The services could be provided at minimal cost, usually on a cost recovery basis.

The local contact for Exnora in Pondicherry is Mrs Chitra Shah. She has agreed to be the key contact person, and can respond to specific requests through accessing the broad network of people resources within the Exnora organisation. Her contact details are:

8, Rue de la Compaigne ,
Pondicherry
Phone : 341026/221105
e-mail : chitrashah@123india.com

8. WASTE EDUCATION PROGRAMS

8.1 EXISTING INITIATIVES

To date, solid waste management has not been a visible component of the curricula within schools in the villages or in Auroville itself. There has been some high quality educational work undertaken by the Auroville Health Centre. Srinivasan, from the Centre produced an excellent video that cleverly and graphically illustrates how waste management in the village environment has changed so dramatically.

The video tells the story of an old man who has cataracts removed from his eyes, allowing him to see for the first time in 20 years. The sight of open drains and rubbish dismay him, which motivates him to convince others to manage the village waste more sustainably. The results have a number of benefits for local residents. This video is an excellent example of how to successfully market the message of responsible waste management.

According to Village Action, approximately 70% of residents in the villages surrounding Auroville are illiterate. This fact needs to be considered very carefully when designing waste management and social marketing education programs.

The Gita of Waste is an illustrated text that was recently published by the Health Centre for 12-14 year olds. The delightful dialogue between two young people and Lord Krishna provides an excellent story where the virtues of sustainable waste management are discussed in great depth.

There is an immediate opportunity for representatives of the schools within Auroville and the surrounding villages to introduce waste management education into their existing education programs.

8.2 SCHOOLS

It is good educational practice to link raising consciousness with hands-on learning through resolving waste problems in the school itself. Eco-Service, NGO's and teachers can give effective presentations at schools, but theory must be followed up with action. The adoption of a "zero waste" programme in the school could be a powerful aspiration which focuses energy on some of the problems posed by solid waste management. The students should assist to design the system, build the physical structure and maintain it. The vermicomposting of organic wastes provides an ideal waste management technology where students can participate in establishing and maintaining a dynamic biological system for all food and garden wastes.

8.3 MOTIVATING VILLAGE PRIDE

People living in villages and city dwellings throughout India make a sustained effort in order to keep their private spaces clean. This situation stands in stark contrast with the way in which public spaces exist. One of the motivators for change is taking pride in cleaning and maintaining these public spaces. A village or an area within a village can differentiate itself through having clean and litter free public spaces.

There are numerous clean up programs which have been developed in the West and in Asia that have been highly successful in developing a sense of national, provincial, city and village pride. Annual Tidy Towns competitions are conducted in each State of Australia and on a national level. The prize is national promotion, a trophy, and a sign at the town's entrance announcing its status as a Tidy Town winner for the particular year. There are also many awards given for items such as the most beautiful gardens, most effective waste minimisation programs, and best environmental programs within schools. Judging categories are based on the population size of the town, with the final prize given to the overall winner under a number of set criteria.

The effect of this campaign over the past 20 years has been substantial. Municipal governments, schools, service clubs, and individuals are motivated to promote their town as a place of beauty and environmental consciousness.

A similar program could be implemented at a local level here in the villages surrounding Auroville. The important element would be in carefully designing judging criteria, and selecting the judges. The judges should be selected from outside the immediate area and ideally should be eminent persons who can add credibility to the program through their social standing.

The competition could commence with prizes for tidiest streets, and expand to categories such as tidiest village once enough interest has been generated. It is important that the judging criteria is not simply aesthetics, as a street may be beautiful, with its waste lying in a wasteland on the outskirts of the village. The people need to demonstrate how waste is managed in an appropriate manner.

The judging should also be based on local community efforts as opposed to money being spent on a government funded program with little community involvement.

The prizes should be of value to the community as a whole, and may include items such as a sign for the street announcing its status. It may include a small grant of money to a community organisation for expenditure on public programs.

The funding needs to be over a long term of at least 10 years. The program needs to be developed into a full proposal, including budgeting for promotion and prizes over a longer term period. The program would be best funded from an organisation such as the State Bank of India, or other local corporations. These organisations would commit to funding this program for minimum of ten years to ensure that the long term benefits of the project would be fully realised.

9. IMPLEMENTATION PROGRAM

9.1 SUMMARY OF KEY TASKS

ACTION	PRIORITY
Organisational Issues	
Meet with Exnora, AV Clean, AVAG and Health Centre Outreach representatives to discuss potential working relationships to develop programmes within the village. Main purpose of the inaugural meeting is to determine relative roles and responsibilities, and further develop an action plan for a pilot programs identified. In particular the Model Village project being funded by HUDCO.	Short Term
Set up a Working Group (AV Clean, AVAG, Health Centre, Exnora) to begin implementing components of the Village Waste Management Strategy. This Working Group will have a representative on the Eco-Service Task Force (Gillian AV Clean & Beautiful).	Short Term
Eco-Service co-ordinator to provide assistance for development of village waste management programs.	Short Term and Ongoing
Eco-Service to employ an Extension Officer, who has the primary task of ongoing development and implementation of village waste management programs.	Medium to Long Term
Strategic Issues	
Eco-Service, Village WM Working Group and NGO's to determine strategic directions for provision of waste infrastructure and collection services in the villages.	Medium Term

Eco-Service to undertake research and development into plastic recycling options. Micro enterprises established would become purchasers of plastic waste from the village waste streams.	Medium Term
Eco-Service would also provide assistance in issues of quality control and resolving operational issues. While direct supervision of the collectors would be undertaken at a village level, the collectors would be responsible to operating under standards set by Eco-Service and NGO's.	Medium Term
Development and Implementation of Pilot Program	
In collaboration with Exnora, and the communities of Lakshmi Puram and Thuruvai, develop two pilot programs for solid waste management.	Short Term
Determine waste collection, recycling and disposal methods for the programs.	Short Term
Utilise the skills and experience of Exnora to implement the most appropriate program in Lakshmi Puram and Thuruvai.	Short Term
Working group to monitor and evaluate the results of the pilots: changes to the environment, satisfaction with the program, perceived benefits, as well as any problems experienced.	Medium Term
Project Funding	
Village WM working group to develop a funding proposal for the project, with stage one as initial funding for the pilot program, and stage two the implementation of the program to other hamlets and villages.	Short Term
Seek funding opportunities from the private sector, and government agencies such as Tamil Nadu Pollution Control Board, promoting Auroville Village WM strategy as a program to develop waste management solutions for rural areas in India.	Short Term
As a part of funding proposals, outline the projected contributions of Eco-Service, AVAG and NGO's, seeking enough funding to cover all associated costs and avoid cost overruns on the project.	Short Term
Organic Waste	
Closely monitor the use of Pondicherry waste as compost on surrounding village land during the wet season.	Short Term and Ongoing
Incorporate contaminated compost issue into educational program targeted directly at village farmers (seek assistance from Lucas – Auro Annam)	Short Term
Continue to liaise with Pondicherry Municipality to encourage the development of a secure landfill site and compost facility. This will ultimately prevent the problem of contaminated compost being used on village land around Auroville.	Medium Term
Waste Education	
Eco-Service and Village WM working group to work with local teachers to utilise existing resources and further develop waste	Medium Term

education curricula materials.	
Develop a program in conjunction with Exnora where village residents who work in Auroville communities and business units are taught correct waste management procedures. This will be conducted on a face to face basis as a part of a review of waste management practices at the community or business unit. This will commence when the Eco-Service co-ordinator has been established.	Medium Term
Implement waste management programs within schools, to ensure that learning about SWM is reinforced by students developing solutions to waste management problems in their school or local area.	Medium Term
Through AVAG networks, provide guest presentations to village groups on waste management issues as a part of raising awareness and demonstrating successful projects. Ensure waste avoidance is a core part of this work.	Medium Term
Introduce a competition to publicly reward streets or areas within villages for their environmental programs, in particular waste management and street beautification. The competition may award efforts by individuals, schools and community groups. Develop funding proposal, including aims and objectives, strategies and a budget for the next 10 year period. Seek long term financial support for the development, implementation and growth of the program, including from the corporate sector.	Medium Term

9.2 TIME LINE

2001

- May - Finalisation of Village Waste Strategy, formation of Village WM Working Group.
- Development of Waste Management Task Force, and employment of Eco-Service co-ordinator.
- Establishment of Eco-Service office
- Develop proposal and secure funding for a rural waste management pilot project and a Stage Two, which would see the extension of the work to other areas.
- Development and implementation of the waste management pilot project

2002

- Employment of Eco-Service Extension Officer
- Establishment of further waste management projects
- Commencement of all short and medium term tasks identified in Village Solid Waste Strategy

2003

- Residual waste disposal solutions for Auroville to be finalised, providing the capacity to also responsibly manage waste from the villages
- All short term tasks completed
- All long term tasks commenced

2004

- All medium term tasks completed

2005

- All actions from the Strategy completed
- Comprehensive review and development of Village Solid Waste Strategy for next 5 years.

9.3 FUNDING – INITIAL AND ONGOING

Funding will be sought on a collaborative basis, between the users and beneficiaries of the proposed programs.

As outlined in this report, there are two initial funding proposals recommended:

1. To develop a pilot project for rural village waste management, and then a second stage where this project is extended and implemented in other villages.
2. To develop and implement a competition for environmental best practice and sustainable management in villages, particularly in solid waste management and street beautification.

On an ongoing and long term basis, residents must fund waste management collection and disposal from household budgets. The contributions made by Eco-Service, the Village WM working group and NGO's in facilitating the process will require significant energy to establish these systems.

A further contribution needs to be considered over the long term, which is the utilisation of Auroville disposal facilities. Whether this is undertaken on a cost recovery basis or as a further contribution to improving waste management practices in the bio-region will depend on a number of factors:

- The capital cost of the facility
- The actual costs involved in operating the facility
- The long term capacity of the facility
- The general profitability of Eco-Service as a business unit
- The logistics of each village using this facility, eg, depending on location and transport costs

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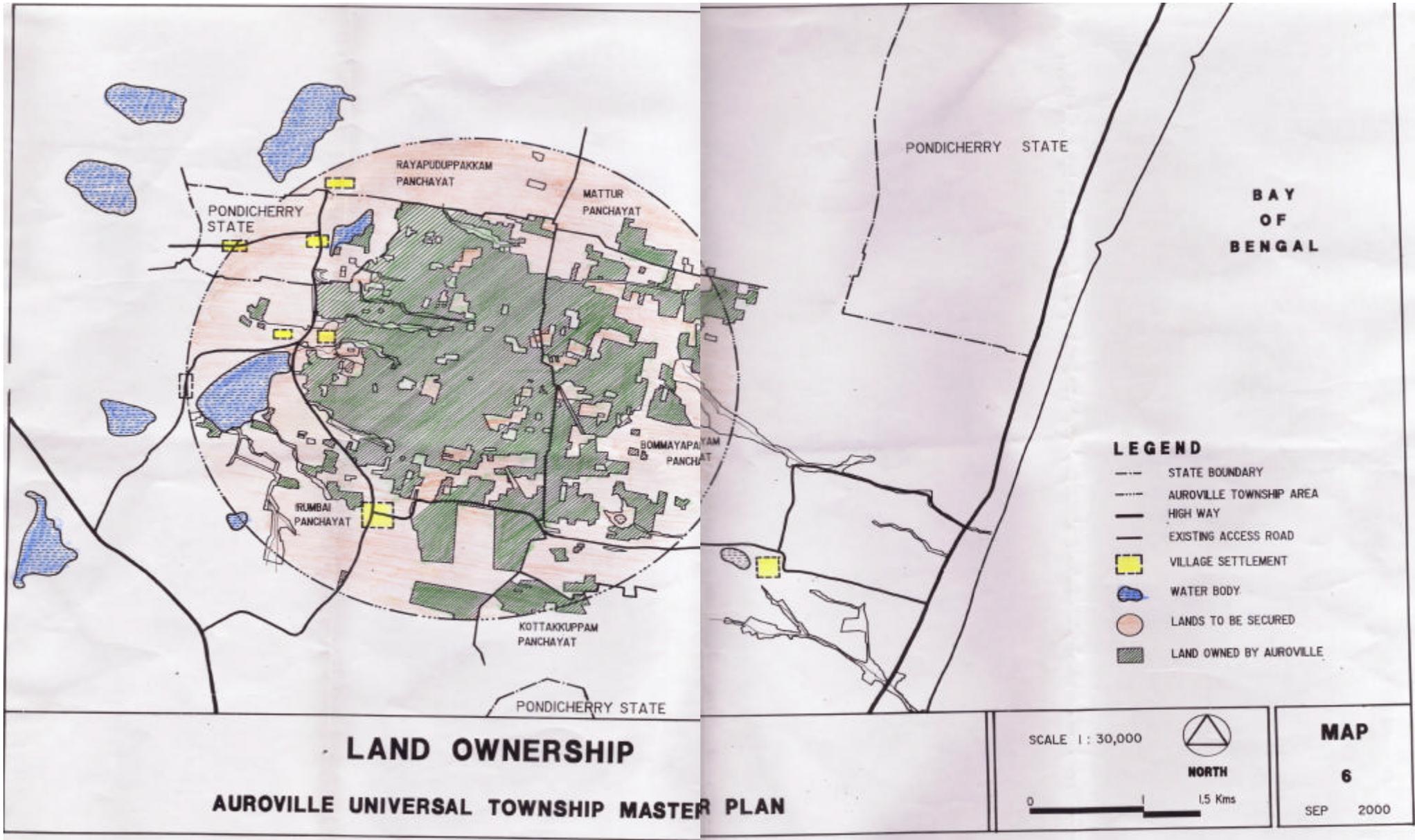
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APPENDIX A: PANCHAYAT BOUNDARIES



APPENDIX B – EDAYANCHAVADY MODEL VILLAGE PROJECT

Turning Edayanchavady into a Model Village Budget & Funding as on May 22nd 2001

Budget:	<u>Amount in Rupees</u>
Buildings Component:	
Community Hall	12,50,332.37
Renovation of the ancient "Chavady"	1,49,421.29
Public Library	1,00,000.00
Development of the main Central Plaza:	<u>2,24,993.45</u>
Sub total building component	Rs 17,24,747.11
Streets & Drainage:	
Concrete streets (3.5m wide in average) (1,072m @ Rs 1,463/m)	15,68,336.00
Drainage (200m @ Rs 585/m)	1,17,000.00
"L" Drainage (100m @ Rs 387/m)	38,700.00
Contingencies @ unforeseen expenses (3%)	<u>51,721.00</u>
Sub Total streets and drainage	Rs 17,75,757.00
Water Supply Improvement	
Overhead tank (60,000litres) (to be located near Udavi School)	
Pipe line from new tank to street line	
Valve pit (2 Nos.)	
Pipe line (4km)	
New Street taps (2 double)	
Existing street taps to be repaired (19 Nos.)	
Sub-total main supply	7,94,500.00
Hand Pump in Mattu Street (200ft deep)	77,000.00
Repairing hand pumps	<u>42,000.00</u>
Sub total Water Supply Improvement	Rs 9,13,500.00
Total Budget as on May 22nd 2001:	Rs 44,13,500.00
	Rupees Forty four lakhs thirteen thousand five hundred
Funding:	
Hudco towards Building component and Street & Drainage component	17,50,000.00
Danida towards Water Supply Improvement	7,83,000.00
Edayanchavady Village towards Water Supply Improvement	<u>1,30,500.00</u>
Total amount already sanctioned as on May 22nd 2001	26,63,500.00
Other potential sponsors (MP, MLA, etc.) are now approached for the balance amount.	

