



THE ROLE OF WOMEN IN SUSTAINABLE SOLID WASTE MANAGEMENT AND POVERTY ALLEVIATION IN RURAL SRI LANKA

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Abstract

This paper is a case study from Vavunia, a rural town in Sri Lanka.

Solid waste generated from human settlements causes problems in many part of the world due to lack of proper disposal facilities. The practice to disposing of solid waste in low lying areas and adjacent to waterways is common in Sri Lanka, as in many other places. This leads to enormous problems and degradation of the environment and ecosystem. Remedial measures were undertaken in Vavunia (a rural town) with the active participation of the women living there. Rural society is closely knit and its members work together better than the residents of urban areas, who are often more cosmopolitan. An affordable, low-technology solid waste disposable system, which could be managed by the women in the community, was established with community participation. This led to income generation and employment opportunities.

1. Background

Vavunia is a rural town located in the Northern Province of Sri Lanka. The economy of the town is based on agriculture. It is one of the regions with the lowest per capita income in Sri Lanka. The Urban Council of Vanunia is responsible for solid waste management. However, the lack of a comprehensive solid waste management system created serious problems in the vicinity of the town and surrounding area. Most garbage produced was dumped along the streets and was pilfered by birds, animals and waste pickers. The local authority did not have capacity to remove the ten tons of solid waste produced daily.

The solid waste dumped along the streets putrefies rapidly due to the high ambient temperature, which ranges from 32°C - 34°C in this area. Furthermore, there were instances of garbage falling into the stormwater drains and clogging them with organic matter, polythene film, other plastic material etc. This contributed to flooding during the rainy season and polluted the lake located downstream of the rural town. The lake was emitting a most unpleasant smell during the dry season as a result of eutrophication and anaerobic conditions caused by leachate from solid waste flowing along the storm drains and from the piles of waste located along the embankment of Vavunia lake. This pollution was contaminating the pipe-borne water supply of the town.

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In Sri Lankan rural society, women are occupied in managing the homes whilst the men work and earn a living for the family. Therefore solid waste is handled by women. The solid waste generated from Sri Lankan homes has a high content of organic matter and moisture, giving it a low calorific value. This is in contrast to waste generated in of to collecting the waste in the back yard of the house as open dumps or disposing it along the road and allow it to degrade naturally and finally burning it. This practice created an unhealthy environment with heaps of solid waste being burnt in back yards or along the streets.

Ten (10) tons of solid waste was generated daily in Vavunia, of which 60% was from the domestic sector and the balance was from the market and other Institutions.

The constituents of the solid waste in Vanunia is given in Table 1. 80% to 90% is organic waste. Some of the non-organic and hazardous components have some economic value, and were being collected by self-employed (informal sector) waste pickers.

Table 1 Constituents of the solid waste in Vavunia

Organic – compostable	Non-organic – recyclable	Hazardous
Vegetables	Bottles	Batteries
Fruits	Tins	Used oil
Coconut husk	Broken glass	Paints
Young coconut shells	Fertiliser bags	Pesticide bottles
Dried leaves	Shopping bags	Herbicide bottles
Banana leaves	Polythene bags	
Tree cuttings	Clothes	
Egg shells	Tyres and tubes	
Slaughter waste	Building debris	
Fish waste	Plastic items	

2. Description of the project

2.1 Introduction

This situation led, in 1995, to the establishment of a comprehensive solid waste management programme which was designed to be suitable for a rural town with an agricultural economy, and which focused on mobilizing the community. The project was funded by the German Agency for Technical Cooperation (GTZ). Initially a foreign expert was employed for three months to decide on the treatment process to be used. Meanwhile, two expatriate staff, one with an engineering background and other with social mobilization skills, were employed for two years to select the most suitable technical option for solid waste management and mobilize the community towards a change in behaviour in relation to solid waste. Local people were trained in both aspects. The budget for the solid waste management programme was \$300,000 for a span of five years, from 1995 to 2000. Implementation was completed in October 2000, and since then waste management has been handled by the local authority. Initially the composting yard was tendered to the private sector by the local authority for \$10,000 and was managed by this operator until 2002. Additional income to support this work was generated by increasing the assessment tax.

In May 2002 the local authority took over the compost yard management. Presently a lady supervisor and six labourers are employed to handle composting.

Sri Lanka has no experience in solid waste disposal other than open dumping by the local authority. However, informal composting has been practised by farmers for ages, but was decreasing in scale after the introduction and intensive advertising of chemical fertilizers, pesticides and herbicides in the 1960s.

The project concentrated on the major producers of waste and the target group was empowered in managing the waste. As mentioned earlier, house wives were the main stakeholders who needed to be addresses on effective solid waste management, empowered with responsibility in taking decision and participating collectively with the community in the vicinity.

2.2 Public awareness and training

The *software* component of any programme is difficult and time consuming. Creating awareness in the rural community and changing behaviour patterns took a long time. Efforts were focused on creating a good understanding of simple techniques such as segregation, composting and other aspects that lead to a cleaner environment. Mobilising the community was done by dividing the target group into clusters of 15 to 20, represented by group leaders chosen by the communities of the respective areas. The Environment Officer, Community Development Officer, Public Health Officer and Technical Officer were entrusted to carry the message to the people. This was done in three stages, namely

- Propagation of the need for good solid waste management.
- Distribution of leaflets and demonstration of pilot composting.
- Enabling individuals to undertake home composting with assistance from the project staff.

The rural community is a conservative society in which the women do not mix freely with men. Therefore the awareness programme was conducted by a lady environmental officer attached the local authority and so the community was happy to allow her to visit homes. She was provided with information in pictorial form, that depended less on reading, to make it easy to transfer the message amongst the target group.

Unlike in urban areas, the rural women do not feel free to discuss with males during an awareness programme. So with a female environmental officer they were able to exchange ideas and opinions and visit the homes undertaking composting during working hours and to learn how to improve the process, how to use the compost and to sell it to the farmers who collect cow dung on regular basis to be used in the paddy fields.

Initially small group meetings were conducted by the lady environment officer attached to the local authority to create awareness and to explain the value of domestic solid waste. They were also made aware about good practices used in the past to compost and use spread decomposed material in the agricultural field as soil conditioner and enhance the nutritional value of the soil.

Small group meeting were organized with the active participation of community leaders. Discussion was facilitated by the Project amongst the target group such that by word of mouth the message on composting was propagated. They started using compost for home gardening.

The awareness programme communicated message, on the segregation of waste, the degradability of various item in the garbage, the economic value of metal, firewood, bottles, polythene etc. for the collectors of garbage attached to the urban council (local authority). They were also made aware that hauling of waste takes considerable time and that the operation had been changed by the construction of a transfer station though which the waste would pass before it reached the compost yard. Once they were familiar with the change in operation strategy, there was a significant improvement in the daily collection of garbage.

Home composting was included into the school curriculum with the blessing of the local education department officials. Initially teachers were given training on solid waste management. Subsequently, they taught the children attending school. Assistance was provided by the lady environmental officer enabling them to construct compost bins using local materials. Once awareness was created in schools, an exhibition was organised in the local authority grounds. The theme was "Appropriate methods for solid waste management". The stalls were prepared by the school children to depict the problem of solid waste and how it could be managed at domestic level and how cash could be generated from trash. The Project offered prizes for the best three stalls carrying the most appropriate messages to the community. The exhibition was well attended by the rural community and it gave an insight to handle waste in organised manner.

2.3 Equipment

Different coloured plastic buckets were given out in the commercial area for segregation of waste into degradable and non-degradable materials. A leaflet was also distributed along with the buckets. To give importance to the Comprehensive Solid Waste Programme, the Government Agent of Vavunia was invited to hand over the buckets to the recipients in the vicinity of the town.

Some new collection carts were added and some modifications were made to the carts such that they could be moved along narrow roads or pathways. The fleet of tractors and trailers was improved by increasing the height of the trailer to accommodate a greater load. A transfer station was constructed to enable the transfer of garbage to bigger trucks. The compost yard was constructed in a planned manner to receive solid waste and to stack it in windrows and so produce compost for sale.

3. Impacts of the Project

It was suggested to have a green day once a fortnight to collect large tree cuttings, such as the large branches that were left on the road and later burnt. Following the awareness programme, people who used to burn the yard sweepings started to compost the leaves and other material falling in the vicinity of the house rather than burning it each day.

While home composting took the lead regarding the change of attitude, non-degradable material with economic value such as bottles, tins, tyres, tubes, cardboard, paper etc. were collected and sold to informal sector collectors.

The overriding factor in solid waste management is the priority given to it by the generators. The contribution to poverty alleviation of solid waste management has less priority due to the lack of past experience. However once the beneficiaries are made aware of the opportunities for income generation, by means of relatively simple ways of handling the waste – composting and selling recyclables – they do give consideration to these issues and change in their behavioural patterns. Further it encourages leadership, empowerment, ownership etc. which were some of the motivating factors.

Firewood is the source of energy for the poor. But when unwanted large trees were cut in their compound the wood was simply burned in the open due to the difficulty of cutting it into small pieces. This was the practice which prevailed. The community was mobilized to organize the informal sector to saw and chop trunks and large branches into sizes that could be used for firewood, and so conserve resources and generate income for the poor.

The domestic sector was organized in handling the solid waste and the informal sector was continuing to collect non-degradable items such as metal, tins, bottles, cardboard polythene etc. which were reusable or recyclable. Attention was drawn towards the other major producer of garbage from the town area. The market generated large quantities of organic waste with little non-degradable material mixed with it. The degradable organic matter mainly comprised of cut and spoil vegetables. It was

transported to the compost yard maintained by the local authority (previously maintained by private sector). Composting was done in windrows. Good quality compost was made in 50 days. The composition of compost showing some constituents useful in agriculture is given in Table 2.

Table 2 Composition of compost

Parameter	%
Organic Matter	43.40
Nitrogen	1.56
Potassium	1.11
Phosphorous (as P ₂ O ₅)	1.33

The compost was field tested and the farmers were of the opinion that applications of herbicide and pesticide were reduced significantly. The soil which was degraded due to repeated use of fertilizer (salinisation) was regenerated and high yields were achieved with cash crops such as tomatoes, brinjals (aubergine) and chillies.

Compost was sold at Rs 10/- (10 US cents) for a 5 kg packet or a trailer load at Rs 500/- (US\$ 5) which was covering cost of production of the compost. The compost yard provided employment for 5 males and 3 females. Women were employed to weigh and pack the compost while the men were stacking the garbage in windrows.

While the project was introducing solid waste management in Vavunia, those involved tried composting in Colombo, the capital city of Sri Lanka. This was undertaken voluntarily in individual houses and flats. Composting was done on a small scale in Colombo due to lack of space. The containers (used tins or barrels) were not heavy and had light lids. Problems were encountered with crows and animals like cats, rats and rodents looking for food and toppling the containers, and rows of ants looking for food were often seen. These problems were unforeseen and unthought-of when initiated on a small scale in the city. The compost was of good quality and used in flower pots. Segregation of waste was essential as city dwellers discard significant amounts of non-degradable material.

4. Conclusion

4.1 Sustainability is achievable if it is demand driven

A successful solid waste programme was implemented in Vavunia with a bottom-up approach involving community participation. The target group was identified and the stakeholders were made aware of the benefits of proper solid waste management. This activity was an off-shoot of the Vavunia Water Supply and Sanitation Project because the raw water source – the lake of Vavunia – was getting contaminated and eutrophication of the lake was imminent. The residents of the area were made aware of the catastrophe they were creating and that their co-operation was essential. Community participation and widespread understanding the problem resulted in the success of the Project. Interest was shown by the Chairman of the local authority of Anuradhapura (a sacred city about 40km from Vavunia having the same environmental and social conditions). Though the initial ground work was done, a lack of funds prevented it from getting off the ground.

4.2 Ambiguity in the measurement of the success of a project.

A major shortcoming in many projects is that physical and financial progress – which are related to hardware project components – are used as indicators to measure progress. However, software

aspects such as mobilising the community, empowerment, and acceptance by the user groups are given low priority as they consume a lot of effort and time which are needed to understand the social and cultural patterns of the target community. Software components need less money whereas hardware components show rapid financial disbursement, which many funding agencies prefer.

4.3 Absence of national policy and guidelines on solid waste management

Solid waste management is given low priority by policy makers though it is one of the biggest problems in all local authorities in Sri Lanka. Open dumping is becoming a major health hazard. Leachate from solid waste has BOD values higher than 20000mg/l and it pollutes the natural watercourses. Remediation is very expensive and it might be too late to undertake it. It is better now than later.

Methods for managing solid waste vary from place to place. It follows that different localities should be empowered to select the most appropriate disposal method. Management guidelines should be developed to explain different options, cost implications, required resources and capacities to handle the task.