

IMPACT OF WASTE MANAGEMENT TECHNOLOGY ON WOMEN WASTE WORKERS IN COMPOSTING – A CASE STUDY OF ERNAKULAM

Dr. T. Dhanalakshmi*

Abstract

Kochi generates 400 tonnes of solid waste per day from domestic, trade, commercials, hospitals, streets and open spaces. These waste materials contain both organic and inorganic components and comprise 67 per cent from households and commercial establishments, 10 per cent from market places, 10 per cent from hospitals and the rest from hotels and restaurants. Not much industrial waste is generated in the city. Waste generation increases year by year on account of the growing population, increased consumption and increasing presence of non degradable substances in the waste streams causes environmental pollution. Thus the environmental pollution caused by waste material is a major health hazard. Also the left uncared substances get into water bodies, pollute air, clog sewers and drains, pollute water distribution networks, sewerage as breeding ground for several pathogens, get littered all around by birds, insects, rodents, etc., degrade sanitation and spoil aesthetic neighbourhoods. By this urban life is rendered prone to break out of epidemics like gastroenteritis, cholera, chikunkunya, etc., in the absence of well managed treatment facilities. Kochi Corporation and various Municipalities in the District near to Kochi city have recently introduced processing unit for waste management system. They have mobilized the units of ‘Kudumbasree’ – the flagship poverty alleviation programme of Government of Kerala, to take over door to door garbage collection and segregation in the city. This paper seeks to frame policies and programmes for women workers who deal waste at source and focuses on activities of Kudumbasree in solid waste composting in Kochi, including the health impacts of Kudumbasree women workers during collection, segregation and composting.

Key words: Kudumbasree, Solid waste management, Composting, Health Impacts.

**Professor, Matha College of Technology, Manakkappadi, North Paravur, Ernakulam*

Introduction

Women’s studies can be of tremendous value in generating consciousness about the multi-dimensional roles played by women in society. A woman is not only a mother, a wife, a daughter or a sister, she is also a human being. She is an individual entity in her own right and affected by social technological and environmental changes. She too contributes towards the development of the nation even though for the most part she remains behind the scenes. As the present study concentrates on technological impact on women waste workers in solid waste management, it is necessary to know about the Kudumbasree. Collection of waste is a critical phase in solid waste

management as much as transportation and final disposal and hence requires special consideration. Door to door waste collection by Kudumbasree is considered as an informal solid waste management system based on collection, rather than disposal of waste materials. It is evident that in most big cities there is a large informal sector of waste collection within which various groups of Kudumbasree have differential access to various types of wastes. The most visible among them is the door to door collector who stalks the city roads, diligently combing residential and commercial areas on foot with tricycle carrying garbage and in search of reusable materials in the city. The system of waste segregation is also readily visible on

municipal processing yard that receive domestic, institutional and commercial solid waste. It is seen that the modern consumption pattern, waste generation and increase of recyclables in the final streams of waste have made even municipal dumping yard more worthwhile. Kudumbasree are seen collecting waste from the households and commercials to the municipal dumping sites and retrieve paper, plastics, rags, metals or everything that possesses intrinsic value and sell the reusable items to middlemen for onward processing. Composting of bio-degradable waste is yet another task carried out by the Kudumbasree in Ernakulam district.

Analytical significance

The globalization and especially technological transformation opened the door for women new opportunities towards their work life. Now, women occupy in all the occupations and professions, which were occupied by men earlier. Women are increasingly engaged as successful professionals like Medical Practitioners, Nurses, Teachers, Lawyers, Bankers, Lecturers, Librarians, Information Technologists, Engineers, etc. But, the women are not like men. Earlier there were the responsibility that the men have to lead the family and work outside for earning and women have to look after the household work. But now, the women also working outside like men and looking after the household work.

There are specific relationships between women's work and wastes that should be investigated by sociologists. Amongst the urban poor, women are usually the main providers or organizers of daily household needs; they collect fuel as well as prepare food and fetch water. They often take responsibility for repairing shelter interiors. Thus, when household survival strategies depend to some extent upon waste collecting and reuse, women's work is closely linked to the nature and availability of wastes. In many cities, large

numbers of the door to door waste collectors are women and build regular occupations upon wastes. Women are highly disadvantaged in this work. They are generally paid less for the wastes. They work in cramped and unsanitary conditions for long hours and low returns. Generally it is observed that the economic condition of the Kudumbasree is not so good, also the social, psychological and health conditions may not be good. This is so because, the Kudumbasree women, have certain socio economic and environmental challenges such as cleaning the environment by performing a role of waste collectors, the Kudumbasree face various problems like ill-treatment, low pay, compensate for their lack of cash for daily needs or for work, there is also problems of poor health conditions due to solid waste pollution and in such way the Kudumbasree have to face many challenges.

Solid waste management that comprises of collection, segregation, disposal and even composting of degradable wastes. As already noted this is a formidable task and Kudumbasree is doing a commendable job in this regard. But the positive contribution and intrinsic role of the Kudumbasree in the solid waste management is neither recognized by the citizens nor municipal authorities. The major problems of Kudumbasree could be devaluation in status and income, deteriorating health and fear of working in unhealthy environment. There are high occupational and health hazards related to waste management practice like skin disease, cough, etc. Kudumbasree working in solid waste management should be caring as women should be workable. However, nobody prefers to work with waste for full time a day, as underprivileged women are looked upon as negligible, illiterate and useless. This leads to various problems like cultural rejection, self-rejection, anxiety and panic, psycho-physiological exhaustion and isolation.

Review of literature and research gap

There are many studies conducted on the different aspects of working women in different professions. Similarly there are studies relating to effective management of solid wastes, (Pachauri R.K. and Sridharan P.V, 1998); including creating wealth from proper treatment of solid wastes (Sunil Khanna and Krishna Mohan, 1995). Studies focusing on Kudumbasree activities are also not scarce; some of them focusing on specific segments of Kudumbasree activities while some others are general studies that touch upon all aspects of Kudumbasree activities. For instance, Archana Sinha (2004) [1] in her paper has observed the vital need for empowering women to enable them to have greater control over the use of scarce natural resources. Manoj P K (2010) [5] has done a focused study of the housing microfinance activities of Kudumbasree which are organized under a specialized scheme called 'Bhavanasree' – the housing microfinance (HMF) initiative of Kudumbasree. The problems and prospects of 'Bhavanasree' scheme, its efficacy in fulfilling the housing needs of Kudumbasree members and hence its potential for women empowerment have been studied. Based on the study findings strategies for better performance of the scheme have been suggested in this paper. A recent research paper by Manoj P. K (2002) has observed the high women empowerment potential of micro enterprises under Kudumbasree, and has accordingly suggested a few measures for further improvement in the performance of Kudumbasree microenterprises and hence the empowerment of women entrepreneurs who run such micro enterprises.

But till now, only a few studies were made to know about the status of women in solid waste management. There are very few detailed studies on the life and working of Kudumbasree in cities. Hence, the present study analyses the socio-economic, psychological and health conditions of the women workers under Kudumbasree who are engaged in composting.

It is organized as a case study of Ernakulam city in Kerala.

Ernakulam City: An Overview

Ernakulam district of Kerala state lies between 9 degree 47' and 10 degree 17' and longitudes 76 degree 9' and 76 degree 47' and is bounded on the north by Thrissur district, on the east by Idukki district, on the south by Kottayam and Alappuzha districts and on the west by the Arabian Sea. Ernakulam is the commercial capital of Kerala. The Ernakulam district includes Kalamassery, Paravur, Angamaly, Aluva, Thiruppunithura, , Moovattupuzha, Kothamangalam municipalities and Kochi corporation, they look after urban development in the city. Industrially also Ernakulam district is one of the most developed districts of Kerala. It has a population of 3.09 million. With the increase in population and economic growth waste generation rate is higher in cities. Garbage lying on the streets for days is a common sight. Sometimes a municipal truck collects and heaps the garbage inefficiently, spilling it all over. The garbage is then either dumped as landfill material on the outskirts of the city or burnt, producing foul smoke and creating unhygienic conditions. It is also reported that potential air pollutants like particulates, CO, CO₂, CH₄, N₂O, NO_x, SO_x, HC₁, HF, H₂S, Chlorinated hydrocarbons, Dioxins/furans, Ammonia, Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Zinc, etc. emitted by these landfills into the environment are the highest in this district and are even beyond the level of tolerance. Also, the water pollutants emitted from landfills like BOD/COD, Suspended solids, Total organic compounds, AOX(Adsorbable Organic Halides), Chlorinated HCs, Dioxins/furans (TEQ), Phenols, Aluminium, Ammonium, Arsenic, Barium,

Cadmium, Chloride, Chromium, Copper, Cyanide, Fluoride, Iron, Lead, Mercury, Nickel, Nitrate, Phosphate, Sulphate, Sulphide, Zinc, etc. are found to be more harmful in many ways to the life and property of human population. (Pollution Control Board, 2000; National Environmental Engineering and Research Institute, 2000).

During the decade, many stakeholders have initiated various innovative solutions to the problems of urban environment, particularly solid waste management. The most important task in solid waste management is segregation of waste. The more it can be done at source of waste generation; the better is the result of safe waste disposal. Even application of modern technology like composting, refuse derived fuel requires segregation of wastes. And here lies the central role of Kudumbasree, often collects the segregated waste from the door steps of urban households and commercials initiated solid waste management process, particularly compost processing unit. Against the above background the study reveals the impact of technology on women particularly Kudumbasree in urban solid waste management in Ernakulam.

Objectives of the study

The present study has set the following as its major objectives:

- (i) To study the socio-economic profile of the women members of Kudumbasree engaged in solid waste management, with reference to selected areas in Ernakulam;
- (ii) To identify the health problems of the women members of Kudumbasree who are working in compost units;
- (iii) To study the psychological conditions of the Kudumbasree waste workers under study, and also their level of satisfaction in the life and their job;

Materials and methods

The present study is conducted by a questionnaire survey. That is the researcher prepared the questionnaire, by considering different aspects of the Kudumbasree workers in compost units. In addition, the researcher conducted personal observation with the selected Kudumbasree members indulge in door to door waste collection and waste segregation in the processing yard. The secondary data are obtained from books, journals, reports published by the Government of Kerala, and official records of Kudumbasree units relating to the selected Panchayats and Municipalities under study.

Five municipalities Kalamassery, Paravur, Thirupunithura, Muvattupuzha and Thrikkakara are indulging Kudumbasree for solid waste collection and processing (composting) in Ernakulam. The study has covered about 50 Kudumbasree women who are working in compost units for more than one year. It may be pointed out that the study has not included the recently placed Kudumbasree waste workers, as they lack the adequate level of field experience that is required for responding to the questions raised by the researcher as part of this study. The Kudumbasree covered under the study have been serving under municipalities in Ernakulam and are settled in Ernakulam too.

Results and discussions

The present study covers the socio-economic, psychological and health aspects of the Kudumbasree working in composting. The collected data are analyzed hereunder:

Age-wise Distribution of the Respondents:

The age of the Kudumbasree covered under the study, determines their health conditions and their position in their families. It is noted that there is no specification on qualification and no age limit for registering Kudumbasree. Child labourers are prohibited and there were no evidence of child labours in any municipalities. Hence, the age of the Kudumbasree in solid

waste management covered under the study are presented in the Table I.

Table I. Age-wise Distribution of the Respondents

Age groups	Number of respondents	Percentage
Below 35 year	11	22
36 -45 years	19	38
46 - 50 years	13	26
Over 50 ears	7	14
Total	50	100

(Source: Survey Data)

One often comes across in our cities and towns solid waste materials that are improperly treated and left in open places near to human habitations. Uncollected wastes often end up in drains, causing blockages that result in flooding and problems of sanitation. Flies and mosquitoes breed in some constituents of solid waste leading to spreading of diseases. Waste collection workers and workers in processing yard face occupational hazards like strains from lifting, injuries from sharp objects and accidents. It is interesting to note that 38 percent were in the age group of 36-45. There were 26 percent of Kudumbasree between the age group of 46-50 years. 22 percent of Kudumbasree were below 35 years. And only 14 percent were in the older age, which leads to the conclusion that there are higher numbers of Kudumbasree in the age group of 36-45 years. (Table II).

Table II. Marital status of the Respondents:

Particulars	Number of respondents	Percentage
Unmarried (single)	12	24
Married living with spouse	28	56
Widows	7	14
Divorcees	3	6
Total	50	100

(Source: Survey Data)

Family problems and concerns

It was asked to the respondents, what are the problems, which made them to take waste management work. They include the daughters’ marriage, son/daughter’s employment, children education, increase in loans, to meet the daily needs, etc. The responses of the respondents are presented in Table III.

Table III. Family problems and concerns

Kinds of family problems	Number of respondents	Percentage
Increase in Loans	14	28
Daughter’s marriage	9	18
Children’s education	7	14
To meet the daily needs	12	24
Any others	5	10
None	3	6
Total	50	100

(Source: Survey Data)

Social Issues of Kudumbasree

The social and cultural implications of female employment in solid waste management are profound, little understood, and almost never addressed in environmental critiques of the sector; while this should not necessarily be allowed to delay implementation of environmental and solid waste initiatives, it is a glaring gap in any systemic effort to understand the sustainability implications of the sector. Women in municipal solid waste processing in particular is important for socio-economic and technological development. Their presence is a vital pre-requisite in running modern solid waste management practices and play an important role in solid waste management system. The composting of biodegradable waste by Kudumbasree, which is the disparity between the adoption of source reduction of waste in the developed and developing world, continues to contribute to the gap in wealth. While there are many factors associated with composting of solid waste, the expense of collection and infrastructure is one important obstacle. In addition, segregation of waste is a key process for waste reduction and if used appropriately can bring important benefits for households,

municipalities, and their interaction. Collections of segregated solid wastes are capable of incorporating an individualized interactive approach where the waste management practice is not only presented to the households but also received from the households. Lack of resources in developing countries and low income communities in some developed countries create an environmental damage not only affects the environmental per se but has an important impact on societies.

Lastly, note that composting of solid waste is a source of employment in developing countries. Although the environmental and human negative impacts of informal waste collection are clear and present, that the sector opens job opportunities also needs to be understood and addressed.

Most of the Kudumbasree were from lower socio-economic strata are lived in slums and were of the age-group above 25 years. Poverty and unemployment were found to be the overriding reasons of joining this work. The reason for working with city solid waste management system is that it does not require any investment, skills, references or even a guarantor.

Residential Status

87 per cent stay in slums and colony. Since it is difficult to run the family, they collect the recyclables from households and commercials and get saleable amount.

Social capital among Kudumbasree

Social capital is defined as the help that comes from people during times of distress. Borrowing and lending money and giving advance money were found to exist. Some of them owned assets like house, land, etc.

Educational background of Kudumbasree

Education is certainly not a priority for these Kudumbasree as expected. 4 percent of them are totally illiterate, 24 percent of them can read and write, 50 percent of them have completed

primary school and 22 percent of them finished their middle school. The low educational level of Kudumbasree is the reflection of the lack of finances or inclination for education within the households. (Table IV).

Table IV. Educational level of Kudumbasree

Educational levels	Number of respondents	Percentage
Illiterate	2	4
Can read and write	12	24
Completed primary school	25	50
Completed middle school (V to VIII)	11	22
Total	50	100

(Source: Survey Data)

Earnings of Kudumbasree

The employment opportunities in city like Kochi for urban poor are very limited because they lack education or employable occupational skills. Most of these Kudumbasree undertook different kinds of petty income earning activities before they joined in Kudumbasree for composting. Door to door waste collection enhancing reuse and recycling activities, especially in developing countries. Their economic scale and growth is difficult to gauge because current economic statistics and modeling systems generally ignore reuse, recycling, and waste management activities compared to traditional sectors such as agriculture, manufacturing, and services. Moreover, in the developing world recovering reusable materials and materials from obsolete equipment is a source of income for poor communities.

A typical day of waste collectors begins anywhere between 7.00 a.m. and 8.00 a.m. in order to have easy access to waste, whereas a waste segregators begins their work between 9.00 a.m. and 10.00 a.m. in the waste processing yard. At the end of each month of work, fetches an income ranging between Rs.30 to Rs.75 per house per month and the waste segregators earn @ Rs. 140 per day as daily wages. The earning

of door to door waste collectors and other Kudumbasree in Ernakulam are obviously influenced by number of houses covered and the market value of the recyclable wastes. It seems waste materials are offered more and more cheaply and in increasing quantities to the middlemen in the waste recycling sector. The daily earnings are variable, depending on several factors, such as season, time of the day, routes taken for waste collection and sources of waste generation. Taking the sample as a whole, the average monthly earning of door to door waste collectors in Ernakulam appeared to be around Rs. 2000 and waste segregators at the processing yard appeared to be around Rs.3000 per month (Table V).

Table V. Earnings of Kudumbasree

Range in Rs	Total respondents	%
Less than Rs.1500	7	14
1501-2000	10	20
2001-2500	9	18
2501-3000	11	22
Above 3001	13	26
Total	50	100

(Source: Survey Data)

The overall picture shows that 48 percent of the Kudumbasree are getting Rs.3000 and above per month. Discussions with these Kudumbasree revealed that most of the waste workers did not undertake waste collection or segregation on their own interest. They tried to search some work or employment opportunity with fixed income, however unable to obtain some kind of work; they finally decided to enter in waste composting.

Organized Strength

Organized forum or strength is an important means of problem solving for the urban poor for various reasons. In recent times, some initiatives are taken by, municipalities and

panchayat, to organize Kudumbasree for their betterment and improvement in working conditions. 28 percent of the Kudumbasree waste workers engaged in composting felt that nothing can be achieved by any of these organizations, whereas 58 percent felt that organization could give some strength for better bargaining and mitigate their work related problems and issues.

Table 6. Feeling about Organization

Responses	Number of respondents	%
Give strength for better bargaining	29	58
Nothing can happen	14	28
No response	7	14
Total	50	100

(Source: Survey Data)

Most of the Kudumbasree were largely pessimistic about their future in the city and hence were hesitant about them getting involved in any kind of organizational activities. However, most of the waste workers preferred various organizations and co-operatives would serve their objectives better in the waste processing sector in the Ernakulam city. The Report of the Committee constituted by the Hon.Supreme Court of India (1999) suggested that the local body may also encourage NGOs or cooperatives to enter this field, organize collection and processing of waste and provide them an opportunity to improve their working conditions and income.

Health Problems of the Kudumbasree

There are potential risks to environment and health from improper handling of solid wastes. Working at garbage disposal site or near waste collection point or on city roads bring these Kudumbasree in close contact with hazardous waste, which not only makes them smell dirty, but also proves to be a source of a large number of health complaints or infections. More recently a study by the US public health service has demonstrated the relationship of 22 human diseases to improper solid waste management. Epidemiological studies have shown that a high

percentage of workers who handle waste, and of individuals who live near or on waste disposal sites, are infected with gastro intestinal parasites, worms and related organisms. Waste being a breeding ground for vectors, rodents and vector insects transmit various diseases like dysentery, cholera, typhoid, infective hepatitis and others.

People collecting waste may be injured by sharp objects, including glass, metal and wood. These may lead to puncture wounds and lacerations which may become infected and cause serious morbidity. Even stray dog bites are found to be quite common. Headaches and back pains are also common among the health complaints. Exposure to fumes in waste dumping sites results in respiratory problems and tuberculosis. More recently, even AIDS has been found to be a risk through accidental contacts with infected sharps in municipal waste. The waste collectors often unknowingly rummage through all kinds of hazardous wastes while trying to recover reusable items from the mix waste. The health of waste collectors is affected at two levels, one arising out of their living conditions in which they live and the exposure to disease and infections resulting out of their waste handling work.

Table VII. Health Problems of Kudumbasree Waste Workers

Name of the diseases	Number of respondents	Percentage
Skin diseases	12	24
Head ache	20	40
Backpains	7	14
Others(Cholera, typhoid,)	5	10
None	6	12

(Source: Survey Data)

It is noted that most of the Kudumbasree covered under the study, are suffering from different kinds of problems. Of which, major problems are skin diseases, head ache etc. The collected data revealed that a few of the

respondents are suffering from more than one health ailment. The data collected are given in Table VII

Working conditions and occupational health

Most of them accept this as a means of earning livelihood as they have no other option. They used bare hands and feet to rummage in the waste. It was seen that most of the waste workers used bare hands while handling waste during composting process. None of them were found using protective gear like gum boots or gloves. It was seen in the study that the absorption of labour in the processing units varies. Though the units employ males and females, the proportion for female labour is the highest. They have no technical qualification and are mostly casual rather than permanent or contractual. Most of them are underpaid. Generally adult males are employed in mechanized production. The workers are provided with protective gear like gloves, masks, etc, while working. But they are not using it whenever needed. Hence they face a number of hazards like safety hazards, hazards related to material handling and unsafe access to materials, health and hygiene hazards during processing of wastes.

Mental Depression and Feeling of Insecurity

It was asked to the respondents that whether they are feeling unsecured and depressed. The different studies related to the waste workers, revealed that due to different problems such as ill health, ill treatment from the society, lack of adequate income and economic power, the waste workers suffer from depression and feeling of insecurity. The responses of the respondents covered under the study are presented as under:

Table VIII: Whether Mentally Depressed and Feeling Unsecured

Particulars	Number of respondents	%
yes	37	74
No	13	26
Total	50	100

(Source: Survey Data)

Major findings of the study

1. Of the total Kudumbasree covered under the study, about 64 per cent of them are in the age group of 36-50 years, 22 percent of them belongs to the age group of below 35 and 14 per cent of them are having the age of over 50.
2. Regarding marital status of the respondents, 56 per cent are married and living with their husbands, about 24 per cent unmarried, 14 per cent widows and remaining 6 per cent are divorcees.
3. Of the concerns, worries and family problems of the Kudumbasree covered under the study, increase in loans represents the most chronic problem and is faced by as high as 28 per cent respondents, followed by the difficulty to meet the daily needs which is faced by 24 per cent of the respondents. Thirdly comes the problem of raising funds for daughter's marriage which is a major concern for 18 per cent. As high as 14 per cent respondents has stated that children's education is a major concern of worry, and 10 per cent of the respondents have had other kinds of problems. It is worth to emphasize that only 6 per cent of the respondents have stated that they have none of such problems.
4. As stated above, majority of the women in solid waste composting are concerned about their health problems. It was asked to the respondents, to explain their specific health problems. Specifically, of the Kudumbasree are suffering from head ache (40per cent), skin diseases (24.00per cent), back pain (14per cent), and other disease (10per cent) and it is also noted that 12per cent of the Kudumbasree women covered under the study are healthy and not suffering from any kind of health problems.

5. Me depression and feeling of insecurity are common among waste workers. For this purpose, it was asked to the Kudumbasree that whether they are suffering from such kind of feelings. About 37 per cent of the respondents feel that they feel insecure, depressed and lonely and the remaining 13 per cent of the respondents do not have such kind of feelings.

Concluding remarks

In view of the foregoing it is noted that Kudumbasree waste workers are doing a commendable job for the betterment of the society by bringing about a healthier and cleaner living surroundings for the public. But, in spite of doing a vital job that is a pre-requisite for any modern society, the lot of waste workers is often ends up as a thankless one. The most embarrassing situation is that waste workers by doing their 'dirty job' find that their own health, financial condition as well as socio-economic status are often at stake. The above situation warrants policy decision of the authorities for more considerate treatment of the waste workers and ensuring that they are receiving timely health care, insurance protection, pension and such other benefits; so that long term sustainability coupled with enhanced sincerity and commitment could be expected from these workers. Affirmative actions as above could instill better confidence in the waste workers. Besides, it is advisable to ensure adequate rehabilitation programmes for those who are affected by chronic illness and ensuring alternate kinds of employment for them.

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