Knowledge, Attitude and Practices on Solid Waste Management: A Sociological Study in Kamalamai Municipality

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LETTER OF RECOMMENDATION

This is to certify that Mr. Om parkash Shrestha has completed the dissertation entitled, **Knowledge, Attitude and Practices on Solid Waste Management: A Sociological Study in Kamalmai Municipality,** under my supervision and guidance therefore; I recommend this dissertation for final approval and acceptance.

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LETTER OF APPROVAL

The evaluation committee has approved this dissertation entitled "**Knowledge, Attitude and Practices on Solid Waste Management: A Sociological Study in Kamalmai Municipality**" submitted by Mr. Om Parkash Shrestha for the partial fulfillment of the requirement for the Master's Degree of Arts in Sociology.

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CHAPTER -I

INTRODUCTION

1.1 Background of the Study

In common parlance, the word ‘waste’ is defined as unnecessary materials. They are the useless and worthless things or objects such as crops and vegetable residue, roughage, papers, polythene bags, torn wearable, empty cans and bottles, punctured tires and parts of the ruined car, and garbage came out from the kitchen etc. that have no more utility in human daily life.

Like resource, waste is a culturally constructed notion. People understanding and perception towards waste may be varied from one people to another, one family to another and one cultural group to another. Different categories of people define it in different ways. To exemplify we can say that the vegetable residue or crop residue in metropolis societies may be ‘waste’ and thrown away but the same waste in rural societies may not be a waste and may be used as a fodder for animals or made organic compost for gardening.

Solid Waste Management means the handling process of solid materials from production at the source of its disposal. Different categories of people have developed and practiced different types of handling process of Solid Wastes those were came out from houses or societies. In some societies, people either burn or bury the waste materials whereas others dump in the open field or riverside. The improper management of SW has negative impacts on human life as well as environmental impacts. It makes the land polluted and reduces its productivity, water and air pollution. As a result some animals disappear which live in the land and water. Similarly, many kinds of transmitted diseases appear and spread through out the area due to the pollution of land, water, and air.

Along with the development of urbanization, industrialization, commercialization, modernization the waste is also in increasing ratio. Similarly, the quantities of the waste materials are increasing due to the changes in consumption pattern. Thus production of waste is closely related to behavior and attitudes of people in a given society. In the past, not much was wasted. Everything which produced from the household or society was reused, recycled and absorbed into the soil. This is still practiced in small rural communities (IUCN, 1991).

The amount of consumption and the SWs have inflated swiftly due to rapid growth of population, industries, commercial enterprise and building houses, without planning at any vacuum place. So, SWM today has become the areas of public debate. Over the periods of ten years, the production of municipal SW grew considerably both in absolute and per capita terms and most importantly for long trends i.e., the production of this is still highly correlated with the growth of economic activity showing a stable or growing ration with respect to gross nation product in almost all the industrial countries (Mc Cathy, 1994).

This study mainly focuses on the examination of people's knowledge, attitude about SWmaterials and trace out the of SWM practices at the Kamalamai Municipality.

1.2 Statement of the Problem

SWM is considered as the environmental issue in Nepal as well as in the world. Therefore, most of the studies are mainly concerned with the environmental impact by neglecting cultural aspects of SWM. However, there is very little study about the SWM in Nepal from anthropological and sociological perspectives (Parajuli and Sharma, 1997, Parajuli, 2000).

There is a close relationship between culture and the solid waste. Understanding SW may vary from person to person as well as culture to culture. For example, some cultural group uses human and animal excreta as SW whereas other uses them as fertilizer. Solid waste, therefore, is very important for anthropological study. Similarly, all societies have customs to identifying and categorizing the objects as unusable things which generally called waste or useable things. Similarly, there is a customary way to transforming and converting the waste things into useable things and customs for managing them. Therefore, these aspects are equally importance while studying SWM.

We can say that SW is not natural phenomena. It is not born itself but these things are manmade. However, human beings are not only the creators of SW but they are the well mangers too. They should know that if something is useful then one should keep it but once it is not useful then they should know exactly where to dispose it off. People should actually know which waste is degradable and which is non-degradable.

People should also make the best use of waste or which is not useable must be properly disposed off.

There is definitely a close relationship between environment and solid waste. The environment will not be polluted and managed till the SW is properly dumped and managed. Human health and environment are dependent upon the quality of SWM. If there is proper maintenance of these SWM the environment will be safe and disease free.

Nepal's most Cities, are facing myriads of problems regarding environmental management and improvement. The actual environmental problems facing by the Kamalamai Municipality are safe drinking waste, air, water and land pollutions, disposal of human excreta and garbage. The main causes of environmental pollution in urban areas are defective government policies, poor management and socio-cultural practices of people (Parajuli, 2000) as well as the lack of resources.

Kamalamai Municipality is facing a lot of problems regarding the SWM. It is one of capital and socio-economic centre of Nepal. Thus, Kamalamai Municipality has increasing number of immigrants from different parts of the VDC and country which indeed have severe environmental deterioration. Actually, in urban Nepal, the existence of traditional, attitudes and habits of waste disposal in both residential and industrial areas is hampering the efforts put by local authorities to collect and dispose off the wastes safely (at the right place) and effectively (IUCN,1991).

Due to the speedy growth of population, industries and commercial enterprise, haphazard building of house, improper use of the container which leads the amount of SWmaterials to raise up. So, the SWM problem is caused by high density of population in certain geographical area. In the context of Kamalamai municipality, the population has been rapidly growing population, industrialization and urbanization and SW are correlated and embedded to each other in many aspects.

The initial concept of SWM basically was just the removed to waste from the cities to keep them clean and hygiene. And the earliest way to dispose was by dumping at landfill site or in the ocean or river. So, such unmanaged disposal of SW did have severe and dangerous impacts on both aquatic and terrestrial environments and which is a threat to all the living beings especially human beings.

The present study attempts to seek the answers of the following questions.

1. What are the major causes of increasing SW materials?
2. What is the relationship between environment and solid waste?
3. What is the relationship between SW and socio-cultural practices in Kamalamai Municipality?
4. How do people manage the waste materials came out from their households?
5. How do people categorize the solid waste?
6. Are there visible differences in peoples' perceptions and attitudes regarding SWs in Kamalamai Municipality? If yes, what are the noticeable differences in the perception and attitudes among people of Kamalamai Municipality?

1.3 Objectives of the Study

The objectives of this study is divided into two categories i.e., general and specific objectives. The general objective of this research is to find out the knowledge, perception and attitude of SWM in Kamalamai Municipality. However, the specific objectives of this study are as follow

- To examine the knowledge, attitude and practices of people about SWM, and
- To identify the existing SWM practices in the study area

1.4 Rationale of the study

SWM is an important subject matter for Sociological study. In this regard, this research is theoretically and methodologically important. This study was oriented towards SWM practices applied by the people in Kamalamai Municipality. I have already mentioned that there are very few sociological studies on SWM. This encouraged me to conduct the study for describing SWM in a heterogeneous society. Therefore, this study will be supplementary source of information to understand the knowledge, attitude and practices of people in Kamalamai Municipality regarding SWM. In this sense, I hope that this study may be able to describe and examine the knowledge, attitude and practices of SWM of people in Kamalamai Municipality.

To some extent, this research will attempt to find out the interrelation between customary law and SWM practices which may be helpful to planners, policy makers and others who are interested and responsible to solve the problem

related to SWM. Similarly, this study will also open the debate and pave the way for future researchers and readers who are interested in this field.

1.5. Limitation of the Study

Research is a scientific and systematic investigation about new facts and verification of old facts. However, it is not totally perfect at all. Notwithstanding, I have tried to make this research more scientific and systematic. Although, due to the lack of perfect knowledge, constrain of time, money, and other resources the research will be limited within a certain geographical locality and certain issues. The main limitations or hindrances will be the followings.

1. This research will be conducted only for the partial fulfillment of the Masters Degree in sociology. Therefore, it has no wider application.
2. The findings are based on the information collected form the Kamalamai people. Therefore, the findings can not be generalized in wider area or another locality.
3. Similarly, the findings are based on the information collected in a specific time period. Therefore, its finding may not be applicable in all time.

CHAPTER - II

REVIEW OF LITERATURE

Review of relevant literature is an essential part of a social research. It provides a guideline and some theoretical and methodological knowledge to the researchers that help them to meet the goal of the research. Similarly, it also helps to make the present research more scientific and logical. This chapter review the pertinent literature related to theory, SWM practices.

2.1. History of SWM in the context of Nepal

The history of SWM is not new phenomena in human history. People had started to manage the SW along with civilization. In the context of Nepal, especially at Kathmandu, the SWM system in early 1900 broke the ice with street blooming and cleaning. At that time of King Jayasthiti Malla enacted the caste in Nepal and engaged different jobs and occupation to each divided caste. During that time, the so-called untouchable castes in Newar community such as *Pode* and *Chyame* were assigned the role of the collection of wastes from the corners and alleys. They are referred as *kuchikar* (sweeper). They used to collect these waste in traditional shoulder baskets known as *kharpan*. They would than hang baskets on two sides of a bamboo poles and carried it on their shoulders to disposal sites, normally the riverbanks and vacant public lands adjacent to the settlements (Thapa and Devkota, 1999, Dangol, 2000). Thus, waste management in Nepal has always been considered the responsibilities of untouchable caste (Habitat, 1990). After collecting and disposing off they were paid in cash or kinds (ibid.). These castes are still involved in their occupation in Kathmandu Valley.

In 1919, Prime-minister Chandra Shamsher Rana introduced the *Safai Adda* (Sanitation Office) later renamed as the *Chevdel Adda.* This *adda* employed *Kuchikars* for cleaning road and alleys. *Kuchikars* collected waste from road and alleys and dumped it on the bank of Bagmati and Bishnumati rivers by themselves. Later the task of transforming waste to dumping sites was taken over by tractors (Thapa and Devkota, 1999).

In 1950s, when the urban core of Kathmandu, Patan and Bhaktapur were promulgated as municipalities, the waste management became the responsibilities of

municipalities. However, people still utilize the vacant public land riverbank, roadside, for waste dumping.

In 1970s German organization, Solid Waste Management and Resource Mobilization Center established to assist waste management of Kathmandu Valley. The center took responsibility to provide container in the municipality as well as to transfer waste from container to transfer stations and finally to landfill sites. Due to the lack of inter-agency coordination in some wards services were being provided by both municipalities and SWMRMC, whereas other wards had no service **(**Joshi, 1986). However, a systematic waste management system i.e., recycling and reuse concept were established in the sphere of waste management. Organic matter of SW for compost fertilizers, some waste were used as raw materials in industries, some of them were reused and recycled. And rest, which could not be reused, was dumped in dumping site. After 1990s the German organization handed over the SWMRMC programme to HMG, Nepal. Thereafter, the organization became passive.

2.2. History of SWM in Kathmandu Valley

Waste management was not such a big problem in the old days in Katmandu Valley (ENPHO, 2001, JICA and MoLD/HMGN, 2005). People in the Kathmandu Valley had their own method to getting rid of the household waste, including a kind of circulation of organic waste between city area and rural areas nearby. Waste was basically composed of agricultural waste and kitchen waste, which was composted by the farmers for use in the field. A small amount of waste was non-degradable which was reused and recycled.

Cultural heritage and different kinds of well opportunities have always attracted the people towards it. Kathamndu valley has attracted a number of people from other parts of country as well as outside of country as a permanent as well as temporary place of residence. As a result this city has been rapidly becoming urbanized and industrialized. The increasing population in the Valley and changing life style and consumption habits, SWM is coming to be recognized as one of the major environmental issue in the Kathmandu Valley (JICA and MoLD/HMGN, 2005).

GTZ started to give assistance to the Kathmandu Valley in 1978, including establishment of the Solid Waste Management Board. After the SWM Board

establishment in 1979, the SWM-related projects were initiated under GTZ assistance, and various projects were implemented in the following 10 years such as collection system development in Kathmandu Metropolitan City and Lalitpur Sub-Metropolitan City, development of Teku Transfer Station (T/S) and Gorkhana landfill site (LFS) and introduction of the Act and related by-laws (JICA and MoLD/HMGN, 2005).

SWMRMC was established in 1986 and subsequently the SWM Act was enacted in 1987, and then the collection and disposal of solid waste started in some systematic way in the Kathmandu Valley. In 1992, the Municipal Act was put into force in order to entrust the cleaning and waste disposal to the local bodies for the areas under their jurisdiction. However, GTZ discontinued its aid while the project remained uncompleted in 1993, ten the SWM system in the Valley was faced with collapse despite the independent efforts by the central government and local bodies as well as other stakeholders such as NGOS/INGOs.

Regarding final disposal in the Kathmandu valley, Gokarna located a distance of 13 km from Kathmandu city core area was selected as a landfill site in 1976. After GTZ's studies, Gokarna LFS commenced its service in 1986 and was being supervised by SWMRMC and KMC together. The LFS was the only official sanitary LFS at that time, and KMC dumped almost all their waste there. However, after the closure of Gokarna LFS in 2000 due to the opposite of the surrounding local people, final disposal could not be other than river side dumping as a temporary solution sine there were no options in the form of LFSs. Following Dhobi River dumping which was discontinued due its contributing bird strike problem at Tribhuvan International Airport, Bagmati River dumping by KMC and KMC began and has been continuing for almost five years so far.

Looking ahead o the necessity of a new LFS before the closure of Gorkharna LFS, SWMRMC has conducted various studies from early 1990s to develop a new LFS within the Kathmandu Valley. However, the sites identified by the studies could not be developed due to strong public opposition as well as due to technical reasons in some cases. Because of the low availability of LFSs in the Valley, the central government and IUCN jointly conducted preliminary alternative analysis as per the request of KMC, and Okharpauwa. Then the related infrastructure

development including access road construction started based on the announcement by the central government for Okharpauwa development.

After closure of Gorkhana LFS in 2000, the necessity of a new short-tem LFS was recognized for receiving the waste from KMC and KMC instead of Bagmati River dumping. Due to the expected difficulty of LFS development within the Valley, Sisdol in Okharpauwa was identified by the central government as the short term LFS to have an immediate solution against the Bagmati River dumping. SWMRMC has been conducting the necessary site preparation for Sisdol LFS so far, including EIA and land acquisition.

The fast growing urbanization of Kathmandu valley has rapidly changed the life style of the people and the nature of waste materials. As a result, SW collection and its disposal are the major problems in the urban landscape in Kathmandu city. Waste left to decompose at open space, streets, corners and riverbanks has become a normal feature of urban landscape in Kathmandu. At least 42 per cent of the households are recorded to disposing their waste in the open space and streets (EMA: 1992). The total SW generated from Kathmandu Valley is estimated to be 284 tons per day. A 16 per cent of the total is industrial, commercial and institutional waste, and the rest 84 percent is domestic waste. Total 213 tons waste is collected and 71 tons left to decompose in the street corners, open space and riverbanks (ICIMOD: 1993). Similarly, of the total waste generated, no more than 93% is being collected. The rest escapes collection because people throw their garbage here and there, often at the bank of the nearby river (Pradhan, 2013). It was estimated that in 1997, agricultural waste and industrial waste made up only 11% and 6% respectively of the total was generated which shows that household waste is the main source of municipal waste in Nepal including Kathmandu valley. The per capita waste generation rate ranges from 0.25 to 5 kg/day (SOE Nepal, 2001 cited in ENPHO, 2001)

With the rapid growth of population, industries and commercial enterprise, the amount of SWs also increased considerably. Several cities have been received huge number of migrants form the rural areas of the country and facing SW problem. In urban Nepal, the persistence of traditional attitudes and traditional waste disposal habits in both residential and industrial areas is hampering efforts by local authorities to collect and dispose off wastes safely and effectively (IUCN, 1991).

2.3. Indigenous/Traditional SWM practices in Nepal

In all societies, human being created solid waste. Ever since human beings appeared on the earth, they have been creating solid waste. Notwithstanding, they have been developing different types of handling the waste materials created by them. In the past, people normally practiced different types of traditional SWM systems. Dongol (2000) has presented five main traditional SWM practices generally practices by people in Kathmandu valley:

1. **Home and garden composting:** composting is one of the highly applied traditional techniques for waste management. It ahs been used for a long time as a solid conditioner. *Sagal* and *Nagal* are two types of pits to make compost traditionally.
2. **Dumping place made by community:** Generally, feasts and religious gathering used to take place in forests, behind temples or in open fields. Foods are served in broad-leaves sews with bamboo pins. Drinks are served in clay cups. These are dumped in common pit at the ends of the occasion.
3. **Open burning:** None useable waste burnt in field and used as its ashes as insecticide.
4. **Dumping in rivers:** the waste those are burnt, composted or reused or given as fodder to animals are collected and disposed into rivers.
5. **Used, reused and recycle:** Kathmandu being an agricultural based society with few industries, therefore, wastes were nearly all bio-degradable organic wastes. Those wastes were also recycled and reused instead of disposed off.

These traditional systems are playing the importance role for the SWM. However, these systems seem ineffective in the context of increasing volume of SW due to the rapidly growing population and urbanization in the urban city. So, people have developed different types of techniques for the management of SW based on the traditional techniques.

Land filling

Land fill refers to the sanitary land filling in which the dump waste buried under the earth and compacted. The concept of land fill do not refer to open dumping which is effected by fire, water pollution odors, rates, flies and blowing of paper and low density of polythene bags. Land filling is highly applied approach in Nepal for SWM especially institutions and authorities. Generally, land fill technique includes followings principles:

- SW must be deposited in the control manner.
- SWs are spread in thin layers.
- Ground of not less than six inches is applied daily.
- No open burning.
- All the factors which are likely to allow deposited wastes to contribute to water pollution must be eliminated.

Land filling is the approach in which the SW is dump for ever. However, the techniques control gas, emission and leach-ate. Some of them are harmful to human health and environment. Most of land fill sites are representing diseases potential, threat of population and land blight. High degree of opposition resentment unwanted gas and water movement and more expensive are also demerits of this technique.

Incineration

Incineration of SW serves the functions of reducing the volume of wastes from their raw or collected states to more management levels, thus obtaining the lower transportation cost to the ultimate disposal sites and accommodating the waste of greater number of people for a given acreage available for land fill.

Composting

SW involves managing condition to accelerate the biological decomposition of some of its organic component. The result is an organically rich product with potential benefit for agricultural soils. The condition for efficient biological decomposition of organic were depended on optimum temperatures (130-150 o F), moisture (46-56%), oxygen (15-21%), pH (6.0-7.5) levels and carbon to nitrogen (25:1-30:1) ratios of the feedstock. If condition deviate from these optimum levels,

the composting process is slowed and chemically unstable compost may be produced. When microorganisms degrade the organic materials under optimum oxygen level, the process is called aerobic composting. In contrast, a different group of microorganism can degrade the organic material under limited origin level where the process is called anaerobic composting. Aerobic composting is usually preferred over anaerobic composting because it is faster than biological oxidation and does not generate as many foul odors, i.e., ammonia, sulfur compounds, and organic acids (Mamo et. al., 1998).

Composting approach is traditionally and indigenously available techniques in Nepal. This system also have some limitation, such as, problem of segregation and land acquisition, ignorance of decomposable component of SWM.

2.4. Institutional Arrangement for Waste Management

In the present ministerial organization, three ministries namely Ministry of population and Environment (MOPE), Ministry of Local Development (MLD) and Ministry of Industry, Commerce and Supplies (MICS) have some kinds of direct institutional set up and responsibilities for the waste management. Other ministries have no direct role in the waste management.

MOPE, legally mandated for the regulation and control of pollution, is a relatively new ministry. It does not have any central level institutions under the ministry and is short adequate manpower and expertise to regulate and control pollution streams arising from various sources.

MLD responsible for guiding development, planning and management of the activities of District Development Committees, Municipalities and Village Development Committees have some form of institutional structures for the management of waste. A central level, 'Solid Waste Management and Resource Mobilization Center' has been established since 1980 for the regulation and control of municipal solid waste. This center was initially under the Ministry of Housing and Physical Planning which was later restructured under the MLD. At the district level, currently there exists no waste management institution. However, establishment of such institution was conceived during the 8^{th} plan period. At local level, municipalities with high population densities have management units catering

the SW collection, transportation and disposal at their level best. The Village Development Committees have no waste management units till now, however, such a management unit was conceived in the 8th plan period.

MICS has established environmental unit at the ministry level and at the central level in the Department of Industry and Department of Small and Cottage Industry. The function of these environmental units is to regulate and control pollution streams emanating from the industries. However, these units are not effective enough to regulate industrial pollution except listing some provisions related to environmental pollution during registration of industry. In case of complain by the local people of authorities, the central level environmental units do inspect the industry facilities thin the scope of complain to resolve the pollution issue. Regular monitoring and record keeping of industrial pollution load is grossly neglected.

Among the existing intuitions, institutions under the Local Development Ministry are functioning to some level for the waste management. However, their cope of waste management is limited to the municipal SW only.

The central level SWMRMC established in 1988, with an objective to strengthen and coordinate waste management at various levels through technical and managerial inputs, was confined to the three municipalities of Kathmandu Valley by the Solid Waste Management and Resource Mobilization Act (1987). The Center operated under German Technical Cooperation (GTZ). In the initial phase, the centre integrated the waste management of the municipal SWM from collection, transportation, segregation, organic recycling and land filling at Gorkarna. In an effort to strengthen municipalities and avoid duplication of collection and transportation of municipalities waste within their jurisdiction the organization collected and transported the municipal waste within their jurisdiction to the transfer station in1993. The basic objective was to focus the role of center in the bulk transportation, composting recycling and land filling of the municipal wastes in integrated fashion. But claim to acquire self sufficiency by the municipalities in the SWM from collection to disposal, the role of municipalities and the center passed through a state of confusion leading to the near collapse of the center. All equipment and facilities transferred to the municipalities, the center is confined to a mere spectator of the waste management. This clearly reflects the lack of clear policy

defining specific roles of centre and the municipalities. Now, with the closures of the Gorkarna land fill site and no other plans to develop landfill and recycling of waste within the municipal areas due to public opposition, municipalities are again turning to centre for the arrangement of sanitary landfill site.

Including three municipalities of Kathmandu Valley, few municipalities of the Tarai and Hill have established Environment Sanitary units to cater the municipal solid waste. Kathmandu, Lalitpur, Bhaktapur and Biratnagar municipalities have even initiated privatization of collection and transportation of municipal SW through public tendering in some specific key areas by levying waste tax from the serviced households and institutions. Activities to segregate waste at source and recycling of waste have also been initiated at small scale.

Despite the efforts put forward by few the municipalities at local level and the SWMRMC at the center, waste management has remained as one of the unresolved, confused and politicking issue in Nepal. To bring the waste management in proper track, formulation of a national policy and strategy for waste management and putting in place of the legislative and organization means for effectively implementing the policy and strategy, must therefore be regarded a top priority.

2.5. Impacts of SWM in Human life and Environment

There is large gap between the knowledge and practices of the household in the issue of waste separation, composting, making money by using or selling the wastes (Parajuli, 2000). The problem of SWM in Kathmandu is caused not only by the inadequate system for the collection, transfer and final disposal of SW but also by an abysmal level of public awareness (Pradhan, 2013). In the practical life, the inhabitants normally dump the wastes in open-field, riverbanks and streets. It is estimated that nearly 33,000 cu. M. of SW has been accumulated Bishnumati River, particularly, between Balaju and Teku areas (Dangol, 2000). The Urban Population Survey reveled that the unmanaged SW disposal was the main cause of environmental problem in the community or locality (CBS 1996). The waste adversely impacts on the land and its productivity. Moreover, it becomes useless for agriculture activities and habits for the living beings. The SW produces toxic and hazardous materials which directly and indirectly mixed with the surface waster first

and gradually with the ground water through seepage. SW dumped without management causes air pollution by the bed smell which mixed with air and spread over the residential areas (IUCN, 1992).

The unmanaged SW adversely affects the health of human beings as well as non-human beings of the surroundings. In this context, the SWM is a growing issues fro the urban environmental degradation and deteriorating the health of living beings. The air, land and water pollutions through SWs highly affected to the people particularly, children. They are suffering from diseases like diarrhea, skin and eye infection and so on (Dangol, 2000).

Similarly, those people who practiced livestock breeding, particularly pig keeping, lived in these area and the animals easily become infected with parasites from the waste and pass diseases on the human beings. Similarly, Hindu people take rivers as holy and use them for bathing. Many Hindu pilgrims travel to Kathmandu to bathe in the rivers for purification of the body by the water of the holy river but instead of the purification of the body they get intestinal and skin disease (Srees, 2002).

CHAPTER - III

Research Methodology

The researcher was applied various sociological tools and techniques for collecting primary and secondary information from the field and some information were collected from the published and unpublished literatures, records and documents.

3.1. Rational for the Selection of Research Site

Kamalamai municipality of sindhuli district is selected for the study. It is a heterogeneous community in terms of case/ethnic and occupational backgrounds. Therefore, this area was suitable for the researcher to document the people's perception, knowledge and practices of different categories of people about the SWM system. Similarly, the area was going to be urbanized and industrialized day by day. Therefore, this area was suitable for the researcher to understand the change in the people's perception and practices about SWM system in the changing situation.

In this area some of the people are still depended upon agriculture and animal husbandry for their subsistence. As a result, they may be still practicing their traditional system for the management of solid waste. Thus, this area was suitable for the research to document the traditional and indigenous waste management system.

3.2. Research Design

The present study was based on analytical and descriptive research design. To achieve the objectives of this study the exploratory research design helped to examine knowledge, attitude and practices of SWM and also explored the change of SWM over time in the study area. Similarly, this research design was also help to explore the relationship between SWM and environment and customary laws. Similarly, the descriptive design helped to describe the socio-economic backgrounds of the studied population.

3.3. Universe and Sampling

All the households of Ward No 6 of Kamalamai municipality of Sindhuli district was the universe of the study. It was selected purposively for study. Out of total households, only 30 households were selected for the detail study. The household survey was held from all households. After conducting the household survey, all household heads was selected for interview to obtain detail information about the subject.

3.4. Nature and Sources of Data

Both qualitative and quantitative data was collected from the field through the use of various research tools and techniques in order to fulfill the stated objectives and to answer the research questions. These data was gathered from primary and secondary sources. The primary data was collected through the field work through various sociological and anthropological tools such as household survey, interview, observation, and group discussion. The secondary data was collected through the published and unpublished documents related to the subject matter.

3.5. Technique of Data Collection

3.5.1. Household survey:

The researcher had done household survey form the 30 households to obtain the objective of the study. Through the household survey, the general household information such as caste/ethnic composition, religion, sex, age, marital status, education status, family structure, house pattern, land holding size, past and present occupation, using practices of SWM in past and present was collected. Besides these, it was also helpful to the researcher for rapport building with the local people and selects the respondents who had more knowledge about the SWM.

3.5.2. Interview:

Interview was done with the head of each household. Through interview, the researcher collected information about the shared and different knowledge, attitude, and practices of SWM among the local inhabitants. Similarly, it was used to document people's perception and knowledge about the solid waste. Moreover, it was also useful to find out the changes in SWM over time in the study area. This tool was used to collect information about the of SWM practices in the study area. Both structural and unstructured interview were used.

3.5.3. Observation:

Observation is an important tool for sociologist and anthropologists to collect the relevant information. This tool helped the researcher to gather qualitative information. The researcher generally observed the present SWM practices existing in the study area. This tool was useful to collect the information about the behavior of people regarding the SWM in the study area. Moreover, this tool was useful to check the reliability of the information which was collect through the other tools like interview, group discussion and household survey.

3.5.4. Group discussion:

Group discussion is an important tool for this study. The researcher applied formal and informal group discussion to collect the relevance information. Mainly, it was hold to find out SWM in past and present in the study area. It was also helpful to find out the people's perception, their knowledge and practices regarding to the SW materials. It was also helpful to understand and document the change in the study area.

3.5.5. Key Informant Interview

The information about the history of SWM, people understanding and perception, knowledge and practices of different categories of people was collected through key informant interview. This method was useful to check the reliability and validity of the data with some knowledgeable persons. The key informants were the respected persons of the communities such as elderly persons, political leader, farmer, the person who involved in the SWM and so on.

3.6. Data Presentation and Analysis

The collected data were presented and analyzed in different ways in this study. Qualitative data, which were collected in the form of words, were presented in a systematic way to strengthen the arguments and analyze them in a logical way. Similarly, quantitative data, which were collected in the form of numbers, were classified on the basis of the nature and were presented in tables, figure and percentage. After presentation of the data, they analyzed and interpreted in the logical way based on the facts.

CHAPTER- IV

THE SETTING OF THE STUDY AREA

This chapter deals with the physical and social setting of the study area. The chapter mainly concerns about the location and demography of KMC and SWM practices carried out by KMC. The chapter also deals about the socio-cultural and economic activities of the sampled HHs such as caste/ethnic composition, education status, house types, age and sex composition of sampled HHs and respondent.

4.1. Location and Demography of Kamalamai Municipality

Kamalamai Municipality is located at the north part of Ramechhap and Okhaldunga district,south part Mahotari and Dhanusha district,East part Udayapur district and west part Makawanpur district . There are 53 VDCs in Sindhuli district. Out of these VDCs, Kamalamai Municipality is situated between 26^0,55' to 27^0,21' latitude and 85^0, 24' to 86^0.22' longitude. The climate is tropical and subtropical is maximum 27.2c and minimum 6.2c. Kamalamai Municipality is one of the oldest historical place of Nepal which is famous for its historical monuments, temples and old Durbars (Palace). Siddhababa, Kalimai, Maishathan are famous place which is rich in its cultural heritages and famous for its fine arts lies within this municipality. Now it is a centre of attraction to tourists. Tourists come to this area to see magnificent architecture of temples and old *patis.* (common platforms).

Kamalamai Municipality consists of 18 wards. Each ward consists of many small *toles* (neighborhood). Ratamata is one of the *tole* laying in ward no 6 having around 2600 inhabitants. This ward has dense population with mixed population.

The population is increasing day to day, therefore, the volume of waste is gradually increasing in the KMC day by day. However, there is no accurate current quantity of waste generation in Madi bazar. It was estimated that nearly 2quentel of waste was collection per day. Source: KMC, 2013

4.2. Involvement of Organization for SWM in KMC

People responded that various organizations and non-government organizations have been involving for the management of waste generated in the KMC area. Basically, the KMC and other several non-government organizations and community based organization are involving for the management of waste. KMC is main responsible organization for the management of waste.

4.3. Collection and transportation of waste:

The waste collection in KMC was carried out in a single shift from 5.00 am to 10.00 am. The residents of municipality practiced to throw mixed waste in packs covered with plastic bags. When the municipal vehicle arrives near the community route it signals the people with a siren, and the people throw in the collection vehicles. The waste is being collected almost free of cost for the city dwellers. Despite this, the municipality placed containers in 7 sites such as Ratamata, Magitar, Madhutar, Milanchock, Dungrebas, Panitanki, and Bazar. The collected waste is transported and dumped along Ward No. 4 Kalikatar, Kamalamai Municipality.

4.4. Settings of the Study Area

Ratamata Tole is the old habitat of the chhetri people which is built in a clustered manner. Plating and Hayu tole are located around the Ratamata tole. Nowadays, trend of constructing new houses is slowly increasing; however, old houses still exist. These old houses are made up of mud and raw brick; some of these have already destroyed while some are in collapsing stage. Many houses of the community are not directly linked by motorable roads. There are narrow streets and allies connecting to the main road. The area suffered from poor drainage system. The streets and courtyards were full of solid wastes and human excreta. Most of them have no public water supply and rely on dwindling wells while the peripheries of the wells were highly polluted by human and animal wastes.

4.5 Socio-economic Profile of the study area

4.5.1. Caste/ethnic composition

Ratamata is one of the oldest tole of Madi bazar, where Chhettri are the dominant groups. However the population of the tole is not homogenous. Brahman,

Chhettri, Gurung, Tamang, Magar also live in the area. The table shows the caste/ethnic composition by the number of household and population of the study area where 66.33% are Chhettri , 23.33 are Brahman . Similarly Gurung, Tamang and Magar constituted 3.33 percent each of the total household studied. The table no. 1 shows the caste/ethnic composition of people in the study area.

Table No. 1

Caste/ethnic composition in the study area

Caste/ethnic	No of HHs	%	No. of population.	Ratio
Chhetri	20	66.33	128	6.40
Brahmin	7	23.33	38	5.42
Gurung	1	3.33	4	4.00
Tamang	1	3.33	7	7.00
Magar	1	3.33	3	3.00
Total	30	100.00	180	6.00

Source: Field Survey, 2013.

The table no 2 also shows that the Chhetri have a slightly bigger family size than the other caste/ethnic groups. This is because of the fact that Chhetri are still living in the joint family system. The people from other caste/ethnic groups have small family size due to the migration. In the study area it was found that one Tamang families have been living together. Therefore the family size seems larger than others caste and ethnic groups who were migrate

4.5.2. Age and Sex of the Population:

It is obvious that age and sex also determine the knowledge, attitude and practices of the SWM system of the population. In the study area it was found that the distribution of population according to age was almost similar. The table no. 2 shows the distribution of population according to age and sex.

Table no. 2

Age-wise Sex Composition of the Studied Population

Age group	Male		Female		Total	
	No	%	No	%	No	%
0-4	5	2.77	7	3.89	12	6.67
5-9	11	6.11	8	4.44	19	10.56
10-14	14	7.78	11	6.11	25	13.89
15-19	4	2.22	6	3.33	10	5.56
20-24	10	5.56	8	4.44	18	10.00
25-29	8	4.44	8	4.44	16	8.89
30-34	7	3.89	9	5.00	16	8.89
35-39	5	2.77	3	1.67	8	4.44
40-44	6	3.33	6	3.33	12	6.67
45-49	3	1.67	5	2.77	8	4.44
50-54	3	1.67	4	2.22	7	3.89
55-59	4	2.22	8	4.44	12	6.67
60+	11	6.11	6	3.33	17	9.44
Total	91	50.56	89	49.44	180	100.00

Source: Field Survey, 2013

The table no 3 shows that out of the total population of male and female, the population of age group 0-19 is quite higher in the study area. It occupied nearly 39% of the total population. A high ratio of the population in the lower age indicates that the birth ratio is quite higher in the study area. It may directly affect on growing population of the study area which directly impact on production of waste in the study area.

4.5.3. Age and Sex-wise distribution of the Respondents:

The age and sex also affects the kind of knowledge, attitude, practices and behavoiur of the population. The table shows distribution of the respondents according to age and sex. The respondents were purposively selected from the age group above 15 years. Because the minors cannot give the exact responses asked by the researcher, or it may mislead the purpose of the study since the objective of the

study is to trace the knowledge, attitude and practices of the SWM system in the study area.

Table no -3

Age and Sex-wise distribution of Respondents of the HHs Survey

Age group	Male		Female		Total	
	No	%	No	%	No	%
15-20	2	6.66	2	6.66	4	13.33
21-30	3	10.00	2	6.66	5	16.67
31-40	2	6.66	4	13.33	6	20.00
41-50	2	6.66	3	10.00	5	16.67
51-60	1	3.33	3	10.00	4	13.33
60 - +	2	6.66	4	13.33	6	20.00
Total	12	40.00	18	60.00	30	100

Source: Field Survey, 2013

4.5.4. The Educational Status

Education is taken as a measure of an individual, which also shows the social prestige within a family or society. Education also plays a vital role in shaping the behavior of an individual, health status, sanitation, use of physical amenities etc. In the study area it was found that those individuals who have got higher education have employment opportunities in government and non-government sectors. The following table no 4 shows the present educational status in the study area (those individuals were not included in this who were under the age of 4 years).

Table No 4

Educational Status of the Studied Population

Description	Male	%	Female	%	Total	%
Illiterate #	5	2.79	22	12.29	27	15.08
Literate*	11	6.15	3	1.68	14	7.82
School level	40	22.35	45	25.14	85	47.49
Campus level	25	13.97	18	10.06	43	24.02
Total	83	45.25	97	54.19	179	100

Source: Field Survey, 2013.

Those who can not read and write.

* Those who have not enrolled in school but are able to read and write.

The table no 4 shows that 12.29% of the female were illiterate in the population studied. It shows that the women in the study area were more responsible for the waste management released from the house. Therefore, it was found that they had no knowledge about the modern waste management practices i.e., separation of degradable and non-degradable waste, use of compost bin or dust-bin.

4.5.5. House Pattern and the Settlement

The core area of Madi bazar and Chhetri settlement areas have mostly clustered houses. The houses here can be found of big corridors, wide rooms, standard planning, Built in ventilation and lighting etc. The table no. 5shows that most of the houses in the study (25 out of 30) were double storied or multiple storied houses and very few houses were single storied. Similarly, 66.67 % of the total houses were concrete roofed, while 33.33 % were tiled roofed. The table no. 6 shows the types of house of the sampled HHs in the study area.

Table no. 5

Types of House in the Study Area

Types of House	Cemented Roofed	%	Tiled Roofed	%	Total	%
Single storied	5	16.66	-	-	5	16.66
Multiple storied	15	50.00	10	33.33	25	83.33
Total	20	66.67	10	33.33	30	100

Source: Field Survey, 2013.

In the study area it was also found that no single storied houses were roofed with tiles. Although these types of houses may have many advantages but poor drainage system and narrow passages also cause sometimes serious illness and outbreak of the diseases

4.5.6. Occupation status of HHs

In KMC the proportion of urban based occupation reached 80-90% of the economically active population, such as manufacturing, public utility supply, tourism, construction, commerce and transport. However, among the sampled HHs majority of them seem to have adopted multiple livelihood strategy for survival.

Table no. 6

Distribution of Migrants Households according to Primary Occupation in Origin and Destination

Occupation	No	%
Business	18	60.00
Service	9	30.00
Farming	3	10.00
Total	30	100.00

Source: Field Survey, 2013

The primary occupation of the household is shown in the table no. 6. In the household survey, 60% households reported business as the main occupation. Similarly, 30% and 10% households claimed service and farming as their primary source of livelihood.

CHAPTER- V

Knowledge and Practices of SWM

This chapter deals about the knowledge and practice which was adopted by the people in the study area. Mainly, the chapter concerns with dumping practices, separation of waste practice, best approach of waste practice, and people attitudes towards the waste. The chapter also makes an overview of the different programs on SWM implemented by government organizations, community based organizations and non-government organizations in the study area**.**

5.1. Dumping Practice

In the study area, it is found that people do not follow single practice for disposing or dumping the waste. They follow various practices for disposing or dumping the waste came out from the houses such as giving to door-to-door collectors, use open space like roadside, back yard, river, communal container, municipality designated disposal, compost bin supplied by CDS, burying in the ground, burning, feeding kitchen residues to animals, reusing and reducing the waste. The table no. 7 shows the dumping practices follow by the people in the study area.

Table no. 7

Dumping Practices by HHs

Practices	**No.**	**%**
Door to door collector	8	26.66
Open space (outside the house, river, road)	4	13.33
Communal container/Municipality designed disposal	2	6.66
Burning or burying in the ground	1	3.33
Compost bin	5	16.66
Composting in the open space	2	6.66
Using as animal feed	2	6.66
Recycling, reuse, reduce	6	20
Total	30	100

Source: Field Survey, 2013.

Table no. 7 illustrates that majority of HHs (26.66%) in study area disposed of their waste at the door to door collector. They have been giving the waste to door to door collectors from last 9 years A total of 13.33% of HHs reported that they practiced open dumping on roads or vacant space. Those who were dumping in the vacant spaces reported that this is the easy method as well as they cannot afford to pay the money for the door to door collectors. Similarly 6.66% of sampled HHs disposed of waste at municipality's designed disposal sites. It was found that the disposal area was located nearby the community. Compost making in the compost bin is relatively a new practice, although it was once abandoned, and the traditional method of composting was widely practiced in the study area in the past. Of the total 16.66 % HHs also said that they separate the degradable waste and non-degradable waste and make the compost out of the degradable waste in the compost bin supplied by the CDS. Similarly, 3.33 % HHs practiced burying the waste in the ground. Among the 7 Brahmin and Chhetri HHs, 2 HHs have been keeping animals and those two household used kitchen residue for feeding their animal and non-edible waste were given to the door-to door collector.

In the study area, majority of the sampled HHs said that female adults were responsible for both handling waste and taking out waste for disposal. However, some of the HHs responded that children were also responsible for both handling waste.

5.2. Disposal period of waste in the study area

In the study area, majority of the people were disposing waste everyday or every alternative day. Nearly 47% of the sampled HHs disposed of waste as soon as it arose i.e., every day. Similarly, 43.33% and 10% HHs used to dispose the waste in an alternative day or weekly respectively. They stored waste in the kitchen or in the backyard. Mostly, they used bucket, plastic bag and cardboard for storing the waste. They informed that the waste collector did come in their suitable time. The table no. 9 shows the disposal period according to the number of HHs.

Table No. 8

Disposal period of waste

Disposal Period	No. of HHs	%
Every day	14	46.67
Twice or thrice a week	13	43.33
weekly	3	10.00
Total	30	100.00

Source: Field Survey, 2013.

5.3. Knowledge and Practices of the households regarding the Waste

In the study area, there was a mixed response to the question that whether they have got the knowledge of waste separation or not. However the slight majority of the respondents had knowledge of waste separation of different kinds. It was found that they gained such knowledge from the different channels such as NGOs working in the field of SWM, mass media, modern education and so on. The table no 10 shows the knowledge regarding the waste separation and its practices in the study area.

Table No. 9

Knowledge regarding the waste separation and its practices

Do you have knowledge of waste separation?				Practices of separation			
Yes		No		Separated		No separated	
No.	%	No.	%	No	%	No	%
16	53.33	14	46.67	11	36.67	19	63.33

Source: Field Survey, 2013.

A total of 53.33 % HHs responded that they have knowledge about separation and actually separating waste while rest of the HHs have knowledge but are not doing so. It was also noted that 46.67% of HHs noted that they neither had knowledge nor practiced any method of separation of waste. The reasons for not part-taking for separation of waste were “takes too much time” and “no space inside the house to keep the separated waste”.

Among the total waste separated HHs, majority of HHs responded that they were selling their recycling material to the buyer. The major items collected for sale were glass and papers. They use the compost as fertilizer for the garden and farming land. Majority of them also said that they learned the importance of compost from the elders or themselves. Some respondents also reported that NGOs/CBOs taught them as well.

Nearly 30 % of HHs made compost in composting bins or open space by making pits or burning or burying. The rest of HHs did not show interest in such activity. The major reasons for unwillingness to compost were: no space available, no need of compost, difficult to separate the waste, and easy availability of the chemical fertilizers.

People's attitude on SWM practices has been changing over time. The case 1 shows the changes of people's knowledge, attitude and practices of SWM.

Case 1
Ruku Thapa age 46 is a local resident of Ratmata, and a farmer. According to her, there used to be one Buka of three or four houses, usually of brothers or clan members in the nearby houses, in the past. All these houses used to dispose the waste came out of the houses. But they used to separate the plastic bags, glass, bottles or other non-degradable items before they are dumped. They used to burn the plastic items. The waste disposed in the field after a few months used to be compost and they used the compost as fertilizer or mulching. However, with the growth of population and urbanization, the proportion of plastic bags, glasses, bottles and other non-degradable waste increased significantly, thus leading to the problem of SWM in the area. As a result it was impossible to manage the waste in field. One year ago, she got an opportunity to participate in an environmental awareness programme organized by Society for Urban Poor (SOUP). SOUP provided 3 days training to the women groups. Thereafter, she bought the compost bin to the villagers. Now-a-days, she has been making compost from the kitchen waste through the compost bin. She produces nearly 60 kg compost every three months. After using the compost bin the use of chemical fertilizers such as urea in their farm land has been reduced.

The case 1 illustrates that the inhabitants of that area who were involved in farming used to decompose the degradable waste in the open space Kalikatar.

Similarly, non-digradable waste like plastic bags, milk pouch etc. were burned to reduce the volume.

5.4. People's Attitude towards the Responsibility for the SWM

In the study area, people's perception towards the responsibility of persons/institutions for SWM was found varied. According to them the responsible person/organizations were government, municipality, political parties/leaders, people themselves or NGOs. The table no. 11x shows the peoples attitude towards the responsibility for the SWM in the study area.

Table No. 10

People's Attitude towards the Responsibility for the SWM

Institutions/Organizations	No. of Responses	%
Government	5	16.67
Municipality	9	30
Political parties/leaders	7	23.33
People ourselves	7	23.33
Non-Government Organization	1	3.33
Don't know	3	10.00

Source: Field Survey, 2013.

The table no.10 shows that majority of the people informed that people themselves should be responsible for the management of the waste. The main reason for the development of the sense of self-responsibility for SWM was that non-government organizations were working in that area for collecting waste since 1999. This organization was also providing knowledge about advantages and disadvantages of solid waste. Similarly, nearly 30% of the respondents said that it was the responsibility of the municipality. Only the few respondents said NGOs should be the stakeholder for the management of waste.

5.5. People's Knowledge Regarding the Best Approach about SWM

People's Knowledge does not always reflect their attitude, practices and behahoiur in the real world situation. There may be some constraints; such as culture, economic status lack of time, and resources, which also determine their choices of the use practices. However it can be said that knowledge itself is an important aspect in the context of the environmental management and solid waste disposal issues. In this study the researcher asked the respondents about the best methods and approach about SWM. From the study it is found that majority of the respondents are fully aware of the best possible approaches; which are established and widely accepted approaches in the SWM system. The table no. 11 shows the responses given by the respondents about the best possible methods and approaches of the SWM in the study area.

Table No. 11

People's Knowledge Regarding the Best Approach about SWM

Practices	Number of Responses	Percentage
Composting	10	33.33
Land filling	7	23.33
Incineration	3	10
Recycling/reuse	8	26.66
Do not know	2	6.66

Source: Field Survey, 2013

The data on the table no. 11 shows that nearly 33.33 % of the respondents reported that the best approaches to SWM are 'composting' followed by 26.66 % 'recycling and reuse'. Those who mentioned composting also maintained that compost 'can be used as fertilizers in the garden' as well as it 'reduce the quantity of waste and protect the environmental pollution'. Those who reported 'recycling and reuse' mentioned the reason that this method 'saves the resources', 'stops pollution' as well as 'earn money by selling the waste to reuse recycling purpose'. Similarly, about 23.33 % respondents also reported that the best approach could be land filling. Those who mentioned this approach mentioned the reason that this is the 'easy' and 'only available option'. Some respondents (4 %) also mentioned that the best methods may be incineration. They possibly pointed out the scattered plastic bags, canes, and hard substances and recommended for burning or cutting. But it was found that they

are not aware about the possible harmful effects of burning plastics, papers, tyres etc. Only 2 % mentioned that they did not know exactly what would be the best method to manage the SW.

People's Knowledge, practices and attitudes have been changing due to the different programmes launched by the CBOs, GOs, and NGOs. The case 2 shows the changes in the peoples SWM practices and knowledge.

Case 2

Bimala Thapa, age 49, an inhabitant of Ratmata has been living in that area since 35 years. She used to collect the waste in dustbin and disposed in municipality containers. When the CDS started the service of door-to-door collection, then she began to give waste to the door to door collectors. During that time, she only separated the glass and bottle while giving the waste to the collectors.

Nearly 4 years ago, she got an opportunity to participate in an environmental awareness programme organized by Women Environment Preservation Committee (WEPCO). The WEPCO provided 4 days training to the women groups. She bought the compost bin to the villagers. Now-a-days, she has been making compost from the kitchen waste in the compost bin. She produced nearly 40 kg compost every three months. Before using the compost bin, she used to buy the chemical fertilizers for her flower garden. Now-a-days, she has been using the compost as fertilizers.

The case number 2 also illustrates that the people who were migrants or did not have enough land for cultivation used to through the degradable as well as non degradable waste in the street or in the municipality designed container (place). Now-a-days, people have started to use the compost bin for biodegradable waste.

5.6. Availability and Use of Waste Collection Service in Study Area

In the study area, NEPCO a non government organization is providing the waste collection service since 1999. However all inhabitants were not covered by this service. The following table no. 12 illustrates the availability and use practices of waste collection services in the study area.

Table No. 12

Availability and Use of Waste Collection Service in Study Area

	No. of HHs	**%**
Service available and used	25	83.33
Service available and not used	5	16.67
Total	30	100.00

Source: Field Survey, 2013.

The table no. 12 shows that all of the respondents responded that waste collection service was available in the study area. Of the total sampled households, 83.33 % HHs service available and used. 16.67 % did not use the collector's service even if it was available, because they found it easy to dump the waste in the open space as well as they do not like to pay money for the collection service.

5.7. Change in occupational role in SWM practices

Nepal is basically caste based society. Caste system in the society led to division of work among the different caste group. Traditionally waste picking was the only task of '*Pode'*, Sarki and Kuwar in Newar community. Sweeper class was regarded as untouchables and placed them in the lower position in the community. They were more often looked down by the society for doing this type of job. In the study area, majority of the sampled HHs responded that waste collection is the task of the lower caste people i.e., Pode and Sarki.

With the change of time, the attitudes of the people have been changed and people from the other caste/ethnic groups have also started performing waste management activities. Among the sweepers, 2 Gurung young men have been involving in this occupation since 4/5 years. The involvement of other caste is very low. On the other hand, in the non-government organizations, most of the collectors were other caste/ethnic group excluding Pode and Sarki. Out of 5 waste collectors associated with NEPCO, 2 were from Sarki castes and 3 from other caste/ethnic groups. Out of them, 1, 1, and 1 were Tamang, Chhetri, and Magar respectively. They are migrated from the country side of the Sindhuli district.

It clearly indicates that local people have not changed their traditional attitude toward the handling of waste activity, i.e., it was the occupation of lower caste people. On the other hand, those people who have migrated from the outsides have changed their traditional attitude toward the handling of waste activity, i.e., it was not only the occupation of lower caste people.

5.8. Change in Knowledge regarding waste

In the study area, all respondents do not have knowledge of the economic value and other functions of waste. There was a mixed response to the question that whether they have got the knowledge of the economic value and other functions of waste or not. As it has been already mentioned that 53.33 % HHs responded that they have knowledge about separation and actually separating waste while 46.67% of HHs noted that they neither had knowledge nor practiced any method of separation of waste. It clearly indicates that majority of people still do not have knowledge about the economic, environmental values and other functions of waste in their lives, family, community and eco-system in totality.

The changing concept of SWM is leading to enhancement of knowledge about economic value of solid waste. Among the total waste separated HHs, majority of them responded that they were selling their recycling material to the buyer. Similarly, nearly 33.33 % of sample HHs making compost by waste for using their garden. Therefore, “today’s waste is tomorrow’s raw materials”, “waste is wealth”, trash is cash” are being common slogan of waste management among the locals in these days. In the course of study, respondents have mentioned several benefits of waste which are as follows:

1. Healthy environment
2. Loveliness or attractiveness of tole and city
3. Source of income
4. Reduce the quantity of waste,
5. Increase the longevity of landfill sites,
6. Help to the municipality for handling the waste
7. Fulfill the obligation of citizen,

8. Increased the prosperity of the tole,
9. Helpful for the development of tole
10. Develop the feeling of brotherhood and friendship among members of toles and communities,
11. To gain health,
12. Helpful to develop the good culture for future generation

According to a key informant Kumar Thapa, the founder president of NEPCO, the quantity and quality of the waste in the study area have been gradually increasing due to the population growth, rapid urbanization, modernization, use of modern facilities etc. But the attitudes of the inhabitants have been changing due to the training provided by different organizations, mass media and informal education system. According to the inhabitants of the study area, in the past, there used to be piles of waste in the cross-roads, squares, gullies and alleys. But now-a-days there are a little or no waste left in such places because of the services provided by the organizations.

CHAPTER VI

Summary and Conclusion

This chapter deals with the summary of the findings, conclusion and recommendations regarding the SWM in the study area. However the recommendations may be taken as the guidelines for the further study.

Summary

The study on SWM in KMC was conducted for the partial fulfillment of the requirements for the degree master of arts in anthropology. The objectives of the study were:

- To examine the knowledge, attitude and practices of people about SWM, and
- To identify the existing SWM practices in the study area

The major methods applied in this study are household survey, sampling, key informants interview and observation. 30 HHs were selected randomly from the Ratamata tole. The composition of sampled HHs were Chhetri (66.33%), Brahmin (23.33 %), Tamang (3.33 %), Gurung (3.33 %) and Magar (3.33 %). The total noumber of population in HHs is 180 including 50.56% male and 49.44% female. The educational status of the HHs population was 15.08% illiterate, 7.82% literate, 47.49% schooling and 24.02% campus level studies. In the sampled households, 83.33% were double storied or multiple storied houses and 16.67 % were single storied. Similarly, 66.67 % of the total houses were concrete roofed, while 33.33 % were tiled roofed. People seem to have occupied multiple occupations. In the study 60% HHs are involved in business, 30% in service and 10% in farming.

In the study area KMC- Environment and Sanitation Section was the main responsible body in the collection and transportation of the solid waste. In addition to this, other non government organizations and community based organizations have been involved in the SWM.

Conclusion

Waste is unnecessary materials which is useless and worth less things but It is culturally constructed notion because in metropolitans societies vegetable residue or crop residue may be waste but the same waste in rural societies may not be waste and may be used as fodder for animals or made organic compost for gardening. Different people have different types of handling process of solid waste.

With the development of urbanization, industrialization and modernization the waste is increasing. The increasing waste is closely related to the people in a given society. Therefore, the examination of people's knowledge, attitude about solid waste materials and solid waste management practices at the Kamalamai Municipality are the important subject matter in this study. Basically, this study found the relationship between environment and solid waste, increasing SW, SW and socio-cultural practices, manage materials' different perception and attitude about solid waste.

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Annex 1

Household Survey

SWM

Respondent Male/Female----------. Caste/Ethnic group----------. Religion ----------Natal village/tole----------. VDC----------.Ward no.----------. District----------.

1. Please provide some information on individuals who belong to this household (begin from the oldest persons).

Individual ID (full name)	Relation to respondent	Sex	Age	Marital status	Occupation	Education	Residential status

Relations: R = Respondent. Hu = Husband, Wi = Wife, Fa = Father, Mo = Mother, So = son, Da = Daughter (use combination of these for others relation).

Marital Status: UM = Unmarried, M = Married, Wid = widowed, Sep = Separated, Div = divorced.

Education Status: Illiterate, Literate (those who can read and write), and Class/Level/Degree (if applicable).

2. Which of the following are the sources of income or livelihood for this household? (Highlight the primary source).

a). Agriculture b) Animal husbandry c) Traditional Craft Service d) Wage Labor (agri.) e) Wage Labor (other-locally) f) Wage Labor (other-elsewhere) g) Business h) Service- Govt./ Pvt. k) Other (if special).

3. Do you have own land?

1. Yes……. No……

If yes, please provide the information in the table below:

Land Type	Occupied Land in Katha
Khet	
Bari	
Others	

4. Where do you dump wastes of your house before they are disposed?

a) Container b) Open space c) Riverbank d) Road sides

e) Courtyard f) Burry g) Others

5. Do you keep your wastes in your own container at you house?

1. Yes……. 2. No…….

If yes, why do you separate? Please tick the right.

1. Because all wastes are easily decomposable.
2. Because some wastes can be reused.
3. To make compost from waste
4. Specify

6. Do you know waste separation helps SWM?

1. Yes……. 2. No…….

If, yes, how does it help? Please inform it.

7. Do you know one can make money from wastes?

1. Yes……. 2. No…….

8. What is the best way to make money from waste?

a) Composting b) Brig netting c) Recycle d) Other

e) No ideas

9. Do you have any pets that can consume waste?

1. Yes……. 2. No…….

If yes, what are they?

a) Goats/Cattle b) Pigs c) Earthworm e) Others

10. What sort of waste do you release most?

a) Papers b) Vegetables residue c) Polythene bags d) Woods

e) Electronic goods f) Others

11. How much do you pay for door to door waste collectors?

12. Is it correct that the municipality is charging an amount for door to door waste collection?

a) Yes b) No c) Do not know

13. What approaches do you have heard for SWM?

a) Composting b) Land filling c) Incineration d) Recycling/ reused

e) Others

14. which way is the best to manage solid waste?

a) Composting b) Land filling c) Incineration d) Recycling/ reused

e) Others f) Do not know

If you Know, Why? Please kindly inform me.

15. What kind of approach are you applying to manage SWin your house?

a) Composting b) Land filling/ burying c) Burning d) Recycling/ reused

e) Giving the collectors f) Selling g) Others

16. If you are applying composting method, how do you prefer to compost?

a) Pits b) Ash pit c) Surface composting d) Giving to pets

Others

17. Do you know the adverse effect of unmanaged SWfor human health/environment?

a) Yes b) No c) Do not know

18. Do you know that the unmanaged SWaffect the economic sector?

1. Yes……. 2. No…….

If yes, what are the effects?

a) Gastritis b) Dysentery c) Hepatitis d) Encephalitis

e) Stinking and headache e) Others

19. Do you know plastic, bottles and some other metals are not biodegradable?

1. Yes……. 2. No…….

If yes, please mention their effect on human and environment.

20. How can they be managed best? Please specify.

21. Do you have house?

Yes…… No…….

If yes, what types of house?

1. Bamboo and mud wall 2. Wooden wall (thatch grass) 3. Wooden wall (corrugated roofed) 4. Stone/ break wall.

22. How many stories does it have?

1. One 2. Two 3. Three

23. What is the source of drinking water?

1. Well 2. Tap 3. Spring

24. Do you have facilities of electricity?

Yes…… No……..

25. Do you have toilet?

Yes……. No……..

Key Informant Interview Sheet

Knowledge, practices and attitudes

1. What do you understand by waste?
2. What kinds of garbage are responsible for increasing solid waste?
3. How do you manage waste?
4. Can you tell me the traditional methods of SWM that you practiced in the past?
5. How the trend of SWM is going on since last decade?
6. Are/were you involving in the farming in the past and present? If yes, how do/did you use the waste for crop?
7. How much are the waste useful for vegetable crops?
8. How do the local people use or dump the waste now-a day?
9. Are these practices beneficial/ advantageous in present context?
10. How do outsider/migrants dump/use the waste?
11. Are these practices beneficial/healthy?
12. What do you suggest the residents of your locally about SWM practices?
13. What are the impacts of unmanaged SWM in the socio-cultural aspects (health) of human beings and livestock?
14. What are the impacts of unmanaged SWM in the environment?
15. Who is responsible for the SWM in you city? And why?

For collector

1. How long have you been involving in this occupation?
2. What do you do the waste?
3. Do you make money from the waste? If yes, how?
4. Do you collect waste from all household?
5. If yes, where did they dump the waste?
6. What are the difficulties you face which collecting?
7. What kind of waste do you collect mostly?
8. Do you know whether people use any scientific method/traditional method to manage waste?
9. What are the best methods to manage the waste?
10. Have you ever fallen seek due to this work?

11. What kinds of diseases are most likely to occur?
12. What kind of relationship do you have with people?
13. Are they paying you money in time?
14. Do you wash your hand/ take bath after the dumping of waste?
15. Do you eat something during collection?
16. What is the perception of people towards you?