

**ROLE OF VYAS MUNICIPALITY ON SOLID WASTE
MANAGEMENT AND ITS EFFECTIVENESS**

By

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POKHARA, KASKI
NEPAL, 2014**

RECOMMENDATION LETTER

This is to certify that Mr. Upendra Neupane has prepared the thesis entitled "**Role of Vyas Municipality on Solid Waste Management and its Effectiveness**" under my guidance and supervision. This thesis report is the result of his own work and he has not copied any aspect from other past thesis.

I recommend this thesis for final evaluation.

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DECLARATION

I, hereby, declare that to the best of my knowledge this thesis is my original work. No part of it was earlier submitted for the candidature of research degree to any university, college or educational institutions. The subject matter presented in this thesis report is the result of my own work. Whatever the data and information I have presented and included in this thesis report belongs to my own original work conducted in the study area except some cited texts.

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ABSTRACT

Health is a valuable property of human being. If we are not physically mentally socially, emotionally well, it is difficult to write and do income generating activities. Nepal is facing more health problems such as the presence of the communicable disease, high mortality rate, malnutrition, etc. This study was conducted among 100 selected household purposively from Vyas municipality comparative study based on primary data collected by using questionnaire for analysis of the data.

The study revealed that only ten percent (10%) budget has been allocated for solid waste management in the fiscal year 2069/70 BS. Vyas municipality has been allocated 35 lakhs for every year to manage solid waste of the municipal area. The study shows that sixty-four percent (64%) of the total waste is organic and compostable and twenty six (26%) is recyclable and ten percent (10%) is inorganic. Similarly, the study shows that there were 6692 residents in Vyas municipality. It produced an estimated 7 tons of waste per day. It is found that seventy-one (71%) percent respondents get information from their ward member, seven percent (7%) respondents get information from magazine. The study shows that sixty-five percent (65%) participant were woman out of total participation in cleaning campaign of the municipality ward. Fifty-one (51%) percent respondents out of total respondents reported that the effectiveness of solid waste management is satisfactory. similarly fifty nine percent (59%) respondents out of total respondents reported that the role of municipality on solid waste management is satisfactory. The highest percent forty five (45%) respondents reported that municipal administration is responsible for the solid waste management.

Finally, to make the Vyas municipality neat and clean, economic and human resource should be mobilize properly and in order to get people's participation municipal authorities should seek people's involvement.

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ABBREVIATION

FY	:	Fiscal Year
HPPE	:	Health, Physical and Population Education
Km	:	Kilometer
T.U.	:	Tribhuvan University
SWM	:	Solid Waste Management
KAP	:	Knowledge Attitude and Practice
PNC	:	Prithvi Narayan Campus
V.M.	:	Vyas Municipality

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Health is the valuable property of human being. Skillful human power is very important for the development of the country. According to the national sanitation foundation of the USA "Sanitation is a way of life". It is a quality of living that is express in the clean home, the clean farm, the clean business, the clean neighbourhood and clean community. Being a way of life is most come from within the people it is nourished by knowledge and grow as an obligation and an ideal in human relation. In fact the term 'Sanitation' covers all the aspects that promote healthy environment and its common things are the living plants, organisms and their environment form and ecosystem. To include biological, ecological, physical, social and economical factors. Environment pollution is also a very serious problem for the country. Environment pollution directly affects the health status of human being.

All living thing like human being, animals, birds, plants and trees are interdependent on each other. There should be reciprocal relationship among them. A healthy and sound work force is a perquisite for all round development of the country. People living in polluted environment, insanities and unhygienic house, courtyard & squalid. Down are always prone to be affected by version kinds of disease and vital epidemics.

Our surrounding environment plays a vital role in making us healthy or sick, for instance, carelessly dumped wastes can cause harm to us in different way. It increases the members of rats, flees and flies. We can get sick to pathogenic germs produced or increased in the waste. It contaminated the sources of drinking water and our environment looks dirty and unpleasant (Dhakal, 1991).

Most of the children are particularly susceptible to respiratory problem caused by dust from dumping sites but also to diarrhea, skin diseases, eye infections and other disease. The major child killing diseases in developing countries are related to unsanitary condition such as those associated with uncollected solid waste.

The main risks to health are undirected and arise from the breeding of vectors and the attractor of rodents and stray animals to wastes. These animals become infected with disease that are then passed on to humans. It is especially true for chickens, ducks, pigs, & buffaloes which are food sources of Nepalese people.

Vyas municipality is located at the center part of Nepal from east to west. It is situated in $83^{\circ} 75'$ to $84^{\circ} 34'$ longitude in east and $27^{\circ} 3'$ to $28^{\circ} 5'$ latitude in north respectively. Total household of Vyas municipality is 6692. It is 150 km. far from Kathmandu in west and 50 km far from Pokhara in east. It is in 310m to 1120m high from the sea level (Vyas Nagar Activities, 2067).

In this study the problem of managing solid waste, the role of municipality, its efforts and effectiveness was vividly studied and analyzed. The ways of manufacturing compost from the solid waste also studied.

Solid waste management and management of sanitation are different words but they are same in nature of functions and goal. Sanitation is the major pillar of self respect, health and development. There is equal responsibilities of a particular person, society and the whole nation for creating sanitation. Nearly 59 percent of the population of the world are taking benefit of sanitation, (Complete Sanitation Program, Tanahun, 2065).

What types of ways can be applied to manage the waste in right way? How the people of municipality are managing the waste?, How can we make our municipality neat and clean to be felt fully sanitation by the people? What types of role, efforts and effectiveness was shown from the side of municipality? These major subjects included in this study is the present condition of solid waste management in Vyas municipality. Vyas municipality is one of the municipalities of Tanahun District which is changing as a sub-metro municipality in Vyas municipality has eleven wards . Among these wards only three main wards 2,10 and 11 are identified as the wards of market area. Ward number two and ten are managed according to the town plan. But, ward number 11 is not managed. About four tractors solid waste are daily collected from these major wards. Management of solid waste is found without well management because good collection centers for solid waste materials are not available in different areas of the municipality. Some small dust-bin made of tin are hanging on the electronic poles for collecting solid waste materials but under those dust-bins neap of waste materials can be seen. Vyas municipality has collected and managed those solid waste

materials using its own tractors daily. The waste materials are well managed by the municipality on the beach of Madi river in Bahateri. In short, present condition of solid waste management in Vyas municipality is comparatively satisfactory than other municipalities. But in this twenty first century municipality and other palaces should be totally neat and clean. To bring necessary changes for bringing neat and clean environment of Vyas municipality I have choose this problem

1.2 Statement of the Problem

Solid waste is one of the most problematic areas of our administration. Nepal is facing a great remarkable environmental situation problem. Most of the people in our country are poor, illiterate and unaware in sanitation.

The World Bank Health sector policy has categorized demographic factors, malnutrition and unhealthy environment as the three main causes responsible for the poor health of developing countries. Solid waste management problem is one of the main problems of Nepal especially in municipality area. Among them Vyas Municipality solid waste management is one of them. Vyas Municipality has been selected as the study area for this study. This study focused on the role of Vyas municipality on solid waste management.

It is a major concern to the municipal role on solid waste management. In this study researcher observed worsening condition of solid waste management and it's effectiveness. The main source of solid waste in Vyas Municipality is the waste which is produced from different hotel, houses, medical, clinics, hospitals, meat shops, grocers, green grocers etc. There are generally two types of solid waste in Vyas Municipality: organic solid waste and Inorganic solid waste.

According to the survey done by Vyas Municipality 72 percent organic and 28 percent inorganic solid waste is produced daily as household waste. Nearly 7 tons waste is daily produced from Damauli area but in the lack of sources and tools waste cannot be timely managed (Vyas Nagar Activities, 2064).

So the vast problem in managing waste is adding day by day. This study is related with the following problems:

- i) To analyze the problems seen in solid waste management.

- ii) To find out the possibility in the field of solid waste management.
- iii) To analyze the role of municipality, its people and other organizations while managing solid waste.

1.3 Objectives of the Study

The general objective of this study is to find out the role of Vyas municipality on solid management in Vyas Nagar. The specific objectives of this study are as follows:

- i. To identify the sanitation condition of Vyas municipality
- ii. To find out the role and effectiveness of municipality about the solid
- iii. waste management.
- iv. To find out the practice of municipal people on solid waste management.

1.4 Significances of the Study

In Tanahun district, there is great difference in the region of culture, living standard and conductivity, due to these reasons there is less knowledge on the health specially in solid waste management. There are not enough community programs in the field of solid waste management. Therefore, awareness and behaviour is one of the solutions of improving health status of common people. In Vyas Municipality, population growth rate is rapidly increasing day-by-day as well as environmental pollution.

There are few researches on solid waste management at Vyas municipality in Tanahun district. The study is helpful to those people who are living in Vyas Municipality. So the present study is significant in the following ways:

- i. This study would be helpful to increase the positive health attitude among the people.
- ii. It would be useful to find out the sanitary problem of people of Vyas municipality.
- iii. This study would be a guideline for concerned institutions to solve the problem of waste management.
- iv. This finding of the study would contribute to establish people's good participation on solid waste management.
- v. This study would be useful for further study.
- vi. This result of the study would contribute to the planning and implementation for a healthy environment.

- vii. The study would be useful as a reference for the similar studies, which is carried out in future.

1.5 Delimitations of the Study

To make the study more flexible and to complete within a time, the scope of present study has been delimited to the following areas:

- i. Study had been concerned ward No. 2, 10 and 11 with sanitation.
- ii. This study had been delimited to 100 respondents of Vyas municipality.
- iii. This study was focused on solid waste management of Vyas municipality.
- iv. In this study, people's participation solid waste management and sanitary condition of selected areas were studied.

1.6 Definition of Important Terms used

Health	:	a process of adaptation to his environment.
Solid waste	:	Residues of vegetables ash, broken glass, papers some of the example of solid waste.
Management	:	Management is process of planning, organizing, organizing teaching, and controlling on organization.
Environment	:	It includes air, water, land, plants, kingdom, animal kingdom and whatever is there in own surrounding community.
Pollution	:	Mixing up of dust, dust particle, smokes etc. in air, Unfavorable lateraltion of our surrounding.
Sanitation	:	System that people's health, esp. those dispose efficiently of human waste.
Sewage	:	Organic refuse and excrement carried off by a regular system of underground pipes.
Disposal	:	Release of any waste materials into air, land and water.
Pilligrimes	:	On who travels to a distance to visit a holy place.
Administration	:	Administration is the organization and direction of human and materials, resources, to achieve desired ends.
Organic	:	Affecting bodily organs, belonging to the animals and vegetables kingdom.
Grocer	:	Dealer in domestic store, grocer's trade.

- courtyards** : A space enclosed by walls or building
- Hotel** : A building where rooms and usually meals are provided for people in returned for payment
- Equipment** : Necessary roles state of being equipped
- Composition** : A constitution of substance compound artificial substance
- Sanitary** : The condition affecting heath especially with reference to cleaners. Precaution against disease etc favorable to health from dirt bacteria.
- Hospital** : An institution providing for medical treatment and care for ill of injured people
- Slum** : A thickly polluted squalid part of the city , inhabited by the poorest people

CHAPTER II

REVIEW OF RELATED LITERATURE

The chapter deals with the related literature to this study, the main purpose of this chapter is to review the available literature so that the process of research could be made clear in information regarding the role of Vyas municipality on solid waste management and effectiveness, related with sanitation of people could presented in a proper way with help of literature review. A review literature available at the library of Tribhuvan university, library of education faculty Kritipur, library of Prithvi Narayan Campus, Pokhara and some published bulletins of reports are studied of Vyas municipality collection thesis abstract about Health research related with solid waste management. The researcher has mentioned some results of studies and some data of published report.

2.1 Review of Theoretical Literature

Sapkota (2001) conducted the research on 'Sanitary facilities and their management in secondary school at Hetauda Municipality'. Sanitary facilities form a main part of the school. Their sanitation depends on better management system of schools. So the major objectives of the study are mostly concern with the present situation, practice and suggestion for the improvement in sanitary facilities and their management for school family.

Dhamal (1990) a thesis of (problems of water & environmental pollution in Pashupatinath temple' & stated that the beauty of this area had been degraded by different polluting factor. Lack of proper waste management system, solid waste disposal, personal & public latrine are the main factors of water and environmental pollution in his study areas. He also found that water pollution is highly considerable condition affected the local people & pilligrimes. He suggested that the pollution factors should be checked & drinking water of the whole areas should be purified.

Manandhar (1990) presented a paper of solid waste management with people's participants. In her paper she expressed her modern ideas & techniques to visualize people's participation on solid waste management.

Joshi (1986) entitled a thesis of 'In our country environmental sanitation is not given high priority. In a sanitation programme priority must be given to a safe drinking water supply &

hygienic excreta disposal. The public health risk is of poor water supply & limited sanitation is reflected by morbidity & mortality sanitation for water born diseases.'

2.2 Review of Empirical Literature

Review of related literature guides, the researchers and give the sufficient knowledge. This part of research helps the researcher to find out new area of research. It provides findings of previous researchers and board knowledge about the related materials like books, thesis, study report, national & international publications, journals, magazines, newspapers, social organization. It reviews the findings of previous studies by other researcher related to this study.

Upreti (2007) conducted the research on "Efforts of municipal authority about the solid waste management in Hetauda municipality. The main objectives were to identify the role of people participation efforts on solid waste management and major problem of Maddhyapur Thimi municipality. The study was conducted in ward no. 15, 16, 17 at Madhyapur Thimi municipality. It was found that per capita waste generations of municipality were 0.34 kg. per day.

Vyas nagar activities (2064 B.S.) presented in different types of solid waste such as biological waste 72% and non biological waste 28% in ward no 2, 10 and 11 of Vyas Nagar. Biological waste can be used as compost and non-biological waste can be used for many purposes after recycling it.

JICA (2003) a report on Hetauda municipality most of the low caste communities which were lying on the roadside of the study area were Kasai tole, Dhami tole, Sharki tole, Kami Gaun and Miya Gaun. It is suggested that the municipal government must think about the education for the low caste people and health facilities should be provided to them.

Adhikar (1998) on his research "Solid waste management of Banepa Municipality". He found in this study the per capita waste generation in Banepa Municipality is 0.267kg per day which brings 0 volume daily waste generation 3.55 tons per day. Pumping of solid waste into the river it may rise to pollution problem. The farmers themselves that lead to environmental improvement have composed some of the solid wastes. Drinking water facilities and sewage system are insufficient in these areas.

Dhakal (2050 B.S.) presented paper in different types of solid waste such as: straw, garden waste & house waste 50 percent, bones 1 percent, wood 1 percent, vegetable, kitchen waste & market 8 percent, glass 2 percent, plastic 20 percent, metal 1 percent rubber, 2 percent stone and ash 10 percent in Bhaktapur municipality.

GTZ (1992) published the poster of a cooperation project about environmental care involving people's participation regarding waste collection & disposal. It highlighted the environmental knowledge with a view to minimize pollution & to promote public health.

According to the study conducted by Thapa in 1989, 350000 residents of Ktm. produced on estimated 140 forms waste per day. At this same time another study was conducted by him. some, 61,337 residents of Bhaktapur municipality produced an estimated 18 tons of waste per day. The per capita waste generation rate of Bhaktapur municipal area was 0.29k per day person (SWM in urban Nepal, p. 22)

WHO Geneva (1986) a report of 'water supply and sanitation decade international action for health'. An adequate supply of clean water is fundamental to individual family and community health statistics shows that about $\frac{1}{2}$ of the world's population are without reasonable access to an adequate supply of water & that even more people are without proper means of sanitation.

Waste collection and sewage disposal were totally inadequate and toilets were few. Solid waste lay on the road side and pile up in the courtyards of the three cities of Kathmandu valley. The waste collected from city areas was as before, being disposed of on river banks and in open field without appropriate consideration of environmental and sanitary effects (Thapa, 1986).

Generally solid waste can be separated in two ways: organic waste and inorganic waste. It can be manage according to nature the quantity of organic waste which is appeared from houses is about $\frac{2}{3}$. If this type of solid waste can be changed into compost, the quantity of the waste which is seen outside is reduced and it helps for creating neat and clean environment the compost can be used for growing plants and production will be good as well as using fertilizer will also be reduced (Practical Action Nepal, www.participation.org).

From the related literatures mentioned above, it can be generalized that the entire municipality have the problems of solid waste management. It is found that most of the

sanitation aspect the proposed to study the solid waste management in Vyas municipality in the present study.

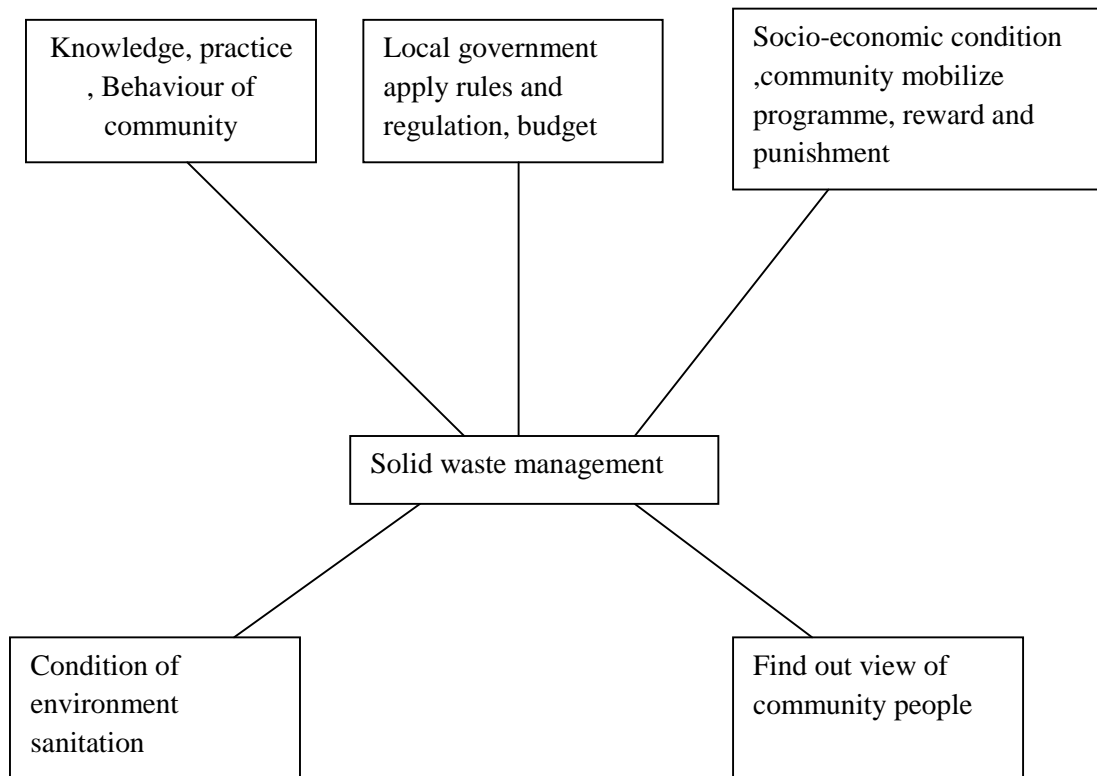
In the context of our country researches mentioned above have also been conducted to find out the people's KAP on solid waste management and these are related to my research & these are the guidelines for my study.

2.3 Implications of the Review for the Study

From the above mentioned literature, it was helpful to prepare the given research study. It was helpful to know about the present problems, role of solid waste management and effectiveness of Vyas Municipality in Tanahun district. It was also helpful about the selection of problem, background of the study, objectives of the research, significance and limitation of the study respectively. It enriched the researcher to make a brief study about the research methodology where research design, source of data, tools and procedures of data collection etc. were identified and discussed. Furthermore, it helped in analysis and interpretation of data in which condition of solid waste management and its effectiveness on environment better known.

2.4 Conceptual Framework

There are so many thing which directly or indirectly related to causing difference ways of solid waste management problem. In my opinion there are some dependent and independent variables which are affect on sanitation. These dependent variables are lack of knowledge, tradition, behavior, lack of local government rules, everywhere throw solid waste etc. which are indirectly effect in the environment. People throw dust from vehicle on the road and street, poor socio-economic condition, religion, Lack of budget for sanitation programme, don't active community people could not effective programmes are independent variables which variables must directly effect to community , conceptual framework shown in figure below.



The related literature, which mentioned above gave the idea to the researcher to develop conceptual framework for this study. The title here "The role of Vyas municipality on Solid waste management and its effectiveness in the independent variable which is influence by the conditions of intermediate variable. So, paying attention on these fact the researcher has developed conceptual framework which is presented on figure 1. The ideas presented on this figure have helpul t to carry out the research work smoothly.

CHAPTER III

RESEARCH METHODOLOGY

Research methodology in common parlance refers to a search for knowledge one can also define search as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. This chapter deals with research design, population of the study, sample size and sampling procedure data collection tools, validation of tools, data collection procedure, analysis and method of data interpretation.

3.1 Research Design

The descriptive method of research was applied to meet the objectives of the study. Quantitative research design was applied to conduct the research.

3.2 Population of the Study

The study was conducted in ward No. 2, 10 and 11 at Vyas Municipality, Tanahun. Total population of ward no.: 2,10 and 11 of Vyas municipality were the population of the study. These Wards had 784, 495, 709 household respectively. All the population of these household were the population of the study. Hundreds respondents were selected among these households.

3.3 Sampling Procedure & Sample Size

The study area is related through quantitative research method. The list of municipal wards were collected from administration section of Vyas Municipality. After getting the list the researcher was conducted field study technique by the help of planning section of Vyas Municipality. Among 3 wards of the sanitary area only 2, 10, 11 slum areas were randomly selected by lottery method. 10 persons from each Ward was selected by lottery method. 100 respondents were selected for the sample of this study.

3.4 Tools for Data Collection

The interview schedule was the major tool of data collection. The interview schedule consists of a serially numbered questions for data collection. Direct interview had been implemented to get related information. This method applied for schedules has been prepared which has consisted of structured questions which are given in appendix.

3.5 Data Collection Procedure

To collect the required data, the researcher visited the selected area with an authorized letter. After taking the permission from the administrators, the researcher got the data by the interview schedule from selected respondents. The researcher collected from the respondents among administrator, stakeholders, cleaning management committee, social worker, Tole committee, political leader by the researcher himself filled up the interview schedule to find out the role of Vyas Municipality on solid waste management.

3.6 Method of Data Analysis and Interpretation

After getting the data from various sources in raw forms, it was arranged in logical and sequential pattern. The data were checked before tabulating them and then the information was analyzed and interpreted in descriptive form. It was simply based on percentage, tables, and diagrams. Diagrams and pie charts were used for presentation of the data.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

This study was conducted with a view to finding out the role of municipality on solid waste management in Vyas municipality Damauli, Tanahun. In this chapter the gathered data were analyzed and interpreted to present the sanitation condition of municipality and the role of Vyas municipality on solid waste management.

The role of municipality on solid waste management and the role of people's participation on cleaning campaign and sanitary condition are discussed under different areas. As regard the presentation of the study sanitation section budget for solid waste management sources of finance, equipments for solid waste management, solid waste collection system and disposal methods are briefly discussed in the first part, which completely descriptive in nature . Similarly ,People's participation on courtyards and public places cleaning campaign media for people's participation , collection of household garbage , methods of disposing domestic dead animals , provision of containers, Sweepers , consultation with ward cleaning committees and sanitary condition of selected areas have been analyzed in the second part of this chapter.

4.1. Municipal Administration

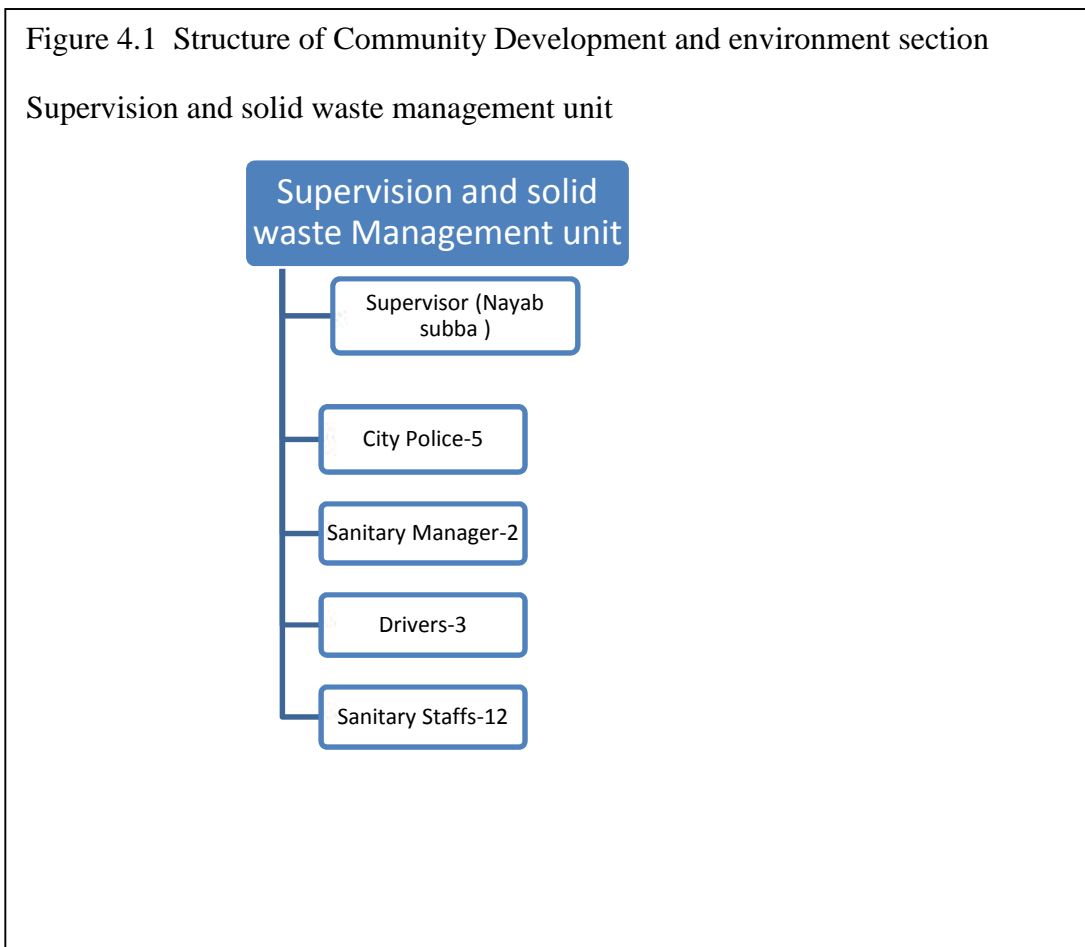
Every municipality has concerned municipal administration. There are different units in Vyas municipality out of them sanitation section is concerned in my research work.

4.1.1. Sanitation Section

Every municipality has its own city cleaning unit. In Vyas municipality the sanitation section is the city cleaning unit. It is supervised by an executive secretary and an assistant executive officer who were both deputed by the ministry of local development.

At present, the sanitation section is fully responsible for the management of municipal solid waste. The existing organizational structure of sanitation section has shown in the following figure No. 1 the below figure No. 1 shows that organization structure of sanitation section shows that the total member of existing man power concerning the solid waste management is 18 together The sanitation section head is the chief of the concerning section of municipal solid waste management . He guides and supervises all the activities of concerning manpower

in the field of solid waste management. Under the guidance of sanitation section head there are 23 Personal's such as Nagar prahari, drivers, helpers and sweepers.



Source: Section of V.M - 2012

There are three technical personals who are tractor driver and the others are non technical personals. According to the concerning section of solid waste management, there are 10 male and 2 female personals.

4.1.2 Budget for solid waste management

Budget is a main component for the effective solid waste management. If any municipal government seen have proper budget for solid waste management, it is not possible for the effective planning and implementation of healthy environment.

The proper distribution of budget is the mirror which reflects the strong efforts of the municipal administration in the context of city cleaning campaign. The total budget i.e. Rs. 3,56,00,000 of this municipality has been allocated for all the sections in the fiscal year

2070/071 B.S. In the field of concerning section of solid waste management is Rs. 30 lakhs i.e. 9 percent out of total budget has been allocated.

Table 4.1 Allocation of Budget

Expenditure	Amount Rs.
Administration	1 crore 6 lakhs
Development	1 crore 50 lakhs

4.1.3 Sources of Finance for solid waste management

Vyas municipality draws its finance from various sources. The income sources of Vyas municipality are given in table 4.2.

Table 4.2 Income Sources of Vyas Municipality

S.N.	Sources of income	Actual income of FY 2069/070 Rs.
1.	Local tax	200,225.25
2.	House rent tax	197,310.00
3.	Profession tax	11,99,315.00
4.	Registration tax of vehicles	217,805.91
5.	United property tax	46,76,779.00
6.	Entertainment tax	1,15,842.00
7.	Service tax	9,06,845.00
8.	Registration tax	50,67,911.96
9.	Resource mobilization	69,32,271.00
10.	Others	60,85,697.00
	Total	2,56,00,000.00

4.1.4 Equipment for solid waste management

In the past there were some traditional unhygienic impractical cleaning equipments but, now there are some modern and improved equipments for solid waste management such as long brooms, special tractor and shovel. Most of the essential tools and equipments have been provided by the municipal administration to the sanitation section for the effective management of solid waste.

The tools and equipments used for cleaning and waste collection are in right condition in the field of solid waste management. The existing tools and equipment for solid waste management Vyas municipality are given in table 4.3.

Table 4.3 Existing tools and equipment for solid waste management

List of Tools and Equipment	Number of Tools and Equipment	Condition of Tools and Equipment
Broom	30	Normally Right
Basket	10	"
Long Spade	4	"
Pick	4	"
Tiper	1	"
Disposal Tanker	1	"
Tractor	2	"
Reksha	2	"
Cart	2	"
Motorbike	1	"
Shovel	10	"
spade	3	"

4.1.5 Solid waste sources of Vyas municipal Area

"Solid wastes are defined as waste arising from human and animal activities that are normally solid and that are discarded as waste or unwanted."(KAZAL SINHA, 1990)

According to Vyas municipality, there are solid waste sources such as domestic, industrial, Agricultural, institution and commercial. Here, these above solid waste sources have been analyzed with the help of recent data.

Commercial wastes mainly consist of packing papers waste from hotel and waste from fruit shop, fancy, vegetable shop etc. In this municipal area solid waste sources covers 16 percent out of the total solid waste sources.

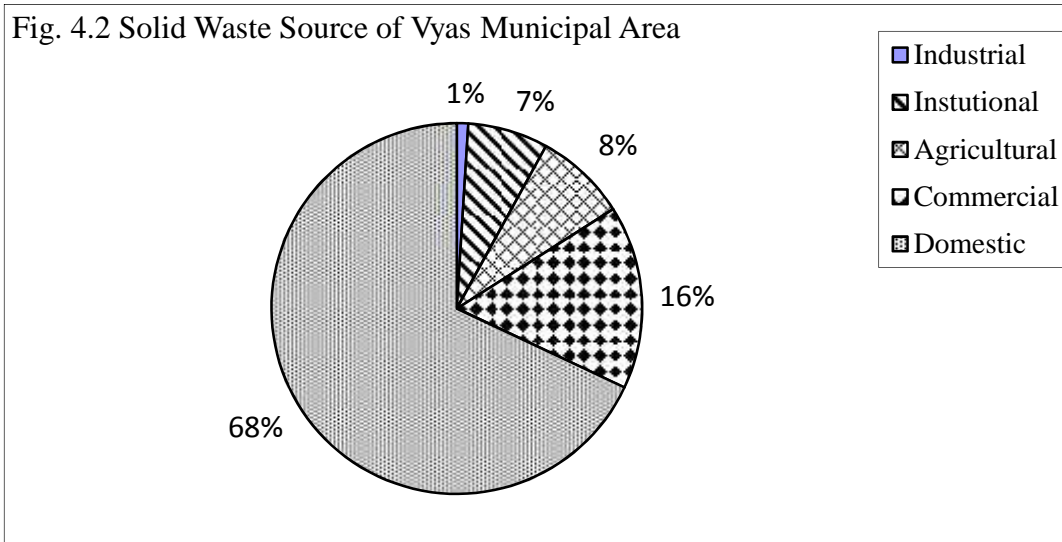


Figure 4.2 shows, domestic waste are produced by single family and multi-family dwellings. It covers almost top 68 Percent of the total waste sources of this municipality. It includes kitchen waste paper, rages some plastic leather, bones, glass, pots, ashes and metals.

Industrial wastes generated by different sources such as construction sites pipe industry , Bread industry , Wood industry , Food , Meat shop are under this source. it covers 1 percent of the total waste sources of the municipality. Institutional wastes mainly consists of school , campus , banks , offices, religions places and hospital. Wastes from this source usually contain food waste, glasses, plastics, syringes used bandages drug containers and other infected materials. According to the report of sanitation section most of the institutional waste have been disposed by their private sectors. So it covers 7 Percent of solid waste sources of municipal area.

4.1.6 Waste Production

Most of the factors that influence the quantity of generated municipal solid waste in general include geo-graphical location. Climate and season, economic factor and social and religious customs . So the waste generation rate differs not only between countries and within a country but also within a city. According to a study conducted by Thapa in 1989, 350 , 0000 residents of Kathmandu produced an estimated 140 forms waste per day . At this same time another study was conducted by him 61337 residents of Bhaktapur municipality produced an estimated 18 tons of waste per day.

Report conducted by Ghimire (2011) 6692 residents of Vyas municipality produced an estimated 10 tones of wastes per day. According to the recent data of Vyas municipality. Figure 4.3 shows the comparison of solid waste in percent.

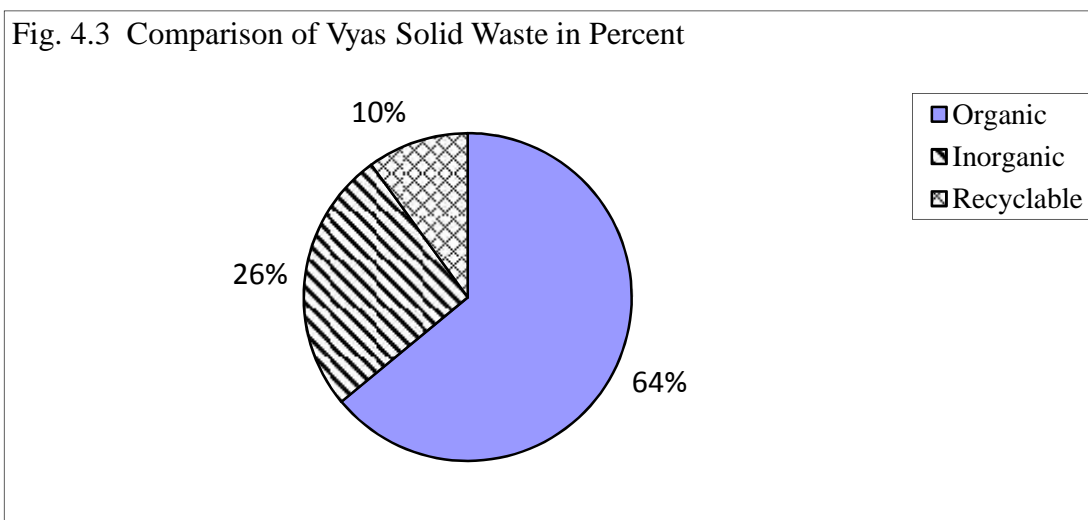


Figure 4.3 shows that, most of the waste was found organic i.e. 64%. Similarly, inorganic 26% and recyclable waste was found 10%.

4.1.7 Solid waste composition

The nature of the composition of the solid waste may usually different from place to place within the country depending upon the economic standard of the urban dwellers . In Vyas municipality it has been clearly seen that more than 64 percent of the total waste is organic and compostable 10 percent recyclable and 26% is inorganic respectively (source field study 2013 A.D.). Due to the lack of proper recycling process most of this recyclable waste materials have been scattered everywhere around the ground and field site.

Table 4.4 Composition of solid waste in percent in study site

S.N	Composition of solid waste	Percent	Type
1	Straw, House waste garden waste	52%	Organic
2	Bones	2%	Organic
3	wood	3%	Organic
4	vegetable, Kitchen waste	14%	Organic
5	Glass	1%	Recyclable
6	Plastics	6%	Recyclable
7	Metal	1%	Recyclable
8	Paper	3%	Recyclable
9	Rubber	1%	Inorganic
10	Stones	6%	Inorganic
11	Others	5%	

Sources: Field Study -2013 A.D.

4.1.8 Waste Collection System

Waste collection system is one of the best method of cleanliness in the city . It was developed 10 years ago. Earlier the time there was not effective waste collection system for waste treatment as well as any recycling process

In our country, due to the cost and caste system only sweepers castes were involved in waste collecting activities but now a days, the situation is changed. So the people of other castes are also involved in this occupation as employment process.

On the other hand the municipal ward 2,10,11 are the main places of the municipality. The Vyas municipality is the main institution which manage the solid waste of this area.

4.1.9 Waste collection method

In fact, in the field of municipal waste collection there is mainly only one type of method house to house collection is running now. People collect their waste and keep on the roadside. Every morning around 8 O'clock tractors are used to upload the wastes collected by the people. There are not any dumps in municipal area. People collect their household waste in their won dustbin.

The waste collecting method using by Vyas municipality is not so much effective because waste collecting method is very traditional. The ward wise basket distribution of Vyas municipality has been shown in the following table 4.5.

Table 4.5 Ward wise distribution of baskets

Ward No.	No. of Basket
2	47
10	53
11	34

4.1.10 Waste Disposal method

An adequate method for the disposal of solid waste is a fundamental public health requirement. Modern man living in ever growing communities with high population concentration has to find superior means of disposal of waste from mere dumping . It is easy to generate waste but difficult to dispose it. Communities face the ever growing quantity of

waste from households commercial centers, industrial areas institutional and agricultural activities.

In the field of waste disposal method in developed countries, there are some disposal waste method i.e. sanitary landfill, incineration, composting, prolepsis compacting, pyrolysis and bio-gas conversion. Among these methods sanitary landfill and composite have been practiced in Vyas municipality.

i. Sanitary Landfill

Sanitary landfill is a developed an engineered method of disposing of solid waste on land by speeding them in this layer. Compacting them to the smallest practical volume and covering them with soil at the end of each working day in a manner that protects the environment.

In the context of Vyas municipality by the sanitary landfill is located in nearby the Madi river bank field which is not properly planned with the help of round engineering principles and construction techniques.

About seven tones of municipal solid waste is taken to sanitary landfill site each day. The landfill site is still open and animals have been grazed in this area.

ii. Composting

Composting is the aerobic thermophilic decomposition of organic solid waste to produce a relatively stable humus like material (problem in community waste management) actually, compost means fertilizer, it comes from the latin word "con" and verb "pausere" which means put together and let rest . The word compost is thus formed with the admixture of word 'can' and 'pausere' , By word itself it means that The fertilizer produces out of mixture of different stuffs and having rest inside the ground which is used for the fertility of agricultural land in the same way.

4.1.11 Effectiveness of solid waste management done by municipality

The municipal waste management system must be good or systematic. It is not well manage there may be chance of transmission of many infections disease and appears in many health hazard During survey, all the respondents were asked about their opinion on effectiveness of solid waste management done by municipality. The following table show the answer of the questions.

Table 4.6 Waste management system in municipality

Condition of waste management	No. of Respondents	Percentage (%)
Good	20	20
Satisfactory	51	51
Poor	29	29
Total	100	100

The table 4.6, reveals that the respondents were scattered. We can say that majority No. of respondents 51 percent said that waste management system of municipal was satisfactory. Respondents 20 percent and 29 percent said that the system was good and poor respectively.

Waste management system is very sensitive issue of health. Hence the municipal administration and municipal development committee should play due attention for the management of municipal waste. This practice can easily affect in the health of community people, courtyard and personal staff.

The respondents were for this asked about aware the any measures for minimizing the municipal waste the majority (25%)of the respondents (75%) yes and remaining who told yes were minimizing wastes , they answered as follow :

- i. Hygienic improvement of the municipal
- ii. Training for waste management staff
- iii. Least use of plastics as for as possible
- iv. Conducting health education and awareness program
- v. Strict supervision and monitoring of the existing waste collection and segregation practice

Though they know many measures for minimizing municipal waste . It was not in use so these measures should be implemented immediately there.

4.2 Opinion towards Responsibility of waste management

Municipal waste should be managed well .The respondent were asked about the responsibility and role of the municipality on solid waste management with a multiple choice question having following bar graphs below shows questions and answers of respondents .

Table 4.7 Opinion towards Responsibility of waste management and Role of municipality

Role and Responsibility	No. of Respondents	Percentage (%)
Municipal administration should take responsibility	45	45
Community should take responsibility	24	24
Municipal staff should take responsibility	21	21
Municipal Development committee	6	6
Ministry of child and labour take responsibility	4	4
Total	100	100

Table 4.7 above we can see that the majority of the respondents (45%) said the role and responsibility of waste management was a municipal administration, smart (24%) said it was a community (21%) said the municipal staff (6%) said of municipal development committee and (4%) said ministry of child and child labour.

In this issues majority of the respondents expressed their view that it was main responsibility of municipal. Very few said municipal development committee should be responsible . Though the main responsibility was municipal. it was not only the issue of municipal but also the government as well as non government organization should involve in it among different kinds of waste the municipal waste is the most dangerous waste for transmission of infection disease which affects human health.

4.2.1 Practice of municipality people on solid waste management

People on solid waste management

- i. Municipality people are actively involved to collect the solid waste of municipal are.
- ii. There is planned urbanization in ward no. 10 and 2 of Vyas municipality
- iii. People collect their household wastes in the basket and handover to the municipal waste collecting staff.
- iv. There is lack of staff training programme.
- v. Community people are requested to collect their household wastes in proper way of collecting method.

- vi. Damuli Market unit is actively involved to make the municipal area neat and clean.
- vii. There is adequate public awareness programme.

4.2.2 People participation on courtyards and public places cleaning camping

Solid waste is the burning problem in human settlement in fact it is directly or indirectly affects the whole world. But now a day the people in the world are more aware of and therefore, concerned about the situation. It is not possible to make healthy environment without the people's active participation on cleaning campaign that is why the people participation should be made active in the field of courtyards and public places cleaning campaign Among them 73 respondents represent the answer 'yes' and 27 respondents did not agree to 'no' answer.

Table 4.8 People Participation on courtyards and public place cleaning campaign

Responses	Ward No.			Total	Percent
	2	10	11		
yes	22	27	24	73	73
No	10	12	5	27	27
Total	32	39	29	100	100.00

From the above table 4.8, we can easily prove that the respondents of public place cleaning campaign "yes" respondents among The ward no. 2,10,& 11 being a total 73 (73%) are agreed and non agreed were 27(27%) respondents in the long run .

4.2.3 Knowledge, Attitude and practice of respondents towards solid waste management

This part present the role of the people's participation on courtyards and public places cleaning campaign with the media for people's participation , respondents suggestions for maximizing people's participation. Solid waste management and sanitary condition of both areas of Vyas municipality.

4.2.4 Media for people's participation

Media has to be considered as an important means of information for people's participation so, it can be said that media is the main component for people's participation. It play the vital role in the field of peoples participation. In this aspect, radio ,magazine health education , ward member and others are to be considered as the different medias for people's participation .

Table 4.9 Media for People's Participation

Media	Ward No.			Total	Percent
	2	10	11		
Ward Member	25	28	18	71	71
Magazine	2	3	2	7	7
Radio	3	3	3	9	9
Health education	2	2	2	6	6
Other	2	2	3	7	7
	34	38	28	100	100

The above table 4.9 indicates that 71 respondents get information for people's participation from their ward member at sanitary area. Whereas 7 respondents from magazine 9 respondents with radio 6 respondents from health education and 7 respondents from other respectively.

4.2.5 Role of municipality on solid waste management

Nothing is possible without effective role of any institution to do something in the society. In the some sense, the role of municipality on solid waste management is very important. To find out the role of Vyas municipality on solid waste management all the respondents of

related ward no of municipality were asked their opinion about the role of Vyas municipality on solid waste management.

The following table shows the answer of the respondent about the role of municipality on solid waste management.

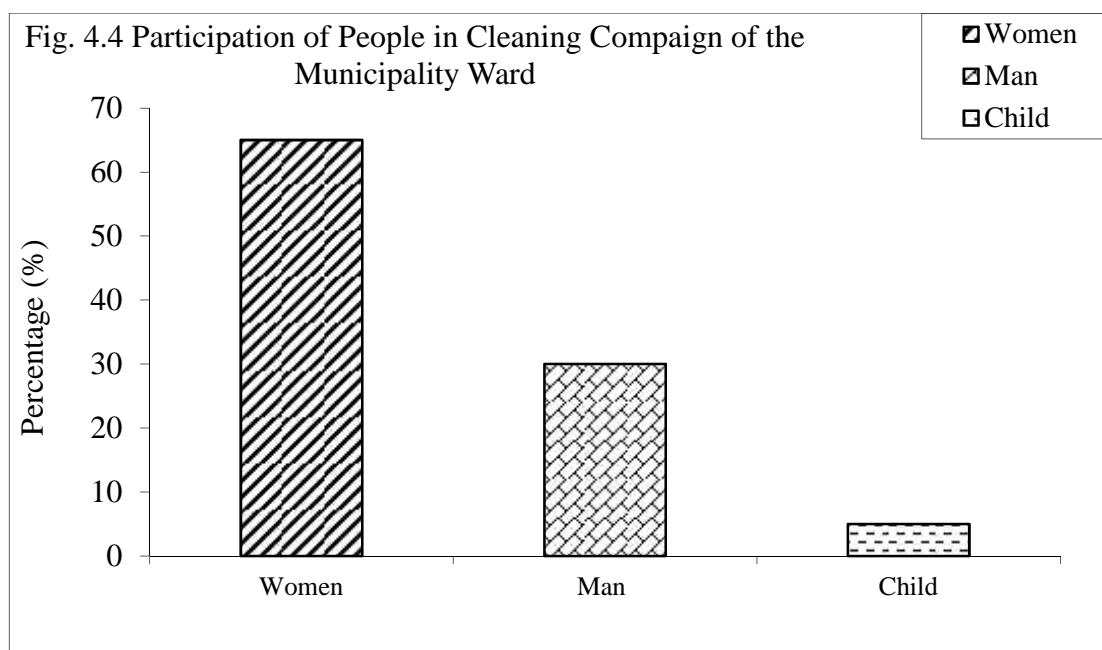
Table 4.10 Role of municipality on solid waste management

Role of municipality on solid waste management	No of Respondents			Total	Percent
	ward No.	2	10		
Good	10	11	7	28	28
Satisfactory	20	24	15	59	59
Poor	4	5	4	13	13
Total	34	40	26	100	100

From the above table 4.10, we can easily prove that the role of municipality on solid waste management was satisfactory which was also seen during observation.

4.2.6 Participation of people in cleaning campaign of the municipality ward

The following figure gives the details about participation of people in cleaning campaign of the municipality ward.



From the above figure 4.4, we can easily say or prove that most of the women were involved in cleaning campaign of the municipality. The research showed that 65 percent women were participating in cleaning campaign of the municipality. Only 30 percent men were involved in the programme. The research showed that only 5 percent children were participating in the cleaning campaign of the related wards.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Solid waste management is a modern technique, which deals with refuse collection, storage, transportation and final disposal. In this study the role of municipal administration on solid waste management and its effectiveness on courtyards and public places cleaning campaign and sanitary condition of both areas of Vyas municipality were included.

The major problem created by the solid waste had been affected the environment of the municipality. The results of this is because of the lack of the people's awareness increasing population and inadequate scientific technology for solid waste management. The people were quite ignorant for solid waste management. The administrative body seems unaware even though some incomplete efforts have been conducted to manage the mentioned solid waste.

Viewing the above-mentioned problem it has been tried to examine efforts of municipal administration. Secondly the study has been dealt in finding the people's role, how each family can contribute for the better management. Thirdly, the study was done to find out the major causes and consequences on solid waste management in the context of rapid urbanization of the municipality.

The survey method of descriptive research design was applied to meet the above stated objectives. The primary data were taken from the municipal administrator and selected household leaders of Vyas municipality; whereas the secondary data were taken from seminar reports, yearly municipal development plan.

The research instrument, the questionnaire was composed of two parts. Part 1: A information sheet for municipal administration and B for selected household leaders Part II : Contained observation checklist. After the tool was protasted its revised form was administered to the household ledger (sample) selected from three ward of Vyas ,municipality were considered as clusters in the present study . Three wards were selected randomly from each cluster. Hundred heads from each area were asked with the help of previous structured questionnaire. The selected data have been organized and tabulated item wise and presented in simple

percentage basis. Bar graphs and pie chart have been used in the present study. The whole part of this study is fully descriptive in nature.

5.2 Findings

The important findings of the present study are in listed as:

- i. It was found that 10 percent budget had been allocated for solid waste management in the fiscal year 2069/70.
- ii. It was found that there were lack of technical and some well trained personnel in the field of municipal solid waste management.
- iii. The study shows that 64 percent of the total waste was organic and compostable 26 percent recyclable and 10 percent inorganic.
- iv. The study showed that there were 6692 residents of Vyas municipality. It produced an estimated 7 tones of wastes per day.
- v. It was found that woman participants are comparatively higher in ward cleaning campaign.
- vi. It was found that the provision of sweepers for ward cleaning campaign at slum area was poorer than at sanitary area.
- vii. It is found that the health related awareness campaign and cooperation of tole dwellers are the main suggestions for maximizing people's participation.
- viii. It is found that the collection of garbage in basket is comparatively higher at sanitary area than at slum area.
- ix. It is found that 71 percent respondents get information for people's participation from their ward member at sanitary area where as 6 percent respondents get information from health education.
- x. It is found that the lack of inner- city cleaning is the main reason of dissatisfaction with the municipality's solid waste management.
- xi. It is found that the provision of baskets for solid waste management is seen to be inadequate in Vyas municipality.
- xii. The tools and equipments used for transportation and waste compositing are inadequate in Vyas municipality.
- xiii. It is found that the municipality is planning to make the neat and clean municipality with the help of stakeholders and community people of Vyas municipality.

5.3 Conclusion

Based on the finding of this study the following conclusions are enlisted.

- i. Vyas municipality was also the fast growing market of Tanahun District.
- ii. The role of municipality of solid waste management is satisfactory from the view of municipal people.
- iii. The transportation and composting tools and equipments are inadequate.
- iv. Sanitary condition of slum area was poorer than the sanitary area of vyas municipality.
- v. Practice of municipality people on solid waste management is satisfactory than the comparison of other municipality of Nepal.

5.4 Recommendations

The following recommendations were made to improve the for role of Vyas municipality on solid waste management and its effectiveness.

5.4.1 Recommendations for further Improvement

According to the finding, conclusion observation as direct personal discussion and interview with the respondent the following recommendation have been forward.

- i. The population of Vyas municipality is rapidly growing up day by day so the importance of the solid waste management stand with high priority.
- ii. In order to get people's participation, municipal's authorities should seek people's involvement in every phase of the programme.
- iii. It is suggested that economic and human resources should be mobilized properly for the solution of problems.
- iv. Training of municipal staff regarding solid waste management should be organized with the help of solid and resource mobilization centre.
- v. It is suggested that the awareness programme about solid waste management should be conducted by municipality.

5.4.2 Recommendation for the national policy

- i. Formal and non-formal education programmes implemented for solid waste management from local government level.

- ii. Active participation of government: its NGO, INGO and the international agencies.
- iii. Local government agencies should organize workshop, seminars, movement programme of better methods for solid waste management.

5.4.3 Recommendation for further research

- i. It is recommended that similar type of study has to be done in other areas of solid waste management and effectiveness.
- ii. The comparative study can be done among other different areas about solid waste management and effectiveness.
- iii. This type of research should be carried out on large area of country.

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APPENDIX I

Interview Schedule

Part A

The interviews schedule prepared to work for the selected. Household leader of the three wards of Vyas Municipality, Tanahun.

Personal Description

Name:

Date:

Cast:

Address:

Occupation:

Ward No.

Age:

1. Do you have provision of contains for the collection of waste materials on the courtyard and street?
 - a) Yes
 - b) No
2. How is the role of Municipality on solid waste management?
 - a) good
 - b) satisfactory
 - c) very effective
3. How is the municipality role in cleaning campaign in your ward?
 - a) satisfactory
 - b) less effective
 - c) more effective
 - d) good
4. How do you dispose if your domestic animal dies?
 - a) by throwing on street
 - b) by throwing into the rivers
 - c) by burning
 - d) other
5. Who participates most in cleaning campaign in your ward?
 - a) man
 - b) women
 - c) child
 - d) others
6. Where do you collect your household of garbage?
 - a) basket
 - b) container
 - c) open place
 - d) others
7. Do you consult with ward cleaning if you have solid waste management problems?
 - a) Yes
 - b) No
8. Are you satisfied with the solid waste management of the municipality?
 - a) yes
 - b) no
9. How the municipality made of provision of sweeps for the ward cleaning campaign?
 - a) yes
 - b) no

10. What do you think about the aspect of solid waste? or What is more polluted by solid waste?
a) air b) water c) land d) other
11. What do you think about the effectiveness of solid waste management done by municipality?
a) good b) satisfactory c) poor
12. Where do you dispose the water of your bathroom and kitchen?
a) open field b) river c) daringly
d) kitchen garden e) others
13. Do you have municipal waste needs special attention?
a) yes b) no
14. Who should take the major responsibility for the management of waste?
a) municipal administration b) municipal staffs
c) local community d) ministry of local development
15. What do you say to the efforts of municipality about the solid waste management?
a) good b) satisfactory c) should improve
17. Do you have any current problems to manage your waste materials?
a) yes b) no

APPENDIX II
Interview Schedule
Part B

Questionnaire for the study of the role of Vyas Municipality on Solid waste management in
 Damauli

Questionnaire Proposal to ask with the administrator of Vyas Municipality.

Q.1 What is the total number of population in Vyas Municipality?

Ward No.	Household No.	Female	Male	Total

Q.2) How many personal are involved in the solid waste management of your municipality at present?

- a) Number of total personnel's
- b) Technical personnel's
- c) Non technical personnel's

Q.3) How many technical personals are there in your municipality?

- a) male
- b) female

Q.4) How many non technical personals are there?

- a) 1-3
- b) 4-6
- c) 7-9
- d) 10-12

Q.5) Are the existing equipment sufficient? If not which types of equipment do you need?

- a) tractor
- b) long spade
- c) pick
- d) contained

Q.6) From which field does the waste come?

- a) home
- b) courtyard
- c) wards
- d) others

Q.7) Which types of instruments are being used for solid waste management at personal?

- a) list of equipment
 - b) condition of equipment
 - c) number of equipment
- Q.8) What are the provisions of solid waste collection?
- a) plastic bin b) metal bin
- Q.9) What are the financial measures to manage the municipal waste?
- a) government fund b) district development committee
 - c) local income d) others
- Q.10) In your opinion, which is responsible to manage the municipal wastes?
- a) government fund b) district development committee
 - c) local income d) others
- Q.11) How is the effectiveness of solid waste management in Vyas municipality?
- a) working effectively b) just working for the work
 - c) not working properly

Thanks for Help

APPENDIX III
Observation Checklist

Name of Municipality:

Ward No.:

Date:

Questions	Yes	No
Have cleaning campaign started in city daily?		
Have you collect household garbage daily?		
Is there any container for the collection of waste materials on the courtyard?		
Is there any container for the collection of waste materials on the street?		
Have you appropriate dumping site a city?		
Are cleaning committee motivated the sweepers in the city?		
Are city people satisfied with cleaning/solid waste management of the municipality?		
Has the municipality made the provision of sweepers for the ward cleaning campaign?		
How do people feel polluted by solid waste?		
Are administration officer/personnel took part in field observation regularly?		
Do you have the provision of basket?		
Male or female who participate more in cleaning campaign?		
Is there sanitary field in the city?		