

Chapter 7

Micro Analysis of the Impacts of Urban Solid Waste Management

A micro analysis of the variables taken helps to highlight i) the socio-economic characteristics of the sample units ii) various impacts of improper solid waste management iii) present status of solid waste management in Alappuzha iv) role of Kudumbasree in solid waste management v) willingness to pay for improved solid waste management system.

7.1 Socio-economic characteristics

Socio-economic characteristics of the study area were analysed by considering i) gender of the respondent ii) education iii) occupation iv) house ownership v) average monthly income vi) monthly expenditure.

i) Gender of the respondent

The gender of the respondents is given in the table: 7.1.

Table: 7.1 Gender

Gender	Percentage (%)
Male	65.4
Female	36.6
Total	100

65.4% of the respondents were male and 35.6% were females.

ii) Education

The educational qualifications of the respondents is given in the table 7.2.

Table: 7.2 Education

Level of education	Percentage (%)
No formal education	3.4
Primary level	35.3
Secondary level	44.8
Higher education	16.4
Total	100

Source: sample survey, 2008.

The table shows that 44.8% have attained secondary education while those with higher education were 16.4%. Only 3.4% of the respondents were without any formal education.

iii) House ownership

The ownership pattern of house is given in the table 7.3

Table: 7.3 House ownership

Ownership	Percentage (%)
Owned	92.1
Rented	7.9
Total	100

Source: sample survey, 2008.

The table shows that 92.1% of the respondents have their own house. Only 7.9% depend on rented houses.

iv) Occupation

The occupation of the respondents is give in the table: 7.4

Table: 7.4 Occupation

Occupation	Percentage (%)
Govt job	16.4
Private job	24.2
Business	16.7
Fishing and related activities	31.6
Tourism	5.6
Others	5.5
Total	100

Source: sample survey, 2008.

31.6% of the respondents are engaged in fishing and related activities while 24.2% have private sector jobs. Tourism employs .6% and 16.4% have government jobs. 16.7% of the respondents do business while 5.5% have other jobs.

v) Average monthly income

The range of average monthly income to which the sample households belong is considered in the table 7.5

Table: 7.5 Average monthly income

Income Range (in Rs.)	Percentage (%)
Less than 1000	14.8
1000 – 5000	61.0
5000 – 10000	19.4
Above 10000	4.8
Total	100

Source: sample survey, 2008.

75.8% of the respondents have an average monthly income of below Rs.5000. A small percentage of 4.8% belongs to the high income group of Rs.100000 and above.

vi) Average monthly expenditure

The table 7.6 gives the statistics for the average monthly expenditures on food, clothing, utilities, education, health, housing, transport and other expenses.

Table: 7.6 Average monthly expenditure (in Rs)

Food	3049.17
Clothing	886.59
Utilities	894.20
Education	1662.38
Health	846.02
Housing	784.15
Transport	1047.65
Others	1045.00
Total	10215.16

Source: sample survey, 2008.

The highest monthly expense is on food with average an average of Rs.3049.17 and the lowest is on housing with Rs.846.02.

vii) Average monthly expenditure

The range of average monthly expenditure of the respondents is given in the table 7.7

Table: 7.7 monthly expenditure

Expenditure	Percentage (%)
Less than 1000	10.8
1000 – 5000	55.1
5000 – 10000	32.6
Above 10000	1.5
Total	100

Source: sample survey, 2008.

Around 66% of the respondents have an expenditure of below Rs.5000. Only a small percentage of 1.5% spends more than Rs.10000.

7.2 Impacts of MSWM

The impacts of MSWM include health impacts to the population, economic impacts, environmental impacts and social impacts. The following section deals with the impacts of improper solid waste management in the municipality.

7.3 Impacts on health

A complex relationship exists between a person's health and immediate environment. Diseases can spread through air, water, food, soil, through environmental factors and lifestyle.

i) Signs and symptoms

The table 7.8 illustrates the signs and symptoms experienced by the respondents.

Table: 7.8 Signs and symptoms

Sl. no:	Signs and symptoms	%age affected
1	Diarrhea	41.7
2	Persistent headache	18.2
3	Fever	33.6
4	Cough and cold	31.3
5	Eye irritation	29.4
6	Skin infection	34.6

Source: sample survey, 2008.

Among the different signs and symptoms identified, 41.7% were affected with diarrhea, 34.6% with skin infection and 33.6% with fever. 18.2% had persistent headache.

ii) Perceived causes of disease signs and symptoms

The table: 7.9 shows the respondent's perceived causes of disease symptoms.

Table: 7.9 perceived causes of disease symptoms.

Signs and symptoms	Physical Environment*	Lifestyle risks**	Non-environment***	Don't know
Diarrhea	91.4	2.4	5.4	0.8
Persistent headache	49.6	38.2	10.8	1.4
Fever	61.7	18.2	18.3	1.8
Cough and cold	86.3	7.7	4.3	1.7
Eye irritation	77.8	6.2	11.5	4.5
Skin infection	89.2	3.4	4.8	2.6

Source: sample survey, 2008.

*air, water, food and soil, **alcohol, drugs, stress, lack of exercise, ***complications due to other diseases.

The respondents mainly attribute physical environmental factors as the cause for disease symptoms. 91.4% and 89.2% of the respondents attribute physical environmental factors as the cause for diarrhea and skin infection respectively. 38.2% considered lifestyle risks as the cause for persistent head aches.

iii) Occurrence of diseases

Table: 7.10 consider the occurrence of diseases among the respondents.

Table: 7.10 Occurrence of diseases

Name of disease	% affected
Dengue	20.1
Cholera	42.7
Jaundice	21.8
Typhoid	30.6
Intestinal parasitism	20.6
Rat fever	33.6
Acute respiratory infection	44.4
Chicken guinea	29.3
More than one disease	33.5
No diseases	5.2

Source: sample survey, 2008.

44.4% of the respondents were affected by acute respiratory infection followed by cholera at 42.7%. Chicken guinea has affected 29.3% of the respondents. 33.5% of the respondents were affected by more than one disease. 5.2% were not affected by the given diseases.

iv) Perceived causes of disease

The table: 7.11 shows the respondent's perceived causes for diseases.

Table: 7.11 Perceived causes of disease

Disease	Physical Environment*	Lifestyle risks**	Non-environment***	Don't know
Dengue	85.6	0.4	5.4	8.6
Cholera	83.5	0.5	6.2	9.8
Jaundice	81.8	1.2	9.3	7.7
Typhoid	78.9	1.7	7.5	11.9
Intestinal parasitism	82.6	0.9	3.5	13
Rat fever	91.6	0.1	2.7	5.6
Acute respiratory infection	80.2	5.7	9.6	4.5
Chicken guinea	94.4	0.3	1.7	3.6

Source: sample survey, 2008.

*air, water, food and soil, **alcohol, drugs, stress, lack of exercise, ***complications due to other diseases.

The respondents mainly attribute physical environmental factors as the cause for the given diseases. 94.4% considers physical environment factors as the cause for chicken guinea. 91.6% of the respondents attribute physical environmental factors as the cause for rat fever.

v) Diseases to children

Table 7.12 shows the effect of diseases on children

Table 7.12 Diseases to children

Response	Percentage (%)
Yes	27.9
No	72.1
Total	100

Source: sample survey, 2008.

72.1% of the respondents agreed that children are getting affected by the diseases.

vi) Seasonal occurrence of the diseases

Table 7.13 considers whether the occurrence of diseases has been seasonal.

Table 7.13 Seasonal occurrence of diseases

Response	Percentage (%)
Yes	64.3
No	35.7
Total	100

Source: sample survey, 2008.

64.3% of the respondents agreed that the occurrence of the diseases as seasonal.

vii) Season prone to diseases

Table: 7.14 shows the season in which there is a great chance for diseases to occur.

Table: 7.14 Season more prone to diseases

Season	Percentage (%)
Monsoon	47.9
Winter	20.9
Summer	31.2
Total	100

Source: sample survey, 2008.

Around 48% of the respondents agreed that the diseases occurred mainly during monsoon season followed by summer season.

viii) Average outpatient expenses

Table: 7.15 consider the average outpatient expense for the treatment of one episode of disease.

Table: 7.15 Average outpatient expenses

Average expenses	Percentage (%)
Less than 500	96.1
Above 500	3.9
Total	100

Source: sample survey, 2008.

96.1% of the respondents had an average outpatient expense of less than of Rs.500 for treating a single episode of a disease.

ix) Average inpatient expenses

Table: 7.16 consider the average inpatient expenses for the treatment of one episode of disease.

Table: 7.16 Average inpatient expenses

Average expenses	Percentage (%)
Less than 500	75
500 – 1000	14.3
Above 1000	10.7
Total	100

Source: sample survey, 2008.

75% of the respondents had average inpatient expenses of less than of Rs.500 for treating a single episode of diseases. 14.3% had an expense between Rs.500 and Rs.1000 and 10.7% had expenses above Rs.1000.

x) Frequency of occurrence of diseases

The table: 7.17 consider whether the frequency of the occurrence of epidemics has increased over the last few years in the municipality.

Table: 7.17 Frequency of occurrence of diseases

Response	Percentage (%)
Yes	86
No	14
Total	100

Source: sample survey, 2008.

86% of the respondents agreed that the occurrence of epidemics in the municipality has increased the last few years.

xi) Reasons for increase in the occurrence of diseases

The table: 7.18 shows the reasons the respondents give for the increased occurrence of diseases in the municipality.

Table: 7.18 Reasons for increase in the occurrence of diseases

Reason	Percentage (%)
Solid waste pollution	78.6
Other pollution	11.8
Don't know	9.6
Total	100

Source: sample survey, 2008.

Around 78.6% of the respondents consider solid waste pollution as the main reason for the increase in the occurrence of diseases. 11.8% consider other types of pollution as the reason while 9.6% didn't know the reason for the increase.

xii) Possession of insurance

Table: 7.19 shows the extent of insurance cover of the respondents.

Table: 7.19 Possession of insurance

Response	Percentage (%)
Yes	37.1
No	62.9
Total	100

Source: sample survey, 2008.

62.9% of the respondents have no insurance cover.

7.4) Economic impact

The economic impacts of SWM include the reduction of land value in the area. The following section deals with the opinion of the respondents regarding the residential land value in the municipal area.

i) Impact on land value due to solid waste pollution

Table: 7.20 consider whether the residential land value has decreased due to solid waste pollution.

Table: 7.20 land value

Response	Percentage (%)
Yes	11.2
No	88.8
Total	100

Source: sample survey, 2008.

Almost 88.8% of the respondents are of the opinion that pollution hasn't reduced land prices in the municipality.

ii) Land value per cent

Table: 7.21 show the expected residential land value per cent of land in the municipal area.

Table: 7.21 land value for one cent

Value	Percentage (%)
Less than 1 lakh	25.6
Above 1 lakh	74.4
Total	100

Source: sample survey, 2008.

About 55.6% of the respondents are of the opinion that the value of one cent of land in the municipal area is below Rs.1 lakh and 44.4% consider it as above Rs.1 lakh.

iii) Land value in the absence of solid waste pollution.

Table: 7.22 consider the whether residential land value in the municipal area will increase in the absence of solid waste pollution.

Table: 7.22 land value in the absence of solid waste pollution

Response	Percentage (%)
Yes	31.1
No	68.9
Total	100

Source: sample survey, 2008.

68.9% of the respondents are of the opinion that the land value will not increase in the absence of solid waste pollution.

iv) Change of residence

Table: 7.23 show the willingness of the respondents to change their residence to a place with less pollution.

Table: 7.23 Change of residence

Response	Percentage (%)
Yes	48.1
No	51.9
Total	100

Source: sample survey, 2008.

About 48.1% of the respondents were ready to relocate to place with less pollution while 51.9% were not ready to relocate.

7.5) Environmental impact

One of the important impacts of SWM is the deteriorating water quality in the area. The following section deals with the impacts of solid waste management on water quality in the municipality.

i) Source of drinking water

Table: 7.24 shows the main source of drinking water of the respondents

Table: 7.24 Source of drinking water

Source	Percentage (%)
Municipal water	73.2
Well water	8.1
Bore well	18.7
Total	100

Source: sample survey, 2008.

About 73.2% depend on municipal water as the main source for drinking water while 18.7% depend on bore well. 8.1% of the respondents use well water.

ii) Quality of water

Table: 7.25 considers the opinion of the respondents on whether the quality of water in the municipal area has deteriorated over the last few years

Table: 7.25 Quality of water

Response	Percentage (%)
Yes	86.7
No	23.3
Total	100

Source: sample survey, 2008.

About 86.7% are of the opinion that the quality of water available has deteriorated over the years.

iii) Reasons for bad water quality

Table: 7.26 consider the main reasons given by the respondents for the bad water quality.

Table: 7.26 Reasons for bad water quality

Reason	Percentage (%)
Solid waste pollution	70.2
Other types of pollution	24.3
Don't know	5.5
Total	100

Source: sample survey, 2008.

About 70.2% of the respondents gave solid waste pollution as the reason for the bad water quality. 24.3% give other types of pollution as the main reason for the bad water quality.

7.6) Social impact

The social impacts created by MSWM are in the form of the disamenities felt by the population. The following section gives an analysis of the disamenities felt by the respondents due to solid waste management in the municipality.

i) Disamenities

Table: 7.27 shows the main disamenities associated with solid waste experienced by the respondents.

Table: 7.27 Disamenities

problems	Percentage (%)
Mosquito, flies	61
Air pollution	1.8
Dirty surroundings	2.8
Bad smell	3.1
All the problems	29
None	2.3
Total	100

Source: sample survey, 2008.

Mosquito and flies are considered as the main problem due to sold waste. 29% are of the opinion that all the given problems are present in the municipal area due to solid waste.

ii) Ranking of the disamenities

Table: 7.28 show the ranking of the disamenities as given by the respondents in the decreasing order of intensity.

Table: 7.28 Ranking of the disamenities

Problems	Rank	Percentage (%)
Mosquito, Flies	I	75.1
Bad smell	II	22.1
Dirty surroundings	III	2.8
	Total	100

Source: sample survey, 2008.

About 75.1% has ranked the disamenity of mosquito and flies as number one. Bad smell is given second rank followed by dirty surroundings.

7.7) Present status of Solid Waste Management

i) Method of solid waste disposal

Table: 7.29 show the various methods adopted by the residents to dispose solid waste.

Table: 7.29 Solid waste disposal

Method	Percentage (%)
Municipal waste bin	77.2
Burning	22.8
Total	100

Source: sample survey, 2008.

About 77.2% of the respondents depend on municipal waste bin for disposing solid waste. Burning solid waste is an option for almost 22.8% of the respondents.

ii) Segregation

Table: 7.30 shows whether household solid waste is segregated before disposed by the respondents.

Table: 7.30 Solid waste segregation

Response	Percentage (%)
Yes	16
No	84
Total	100

Source: sample survey, 2008.

Only 16% of the respondents segregate the solid waste into bio degradable and non bio degradable before disposal.

iii) MSW collection

Table: 7.31 consider the frequency of the municipal solid waste collection in a week.

Table: 7.31 Frequency of solid waste collection

Frequency	Percentage (%)
Daily	3.3
Once in three days	32.5
Once in a week	63.2
Total	100

Source: sample survey, 2008.

63.2% of the respondents put the frequency of collection as once in a week while 32.5% gave it as once in three days.

iv) Rating of MSWM

Table: 7.32 shows the ratings given by the respondents on the MSWM of Alappuzha municipality.

Table: 7.32 Rating of solid waste management

Response	Percentage (%)
Very good	2.4
Good	30.9
Bad	66.7
Total	100

Source: sample survey, 2008.

About 66.7% of the respondents rated the municipality's solid waste management as bad. 30.9% rated it as good while only 2.4% rated it as very good.

v) Kudumbasree

Table: 7.33 show the use of Kudumbasree service for solid waste collection by the respondents.

Table: 7.33 Kudumbasree

Response	Percentage (%)
Yes	24.5
No	75.5
Total	100

Source: sample survey, 2008.

About 75.5% of the respondents use Kudumbasree for solid waste disposal.

vi) Rating of Kudumbasree

Table: 7.34 show the rating of the respondents on Kudumbasree in solid waste collection.

Table: 7.34 Rating of Kudumbasree

Opinion	Percentage (%)
Good	75.9
Very good	1.5
Bad	22.6
Total	100

Source: sample survey, 2008.

About 75.9% rated the performance of Kudumbasree as good while 1.5 rated as very good. The performance of Kudumbasree was as bad only by 22.6%.

vii) Comparison of Kudumbasree and municipality

Table: 7.35 consider a comparison of the performance between Kudumbasree and municipality in solid waste collection.

Table: 7.35 comparisons of Kudumbasree and Municipality

Response	Percentage (%)
Yes	63.5
No	36.5
Total	100

Source: sample survey, 2008.

63.5% of the respondents rated the performance of Kudumbasree as better than the municipality while 36.5% rated the performance of municipality as better than Kudumbasree.

7.8 Valuation for an improvement of the SWM

i) Awareness

Table: 7.36 shows the awareness of the respondents about the various prevailing environmental issues.

Table: 7.36 Awareness

Response	Percentage (%)
Yes	89.2
No	10.8
Total	100

Source: sample survey, 2008.

89.2% of the respondents were aware of the various environmental issues while 10.8% were not aware about the issues.

ii) Rating of the municipality’s environment

Table: 7.37 show the rating given by the respondents on the municipality’s environment.

Table: 7.37 Rating of the environment

Opinion	Percentage (%)
Very good	1.6
Good	24.9
Bad	73.6
Total	100

Source: sample survey, 2008.

73.6% of the respondents rated the town’s environment as bad. About 24.9% considered the environment as good while only 1.6% considered it as very good.

iii) Solid waste pollution and environmental degradation

Table: 7.38 consider the opinion of the respondents regarding the role of solid waste pollution in the environmental degradation of the municipality.

Table: 7.38 Role of solid waste pollution

Response	Percentage (%)
Yes	91.1
No	8.9
Total	100

Source: sample survey, 2008.

An overwhelming 91.1% of the respondents cited solid waste pollution as the main reason behind the environmental degradation of the municipality.

iv) Solving solid waste pollution

Table: 7.39 consider the opinion of the respondents regarding solving the issue of solid waste pollution of the municipality without considering the cost involved.

Table: 7.39 solving solid waste pollution

Response	Percentage (%)
Yes	88.4
No	11.6
Total	100

Source: sample survey, 2008.

88.4% of the respondents were of the opinion that solid waste pollution must be solved without considering the cost involved.

v) Need for environmental projects

Table: 7.40 show the opinion of the respondents regarding the need for projects solving environmental issues. This opinion given by the respondents is indicative of their environmental ethic.

Table: 7.40 Need for environmental projects

Response	Percentage (%)
Yes	85.3
No	14.7
Total	100

Source: sample survey, 2008.

An overwhelming 85.3% of the respondents were of the opinion that there is a need for projects solving environmental issues.

7.9 Cross tabulation of the variables

The following section considers the cross tabulation of the variables monthly income and environmental ethic and education and environmental ethic.

i) Monthly income and environmental ethic

The relation between monthly income and environmental ethic is given in the table: 7.41.

Table: 7.41 Monthly income and environmental ethic

Monthly income(in Rs)	Environmental ethic (%)	
	Yes	No
Less than 1000	82.6	18.4
1000-5000	85.4	15.6
5000-10000	86.7.	13.3
Above 10000	86.8	13.2

The level of income does not seem to play a big role in determining the environmental ethic of the respondent. 82.6% of the respondents belonging to the income category less than 1000 have environmental ethic and as the income level increases there is a slight increase in the possession of environmental ethic.

i) Education of the respondent and environmental ethic.

The relation between Education of the respondent and environmental ethic is given in the table: 7.42

Table: 7.42 Education and environmental ethic.

Education of the respondent	Environmental ethic (%)	
	Yes	No
No education	76.4	23.6
Primary education	80.1	19.9
Secondary education	82.6	17.4
Higher education	83.7	16.3

76.4% of the respondents without education possess environmental ethic while 80.1% of the respondents with primary education has environmental ethic. As the education level increases from secondary education to higher education the respondents with environmental ethic increases from 82.6% to 83.7%.

7.10 WTP for improved solid waste management programme.

The valuation process consisted of giving the respondents two hypothetical solid waste management projects. The characteristics and advantages of the projects were explained to the respondents clearly.

i) Project description

The municipality is planning to have two different solid waste management programmes that will take into consideration different aspects of efficient solid waste management starting from generation of wastes to final disposal. The project can also be done by a private agency. The second project will be having additional advantages when compared with the first project and the cost will be high. Contribution from the public in the form of user charges is required.

ii) The first project

It will cost around Rs. 6 crore and the key characteristics of the project are:

- i) a new collection system that ensures 100 % collection of solid wastes.
- ii) construction of a controlled landfill in the present site with a large life span.
- iii) avoiding contamination of ground water.

The valuation exercise used the bidding format and gave Rs.30per month as the starting point. If the willingness to pay was more than Rs.30 the amount was raised in the subsequent question and then the respondent was asked to give the final amount. Similarly, if the willingness to pay was less than Rs.30, a lesser amount was asked in the subsequent question and finally the respondents were asked to give their final amount.

iii) Amount willing to pay for the first project by the municipality

Table: 7.43 shows the distribution of the various amounts willing to be paid by the respondents for the first project done by the municipality

Table: 7.43 Amount willing to pay

Amount	Percentage (%)
More than Rs. 30	34.1
Amount of Rs. 30	16.4
Less than Rs. 30	40.6
None	8.9
Total	100

Source: sample survey, 2008.

34.1% of the respondents were willing to pay an amount of more than Rs.30 and about 16.4% were willing to pay the amount of Rs.30. About 40.6% were ready to pay an amount of less than Rs.30 and 8.9% were unwilling to pay any amount for the project.

iv) Reasons for willing to pay for the first project by the municipality

Table: 7.44 consider the reasons given by the respondents for willing to pay for the first project to be done by the municipality.

Table: 7.44 Reasons for willing to pay

Reason	Percentage (%)
Health concerns	72.5
Disamenity concerns	22.4
Not indicated	5.1
Total	100

Source: sample survey, 2008.

72.5% cited health concerns as the reason for willing to pay for the project while 22.4% gave disamenity concerns as the reason. 5.1% gave no reasons for their decision to pay for the project.

v) Reasons for unwillingness to pay for the first project by the municipality

Table: 7.45 shows the various reasons given by those respondents who were unwilling to pay any amount for the project.

Table: 7.45 Reasons for unwillingness to pay

Reason	Percentage (%)
Can't afford to pay	45.1
Municipality should bear the expense	33.3
No faith in the municipality	16.3
No reasons	5.3
Total	100

Source: sample survey, 2008.

45.1% of the respondents cited financial problems as the reason for unwillingness to pay for the project while 33.3% believe that municipality should bear the full expenses. 16.3% has no faith in the municipality and 5.3% gave no reasons for their decision of not to pay for the project.

vi) Amount willing to pay for the first project by the private agency

Table: 7.46 show the amount willing to pay for the first project to be done by the private agency.

Table: 7.46 Amount willing to pay

Amount	Percentage (%)
More than Rs. 30	23.1
Amount of Rs. 30	17.4
Less than Rs. 30	47.6
None	11.9
Total	100

Source: sample survey, 2008.

23.1% of the respondents were willing to pay an amount of more than Rs.30 and about 17.4% were willing to pay the amount of Rs.30. About 47.6% were ready to pay an amount of less than Rs.30 and 11.9% were unwilling to pay any amount for the project.

vii) Reasons for willingness to pay for the first project by the private agency

Table: 7.47 consider the reasons given by the respondents for willingness to pay for the first project done by the private agency.

Table: 7.47 Reasons for willingness to pay

Reason	Percentage (%)
Health concerns	70.5
Disamenity concerns	23.7
Not indicated	6.8
Total	100

Source: sample survey, 2008.

70.5% cited health concerns as the reason for willing to pay for the project while 23.7% gave disamenity concerns as the reason. 6.8% gave no reasons for their decision to pay for the project.

viii) Reasons for unwillingness to pay for the first project by the private agency

Table: 7.48 consider the reasons given by the respondents for their unwillingness to pay for the first project to be done by the private agency.

Table: 7.48 Reason for unwillingness to pay

Reason	Percentage (%)
Can't afford to pay	53.1
Municipality should bear the expense	37.3
No faith in the private agency	5.2
No reasons	4.4
Total	100

Source: sample survey, 2008.

53.1% of the respondents cited financial problems as the reason for unwillingness to pay for the project while 37.3% believe that municipality should bear the full expenses. 5.2% has no faith in the private agency and 4.4% gave no reasons for their decision of not to pay for the project.

vii) The second project

It will cost around 8 crore and the key features of the second project are

- i) new collection system that ensures 100 % collection of solid wastes.
- ii) construction of a controlled landfill with a large life span.
- iii) avoiding contamination of ground water.
- iv) generation of compost from waste.
- v) recycling of waste.

For the bidding format, the starting point amount was kept at Rs.40per month.

viii) Amount willing to pay for the second project by the government

Table: 7.49 consider the amount willing to pay by the respondents for the second project to be done by the government.

Table: 7.49 Amount willing to pay

Amount	Percentage (%)
More than Rs. 40	15.2
Amount of Rs. 40	19.3
Less than Rs. 40	50.7
None	14.8
Total	100

15.2% of the respondents were willing to pay an amount of more than Rs.40 and about 19.3% were willing to pay the amount of Rs.40. About 50.7% were ready to pay an amount of less than Rs.40 and 14.8% were unwilling to pay any amount for the project.

ix) Reasons for willingness to pay for the second project by the municipality

Table: 7.50 shows the various reasons given by the respondents regarding their decision of paying for the second project.

Table: 7.50 Reasons for willing to pay

Reason	Percentage (%)
Health concerns	76.5
Disamenity concerns	17.3
Not indicated	6.2
Total	100

76.5% cited health concerns as the reason for willing to pay for the project while 17.3% gave disamenity concerns as the reason. 6.2% gave no reasons for their decision to pay for the project

x) Reasons for unwillingness to pay for the second project by the municipality

Table: 7.51 shows the various reasons given by the respondents regarding their decision of not paying for the second project.

Table: 7.51 Reason for unwillingness to pay

Reason	Percentage (%)
Can't afford to pay	53.2
Municipality should bear the expense	27.3
No faith in the municipality	17.1
No reasons	2.4

53.2% of the respondents cited financial problems as the reason for unwillingness to pay for the project while 27.3% believe that municipality should bear the full expenses. 17.1% has no faith in the municipality and 2.4% gave no reasons for their decision of not to pay for the project.

xi) Amount willing to pay for the second project by the private agency

Table: 7.52 show the amount willing to pay by the respondents for the second project to be done by the private agency.

Table: 7.52 Amount willing to pay

Amount	Percentage (%)
More than Rs. 40	14.1
Amount of Rs. 40	18.2
Less than Rs.40	53.8
None	13.9
Total	100

Source: sample survey, 2008.

14.1% of the respondents were willing to pay an amount of more than Rs.40 and about 18.2% were willing to pay the amount of Rs.40. About 53.8% were ready to pay an amount of less than Rs.40 and 13.9% were unwilling to pay any amount for the project.

xii) Reasons for willing to pay for the second project by the private agency

Table: 7.53 shows the reasons given by the respondents for willing to pay for the second project to be done by the private agency.

Table: 7.53 Reasons for willing to pay

Reason	Percentage (%)
Health concerns	78.5
Disamenity concerns	16.9
Not indicated	4.6
Total	100

Source: sample survey, 2008.

78.5% cited health concerns as the reason for willing to pay for the project while 16.9% gave disamenity concerns as the reason. 4.6% gave no reasons for their decision to pay for the project.

xiii) Reasons for unwillingness to pay for the second project by the private agency

Table: 7.54 shows the reasons given by the respondents for their unwillingness to pay for the second project to be done by the private agency.

Table: 7.54 Reasons for unwillingness to pay

Reason	Percentage (%)
Cant afford to pay	57.1
Municipality should bear the expense	36.3
No faith in the private agency	4.3
No reasons	2.3
Total	100

Source: sample survey, 2008.

57.1% of the respondents cited financial problems as the reason for unwillingness to pay for the project while 36.3% believe that municipality

should bear the full expenses. 4.3% has no faith in the private agency and 2.3% gave no reasons for their decision of not to pay for the project.

7.11 Average WTP for the projects

The average WTP for the two projects is given in the table: 7.55.

Table: 7.55 Average WTP for the project

Project	Average WTP amount(in Rs)
First project by municipality	26.4
First project by private agency	25.74
second project by municipality	28.67
second project by private agency	27.42

The average WTP for the first project by the municipality is Rs.26.4 while for the same project done by the private agency it is Rs.25.74. For the second project by the municipality the average WTP is Rs.28.67 while for the private project it is Rs. 27.42. Statistical treatment is given in the next chapter.