

Chapter 5

Kitchen Waste Disposal

India has in past two decades, become a potential world leader and is experiencing a steady economic growth. This growth has led to increasing consumerism especially in urban sector. And pose a significant challenge to country's sustainable and ecological development. In our country an average per capita waste generation ranges from 300 to 500 gm per person per day. However changing lifestyle due to economic growth had resulted increasing by 1.3% in per capita waste generation every year. During our present study it has been observed that generally the waste produced daily is thrown outside just on the roads or in open space. Due to this practice, it turns into a huge pile, producing foul smell, disturbing the aesthetics, attracts stray animals, provides suitable breeding site to flies and mosquitoes and worsens the entire scene, then people pay to clean the streets. Thus kitchen waste has double hit on kitchen costs and waste management is most tiresome practice for many city developers. Waste is produced from every corner of the house but occasionally, whereas kitchen is a place where waste is produced daily in largest volume of all the waste. Each person in the family contributes to kitchen waste generation.

This chapter deals with the kitchen waste disposal which include mainly vegetable peel, fruit peel, food waste, residual waste and other material which are generally used in kitchen of every household and disposed. All these kitchen waste are analyzed separately along with the fact and spatial disposal pattern in Kanpur metropolis. Before discussing separately these wastes it is worth mentioning to analyze kitchen waste disposal comprehensively for the study area. Therefore, this chapter is divided into 6 sub-sections. The overall kitchen waste disposal is dealt in section 5.1 whereas, section 5.2, 5.3, 5.4, 5.5 and 5.6 represents the analytical description of vegetable peel(VP), fruit peel(FP), food waste(FW) residual waste and other kitchen waste disposal of Kanpur metropolis respectively.

5.1 Analysis of Total Kitchen Waste Disposal :

Traditional systems prevailing in Indian kitchen were truly eco-friendly. Numbers of used resources were re-utilized in various ways until it totally gets finished or very little remnants found which is finally absorbed in the environment without any change or harm. Food waste and farm waste is used to feed cattle, cattle waste is used to make manure or cattle dung cake, cow dung cake is used as kitchen fuel, the ash content is used to make '*gullas*' which is further burnt reused as fuel and finally the remains are very little. Another example is from the use of clay pots, utensils, '*diya*' etc. when it is thrown it mixes with the soil. One more example is the use of big sized leaf for making "*donna*" and "*pattal*" when it is thrown after use, degrades and increases humus content and enhance the fertility of the land. But now a days there is a sudden change observed in Indian kitchens which depends more on ready to eat food, fast food etc producing more packaging material, food waste and vegetable waste. Since, kitchen waste decay very soon it is disposed on daily basis and if waste management plans are not properly practiced it is thrown outside in open by household where only stray animals appears to be a solution or else it degrades gradually it is attention gaining issue because of its increasing volume due to increase in population and readymade facilities.

Biodegradable fraction is quite high in Indian Municipal Solid Waste, essentially due to habit of using fresh vegetables. The high biodegradable fraction combined with the tropical climate warrants frequent collection and removal of refuse from collection point. The organic content on a dry weight basis ranges between 30% - 60%. The nitrogen, phosphorus and potassium of Municipal Solid Waste range between 0.5% – 0.7%, 0.5% – 0.8% and 0.5% – 0.8% respectively. The calorific value ranges between 200 – 3000 BTU/lb (Bhide and Sundaresan, 2001). As per a survey done by Central Pollution Control Board, 1999 the compostable Percentage of material in Municipal Solid Waste are as 40% in of Mumbai, 40% is Kolkata, Kanpur is 40%, Chennai is 44%, Delhi is 31.78%, Surat is 40% and Vishakhapatnam is 35%. If the importance of organic composition of Municipal Solid Waste is realized and recognized by the people it can be utilized instead of disposing it with city garbage. In this sub section it is tried to analyze the total waste

generated in kitchen during the preparation of meals and disposed daily from the kitchen. The total quantity and volume of kitchen waste varies from one zone to another zone and also from one socio economic class to another socio economic class keeping in view this phenomenon present sub section is further divided into two sub headings and analyzed as below-

5.1.1 Spatial Distribution of Kitchen Waste Disposal :

The kitchen waste disposal quantity and quality varies from locality to locality because of residents status and articles used by them. It has been proved by various studies that Population and living standard of the country are the two main parameters affecting annual quantity and composition of waste generated. Deepak et al and Somshekhar et al 2002 have worked on annual quantity and composition of waste and found that composition of waste depend upon wide range of factors like food, food-habits, cultural traditions, lifestyle, climate and income. As per survey of Environment Protection Training and Research Institute in India in 1995, 42.5% of total waste is compostable which is generated from kitchen and has remained constant over the past decades at the level of 40%.

In the present study it has been observed that along with the socio economic condition kitchen waste disposal is largely controlled by the type of area and locally available resources. Table No 5.1 represents total kitchen waste generation per person per day in all the six zones and the detail of different kinds of waste generated in the kitchen daily is shown in Fig. No .5.1. As per the survey done Kitchen waste disposal per person per day ranges from 0.431kg to 0.483 kg and on an average waste disposal per person per day is 0.443 kg. The study reveals that zone 1 and zone 4 being in area of rich class produce more waste due to their income, readily available resources and modern lifestyle. As shown in fig.5.1 per person per day kitchen waste disposal in zone 1 is 0.479 kg, zone 2 is 0.441 kg, in zone 3 is 0.431 kg, in zone 4 is 0.483 kg, in zone 5 is 0.435 kg and in zone 6 is 0.444 kg. Moderate waste disposal is by the inhabitants of zone 2 and zone 6 whereas residents of zone3 and zone 5 produce least kitchen waste disposal. The reason for less waste generation is due to the type of area mainly where some areas are under development like in zone 5 and zone 3 while some areas are service class people

dominated areas like in zone 2, zone 3 and zone 5. Quantitatively vegetables peels are disposed maximum as it is a commodity of daily use and affordable means of nutrients whereas fruits are costly, so people depend on only seasonal fruits. Only rich class people consume variety of fruits. In some fruits peels are more like banana, orange, pomegranate, mango, melons, pineapple etc. whereas in some fruits peels are not discarded at all like apple, guava etc. Food waste is not intentionally disposed, rather it is given to the needy, helpers or cattle are fed. Rarely it ferments and disposed. Although meager but residual waste is disposed regularly which includes left over tea leaves, flour husk, seeds of nuts and castings of nuts like groundnuts and almonds commonly used till low income class.

Table No. 5.1
Zone-wise Disposal of Kitchen Waste Types

Types of Waste	Per Person Per Day Disposal Amount in kg					
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Vegetable Peels	0.212	0.196	0.192	0.214	0.194	0.197
Fruit Peels	0.074	0.066	0.064	0.073	0.065	0.067
Food Waste	0.064	0.059	0.057	0.064	0.058	0.059
Residual Waste	0.065	0.061	0.060	0.067	0.060	0.062
Other Waste	0.064	0.059	0.057	0.065	0.058	0.059s
Total	0.480	0.441	0.431	0.484	0.437	0.445

Zone wise disposal amount of kitchen waste types is represented in Fig No. 5.1. Table No. 5.1 shows vegetable peels disposal per person per day in zone 1 is 0.212 kg, in zone 2 is 0.196 kg, in zone 3 is 0.192 kg, in zone 4 is 0.214 kg, in zone 5 is 0.194 kg and in zone 6 is 0.197 kg which is disposed in highest amount. Fruit peels disposal per person per day in zone 1 is 0.074 kg, in zone 2 is 0.066 kg, in zone 3 is 0.064 kg, in zone 4 is 0.073 kg, in zone 5 is 0.065 kg and in zone 6 is 0.067 kg which is disposed in second highest amount. Food waste disposal per person per day in zone 1 is 0.064 kg, in zone 2 is 0.059 kg, in zone 3 is 0.057 kg, in zone 4 is

0.064 kg, in zone 5 is 0.058 kg and in zone 6 is 0.059 kg. Residual waste disposal per person per day in zone 1 is 0.065 kg, in zone 2 is 0.061 kg, in zone 3 is 0.060 kg, in zone 4 is 0.067 kg, in zone 5 is 0.060 kg and in zone 6 is 0.062 kg. Other waste disposal per person per day in zone 1 is 0.064 kg, in zone 2 is 0.059 kg, in zone 3 is 0.057 kg, in zone 4 is 0.065 kg, in zone 5 is 0.058 kg and in zone 6 is 0.059 kg. To analyze spatial waste disposal pattern of Kanpur Metropolis on the basis of quantity and quality of waste three categories of spatial pattern are identified. These categories are high kitchen waste disposal (above 0.480 kg./person/day), moderate kitchen waste disposal (440-480 kg./person/day) and low kitchen waste disposal (less than 440 kg./person/day). Zone-wise kitchen waste disposal per person per day by various socio economic classes are presented in Table No. 5.2. The spatial waste disposal patterns are shown in Fig. No 5.2.

Table No. 5.2
Zone-wise Kitchen Waste Disposal by Socio-economic Groups

Socio-economic Groups	Per Person Per Day Disposal Amount in kg						
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Total
Exclusively High Income Class	0.705	0.642	0.630	0.650	0.645	0.650	3.292
Very High Income Class	0.742	0.680	0.675	0.752	0.677	0.687	4.213
High Income Class	0.672	0.672	0.662	0.737	0.672	0.675	4.09
Moderate Income Class	0.447	0.397	0.687	0.450	0.392	0.400	2.773
Low Income Class	0.385	0.332	0.325	0.390	0.330	0.340	2.102
Very Low Income Class	0.275	0.250	0.237	0.270	0.242	0.252	1.526
Economically Weaker Section	0.142	0.114	0.105	0.142	0.107	0.117	0.724
Total	3.368	3.3087	3.021	3.391	3.065	3.121	19.274
Average	0.481	0.441	0.431	0.484	0.437	0.445	2.719

5.1.1.1 High Disposal Level :

This category includes these areas where kitchen waste disposal quantity is higher disposal amount of more than 0.480 kg./person/day Kitchen waste disposal

by the people of zone 4 is 0.484 kg per person per day in Kanpur metropolis followed by the inhabitants of zone 1 where waste disposal is 0.480 kg per person per day. The Higher quantity of kitchen waste disposal in zone 1 and zone 4 is due to well established market in these areas and high per capita income of residents which makes easy access to the available resources. They dispose lavishly because they do not have to bother about the sanitation and waste disposal in their residential areas as the best of the facilities are provided in these areas by city administration. In zone 1 per person per day kitchen waste disposal by exclusively high income class is 0.705 kg, very high income class is 0.742 kg, high income class is 0.672 kg, moderate income class is 0.447 kg, low income class is 0.385 kg, very low income class is 0.275 kg and economically weaker section is 0.142. Waste disposal generally decreases with decrease in income. It is also observed that Exclusive high class dispose slightly less because it is shared by dependents working in their households instead of the disposal, whereas in zone 4 per person per day kitchen waste disposal by exclusively high income class is 0.650 kg, very high income class is 0.752 kg, high income class is 0.737 kg, moderate income class is 0.450 kg, low income class is 0.390 kg, very low income class is 0.270 kg and economically weaker section is 0.142 kg.

5.1.1.2 Moderate Kitchen Waste Disposal :

Moderate kitchen waste disposal pattern is observed in zone 2 and 6 because in these zones the amount of residual waste disposal is between 0.440-0.480 (Fig. 5.2). Although kitchen waste disposal by the residents of zone 2 and 6 is kept under moderate level kitchen waste disposal but there is not much difference and per person per day kitchen waste disposal by the people of zone 6 is 0.444 kg and zone 2 is 0.441 kg. Unlike other waste Kitchen waste is generated on daily basis due to daily requirement. So the high income class people are not affected by the constraints of area. All constraints are with less income class people. In zone 2 per person per day kitchen waste disposal by exclusively high income class is 0.642 kg, very high income class is 0.680 kg, high income class is 0.672 kg, moderate income class is 0.397 kg, low income class is 0.332 kg, very low income class is 0.250 kg and economically weaker section is 0.114 kg. And in zone 6 per person per day

kitchen waste disposal by exclusively high income class is 0.650 kg, very high income class is 0.687 kg, high income class is 0.675 kg, moderate income class is 0.400 kg, low income class is 0.340 kg, very low income class is 0.252 kg and economically weaker section is 0.117 kg.

5.1.1.3 Low Disposal Level :

This low kitchen waste disposal pattern includes those areas where kitchen waste disposal is lower than the city average. It is evident from Fig. 5.2 that two zones such as zone 3 and zone 5 where average kitchen waste disposal are 0.431 kg./person/day and 0.437 kg./person/day. Kitchen Waste disposal by the residents of zone 3 and 5 is least of all the zones. The reasons of fewer disposals in these zones are their traditional living in some areas and developing stage or extension of the city areas where most of the people of these areas belong to comparatively lower income group which affect their purchasing capacity on one hand and on the other hand accessibility of market due to their locations away from the main city. In zone 3 per person per day kitchen waste disposal by exclusively high income class is 0.630 kg, very high income class is 0.675 kg, high income class is 0.662 kg, moderate income class is 0.687 kg, low income class is 0.325 kg, very low income class is 0.237 kg and economically weaker section is 0.105 kg., while in zone 5 per person per day kitchen waste disposal by exclusively high income class is 0.645 kg, very high income class is 0.677 kg, high income class is 0.672 kg, moderate income class is 0.392 kg, low income class is 0.330 kg, very low income class is 0.242 kg and economically weaker section is 0.107 kg.

5.1.2 Kitchen Waste Disposal by of Socio- economic Classes :

In general it has been observed that among the factors affecting kitchen waste disposal the socio-economic conditions of the families play an important role in all types of waste. Therefore kitchen waste disposal is also affected by social condition for example High purchase capacity of residents encourages developed markets in the area providing variety of goods. And available resources attract buyers of high income class. This is the reason that in the exclusively high income class and very high income class produces comparatively less waste than high income class where people generate maximum waste. It is evident in Fig No 5.2B

that in every zone per person per day disposal by different socio economic classes are decreasing and is shown in detail in Table No 5.2. The waste disposal by seven socio-economic classes is discussed separately.

5.1.2.1 Disposal by Exclusively High Income Class (Group A) :

This is exclusive high class of society having monthly income of more than one lakh. Kitchen waste disposal per person per day by exclusively high income class people in zone 1 is 0.705 kg, zone 4 and zone 6 is 0.650 kg, zone 2 is 642 kg and zone 5 is 0.645kg. People of this class produce comparatively less kitchen waste than very high class and high income class, as the left over part food, vegetables, and fruits are shared by number of helpers working in their houses. The people belonging to this group are most frequently visit parties and restaurant and thus waste generation become less.

5.1.2.2 Disposal by Very High Income Class (Group B) :

This class of society has monthly income between 75,000-1,00000. Kitchen waste disposal per person per day by very high income class is highest in all the social groups. The disposal amount in zone 4 is 0.752 kg which is highest followed by zone 1 is 0.742 kg. Waste per person per day by zone 2 is 0.680 kg, whereas in zone 3 it is 0.675 kg. In zone 5 per person per day kitchen waste disposal is 0.677 kg and in zone 6 is 0.687 kg. Kitchen waste produced by this class is observed to be highest.

5.1.2.3 Disposal by High Income Class (Group C) :

This class of society has monthly income between 50,000 – 75,000. Kitchen waste disposal per person per day by very high income class is also higher but less than the very high income class. The disposal amount by the people in zone 4 is 0.737 kg which is highest followed by zone 1 is 0.672 kg. Waste per person per day by zone 2 is 0.672 kg whereas; in zone 3 it is 0.662 kg. In zone 5 per person per day kitchen waste disposal is 0.672 kg and in zone 6 is 0.675 kg.

5.1.2.4 Disposal by Moderate Income Class (Group D) :

This class of society has monthly income between 25,000 –50,000. Kitchen waste disposal per person per day by moderate income class in zone 4 is 0.450 kg

which is maximum followed by zone 1 is 0.447 kg Waste per person per day by zone 2 is 0.397 kg whereas; in zone 3 it is 0.387 kg. In zone 5 per person per day kitchen waste disposal is 0.392 kg and in zone 6 is 0.400 kg Kitchen waste produced by this class is observed to be decreasing according to their income.

5.1.2.5 Disposal by Low Income Class (Group E) :

This class of society has monthly income of 10,000 to 25,000. Kitchen waste disposal per person per day by low income class in zone 4 is 0.390 kg which is highest followed by zone 1 is 0.385 kg. Waste per person per day by zone 2 is 0.332 kg whereas; in zone 3 it is 0.325 kg. In zone 5 per person per day kitchen waste disposal is 0.330 kg and in zone 6 is 0.340 kg. Decreasing trend in Kitchen waste produced disposal is observed in this class also as the families have constraints of income and liabilities.

5.1.2.6 Disposal by Very Low Income Class (Group F) :

This class of society has monthly income of 5,000 to 10,000. Kitchen waste disposal per person per day by very low income class in zone 4 is 0.270 kg which is highest followed by zone 1 is 0.275 kg. Waste per person per day by zone 2 is 0.250 kg whereas; in zone 3 it is 0.237 kg. In zone 5 per person per day kitchen waste disposal is 0.242 kg and in zone 6 is 0.252 kg. Kitchen waste disposal show a consistent decline with their monthly income.

5.1.2.7 Disposal by Economically Weaker Section (Group G) :

This class of society has monthly income upto 5,000. Kitchen waste disposal per person per day by very economically weaker section in zone 4 is 0.142 kg which is highest followed by zone 1 is 0.142 kg. Waste per person per day by zone 2 is 0.114 kg whereas; in zone 3 it is 0.105 kg. In zone 5 per person per day kitchen waste disposal is 0.107 kg and in zone 6 is 0.117 kg. Kitchen waste produced by economically weaker section is observed to be the lowest.

5.1.3 Zone-wise Kitchen Waste Disposal :

The kitchen waste disposal is not uniform throughout the city. It varies time of time, place to place and generated according to needs. To study kitchen waste generation pattern in Kanpur metropolis, various income group people were

interviewed through a survey covering all six zones, (administrative units) of the city. The spatial variation of disposed waste such as vegetable peel, fruit peel, food waste, residual waste and other waste is analyzed on the basis of zones of Kanpur Nagar Nigam. The disposal amount of the kitchen waste varies not only from zone to zone but also from social class to class. Therefore zone-wise total kitchen waste disposal per person per month and per day of all socio economic classes have been analyzed as below:

Table No. 5.3
Kitchen Waste Disposal in Zone 1

Socio-economic Groups		Per Person Per Month and Per Day Disposal Amount in kg					
		VP	FP	FW	RW	OW	Total
A	M	8.475	5.325	2.775	2.326	2.326	21.150
	D	0.282	0.177	0.092	0.077	0.077	00.705
B	M	8.925	3.600	3.600	4.425	1.875	22.275
	D	0.297	0.120	0.120	0.147	0.062	00.742
C	M	9.675	1.800	2.250	2.625	3.825	20.175
	D	0.322	0.060	0.075	0.087	0.127	00.672
D	M	5.925	1.725	1.725	2.025	2.025	13.425
	D	0.197	0.057	0.057	0.067	0.067	00.447
E	M	5.550	1.650	1.575	1.350	1.500	11.550
	D	0.185	0.055	0.052	0.045	0.050	00.385
F	M	4.050	1.200	1.050	0.825	1.125	08.250
	D	0.135	0.040	0.035	0.027	0.037	00.275
G	M	2.100	0.300	0.600	0.450	0.825	04.275
	D	0.070	0.010	0.020	0.015	0.027	00.141
Total	M	44.700	15.600	13.575	13.725	13.500	101.100
	D	01.490	00.520	00.452	00.457	00.45	03.370

5.1.3.1 Kitchen Waste Disposal in Zone 1 :

Zone one is located in north central part of the city which includes densely populated old *Mohallas*. As discussed in previous chapter the characteristics of zone 1 with total population of 415038 where business

centre are established very well and people belong to rich class. Kitchen waste disposal such as vegetable peel, fruit peel, food waste, residual waste and other waste varies greatly from social class to class within the zone 1.

Various types of kitchen waste are disposal represented in Table No 5.3 and it is shown in Fig No 5.3 A which, depicts the quantity of different types of kitchen waste disposal by various socio economic groups in zone 1 where maximum kitchen waste 0.672 Kg is disposed by high income class while minimum 0.41Kg kitchen waste disposed by economically weaker section. Per person per day waste disposal by exclusively high income class is 0.282 kg vegetable peels, 0.177 kg fruit peels, 0.092 kg food waste, 0.077 kg residual waste and 0.077 other wastes and total kitchen waste disposal per person per day is 0.705 kg. Kitchen waste disposal by very high income class is 0.297 kg vegetable peels, 0.120 kg fruit peels, 0.120 kg food waste, 0.147 kg residual waste and 0.062 other wastes and total kitchen waste disposal per person per day is 0.742 kg. Kitchen waste disposal by high income class is 0.322 kg vegetable peels, 0.060 kg fruit peels, 0.075 kg food waste, 0.087 kg residual waste and 0.127 other wastes and total kitchen waste disposal per person per day is 0.672 kg. Kitchen waste disposal by high income class is 0.322 kg vegetable peels, 0.060 kg fruit peels, 0.075 kg food waste, 0.087 kg residual waste and 0.127 other wastes and total kitchen waste disposal per person per day is 0.672 kg. Kitchen waste disposal by moderate income class is 0.197 kg vegetable peels, 0.057 kg fruit peels, 0.057 kg food waste, 0.067 kg residual waste and 0.067 other wastes and total kitchen waste disposal per person per day is 0.447 kg. Kitchen waste disposal by low income class is 0.185 kg vegetable peels, 0.055 kg fruit peels, 0.052 kg food waste, 0.045 kg residual waste and 0.050 other wastes and total kitchen waste disposal per person per day is 0.385 kg. Kitchen waste disposal by very low income class is 0.135 kg vegetable peels, 0.040 kg fruit peels, 0.035 kg food waste, 0.027 kg residual waste and 0.037 other wastes and total kitchen waste disposal per person per day is 0.275 kg. Kitchen waste disposal by economically weaker section is 0.070 kg vegetable peels, 0.010 kg fruit peels, 0.020 kg food waste, 0.015 kg residual waste and 0.027 other wastes and total kitchen waste disposal per person per day is 0.142 kg.

5.1.3.2 Kitchen Waste Disposal in Zone 2 :

Zone 2 covers south eastern part of Kanpur and the total population is 4,31,821 the areas are under developmental process. Sewerage system, roads and other civic amenities are still not available in many of the areas and living of people is miserable, because of high density of population that to service and labour class. Disposal tendencies are also not to be appreciated.

Table No. 5.4
Kitchen Waste Disposal in Zone 2

Socio-economic Groups		Per Person Per Month and Per Day Disposal Amount in kg					
		VP	FP	FW	RW	OW	Total
A	M	7.725	4.800	2.475	2.100	2.175	19.275
	D	0.257	0.160	0.082	0.070	0.072	00.642
B	M	8.100	3.300	3.300	4.050	1.650	20.400
	D	0.270	0.110	0.110	0.135	0.055	00.680
C	M	9.675	1.800	2.250	2.625	3.825	20.175
	D	0.322	0.060	0.075	0.087	0.127	00.672
D	M	5.250	1.575	1.575	1.725	1.762	11.925
	D	0.175	0.052	0.052	0.057	0.058	00.397
E	M	4.800	1.425	1.425	1.125	1.275	10.020
	D	0.160	0.047	0.047	0.037	0.042	00.334
F	M	3.675	1.050	0.975	0.750	1.050	07.470
	D	0.122	0.035	0.032	0.025	0.035	00.249
G	M	1.950	-	0.450	0.300	0.675	03.420
	D	0.065	-	0.015	0.010	0.022	00.114
Total	M	41.175	13.950	12.450	12.975	12.450	92.700
	D	01.372	00.465	00.415	00.432	00.415	03.090

Kitchen waste disposal of zone 2 is represented in Table No 5.4 and Fig No 5.3 B depicts the quantity of different types of kitchen waste disposal by various

socio economic groups in zone 2 where exclusively high income class is observed disposing maximum kitchen waste whereas minimum kitchen waste is disposed by economically weaker section. Per person per day waste disposal by exclusively high income class is 0.257 kg vegetable peels, 0.160 kg fruit peels, 0.082 kg food waste, 0.070 kg residual waste and 0.072 other wastes and total kitchen waste disposal per person per day is 0.642 kg. Kitchen waste disposal by very high income class is 0.270 kg vegetable peels, 0.110 kg fruit peels, 0.110 kg food waste, 0.135 kg residual waste and 0.055 other wastes and total kitchen waste disposal per person per day is 0.680 kg. Kitchen waste disposal by high income class is 0.322 kg vegetable peels, 0.060 kg fruit peels, 0.075 kg food waste, 0.087 kg residual waste and 0.127 other wastes and total kitchen waste disposal per person per day is 0.672 kg. Kitchen waste disposal by high income class is 0.322 kg vegetable peels, 0.060 kg fruit peels, 0.075 kg food waste, 0.087 kg residual waste and 0.127 other wastes and total kitchen waste disposal per person per day is 0.672 kg. Kitchen waste disposal by moderate income class is 0.175 kg vegetable peels, 0.052 kg fruit peels, 0.052 kg food waste, 0.057 kg residual waste and 0.58 other wastes and total kitchen waste disposal per person per day is 0.397 kg. Kitchen waste disposal by low income class is 0.160 kg vegetable peels, 0.047 kg fruit peels, 0.047 kg food waste, 0.037 kg residual waste and 0.042 other wastes and total kitchen waste disposal per person per day is 0.334 kg. Kitchen waste disposal by very low income class is 0.122 kg vegetable peels, 0.035 kg fruit peels, 0.032 kg food waste, 0.025 kg residual waste and 0.035 other wastes and total kitchen waste disposal per person per day is 0.249 kg. Kitchen waste disposal by economically weaker section is 0.065 kg vegetable peels, 0.015 kg food waste, 0.010 kg residual waste and 0.022 other wastes and total kitchen waste disposal per person per day is 0.114 kg.

5.1.3.3 Kitchen Waste Disposal in Zone 3 :

Zone 3 is located between zone 2 and 5 with the total population of the zone 4,25,401. The areas are still in the developmental process but rate of development is fast and extending now in the interior towards rural areas. The noticeable difference is that the civic amenities in zone 3 are better than zone 2 as the developmental aspects like housing pattern and roads are monitored by Kanpur Nagar Nigam and

Kanpur Development Authority. The quantity of different types of kitchen waste disposal by various socio economic groups in zone 1 is shown in Table No 5.5 and disposal pattern is represented in Fig No 5.3 C, where per person per day waste disposal by exclusively high income class is 0.252 kg vegetable peels, 0.157 kg fruit peels, 0.082 kg food waste, 0.070 kg residual waste and 0.067 other wastes and total kitchen waste disposal per person per day is 0.630 kg.

Table No. 5.5
Kitchen Waste Disposal in Zone 3

Socio-economic Groups		Per Person Per Month and Per Day Disposal Amount in kg					
		VP	FP	FW	RW	OW	Total
A	M	7.575	4.725	2.475	2.100	2.025	18.900
	D	0.252	0.157	0.082	0.070	0.067	00.630
B	M	8.100	3.225	3.225	4.050	1.650	20.250
	D	0.270	0.107	0.107	0.135	0.055	00.675
C	M	9.525	1.800	2.175	2.625	3.750	19.875
	D	0.317	0.060	0.072	0.087	0.125	00.662
D	M	5.175	1.500	1.500	1.725	1.725	11.625
	D	0.172	0.050	0.050	0.057	0.057	00.387
E	M	4.725	1.350	1.275	1.125	1.275	09.750
	D	0.157	0.045	0.042	0.037	0.042	00.325
F	M	3.525	0.975	0.900	0.750	0.975	07.125
	D	0.117	0.032	0.030	0.025	0.032	00.237
G	M	1.800	-	0.450	0.300	0.600	03.150
	D	0.060	-	0.015	0.010	0.020	00.105
Total	M	40.425	13.575	12.000	12.675	12.000	90.675
	D	01.347	00.452	00.400	00.422	00.400	03.022

Kitchen waste disposal by very high income class is 0.270 kg vegetable peels, 0.107 kg fruit peels, 0.107 kg food waste, 0.135 kg residual waste and 0.055 other wastes and total kitchen waste disposal per person per day is 0.675 kg. Kitchen waste disposal by high income class is 0.317 kg vegetable peels, 0.060 kg fruit peels, 0.072 kg food waste, 0.087 kg residual waste and 0.125 other wastes and total kitchen waste disposal per person per day is 0.662 kg. Kitchen waste disposal by

moderate income class is 0.172 kg vegetable peels, 0.050 kg fruit peels, 0.050 kg food waste, 0.057 kg residual waste and 0.057 other wastes and total kitchen waste disposal per person per day is 0.387 kg. Kitchen waste disposal by low income class is 0.157 kg vegetable peels, 0.045 kg fruit peels, 0.042 kg food waste, 0.037 kg residual waste and 0.042 other wastes and total kitchen waste disposal per person per day is 0.325 kg. Kitchen waste disposal by very low income class is 0.117 kg vegetable peels, 0.032 kg fruit peels, 0.030 kg food waste, 0.025 kg residual waste and 0.032 other wastes and total kitchen waste disposal per person per day is 0.237 kg. Kitchen waste disposal by economically weaker section is 0.060 kg vegetable peels, 0.015 kg food waste, 0.010 kg residual waste and 0.020 other wastes and total kitchen waste disposal per person per day is 0.105 kg.

5.1.3.4 Kitchen Waste Disposal in Zone 4 :

Zone 4 is also one of the densely populated zones besides zone 1 on the right bank of river Ganga with total population of 3,90,203.

**Table No. 5.6
Kitchen Waste Disposal in Zone 4**

Socio-economic Groups		Per Person Per Month and Per Day Disposal Amount in kg					
		VP	FP	FW	RW	OW	Total
A	M	07.800	4.875	2.550	2.175	2.175	19.500
	D	00.260	0.162	0.085	0.072	0.072	00.650
B	M	09.000	3.675	3.600	4.500	1.800	22.575
	D	00.300	0.122	0.120	0.150	0.060	00.752
C	M	10.650	2.025	2.400	2.850	4.200	22.125
	D	00.355	0.067	0.080	0.095	0.140	00.737
D	M	05.925	1.725	1.725	2.025	2.025	13.500
	D	00.197	0.057	0.057	0.067	0.067	00.450
E	M	05.625	1.650	1.575	1.350	1.500	11.700
	D	00.187	0.055	0.052	0.045	0.050	00.390
F	M	03.975	1.125	1.050	0.825	1.125	08.100
	D	00.132	0.037	0.035	0.027	0.037	00.270
G	M	02.100	0.375	0.600	0.450	0.825	04.275
	D	0.070	0.012	0.020	0.015	0.027	00.142
Total	M	45.075	15.450	13.500	14.175	13.650	101.850
	D	01.502	00.515	00.450	00.472	00.455	003.395

People in this zone disposed high quantity of waste but their disposal ethics are commendable and we find the best kitchen waste collection in the areas of zone 4. The residents respond to all the government policies very well. The same is reflecting in the Table No 5.6 and that depicts the quantity of different types of kitchen waste disposal by various socio economic groups in zone 1 and shown in Fig No 5.3D where per person per day waste disposal by exclusively high income class is 0.260 kg vegetable peels, 0.162 kg fruit peels, 0.085 kg food waste, 0.072 kg residual waste and 0.072 other wastes and total kitchen waste disposal per person per day is 0.650 kg. Kitchen waste disposal by very high income class is 0.300 kg vegetable peels, 0.122 kg fruit peels, 0.120 kg food waste, 0.172 kg residual waste and 0.072 other wastes and total kitchen waste disposal per person per day is 0.650 kg. Kitchen waste disposal by high income class is 0.355 kg vegetable peels, 0.067 kg fruit peels, 0.080 kg food waste, 0.095 kg residual waste and 0.140 other wastes and total kitchen waste disposal per person per day is 0.737 kg. Kitchen waste disposal by moderate income class is 0.197 kg vegetable peels, 0.057 kg fruit peels, 0.057 kg food waste, 0.067 kg residual waste and 0.067 other wastes and total kitchen waste disposal per person per day is 0.450 kg. Kitchen waste disposal by low income class is 0.187 kg vegetable peels, 0.055 kg fruit peels, 0.052 kg food waste, 0.045 kg residual waste and 0.050 other wastes and total kitchen waste disposal per person per day is 0.390 kg. Kitchen waste disposal by very low income class is 0.132 kg vegetable peels, 0.037 kg fruit peels, 0.035 kg food waste, 0.027 kg residual waste and 0.037 other wastes and total kitchen waste disposal per person per day is 0.270 kg. Kitchen waste disposal by economically weaker section is 0.070 kg vegetable peels, 0.012 kg fruit peels, 0.020 kg food waste, 0.015 kg residual waste and 0.027 other wastes and total kitchen waste disposal per person per day is 0.142 kg.

5.1.3.5 Kitchen Waste Disposal in Zone 5 :

Zone 5 lies in the south west part of the Kanpur besides zone 3 where the total population is 4,50,3733 and the areas enjoy one of the best civic amenities. The area is developing very fast although penetrating into interiors of rural areas. Zone 5 areas are getting administrative attention due to industrial setup. We have observed

that the people in this zone are of different attitudes. Some give proper response to the facilities given whereas some do not. Their same attitude is reflected in Table No. 5.7 which affects the kitchen waste disposal pattern. The Fig No 5.3 E depict the quantity of different types of kitchen waste disposal by various socio economic groups in zone 1 where per person per day waste disposal by exclusively high income class is 0.257 kg vegetable peels, 0.162 kg fruit peels, 0.085 kg food waste, 0.070 kg residual waste and 0.070 other wastes and total kitchen waste disposal per person per day is 0.645 kg. Kitchen waste disposal by very high income class is 0.270 kg vegetable peels, 0.107 kg fruit peels, 0.107 kg food waste, 0.135 kg residual waste and 0.055 other wastes and total kitchen waste disposal per person per day is 0.677 kg. Kitchen waste disposal by high income class is 0.322 kg vegetable peels, 0.060 kg fruit peels, 0.075 kg food waste, 0.087 kg residual waste and 0.127 other wastes and total kitchen waste disposal per person per day is 0.672 kg.. Kitchen waste disposal by moderate income class is 0.172 kg vegetable peels, 0.055 kg fruit peels, 0.050 kg food waste, 0.060 kg residual waste and 0.060 other wastes and total kitchen waste disposal per person per day is 0.392 kg.

Table No. 5.7
Kitchen Waste Disposal in Zone 5

Socio-economic Groups	Per Person Per Month and Per Day Disposal Amount in kg						
		VP	FP	FW	RW	OW	Total
A	M	7.725	4.875	2.550	2.100	2.100	19.350
	D	0.257	0.162	0.085	0.070	0.070	00.645
B	M	8.100	3.225	3.225	4.050	1.650	20.325
	D	0.270	0.107	0.107	0.135	0.055	00.677
C	M	9.675	1.800	2.250	2.625	3.825	20.175
	D	0.322	0.060	0.075	0.087	0.127	00.672
D	M	5.175	1.650	1.500	1.800	1.800	11.775
	D	0.172	0.055	0.050	0.060	0.060	00.392
E	M	4.725	1.350	1.350	1.125	1.275	09.900
	D	0.157	0.045	0.045	0.037	0.042	00.330
F	M	3.600	0.900	0.975	0.750	1.050	07.275
	D	0.120	0.030	0.032	0.025	0.035	00.242
G	M	1.875	-	0.450	0.300	0.600	03.225
	D	0.062	-	0.015	0.010	0.020	00.107
Total	M	40.875	13.800	12.300	12.750	12.30	92.025
	D	01.362	00.460	00.410	00.425	00.410	03.067

Kitchen waste disposal by low income class is 0.157 kg vegetable peels, 0.045 kg fruit peels, 0.045 kg food waste, 0.037 kg residual waste and 0.042 other wastes and total kitchen waste disposal per person per day is 0.330 kg. Kitchen waste disposal by very low income class is 0.120 kg vegetable peels, 0.030 kg fruit peels, 0.032 kg food waste, 0.025 kg residual waste and 0.035 other wastes and total kitchen waste disposal per person per day is 0.107 kg. Kitchen waste disposal by economically weaker section is 0.062 kg vegetable peels, 0.015 kg food waste, 0.010 kg residual waste and 0.020 other wastes and total kitchen waste disposal per person per day is 0.107 kg.

5.1.3.6 Kitchen Waste Disposal in Zone 6 :

The western most part of Kanpur is zone 6. The total population is 4,38,499. The areas of zone 6 show variation in development, some areas are very well developed like, Swaroop nagar, Tilak nagar, Arya nagar whereas some areas are still with rural impact like Bithoor while some are under development like Awas Vikas. Also some areas are very old so inefficient in carrying the load of present population and its modern life style, like Nawabganj, Vishnu puri. The disposal ethics reflects their living conditions and hence, they show mixed response in waste disposal. We observed the mixed responses from the households and our analysis is represented in the Table No 5.8 which depicts the quantity of different types of kitchen waste disposal by various socio-economic groups. Disposal pattern in all the zones by different socio-economic groups is shown in Fig. No 5.3 F in zone 1 where per person per day waste disposal by exclusively high income class is 0.260 kg vegetable peels, 0.162 kg fruit peels, 0.085 kg food waste, 0.072 kg residual waste and 0.070 other wastes and total kitchen waste disposal per person per day is 0.650 kg. Kitchen waste disposal by very high income class is 0.275 kg vegetable peels, 0.110 kg fruit peels, 0.110 kg food waste, 0.137 kg residual waste and 0.055 other wastes and total kitchen waste disposal per person per day is 0.687 kg. Kitchen waste disposal by high income class is 0.325 kg vegetable peels, 0.060 kg fruit peels, 0.075 kg food waste, 0.087 kg residual waste and 0.127 other wastes and total kitchen waste disposal per person per day is 0.675 kg. Kitchen waste disposal by moderate income class is 0.175 kg vegetable peels, 0.052 kg fruit peels, 0.052 kg

food waste, 0.060 kg residual waste and 0.060 other wastes and total kitchen waste disposal per person per day is 0.400 kg. Kitchen waste disposal by low income class

is 0.162 kg vegetable peels, 0.047 kg fruit peels, 0.045 kg food waste, 0.040 kg residual waste and 0.045 other wastes and total kitchen waste disposal per person per day is 0.340 kg. Kitchen waste disposal by very low income class is 0.122 kg vegetable peels, 0.035 kg fruit peels, 0.032 kg food waste, 0.025 kg residual waste and 0.035 other wastes and total kitchen waste disposal per person per day is 0.252 kg. Kitchen waste disposal by economically weaker section is 0.060 kg vegetable peels, 0.007 kg fruit peels, 0.015 kg food waste, 0.012 kg residual waste and 0.022 other wastes and total kitchen waste disposal per person per day is 0.117 kg.

Table No. 5.8
Kitchen Waste Disposal in Zone 6

Socio-economic Groups		Per Person Per Month and Per Day Disposal Amount in kg					Total
		VP	FP	FW	RW	OW	
A	M	7.800	4.875	2.550	2.175	2.100	19.500
	D	0.260	0.162	0.085	0.072	0.070	00.650
B	M	8.250	3.300	3.300	4.125	1.650	20.625
	D	0.275	0.110	0.110	0.137	0.055	00.687
C	M	9.750	1.800	2.250	2.625	3.825	20.250
	D	0.325	0.060	0.075	0.087	0.127	00.675
D	M	5.250	1.575	1.575	1.800	1.800	12.000
	D	0.175	0.052	0.052	0.060	0.060	00.400
E	M	4.875	1.425	1.350	1.200	1.350	10.200
	D	0.162	0.047	0.045	0.040	0.045	00.340
F	M	3.675	1.050	0.975	0.750	1.050	07.575
	D	0.122	0.035	0.032	0.025	0.035	00.252
G	M	1.800	0.225	0.450	0.375	0.675	03.525
	D	0.060	0.007	0.015	0.012	0.022	00.117
Total	M	41.400	14.250	12.450	13.050	12.450	93.675
	D	01.380	00.475	00.415	00.435	00.415	03.122

5.2 Disposal of Vegetable Peels :

Vegetable peels are a type of waste which generate from cutting and peeling of different type of vegetables. In some vegetable peels are produced too much whereas in some vegetable peels are produced very less or sometimes if becomes nil. In every discards peel of vegetables, fruits, some food remains like tea leaves, flour husk, shells and seeds and coverings of nuts are found. Out of all types of waste produced in kitchen, vegetable peel waste is maximum. The quantity of vegetables peels depends on season, choice and availability. Some vegetables leave thick and more waste like jackfruit, green peas, cauliflowers etc. whereas some do not leave anything and gets consumed completely like brinjal, *tinde*, *parwal*.etc. Off course some leave little left out like potato, tomato, *turai* etc. In summers less vegetable waste is disposed and in winters more waste is disposed. Above all income plays very important role in waste disposal. Our study proves that high income families produce more vegetable waste as they use variety of vegetable in their meals and vegetable waste generation keep decreasing with the decreasing income of various social groups. The vegetable peels disposal is analyzed on the basis of socio-economic classes in our research work. Table No 5.9 includes zone-wise per person per day quantity of vegetable peels on the basis of various social classes. Thus this section is further divided into two subsections and described below.

Table No. 5.9
Zone-wise Vegetable Peels Disposal by Socio-economic Groups

Socio-economic groups	Per Person Per Day Disposal Amount in kg					
	Zone-1	Zone-2	Zone-3	Zone-4	Zone-5	Zone-6
A	0.282	0.257	0.252	0.260	0.257	0.260
B	0.297	0.270	0.270	0.300	0.270	0.275
C	0.322	0.322	0.317	0.355	0.322	0.325
D	0.197	0.175	0.172	0.197	0.172	0.175
E	0.185	0.160	0.157	0.187	0.157	0.162
F	0.135	0.122	0.117	0.132	0.120	0.122
G	0.070	0.065	0.060	0.070	0.062	0.060
Total	1.490	1.372	1.347	1.502	1.362	1.380
Average	0.212	0.196	0.192	0.214	0.194	0.197
Per day Generation	87988.05	84636.16	81676.99	83503.44	87372.36	86384.30

5.2.1 Spatial Analysis of Vegetable Peels Disposal :

Vegetable waste disposal per person per day varies from place to place depending upon the available resources. New developing areas, extensions from rural areas are in easy access to fresh vegetables. Along with that per capita purchase capacity of families also is a major factor that is responsible for waste disposal. High income group people avail all the facilities even if they are not close to the resources. During our study we have observed that in some areas disposal of vegetables peels are high and in some areas it is lower. Hence the optional pattern of waste generation and their disposal categorized into High (more than 0.200 kg./person/day), Moderate (between 0.195 kg./person/day) and Low (less than 0.195 kg./person/day) as evident from Fig. No 5.4 A

5.2.1.1 High Disposal Level :

Disposal of vegetable peels is observed as high in zone 4 and in zone 1 which is more than 0.200 kg/person/day. People belonging to high income group of zone 4 dispose maximum vegetable peels, 0.214 kg per person per day and total vegetable waste produced in zone 4 is 83503.44 kg per day where per person per day disposal by exclusively high income class is 0.260 kg, by very high income class is 0.300 kg, by high income class is 0.355 kg, by moderate income class is 0.197 kg, by low income class is 0.187 kg, by very low income class is 0.132 kg and by economically weaker section is 0.070 kg .Similarly residents of zone 1 also fall in the category of high vegetable peel disposal and dispose 0.212 kg per person per day and the total vegetable peel disposal in zone 1 is 87988.05 kg per day where per person per day disposal by exclusively high income class is 0.282 kg, by very high income class is 0.297 kg, by high income class is 0.322 kg, by moderate income class 0.197 kg, by low income class is 0.185 kg, by very low income class is 0.135 kg and by economically weaker section is 0.070 kg. As discussed earlier this group people can afford to get all types of vegetables due to their high income always.

5.2.1.2 Moderate Disposal Level :

The areas that are categorized as moderate vegetable waste disposer are zone 6 and zone 2 where the disposal varies between 0.695 kg/person/day to 0.200

kg./person/day. People of zone 6 dispose vegetable peels, 0.197 kg per person per day at moderate level and total vegetable peel waste produced in zone 6 is 86384.30 kg per day where per person per day disposal by exclusively high income class is 0.260 kg, by very high income class is 0.275 kg, by high income class is 0.325 kg, by moderate income class 0.175 kg, by low income class is 0.162 kg, by very low income class is 0.122 kg and by economically weaker section is 0.060 kg. Similarly residents of zone 2 also fall in the category of moderate vegetable peel disposal and dispose 0.196 kg per person per day and the total vegetable peel disposal in zone 2 is 84636.16 kg per day where per person per day disposal by exclusively high income class is 0.257 kg, by very high income class is 0.270 kg, by high income class is 0.322 kg, by moderate income class 0.175 kg, by low income class is 0.160 kg, by very low income class is 0.122 kg and by economically weaker section is 0.065 kg.

5.2.1.3 Low Disposal Level :

Low vegetable waste disposal is recorded in zone 3 and zone 5 and disposal of vegetable peels waste is found to be less than 0.195 kg/person/day. People of zone 3 dispose vegetable peels, 0.192 kg per person per day at low level and total vegetable peel waste produced in zone 3 is 81676.99 kg per day where per person per day disposal by exclusively high income class is 0.252 kg, by very high income class is 0.270 kg, by high income class is 0.317 kg, by moderate income class is 0.172 kg, by low income class is 0.157 kg, by very low income class is 0.117 kg and by economically weaker section is 0.060 kg. Similarly residents of zone 5 also fall in the category of low vegetable peel disposal and dispose 0.194 kg per person per day and the total vegetable peel disposal in zone 5 is 87372.36 kg per day where per person per day disposal by exclusively high income class is 0.257 kg, by very high income class is 0.270 kg, by high income class is 0.322 kg, by moderate income class is 0.172 kg, by low income class is 0.157 kg, by very low income class is 0.120 kg and by economically weaker section is 0.062 kg.

5.2.2 Vegetable Peel Disposal by Socio-economic Classes :

We have observed that there is direct correlation between income and waste generation. Quantity of vegetable peels disposal increases with the increase in income. High income class people dispose more vegetable peels which shown

decrease with decrease in income of different social groups. In our study we have observed that exclusively high income class and very high income class comparatively dispose little less vegetable peels than high income class of high income and the reason is that exclusively very high income class and very high income class people depend on high percent of readymade food, packed food etc. The study shows in detail the variation in quantity of vegetable peel disposal among seven socio economic classes that we is shown in Table No 5.4 and the zone wise disposal of vegetable peels by all social classes is shown in Fig No 5.4 B.

5.2.2.1 Disposal by Exclusively High Income Class (Group A) :

People belonging to exclusively very high income class dispose high level waste, along with varieties of different waste due to their high per capita income. They also depend on more readymade food and ready to eat food and so per person per day vegetable peel disposal by exclusively high income class is 0.282 kg in zone 1, 0.257 kg in zone 2, 0.252 kg in zone 3, 0.260 kg in zone 4, 0.257 kg in zone 5, 0.260 in zone 6. The disposal of exclusively high income class is high but less than people of very high income class and high income class.

5.2.2.2 Disposal by in Very High Income Class (Group B) :

Very high income class people dispose more vegetable peels than exclusively high income class but less than high income class people. People belonging to this class also dispose high level waste, along with variety due to their high per capita income. They also depend on more readymade food and ready to eat food and so per person per day vegetable peel disposal by very high income class is 0.297 kg in zone 1, 0.270 kg in zone 2, 0.270 kg in zone 3, 0.300 kg in zone 4, 0.270 kg in zone 5 and 0.275 kg in zone 6.

5.2.2.3 Disposal by High Income Class (Group C) :

High income class people of this class dispose maximum vegetable peels as they have fair monthly income and they prefer variety of homemade vegetables instead of ready to eat food. So per person per day vegetable peel disposal by high income class is 0.322 kg in zone 1, 0.322 kg in zone 2, 0.317 kg in zone 3, 0.355 kg

in zone 4, 0.322 kg in zone 5 and 0.325 kg in zone 6. Disposal in this class is observed to be highest.

5.2.2.4 Disposal by Moderate Income Class (Group D) :

Disposal of vegetable peels by moderate income class people is observed as less than high income class people and people belonging to moderate class depend on seasonal vegetable due to their moderate monthly income and do not waste their money for purchasing off season vegetables and ready to eat food. So per person per day vegetable peel disposal starts decreasing and observed to be 0.197 kg in zone 1, 0.175 kg in zone 2, 0.172 kg in zone 3, 0.197 kg in zone 4, 0.172 kg in zone 5 and 0.175 kg in zone 6 by moderate income class people.

5.2.2.5 Disposal by Low Income Class (Group E) :

We observed constant decline in disposal of vegetable peels in low income class people also. Decrease in income of low income class faces every day challenge in matching up status of society and completing their day to day need. So, their expenditure on vegetables is as per the need. Hence, dispose less vegetable peels compared to above classes. So per person per day vegetable peel disposal is 0.185 kg in zone 1, 0.160 kg in zone 2, 0.157 kg in zone 3, 0.187 kg in zone 4, 0.157 kg in zone 5 and 0.162 kg in zone 6 by low income class people.

5.2.2.6 Disposal by Very Low Income Class (Group F) :

Due to low income their difficulties further increases which lowers their vegetable peel disposal. Hence, we have recorded decreasing per person per day disposal in very low income class as 0.135 kg in zone 1, 0.122 kg in zone 2, 0.117 kg in zone 3, 0.132 kg in zone 4, 0.120 kg in zone 5 and 0.122 kg in zone 6.

5.2.2.7 Disposal by Economically Weaker Section (Group G) :

The people of economically weaker section are the residents of occupied areas, roadside dwellers or living in temporary houses. They have very low monthly income or depend on daily wages so they hardly have anything to discard. Moreover it has also been observed that people of this class depend upon street food while on work or depend on the food brought from the houses where they work. Hence, per person per day disposal is recorded as 0.070 kg in zone 1, 0.065 kg in zone 2, 0.060

kg in zone 3, 0.070 kg in zone 4, 0.062 kg in zone 5 and 0.060 kg in zone 6 by Economically Weaker Section people.

5.3 Disposal of Fruit Peels :

Fruit peels disposal actually is much less than vegetable peels disposal as vegetables consumption is on the daily basis whereas, fruit consumption is random and as per need. Only rich class people can afford it and the consumption becomes nil in the low income classes. In Kanpur Metropolis, fruit peels generation and its disposal vary greatly from class to class and slightly from zone to zone. Zone-wise and class wise disposal of fruit peels are mentioned in Table No 5.10. Therefore this section is divided further into two sub-sections and described below:

5.3.1 Spatial Analysis of Fruit Waste Disposal :

The study reveals that the fruit peels disposal is less in comparison to vegetable peels and its consumption is restricted to high income class more or less other class people also generates fruit peels as per the need and their purchase power. Fig No 5.5A represents per person per day disposal in all the zones. It is observed that the fruit waste disposed is more in some areas and less in other areas as shown in Table No 5.10. Zone-wise waste generation is analyzed on the basis of three disposal levels as high disposal level (more than 0.070 kg/person/day), moderate disposal level (between 0.066kg/person/day) and low disposal level (less than 0.066kg/person/day) which is discussed as below:

5.3.1.1 High Disposal level of Fruit Peels :

Fruit peels disposal with 0.070 kg/person/day is categorized as high disposal level observed in zone 1 and zone 4 because the number of person belonging to high income group are more than the other zones. The maximum fruit peels, 0.074 kg per person per day is recorded in zone wise total disposal of fruit peels is 30712.81 kg per day where per person per day disposal by exclusively high income class is 0.177 kg, by very high income class is 0.120 kg, by high income class is 0.060 kg, by moderate income class is 0.057 kg, by low income class is 0.055 kg, by very low income class is 0.040 kg and by economically weaker section is 0.010 kg. Similarly residents of zone 4 also fall in the category of high vegetable peel disposal and

dispose 0.073 kg per person per day and the total vegetable peel disposal in zone 1 is 28484.81 kg per day where per person per day disposal by exclusively high income class is 0.162 kg, by very high income class is 0.122 kg, by high income class is 0.067 kg, by moderate income class 0.057 kg, by low income class is 0.055 kg, by very low income class is 0.037 kg and by economically weaker section is 0.012 kg. As discussed earlier this group people can afford to get all types of fruits due to their high income always.

Table No. 5.10
Zone-wise Fruit Peels Disposal by Socio-economic Groups

Socio-economic groups	Per Person Per Day Disposal Amount in kg					
	Zone-1	Zone-2	Zone-3	Zone-4	Zone-5	Zone-6
A	0.177	0.160	0.157	0.162	0.162	0.162
B	0.120	0.110	0.107	0.122	0.107	0.110
C	0.060	0.060	0.060	0.067	0.060	0.060
D	0.057	0.0525	0.050	0.057	0.055	0.052
E	0.055	0.047	0.045	0.055	0.045	0.047
F	0.040	0.035	0.032	0.037	0.030	0.035
G	0.010	-	-	0.012	-	0.007
Total	0.520	0.465	0.452	0.515	0.460	0.475
Average	0.074	0.066	0.064	0.073	0.065	0.067
Per Day Generation	30712.81	28500.18	27225.66	28484.81	29274.24	29379.43

5.3.1.2 Moderate Disposal level of Fruit Peels :

The zones that are categorized as of moderate level disposal are zone 6 and zone 2 where fruit peels disposal ranges between 0.066 kg/person/day to 0.070 kg/person/day. People of zone 6 dispose fruit peels, 0.067 kg per person per day at moderate level and total fruit peel waste produced in zone 6 is 29379.43 kg per day where per person per day disposal by exclusively high income class is 0.162 kg, by very high income class is 0.110 kg, by high income class is 0.060 kg, by moderate income class 0.052 kg, by low income class is 0.047 kg, by very low income class is 0.035 kg and by economically weaker section is 0.007 kg. Similarly residents of zone 2 also fall in the category of moderate fruit peel disposal and dispose 0.066 kg

per person per day and the total fruit peel disposal in zone 2 is 28500.18 kg per day where per person per day disposal by exclusively high income class is 0.160 kg, by very high income class is 0.110 kg, by high income class is 0.060 kg, by moderate income class 0.052 kg, by low income class is 0.047 kg, by very low income class is 0.035 kg and by economically weaker section disposal is nil.

5.3.1.3 Low Disposal level of Fruit Peels :

Low level fruit peels disposal is recorded in zone 3 and zone 5 which is below 0.066 kg/person/day. People of zone 3 dispose fruit peels, 0.064 kg per person per day at low level and total vegetable peel waste produced in zone 3 is 27225.66 kg per day where per person per day disposal by exclusively high income class is 0.157 kg, by very high income class is 0.107 kg, by high income class is 0.060 kg, by moderate income class is 0.050 kg, by low income class 0.045 kg, by very low income class is 0.032 kg and by economically weaker Section is nil. Similarly residents of zone 5 also fall in the category of low vegetable peel disposal and dispose 0.065 kg per person per day and the total vegetable peel disposal in zone 5 is 29274.24 kg per day where per person per day disposal by exclusively high income class is 0.162 kg, by very high income class is 0.107 kg, by high income class is 0.060 kg, by moderate income class is 0.055 kg, by low income class is 0.045 kg, by very low income class is 0.030 kg and by economically weaker section is nil.

5.3.2 Fruit Peels Disposal by of Socio-economic Classes :

The income of families and waste generation is directly related. Quantity of fruit peels disposal increases with the increase in income. High income class people dispose more fruit peels while low income group dispose less fruit peels. High income class people can afford all types of fruits even in off season. The study reveals that the variation in quantity of fruit peels disposal among the seven socio-economic classes as shown in Table No 5.10. The class-wise disposal patterns in every zone are represented in Fig. No 5.5 B. Class-wise per person per day disposal quantity of fruit peels and total amount of waste disposal in Kanpur metropolis are discussed in following:

5.3.2.1 Disposal by Exclusively High Income Class (Group A) :

Fruit peels disposal by exclusive high income class people is found to the maximum unlike vegetable peels, residual waste, food waste and other waste due to their high income and health conscious attitude. Per person per day fruit peel disposal in zone 1 by people of this class is 0.177 kg, in zone 2 is 0.160 kg, in zone 3 is 0.157 kg, in zone 4 is 0.162 kg, in zone 5 is 0.162 kg and in zone 6 also fruit peels disposal is 0.162 kg

5.3.2.2 Disposal by Very High Income Class (Group B) :

We have observed gradual decrease in fruit peels disposal by very high income class families where per person per day fruit peel disposal in zone 1 by people of very high income class is 0.120 kg, in zone 2 is 0.110 kg, in zone 3 is 0.107 kg, in zone 4 is 0.122 kg, in zone 5 is 0.107 kg and in zone 6 also fruit peels disposal is 0.110 kg.

5.3.2.3 Disposal by High Income Class (Group C) :

In high income class fruit peels disposal show as constant with decline with per person per day disposal of fruit peels by high income class is 0.060 kg in zone 1, zone 2, zone 3, zone 5 and zone 6. But in zone 4 fruit peels disposal is 0.067 kg per person per day.

5.3.2.4 Disposal by Moderate Income Class (Group D) :

Fruit peel disposal in moderate income class is less than even high class people where per person per day fruit peel disposal in zone 1 and zone 4 by people of moderate income class is 0.057 kg, while in zone 2 & zone 6 is 0.052 kg, in zone 3 is 0.050 kg, in zone 5 is 0.055 kg.

5.3.2.5 Disposal by Low Income Class (Group E) :

We have recorded that per person per day fruit peel disposal in zone 1 and in zone 4 by people of low income class is 0.055 kg, in zone 2 and zone 6 is 0.047 kg, in zone 3 & zone 5 is 0.045 kg which show continuous decreasing trend in fruit peel disposal.

5.3.2.6 Disposal by Very low Income Class (Group F) :

Fruit peel disposal in zone 1 by people of very low income class is 0.040 kg, in zone 2 & zone 6 is 0.035 kg, in zone 3 is 0.032 kg, in zone 4 is 0.037 kg, in zone 5 and is 0.030 kg per person per day. The decrease in disposal quantity is due to low income.

5.3.2.7 Disposal by Economically Weaker Section (group G) :

It has been observed that fruit peels disposal is least in economically weaker section. Per person per day fruit peel disposal in zone 1 by people of this class is 0.010 kg, in zone 4 is 0.012 kg, and in zone 6 is also 0.007 kg. While there is no fruit peels disposal observed in zone 2, zone 3 and zone 5.

5.4 Disposal of Food Waste :

Food waste is left over that is either discarded or thrown. It is also given to others before it degrades. Food waste is produced maximum by very high income group but it is not thrown. It is shared with the workers working in the families. But it is not applied in category of exclusively high income class and very high income class because meals are not cooked in their homes regularly. So, food waste produced in high income class is comparatively less than very high income class. Food waste decreases from high income class to economically weaker section with decrease in income. Although the leftover food is not thrown uselessly unless it degrades or ferments and cattles are fed on it but the fermented food is off course disposed. Almost in every family few chapattis and sometimes *daal* and vegetables are often thrown. Food waste disposal also varies from family to family, season to season or time to time. Table No 5.11 represents zone-wise disposal pattern by different socio economic classes. Therefore this section is divided further into two sub sections, on the basis of spatial analysis and on the basis of socio economic classes.

5.4.1 Spatial Analysis of Food Waste Disposal :

The study reveals that the food waste disposal is done by all socio economic groups in all the zones.

Table No. 5.11
Zone- wise Food Waste Disposal by Socio-economic Groups

Socio-economic groups	Per Person Per Day Disposal Amount in kg					
	Zone-1	Zone-2	Zone-3	Zone-4	Zone-5	Zone-6
A	0.092	0.082	0.082	0.085	0.085	0.085
B	0.120	0.110	0.107	0.120	0.107	0.110
C	0.075	0.075	0.072	0.080	0.075	0.075
D	0.057	0.052	0.050	0.057	0.050	0.052
E	0.052	0.047	0.042	0.052	0.045	0.045
F	0.035	0.032	0.030	0.035	0.032	0.032
G	0.020	0.015	0.015	0.020	0.015	0.015
Total	0.452	0.415	0.400	0.450	0.410	0.415
Average	0.064	0.059	0.057	0.064	0.058	0.059
Per Day Generation	26562.43	25477.43	24247.85	24972.99	26121.63	25871.44

The variation in food waste disposal by social classes in all the zones is evident from Table No. 5.11. Food waste disposal per person per day in all the zones by various socio economic groups is represented by Fig No 5.6 A. We observed that the food waste disposed is more in some areas while less in some areas. Hence the level of food waste generation is studied in three categories as high disposal level (more the 0.060 kg./person/day), moderate disposal level (0.058 kg./person/day) and low disposal level (less than 0.058 kg./person/day).

5.4.1.1 High Disposal Level :

High food waste disposal pattern is observed in zone 1 and zone 4 where waste disposal per person per day is more than 0.060 kg./person/day. People belonging to high income group of zone 1 dispose maximum food waste, 0.064 kg per person per day and total food waste produced in zone 1 is 2656.24 kg per day where per person per day disposal by exclusively high income class is 0.192 kg, by very high income class is 0.120 kg, by high income class is 0.075 kg, by moderate income class is 0.057 kg, by low income class is 0.052 kg, by very low income class is 0.035 kg and by economically weaker section is 0.020 kg. Similarly residents of zone 4 also fall in the category of high food waste disposal and dispose 0.085 kg

per person per day and the total food waste disposal in zone 4 is 24972.99 kg per day where per person per day disposal by exclusively high income class is 0.085 kg, by very high income class is 0.120 kg, by high income class is 0.080 kg, by moderate income class 0.057 kg, by low income class is 0.052 kg, by very low income class is 0.035 kg and by economically weaker section is 0.020 kg. As discussed earlier this group people can afford to get variety of food readymade, ready to eat or cooked due to their high income.

5.4.1.2 Moderate Disposal Level :

This category includes those areas where food waste disposal is moderate like in zone 2 and zone 6. The amount of food waste disposal is between 0.058 kg/person/day to 0.060 kg/person/day. People of zone 6 dispose food waste, 0.059 kg per person per day at moderate level and total food waste produced in zone 6 is 25871.44 kg per day where per person per day disposal by exclusively high income class is 0.085 kg, by very high income class is 0.110 kg, by high income class is 0.075 kg, by moderate income class 0.052 kg, by low income class is 0.045 kg, by very low income class is 0.032 kg and by economically weaker section is 0.010 kg. Similarly residents of zone 2 also fall in the category of moderate food waste disposal and dispose 0.059 kg per person per day and the total food waste disposal in zone 2 is 25477.43 kg per day where per person per day disposal by exclusively high income class is 0.082 kg, by very high income class is 0.110 kg, by high income class is 0.075 kg, by moderate income class 0.052 kg, by low income class is 0.047 kg, by very low income class is 0.032 kg and by economically weaker section is 0.015 kg disposal .

5.4.1.3 Low Disposal Level :

Low food waste disposal pattern is observed in zone 3 and zone 5 where the amount of waste disposal below 0.058 kg./person/day. We observed that people of zone 3 dispose food waste, 0.057 kg per person per day and total food waste produced in zone 3 is 2424.85 kg per day where per person per day disposal by exclusively high income class is 0.082 kg, by very high income class is 0.107 kg, by high income class is 0.072 kg, by moderate income class is 0.050 kg, by low income class is 0.042 kg, by very low income class is 0.030 kg and by economically weaker

section is 0.015 kg. Similarly residents of zone 5 also fall in the category of low food waste disposal and dispose 0.058 kg per person per day and the total vegetable peel disposal in zone 5 is 26121.63 kg per day where per person per day disposal by exclusively high income class is 0.085 kg, by very high income class is 0.107 kg, by high income class is 0.075 kg, by moderate income class is 0.050 kg, by low Income class is 0.045 kg, by very low income class is 0.032 kg and by economically weaker section is 0.015 kg.

5.4.2 Food Waste Disposal by of Socio-economic Classes :

As we know that the income of families and waste generation is directly related to each other. Quantity of food waste disposal increases with the increase in income. High income group people dispose more food waste which decrease with decrease in income. This class people can afford all types of food. The study shows in detail the variation in quantity of food waste disposal through seven socio economic classes as shown in Table No 5.11 and class wise waste generation in all the zones is shown in Fig. No 5.6 B where food waste disposal is maximum in high class and it decreases as income decreases.

5.4.2.1 Disposal by Exclusively High Income Class (Group A) :

We observed that food waste disposal by exclusively high income class is less than very high income class due to less use of kitchen and dependence on readymade food. We found that per person per day food waste disposal in zone 1 by people of this class is 0.092 kg, in zone 2 and zone 3 food waste disposal is 0.082 kg while in zone 4, zone 5 and in zone 6 also food waste disposal is 0.085 kg We have observed that for food waste disposal, income is more important factor than area of living.

5.4.2.2 Disposal by Very High Income Class (Group B) :

We observed maximum food waste disposal by very high income class in our study and we noticed maximum per person per day food waste disposal in zone 1 & zone 4 by people of this class which is 0.120 kg. In zone 2 and zone 6 it is 0.110 kg while in zone 3 and in zone 5 food waste disposal is 0.107 kg. The food waste disposal is minimum by very high income class people in zone 3 and zone 5.

5.4.2.3 Disposal by High Income Class (Group C) :

We have recorded that there is a gradual decrease in food waste disposal by high income class. Food waste disposal per person per day in zone 1, zone 2, zone 5 and zone 6 by people of this class is 0.075 kg while in zone 3 is 0.172 kg. In zone 4 food waste disposal which is observed is 0.080 kg to be the highest in high income class.

5.4.2.4 Disposal by Moderate Income Class (Group D) :

Decline in disposal of food waste is further observed as decreasing with decrease in income where per person per day food waste disposal in zone 1 and zone 4 by people of this class is 0.057 kg, in zone 2 and zone 6 is 0.052 kg, in zone 3 and in zone 5 is 0.050 kg.

5.4.2.5 Disposal by Low Income Class (Group E) :

Food waste disposal per person per day in zone 1 and in zone 4 by people of low income class is 0.052 kg, in zone 2 is 0.047 kg, in zone 3 is 0.042 kg, in zone 4 is 0.052 kg, in zone 5 and in zone 6 it is 0.045 kg. We have observed the decrease in disposal quantity which is due to their low income.

5.4.2.6 Disposal by Very low Income Class (Group F) :

Food waste disposal by very low income class is found as decreasing further in zone 1 and in zone 4 by people of this class is 0.035 kg, in zone 3 is 0.030 kg, in zone 4 is 0.035 kg, in zone 2, zone 5 and in zone 6 is food waste disposal 0.032 kg per person per day.

5.4.2.7 Disposal by Economically Weaker Section (Group G) :

Food waste disposal is found to be the least by economically weaker section. It is observed that food waste disposal in zone 1 and in zone 4 by people of this class is 0.020 kg./person/day while in zone 3, in zone 4, in zone 5 and in zone 6 food waste disposal is observed 0.015 kg/person/day.

5.5 Disposal of Residual Waste :

Residual waste remains or left out food material that is discarded before, during and after preparation of food or cooking. The seeds & covering of nuts is also

included in residual waste like tea leaves, flour husk, seeds and coverings of nuts etc. Disposal of residual waste is actually much less, although the food materials consumption is on the daily basis but in very small quantity, as per need. Like other wastes that are discussed till now, residual waste also show the tendency of decreasing with decreasing income. Table No 5.12 represents spatial distribution of residual waste disposal which shows that residual waste disposal vary not only zone to zone but also from class to class. Therefore the analysis of residual waste is further classified into two sub sections and discussed as below:

Table No. 5.12
Zone-wise Residual Waste Disposal by Socio-economic Groups

Socio-economic groups	Per Person Per Day Disposal Amount in kg					
	Zone-1	Zone-2	Zone-3	Zone-4	Zone-5	Zone-6
A	0.077	0.070	0.070	0.072	0.070	0.072
B	0.147	0.135	0.135	0.150	0.135	0.137
C	0.087	0.087	0.087	0.095	0.087	0.087
D	0.067	0.057	0.057	0.067	0.060	0.060
E	0.045	0.037	0.037	0.045	0.037	0.040
F	0.027	0.025	0.025	0.027	0.025	0.025
G	0.015	0.010	0.010	0.015	0.010	0.012
Total	0.467	0.422	0.422	0.472	0.425	0.435
Average	0.066	0.060	0.060	0.067	0.060	0.062
Per Day Generation	27392.50	25909.26	25524.06	26143.60	27022.38	27186.93

5.5.1 Spatial Analysis of Residual Waste Disposal :

The study reveals that the residual waste disposal is less in comparison to vegetable peels and fruit peels but its consumption is done by all socio economic groups. High income class consumes such material more which produces residual waste but more or less other class people also consume it as per the need and their income. Fig No 5.7A represents spatial distribution of residual waste as well as the quantity of waste disposal by various economic groups. Table No 5.12 indicates per person per day disposal in all the zones. In our study we observed that residual waste

is disposed more in some areas and less in some areas. Hence the level of residual waste disposal is studied in three levels such as high disposal level (more than 0.066 kg./person/day), moderate disposal level (between 0.060 kg./person/day to 0.066 kg./person/day) and low disposal level (less than 0.060 kg./person/day).

5.5.1.1 High Disposal Level :

Residual waste disposal in zone 1 and zone 4 is recorded as high which is more than 0.066 kg./person/day and people belonging to high income group of zone 1 dispose maximum residual waste, 0.066 kg per person per day and total residual waste produced in zone 1 is 27392.50 kg per day where per person per day disposal by exclusively high income class is 0.077 kg, by very high income class is 0.147 kg, by high income class is 0.087 kg, by moderate income class is 0.067 kg, by low income class is 0.045 kg, by very low income class is 0.027 kg and by economically weaker section is 0.015 kg. Similarly residents of zone 4 also fall in the category of high residual waste disposal and dispose 0.067 kg per person per day and the total residual waste disposal in zone 4 is 2614.60 kg per day where per person per day disposal by exclusively high income class is 0.072 kg, by very high income class is 0.150 kg, by high income class is 0.095 kg, by moderate income class 0.067 kg, by low income class is 0.045 kg, by very low income class is 0.027 kg and by economically weaker section is 0.015 kg.

5.5.1.2 Moderate Disposal Level :

Moderate residual waste disposal pattern is observed in zone 6 and in zone 5. The amount of waste disposal ranges between 0.060 kg./person/day to 0.066 kg./person/day where people of zone 6 dispose 0.062 kg residual waste per person per day at moderate level and total residual waste produced in zone 6 is 27186.93 kg per day where per person per day disposal by Exclusively High Income Class is 0.072 kg, by Very High Income Class is 0.137 kg, by High Income Class is 0.087 kg, by Moderate Income Class 0.060 kg, by Low Income Class is 0.037 kg, by Very Low Income Class is 0.025 kg and by Economically Weaker Section is 0.010 kg. Similarly residents of zone 5 also fall in the category of moderate residual waste disposal and dispose 0.060 kg per person per day and the total residual waste disposal in zone 2 is 27022.38 kg per day where per person per day disposal by

exclusively high income class is 0.070 kg, by very high income class is 0.135 kg, by high income class is 0.087 kg, by moderate income class 0.057 kg, by low income class is 0.037 kg, by very low income class is 0.025 kg and by economically weaker section disposal is 0.010 kg.

5.5.1.3 Low Disposal Level :

This category includes those areas where residual waste disposal is found to be the least which is recorded below 0.060 kg./person/day. People of zone 2 dispose 0.060 kg per person per day of residual waste and total residual waste produced in zone 2 is 25909.26 kg per day where per person per day disposal by exclusively high income class is 0.070 kg, by very high income class is 0.135 kg, by high income class is 0.087 kg, by moderate income class is 0.057 kg, by low income class is 0.037 kg, by very low income class is 0.025 kg and by economically weaker section is 0.010 kg. Similarly residents of zone 3 also fall in the category of low residual waste disposal and dispose 0.065 kg per person per day and the total residual waste disposal in zone 5 is 25524.06 kg per day where per person per day disposal by exclusively high income class is 0.070 kg, by very high income class is 0.135 kg, by high income class is 0.087 kg, by moderate income class is 0.057 kg, by low income class is 0.037 kg, by very low income class is 0.025 kg and by economically weaker section residual waste is just 0.010 kg/person/day.

5.5.2 Residual Waste Disposal by Socio-economic Classes :

Waste generation is directly affected by the income of families. Quantity of residual waste disposal increases with the increase in income. High income group people dispose more, which decrease with decrease in income. The study shows the detail of the variation in quantity of residual waste disposal among seven socio economic classes as shown in the Table No 5.12 zone wise residual waste disposal is represented in Fig. No 5.7 B by all socio-economic groups.

5.5.2.1 Disposal by Exclusively High Income Class (Group A) :

Residual waste disposal by exclusive high income class is found to be less than very high income class and high income class. Residual waste disposal per person per day by people of exclusive high income class in zone 1 is 0.077 kg while

in zone 2, zone 3 and zone 5 it is 0.070 kg, in zone 6 is 0.072 kg. Their tea leaves and other left out disposal is comparatively less than Very High Income Class because they depend on number of other drinks.

5.5.2.2 Disposal by Very High Income Class (Group B) :

People of very high income class dispose maximum residual waste, residual waste disposal per person per day in zone 1 by people of very high income class is 0.147 kg, in zone 2, zone 3 and zone 5 is 0.135 kg each, in zone 4 residual waste disposal is 0.150 kg, which is highest observed as and in zone 6 is also 0.137 kg.

5.5.2.3 Disposal by High Income Class (Group C) :

Residual waste disposal by high income class is recorded as less than very high income class but more than exclusive high income class. Where per person per day disposal of residual waste by people of high income class is 0.087 kg, in zone 1, in zone 2, zone 3, and zone 6 whereas residual waste disposal in zone 4 is 0.095 kg which is maximum in high income class.

5.5.2.4 Disposal by Moderate Income Class (Group D) :

Moderate income class disposal show a decline in residual waste disposal where we observed that per person per day residual waste disposal by people of moderate income class in zone 1 and zone 4 is 0.067 kg, whereas the residual waste disposal in zone 2 , zone 3 is 0.057 kg. But in zone 5 is and in zone 6 it is recorded 0.060 kg. Disposal in zone 1 and zone 4 is maximum whereas in zone 3 and zone 5 disposal of residual waste is minimum.

5.5.2.5 Disposal by Low Income Class (Group E) :

In low income class disposal of residual waste show a consistent decline and we observed and per person per day disposal of residual waste in zone 1 and zone 4 the residual waste disposal is 0.045 kg by people of low income class whereas in zone 2, zone 3 and zone 5 is 0.037 kg but in zone 6 residual waste disposal is also 0.040 kg.

5.5.2.6 Disposal by Very low Income Class (Group F) :

We observed constant decrease in residual waste disposal by very low income class residual waste disposal per person per day in zone 1 and zone 4 by people of very low income class is 0.027 kg while in zone 2, zone 3, zone 5 and in zone 6 residual waste disposal is 0.025 kg.

5.5.2.7 Disposal by Economically Weaker Section (Group G) :

Economically weaker section disposes lowest residual waste in all the zones. Residual waste disposal per person per day in zone 1 and zone 4 by people of economically weaker section is 0.015 kg whereas in zone 2 and zone 5 it is 0.010 kg. But in zone 6 residual waste disposal observed is 0.012 kg.

5.6 Other Waste Disposal :

The waste that does not come under our categories of types of waste comes under Other Waste. There are different types of waste generated at household level. All types of such disposals were recorded in the category other than vegetable peels, fruit peels, food waste, residual waste, including some packaging materials. Other waste is also disposed more by high income people. Other waste decreases from exclusively high income class to economically weaker section with decrease in income. Other waste includes egg shells, paper packing materials etc. Other waste disposal also varies for place to place and time to time so the study of this section is divided in zone-wise analysis along with amount of disposal among socio economic classes which is shown in Table No 5.13. The two sub sections are discussed below:

5.6.1 Spatial Analysis of Other Waste Disposal :

We have observed in our study that the other waste disposal is also less in comparison to vegetable peel, fruit peels and residual waste but its consumption is done by all socio economic classes that are shown in Table No 5.13. Spatial distribution is represented in Fig. No 5.8A where per person per day disposal in all the zones by various socio economic classes are shown. We have observed that other waste disposed is more in some areas while less in some areas. Hence the level of other waste generation is studied in three levels as high disposal level (more that

0.064 kg./person/day), moderate disposal level (between 0.058 kg./person/day to 0.064 kg/person/day) and low disposal level (less than 0.058 kg./person/day).

**Table No. 5.13
Zone-wise Other Waste Disposal by Socio-economic Groups**

Socio-economic groups	Per Person Per Day Disposal Amount in kgs					
	Zone-1	Zone-2	Zone-3	Zone-4	Zone-5	Zone-6
A	0.077	0.072	0.067	0.072	0.070	0.070
B	0.062	0.055	0.055	0.060	0.055	0.055
C	0.127	0.127	0.125	0.140	0.127	0.127
D	0.067	0.058	0.057	0.067	0.060	0.060
E	0.050	0.042	0.042	0.050	0.042	0.045
F	0.037	0.035	0.032	0.037	0.035	0.035
G	0.027	0.022	0.020	0.027	0.020	0.022
Total	0.450	0.413	0.400	0.455	0.410	0.415
Average	0.064	0.059	0.057	0.065	0.058	0.059
Per Day Generation	26562.43	25477.43	24247.85	25363.19	26121.63	25871.44

5.6.1.1 High Disposal Level :

High other waste disposal pattern is recorded in zone 1 and zone 4 and the amount of disposal waste is found to be more than 0.064 kg./person/day. People belonging to high income group of zone 1 dispose maximum other waste, 0.0664 kg per person per day and total other waste produced in zone 1 is 26562.43 kg per day where per person per day disposal by exclusively high income class is 0.077 kg, by very high income class is 0.062 kg, by high income class is 0.0127 kg, by moderate income class is 0.067 kg, by low income class is 0.050 kg, by very low income class is 0.037 kg and by economically weaker section is 0.027 kg. Similarly residents of zone 4 also fall in the category of high disposal of other waste and dispose 0.065 kg per person per day and the total other waste disposal in zone 4 is 25363.19 kg per day where per person per day disposal by exclusively high income class is 0.072 kg, by very high income class is 0.060 kg, by high income class is 0.140 kg, by

moderate income class 0.067 kg, by low income class is 0.050 kg, by very low income class is 0.037 kg and by economically weaker section is 0.027 kg.

5.5.1.2 Moderate Disposal Level :

Other waste disposal in zone 6 and zone 2 is observed as moderate disposal which ranges between 0.058 kg./person/day to 0.064 kg./person/day. People of zone 6 dispose other waste, 0.059 kg per person per day at moderate level and total other waste produced in zone 6 is 25871.44 kg per day where per person per day disposal by exclusively high income class is 0.070 kg, by very high income class is 0.055 kg, by high income class is 0.127 kg, by moderate income class 0.060 kg, by low income class is 0.045 kg, by very low income class is 0.035 kg and by economically weaker section is 0.022 kg. Similarly residents of zone 2 also fall in the category of moderate level of other waste disposal and dispose 0.059 kg per person per day and the total other waste disposal in zone 2 is 25477.85 kg per day where per person per day disposal by exclusively high income class is 0.072 kg, by very high income class is 0.055 kg, by high income class is 0.127 kg, by moderate income class 0.058 kg, by low income class is 0.042 kg, by very low income class is 0.035 kg and by economically weaker section disposal is 0.022 kg.

5.5.1.3 Low Disposal Level :

Other waste disposal is found to be of low level in zone 3 and zone 5 which is less than 0.058 kg./person/day. People of zone 3 dispose 0.057 kg per person per day of other waste and total other waste produced in zone 3 is 24247.85 kg per day where per person per day disposal by exclusively high income class is 0.067 kg, by very high income class is 0.055 kg, by high income class is 0.125 kg, by moderate income class is 0.057 kg, by low income class is 0.042 kg, by very low income class is 0.032 kg and by economically weaker section is 0.020 kg. Similarly residents of zone 5 also fall in the category of low other waste disposal and dispose 0.058 kg per person per day and the total other waste disposal in zone 5 is 26121.63 kg per day where per person per day disposal by exclusively high income class is 0.070 kg, by very high income class is 0.055 kg, by high income class is 0.127 kg, by moderate income class is 0.060 kg, by low income class is 0.042 kg, by very low income class is 0.035 kg and by economically weaker section is 0.020 kg.

5.5.2 Other Waste Disposal by Socio-economic Classes :

The income of families and waste generation is directly proportional. Quantity of other waste disposal also increases with the increase in per capita income. It is evident from Table No. 5.13 that high income class people dispose more other waste which decreases with decrease in income. The study shows the variation in quantity of other waste disposal by seven socio economic classes as shown in Fig No. 5.8 B.

5.5.2.1 Disposal by Exclusively High Income Class (Group A) :

Other waste disposal in zone 1 by people of exclusively high income class is 0.077 kg, in zone 2 and in zone 4 is 0.072 kg, in zone 3 is 0.067 kg per person per day while in zone 5 and in zone 6 other waste disposal is 0.070 kg per person per day. Although the disposal of other waste varies time to time but the disposal observed is less than high income class but more than very high income class people.

5.5.2.2 Disposal by Very High Income Class (Group B) :

Other waste disposal in zone 1 by people of very high income class is 0.062 kg, in zone 2 and in zone 3 is 0.055 kg, in zone 4 is 0.060 kg while in zone 5 and in zone 6 is also 0.055 kg per person per day. Disposal is less than exclusively high income class and very high income class people.

5.5.2.3 Disposal by High Income Class (Group C) :

Per person per day other waste disposal in zone 1 by people of this class is 0.127 kg, in zone 2 is 0.127 kg, in zone 3 is 0.125 kg, in zone 4 is 0.140 kg, in zone 5 is 0.127 kg and in zone 6 is also 0.127 kg. Disposal of other waste is found to be maximum by high income class people like vegetable peels.

5.5.2.4 Disposal by Moderate Income Class (group D) :

Disposal of other waste by moderate income class people is observed decreasing where per person per day disposal of other waste in zone 1 and zone 4 by people of moderate income class is 0.067 kg, in zone 2 is 0.058 kg, in zone 3 is 0.057 kg while in zone 5 and in zone 6 is 0.060 kg per person per day.

5.5.2.5 Disposal by Low Income Class (Group E) :

Decrease in disposal is further recorded by low income class people. Per person per day other waste disposal in zone 1 by people of low income class is 0.050 kg, in zone 2 and in zone 3 is 0.042 kg, in zone 4 is 0.050 kg, while in zone 5 and in zone 6 other waste disposal is 0.045 kg per person per day.

5.5.2.6 Disposal by Very low Income Class (Group F) :

A consistent decline in other waste disposal is observed by people of very low income. Per person per day disposal of other waste in zone 1 and zone 4 by people of very low income class is 0.037 kg, in zone 2, zone 5 and zone 6 is 0.035 kg whereas in zone 3 other waste disposal is 0.032 kg per person per day.

5.5.2.7 Disposal by Economically Weaker Section (Group G) :

Disposal of other waste is recorded as lowest by the people of economically weaker section because the families have very low income and deprived of resources. Per person per day other waste disposal in zone 1 and zone 4 by people of economically weaker section is 0.027 kg, in zone 2 and zone 6 is 0.022 kg whereas in zone 3 and in zone 5 is 0.020 kg per person per day.