Government of Punjab

TA 7321 – PAK
Punjab Cities Improvement
Investment Program

The Urban Unit

Sialkot Waste Assessment and Characterization Survey

Draft Final

September 2010

(J40252334)

GHK Consulting Ltd.

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ABBREVIATIONS

ADB	Asian Development Bank
CDC	Community Development Concern
e-waste	Electronic waste
GNP	Gross National Productivity
HIG	High Income Group
Kg/ m3	Kilogram per cubic meter
Kg/hh/day	Kilogram per household per day
LIG	Low Income Group
MIG	Moderate Income Group
SWACS	Sialkot Waste Assessment and Characterization Survey
TMA	Tehsil Municipal Administration
TPD	Tons per day
UC	Union Council
WACS	Waste Assessment and Characterization Survey

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EXECUTIVE SUMMARY

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ES.0 EXECUTIVE SUMMARY

Sialkot city is famous all over the world owing to its sports goods production and export. This city showed tremendous growth in population and industry during last three decades. With fast growth rate in urbanization, Sialkot is facing various environmental problems. Improper disposal of municipal solid waste (MSW) is one of the major environmental concerns in the city. Present Waste Assessment and Characterization Survey (WACS) was amid to explore the daily generation and characterization of MSW before implementation of any plan for the beneficial use and proper disposal of MSW at Sialkot without compromising on local environment. This survey was conducted during early summer season, commencing from 30th April, 2010 and culminated on 6th may, 2010 for the period of one week.

Solid waste of 260 tonnes per day is recorded from residential areas of Sialkot city and per capita per day MSW generation ranged from 0.22 kg to 0.36 kg. The population of the city is about 0.91 million. On an average daily per capita MSW generation studied to be 0.32, 0.28 and 0.26 Kg/ person/ day from HIG, MIG and LIG, respectively, depending upon the economic status of the communalities. In commercial areas, maximum waste was generated from markets (64 Kg/ day) followed by restaurants (10 Kg/ day), Fruit/ vegetable shops (7.6 Kg/ day) and commercial shops (2.1 Kg/ day). Similarly, schools, hospitals/ clinics, offices/ Institutes, religious facilities (mosque) and Govt. offices produced MSW about 4.1, 3.7, 2.6 1.7 and 1.5, Kg/ day, respectively.

Maximum bulk density was recorded from Bonkan UC (190 Kg/ m3) followed by Shahabpura (175 Kg/ m3) than commercial/ institutes (170 Kg/ m3) and minimum at Model Town (164 Kg/ m3). Low bulk density was recorded because of high amount of polythene bags, plastic and papers, whereas, low concentration of fines and inert waste. Food/ organic was the major component of MSW, sharing about 41% of the total generated waste, whereas, 14% and 13% of the MSW was contributed by paper/ cardboard. The remaining components of MSW were glass, wood, rubber, metals and residual waste. Recyclers collected from mixed waste 20% of recyclables from the mixture of MSW. Recyclers preferably collected metals, glass, plastic articles, papers and cardboards while, collectors did not showed any interest in the collection of polythene bags. The selection behaviour of recyclers for recyclables was directly related with local re-sale market.

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SECTION 1

INTRODUCTION

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1.0 INTRODUCTION

1.1 Theoretical Background

Solid waste is an unavoidable by-product of most anthropogenic activities and is viewed as a discarded material, which has no consumer value to the person abandoning it (Cointreau, 1982). It qualifies as an urban solid waste or municipal solid waste (MSW) if it is by and large perceived by the society as being within the responsibilities of the municipality to collect and dispose off, which is an important type of solid waste, produced from households, offices, hotels, shops, schools and other institutions. Paper, plastic, packing material, metal, glass, e-waste (electronic waste) and polythene bags are the major contributor in generation of MSW.

However, improper disposal of solid waste in most of developing countries has resulted in human and animal health problems that eventually lead to environmental and economic losses (Sharholy *et al.,* 2008).

In developing countries like Pakistan, rapid urbanization, population growth has changed the life style of the people and per capita municipal waste generation. According to Robinson (1986) solid waste management is the application of techniques that ensure the orderly execution of the functions of collection, transport, processing, treatment and disposal of solid waste. The major constraints in developing countries for the solid waste management are low technical experience and low financial resources for safe disposal (Collivignarelli *et al*., 2004).

Improper management of solid waste has been reported by several researchers in different cities of developing countries (Sharholy *et al.,* 2008; Imam et al., 2008; Chung *et al.,* 2008). In Pakistan, about 80% of urban growth is restricted to major cities viz; Karachi, Lahore, Faisalabad, Hyderabad, Multan, Sialkot, Gujranwala, Rawalpindi, Peshawar and Kasur (Aftab *et al.,* 2000). Urban settlements occupy about 1% of total land area; contributing 48% of the Gross National Productivity (GNP) and more than 80% of industrial manufacturing (Khan, 1996). There is no well planned programme for the reuse and reduction of waste generation. If there is any solid waste management present then it is sporadic and inefficient.

1.2 Description of Sialkot City

Sialkot city is situated 125 Km away from Lahore in north-west direction. The history of Sialkot is about 5000 years old, when Raja Sul laid the foundation of Sulkot (former name of Sialkot) and was also opted as the capital by many king and Rajas. Sialkot was well organized and clean city in past many decades.

1.3 Climate

The city experience four distinct seasons viz., summer (pre monsoon; April to mid-June), rainy season (monsoon; mid-June to mid-September), autumn (post monsoon; mid-September to November), winter (December to February) and a short spring (March). Climate is hot and humid during summer and cold during winter. June is the hottest month of the year with maximum daily temperature soaring to 40oC and above. The temperature during winter may usually drop to 4oC but occasionally may even decline to freezing point during the month of January. The mean annual rainfall is about 950mm of which maximum precipitation (~80%) occurs during the monsoon season. During frequent rainfall in monsoon season, rain water flows into streams

through surface runoff and cause flooding which usually have devastating effects on crops and human settlements.

1.4 Solid Waste Menace in Sialkot

Sialkot emerged as one of the important economic centre of Pakistan and famous all over the world for its leather garments, surgical instruments and sports goods export (Ghani, 2002). During last three decades this city made a tremendous progress in the development of small and medium industry, which created a lot of income generating activities and job opportunities in the city which improved the living standard of local people. This situation was favorable for the rapid urbanization and human settlements which resulted in a rapid expansion of Sialkot city.

As a result, the city of Sialkot started to expand after industrial revolution, when thousands of jobs were created in this city. That's why thousand people coming from its vicinities and other parts of the country were absorbed. This higher population growth rate and higher rate of immigrants put the existing municipal system under stress and worsen day by day. According to the officials of Tehsil Municipal Administration (TMA) there were about 1600 sanitary workers in Sialkot city during 1990 but this number is now reduced to 700 people, creating a big gap between disposal and solid waste generation. It is factual situation that working force and resources of TMA are not enough to fulfil the requirements for solid waste disposal and sewerage system. TMA is fully functional and operative in some relict areas which are located in central city, however, the peripheral population of Sialkot city, often deprived from this service. The peripheral parts of city not only face the improper solid waste management but also countenance the open dumping site of solid waste along the road, railway tract and schools (Plate 1.1).

A big gap exists between solid waste generation and disposal capacity of TMA. That's why local community throws its solid waste on any nearest open place. A lot of hump of solid waste can be observed in the peripheral and poor populated areas near public schools (Plate 1.2). During heavy rain fall openly dumped solid waste on the roads is flushed away in the sewerage system, which not only blocks the drains but makes the roads the stagnant pools of sewage water (Plate 1.3). Another method, which is commonly used in Sialkot for solid waste disposal waste is the dumping of solid waste alongside the Nullahs/ streams. The running water inside the streams keeps away solid waste to the riverine ecosystem (Plate.1.4).

It has been commonly observed in Sialkot like the cities of the other countries that some people burn the solid waste to get rid of its nuisance effects. Owing to burning of solid waste, many toxic fumes and gases are produced, which pollute the environment badly (Plate1.5). These inadequate facilities for the solid waste disposal are causing human health, sanitation and pollution problems (Qadir *et al.,* 2008) and there is dire need to address them accordingly.

The urban centres of Pakistan are developing rapidly, which are putting the environment under stress. In Pakistan about 80% of the solid waste is openly dumped along the road side, agriculture land, in drains causing blockages in sewage system and in streams as only 51- 69% waste is collected by the inadequate waste collection system presently (Mahar *et al*, 2007). This waste collection costs represent 80 to 90% of the municipal solid waste management budget.

Plate 1.1: Open Dumping os Solid Waste Along the Road near Shahabbpura, Sialkot

Plate 1.2: Dumping of MSW in Poor Populated Areas near Public School

Plate 1.3: MSW Blocks the Drains and Makes the Roads the Stagnant Pools of Sewage

Plate 1.4: Dumping of Solid Waste in Side Nullahs Keeps Away Solid Waste to the Riverine Ecosystem

Plate 1.5: Burning of Solid Waste Produces Toxic Fumes and Gases Which Pollute the Environment Badly

Before implementation of solid waste management, it is important to know the basic information about the generation rate of MSW, its components and bulk density in addition to the proportion of recyclable components. MSW is now a profitable, recyclable and can be used in energy generation and production of organic manure. It is therefore, imperative to aware the masses about the aforesaid information, essential for sustainable solid waste management. Keeping all the consequences of current solid waste menace, Govt. of the Punjab with the help of Asian Development Bank (ADB) and GHK International, UK has launched a project titled Punjab Cities Improvement Investment Program with a component of Sialkot Waste Assessment and Characterization Survey (SWACS).

1.5 Objectives

The salient objectives of Sialkot Waste Assessment and Characterization Survey (SWACS) are as under:

- Assess the composition and characteristics of municipal waste in Sialkot in terms of household/ commercial recyclable materials.
- Curbside/ street/ community recycled materials.

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SECTION 2

METHODOLOGY

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2.0 METHODOLOGY

2.1 Site Selection

Three areas were selected for residential and non- residential areas alongwith their commercial and institutional areas of Sialkot city on the basis of their income level from three Union Councils (UCs) of Sialkot city (Fig. 1).

A. Residential areas

(i) Model Town UC
(ii) Shahabpura UC
(iii) Bonkan UC

B. Non- residential areas from above UCs

(i) Commercial areas (Shops, restaurants, markets, fruit and vegetable shops)
(ii) Institutions (schools, religious facility, Govt. offices, private offices and hospitals/ clinics.

One hundred respondents from each above UC in Sialkot city were identified for waste production, assessment and characterization on the basis of their income and were marked for daily collection of solid waste. Higher income group (HIG) was selected from Model Town UC, which have income level more than Rs.15,000. Moderate income group (MIG) was selected from Shahabpura UC with income ranging from Rs.7500 to 15000, whereas, low income group (LIG) was selected from Bonkan UC having income less than Rs.7500. Commercial areas and institutions were selected from every UC for the collection of commercial solid waste.

2.2 Sample Groups

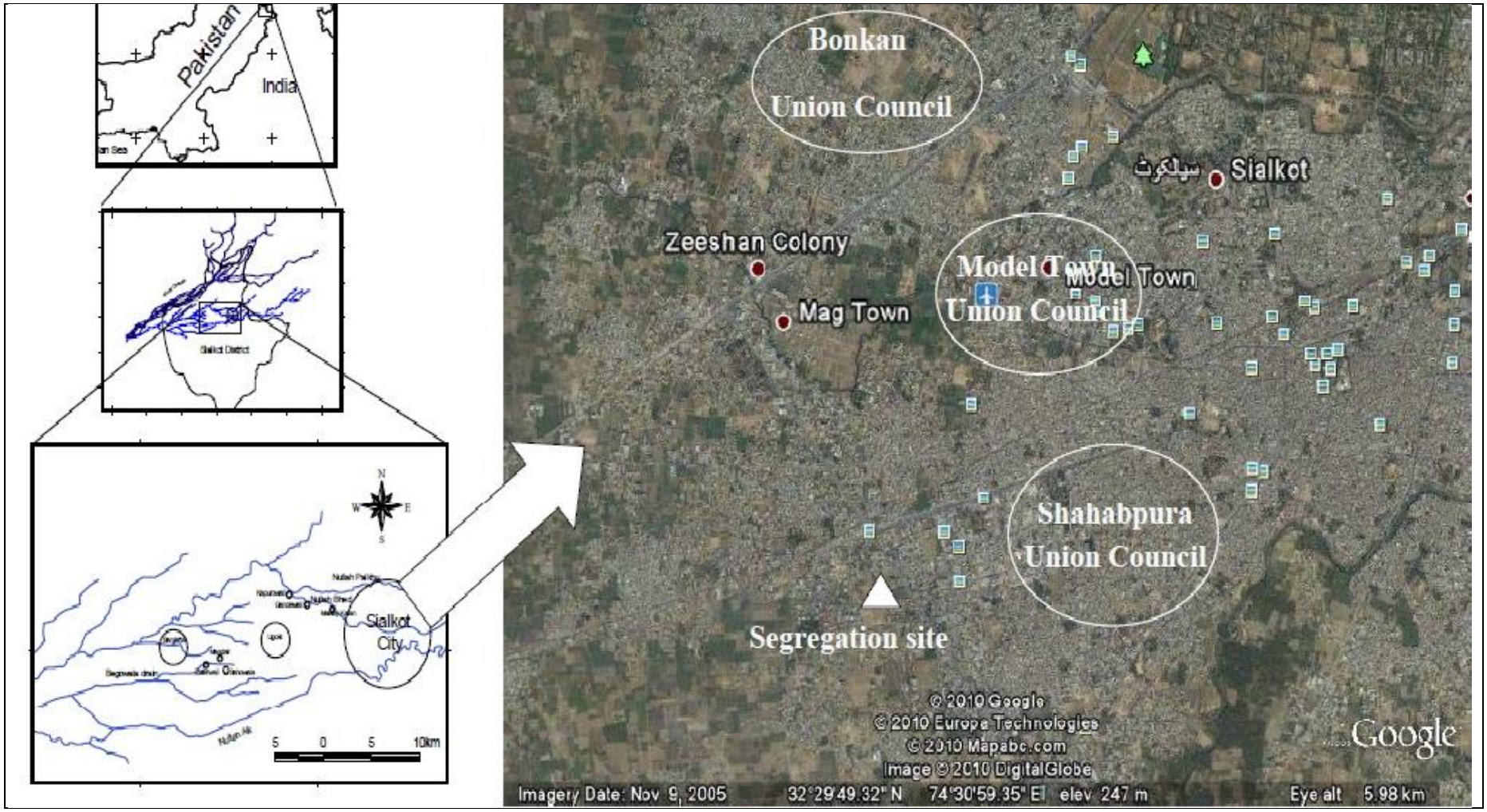
A. Residential areas

One hundred households were selected from low, medium and high income groups from above three UCs.

B. Non- Residential Areas Commercial

Waste was collected from two shops, restaurants and markets from two different locations in each UC.

Figure 2-1: Map of the Sampling Sites Located at Sialkot, Pakistan



2.3 Institutions

MSW was collected from two schools, religious facilities, government offices (institutes), and hospital/ clinics general waste from two different locations in each UC.

2.4 Waste Collection, Handling and Transportation

Each day of the survey, waste collectors along with respective team leader went door to door and briefed the head of every household/ shop/ institution in operational area about the importance of the survey and its future impacts on their lives and city. In this survey basic necessary information was given to household/ shop/ institution by pamphlets in local language Urdu (Annexure H) and face to face education. For sample collection every household was given two different coloured polythene bags. Yellow polythene bag was meant for dry solid waste and blue polythene bag for kitchen waste, provided 24 hours before its collection (Plate 2.1). This collection process was started from 29th April, 2010 and culminated on 5th May, 2010. The collection of MSW was made in the morning from 8 am to 1 pm.

Every day waste collector picked up both blue and yellow polythene bags with household waste, whereas, white (dry waste) and black polythene bags (wet waste) from commercial areas and institutes. Every day, waste generators saved their primary recyclables and waste in separated coded plastic bags for collection by the team (Plate. 2.2). Waste and primary recyclables were collected daily and bags were provided to waste generators for the next day. Waste generators were paid nominal money as a reward for the primary recyclables.

During the SWACS team leader and waste collectors were responsible for waste collection, transportation to waste segregation site. Waste collectors collected and placed the coded solid waste bag at central pick up point in respective UC (Plate 2.3) for transportation purpose (Plate 2.4) on borrowed TMA tractor trolley/ private vehicles (Plate 2.5).

Plate 2.1: Distribution of Polythene Bags for the Collection of MSW from Residential Area

Plate 2.2: Daily MSW Collection from Residential Area and Provision of Bags to the Waste Generators for the Next 24 Hours

Plate 2.3: MSW Collection Point in Shahabpura UC

Plate 2.4: Collected MSW on the Way to MSW Processing Site

Plate 2.5: Offloading of MSW Collected from Privately Hired Vehicles at MSW

2.5 Waste characterization and analysis

- The color coded bags of primary recyclables and waste (Plate 2.6) from each sample group were transferred to the weighing area in closed truck and safely stored.

Plate 2.6: MSW Collection in Different Coloured Polythene Bags

Plate 2.7: Segregation of Different Components of MSW from Each Sample Group

- Components of MSW from each sample group were segregated (Plate 2.7) into the following MSW component (Plate 2.8 a - g), weighed (Plate2.9): and recorded (Plate 2.10):
  i. Glass
  ii. Metals
  iii. Paper/ Cardboard
  iv. Plastics
  v. Food/ Organic
  vi. Wood
  vii. Leather/ Rubber
  viii. Hazardous Waste
  ix. Residuals/ Other

For each sample group, the residual waste was again mixed and exposed to street recyclers, who remove the materials they would normally collect on a day-to-day basis. These materials were then weighed and recorded.

2.6 Disposal

On completion of the daily activities, the recyclable materials were given to the involved recycler personnel, and the waste was collected for municipal disposal.

2.7 Bulk Density

Bulk density was calculated by measuring the volume of MSW carrying vehicle and then weighing the loaded MSW (Plate 2.11). The bulk density was expressed in kg/m3 and is calculated by following formula.

Bulk density = total weight of MSW (Kg) / volume of the MSW (m3)

Plate 2.8: General Components of Generated MSW

(a) Glass

(b) Metals

(c) Paper

(d)Plastic

(d) Food / Organic

(e) Leather / Rubber

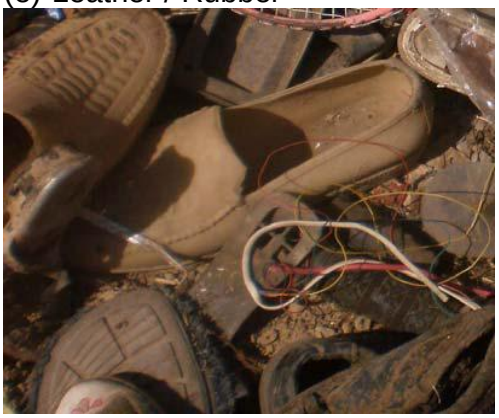


Plate 2.9: Weighing of Different Components of MSW

Plate 2.10: Verification of Data Sheets on the Spot

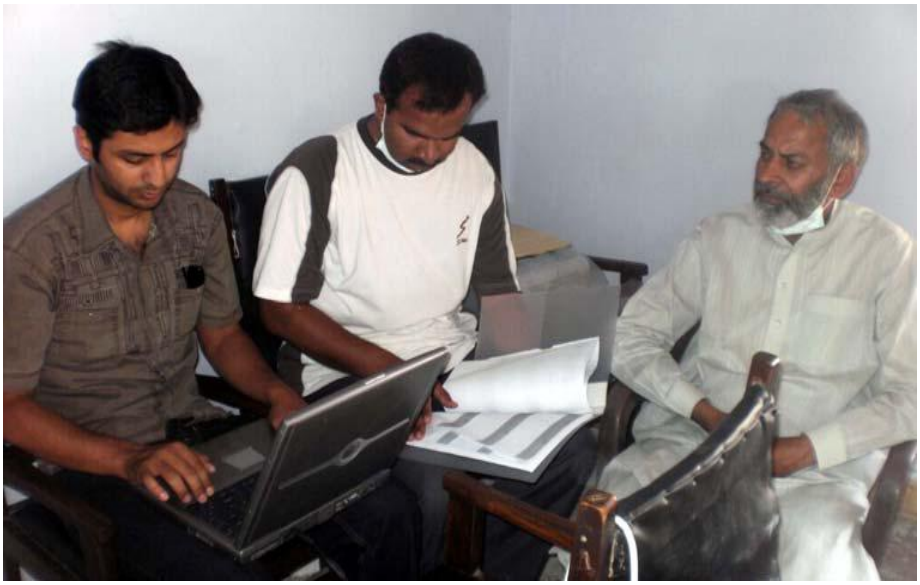


Plate 2.11: Segregators Measuring the Volume of the MSW before Off Loading Waste

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SECTION 3

SWACS RESULTS AND DISCUSSION

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3.0 SWACS RESULTS AND DISCUSSION

3.1 Solid Waste Generation in Residential Areas

During present survey, a total of 300 household were visited for MSW collection from residential areas of Sialkot city. In one week survey, a total of 3599 Kg MSW was collected from 233.29 households per day. Average daily MSW generation in residential areas of the Sialkot was found to be 2.2 Kg per household per day, with the rate of 0.29 kg/ person/ day. It is evident (Fig. 3.1) that food/ organic waste was generated in maximum amount as a biodegradable material followed by paper/ card board, plastics, other, glass, metals, leather/ rubber, wood, e-waste (electronic waste), and residual waste.

3.2 General Composition of MSW

The major fraction of MSW was organic waste and shared 41% of the total waste, mostly consisting of kitchen waste, food and fruits remain spoiled and fermented food, leaves and garden waste. Second major part of MSW was paper waste (including cardboard, packing material, news papers, magazines, empty cigarette case, match boxes) and shared about 14% of the total generated solid waste.

Plastic waste was found to be the 14% of the total waste. In Sialkot city, people use the plastic products frequently in their routine activities, such as pottery, water and soft drink bottles, cooking oil and ghee bottles, toys, polythene bags and wrappers. After plastic waste, glass was another important constituent of MSW, which was 8% of the total waste generated and mainly represented by empty/ broken bottles of medicine, soft drinks, window glass, tumbler and ceramics material.

In case of metals as a waste (4%), it was contributed by iron (vegetable ghee containers, beverage caps), silver (tin packs, body sprays), copper wires, crockery and broken pieces of metal from different household items. Leather / rubber waste shared about 4% of total MSW and mainly consisted of shoes, hand/ school bags, belts. Similarly wood also contributed 4% of the total MSW and collected in the form of broken wood, twigs, and wood cartons.

Figure 3-1: Over all Generation of Different Components MSW in Three UCs of Sialkot City

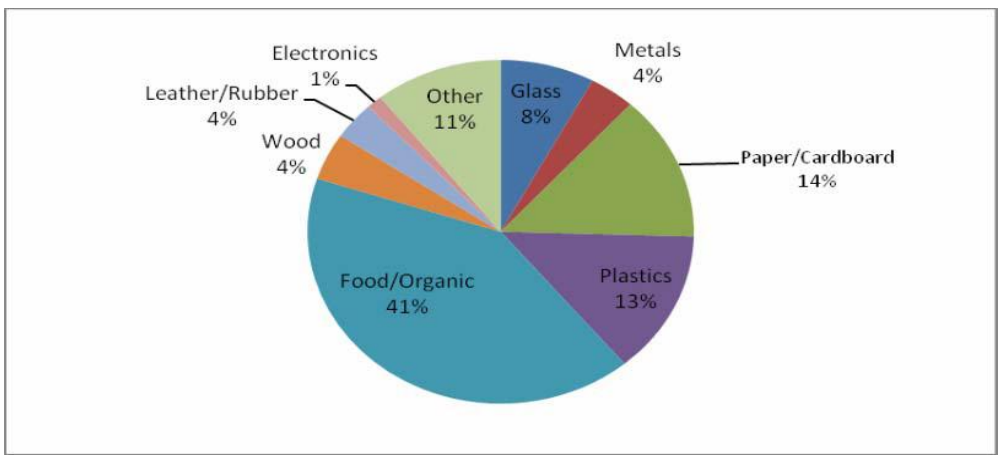
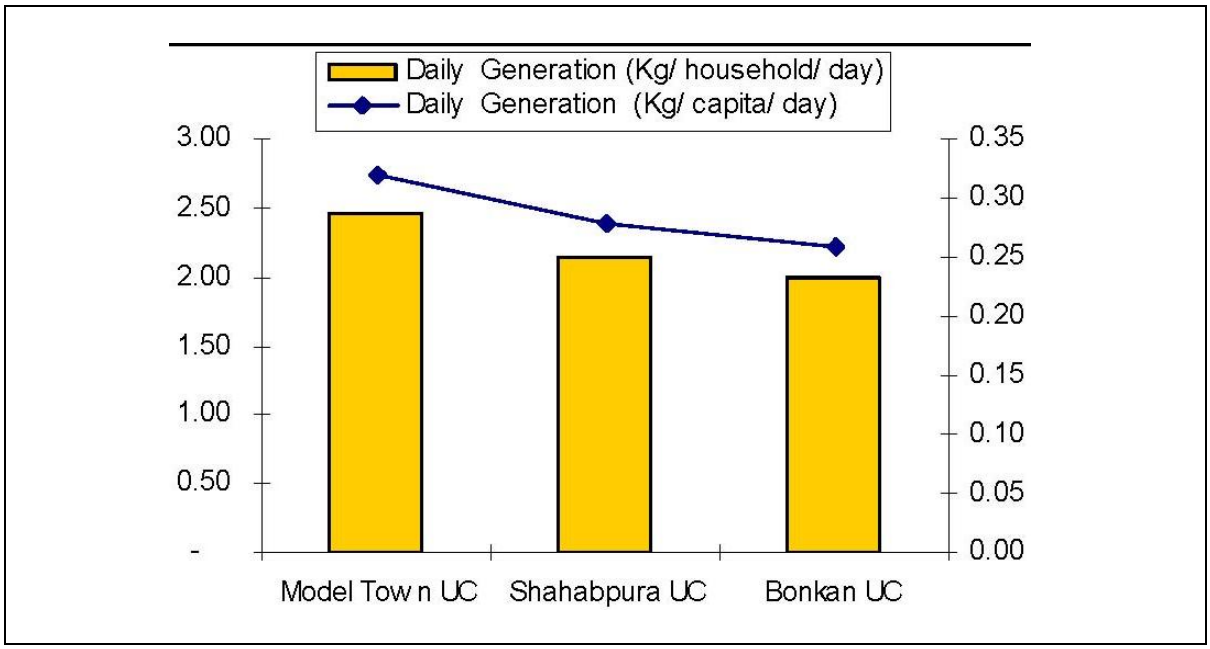


Figure 3-2: Daily Per Capita MSW Generation in Three UCs of Sialkot city



However, a least fraction of the waste was generated in the form of e-waste (1%) and consisted of broken parts of various devices, energy saver, mobile charger, CDs. Other (residual waste) generated as 11% of the total MSW and mainly contributed by inert solid waste, gravels, and stones, fine, pampers and clothes.

It was observed that the solid waste generation varies from one area to other depending upon the activities being operated in that particular area. It was further noticed that the MSW generation was directly correlated with levels of economic development and activity. High- income areas usually produce large quantity of waste in comparison to low- income areas. Similarly, the economic conditions of a family directly influence the production of MSW. Similar patterns of solid waste generation were observed in three selected UCs. Highest solid waste generation rate was observed in Model Town UC and 1254 Kg MSW was collected from 72 households (daily average) for one week with an average rate of 0.32 Kg/ person/ day (Fig.3.2) whereas, in case of Shahabpura UC, 1254 Kg MSW was generated from 82 households for one week resulting with an average of 0.28 Kg per person per day
which is higher than the other income groups showing a positive correlation between income and MSW generation. In Bonkan UC 1050 Kg MSW was collected from 74 households (daily average) at the rate of 0.26 Kg per person per day. (Fig. 3.2).

The quantity and characteristics of MSW vary both on spatial and temporal basis (World Bank, 1999 and Chandra et al., 2009). There are many factors that influence the generation and characterization of MSW such as income status, MSW generation sources, population, community attitude, climate etc. Many studies have been reported that the waste generation of MSW directly related with the economic level of the community (World Bank, 1999 and Chandra et al., 2009). Generally, a city population can be divided in to three categories viz., know income group (LIG), middle income group (MIG) and high income group (HIG) on the basis of MSW generation (Chandra et al., 2009).

3.2.1 Model Town UC

On an average, sampled households in Model Town UC showed variations in MSW generation, ranging from 0.29 to 0.36 Kg/ hh/ day (Fig.3.2). Organic/ food waste was comprised of 41% of the total MSW followed by paper/ cardboard (14%) then plastic waste (13%) whereas, rest of the waste (32%) was mainly shared by glass, wood, leather/ rubber, e-waste and others types of the waste (Fig. 3.3), A major portion of organic/ food waste was consisting of remains of fruits and vegetables, kitchen and garden waste.

Figure 3-3: Generation of Different Components MSW at Model Town UC

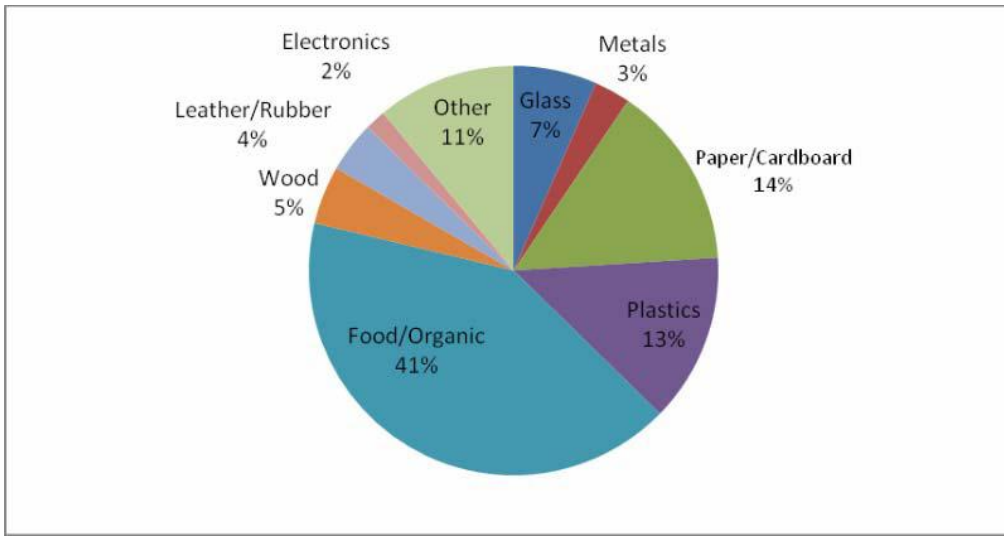
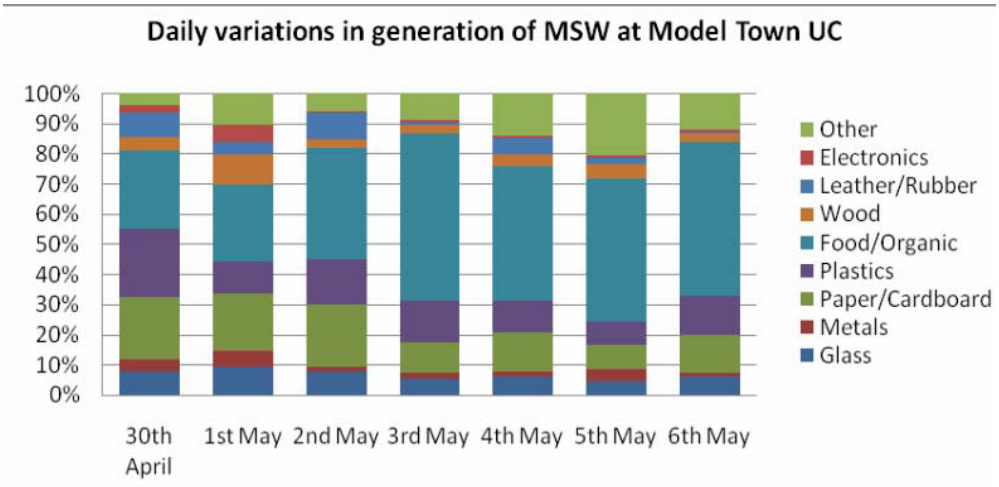


Figure 3-4: Daily Variations In Generation of Different Components MSW at Model Town UC



In the beginning (Fig. 3.4), MSW was consisting of comparatively higher proportion of recyclables because of the community mobilization campaign which was declined till last

days as recyclable components usually stored and sold to recyclers but now it was handed over to the survey collectors. Similarly, a declining trend was also observed in collection of glass, paper/ cardboard and plastics.

3.2.2 Sahabpura UC

Daily per capita waste generation varied from 0.17 to 0.36 Kg/ hh/ day at Sahabpura UC with 2.15 Kg/ hh/ day (Fig. 3.2). In this UC 41% of MSW was contributed by organic waste (Fig. 3.5). Among the other types of waste, 13% of the total waste was shared by each paper/ cardboard and plastic waste while glass, wood, rubber/leather, metals and e-waste accounted for only 8%, 4%, 3%, 3% and 1%, respectively. Remaining 14% of MSW was contributed by cloths, inert waste and fines. Daily trend in MSW generated is shown in the Fig 3.6.

3.2.3 Bonkan UC

Total solid waste generated at the rate of 0.26kg/ hh/ day (Fig. 3.2).. Data collected for Bonkan UC highlighted almost similar trend as perviously discussed data in case of paper/ cardboards and plastic and both accounded for 13% of the total MSW (Fig.3.7). However, organic waste (36%) showed less generation in comparison with organic waste generated at shahabpura UC and Model Town UC. Rest of the components of MSW such as glass rubber/ leather, wood, e-waste accounted for 8%, 4%, 4%, 2% and 2%, respectively. Rest of 18% of MSW was contributed by old cloths, fines, gravels. Daily MSW generation is depicted in the Fig. 3.8.

Figure 3-5: Generation of Different Components MSW at Shahabpura UC

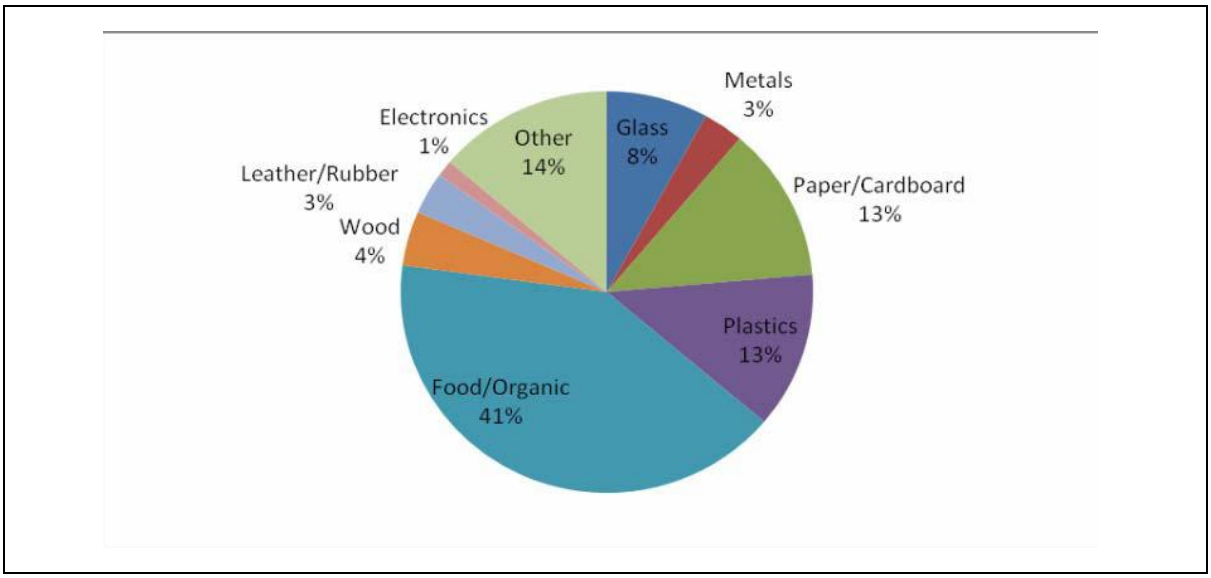


Figure 3-6: Daily variations in Generation of Different Components MSW at Shahabpura UC

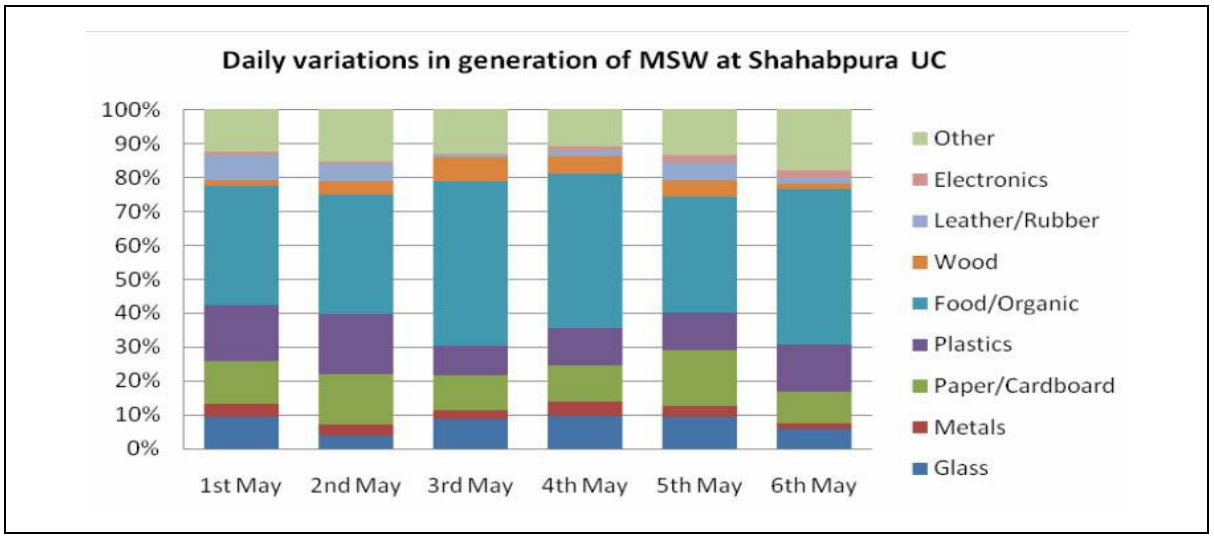


Figure 3-7: Generation of Different Components MSW at Bonkan UC

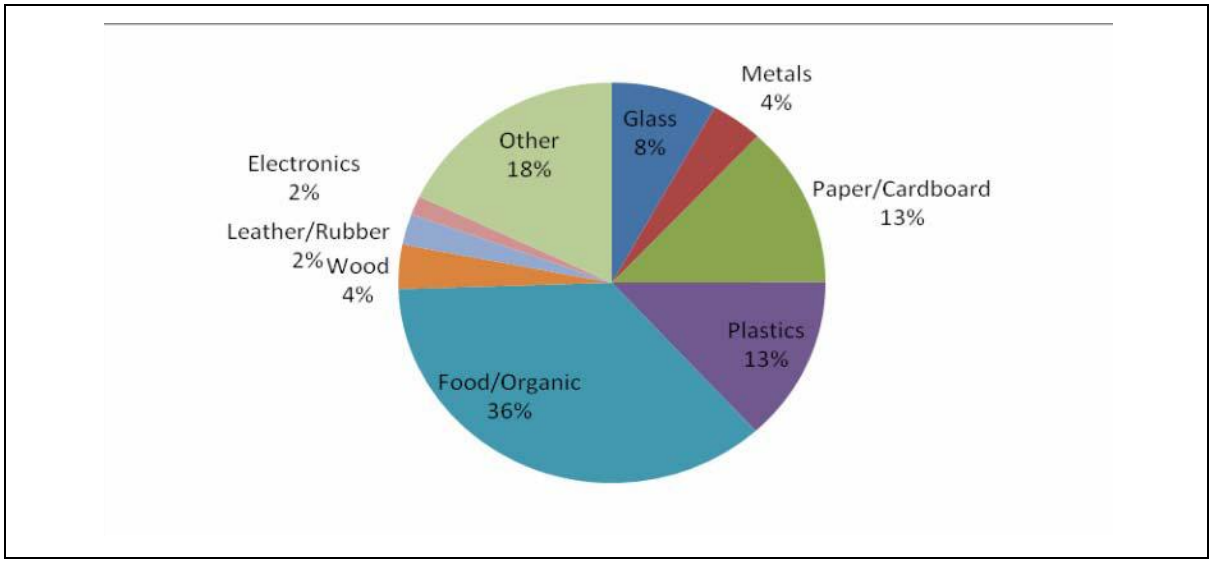
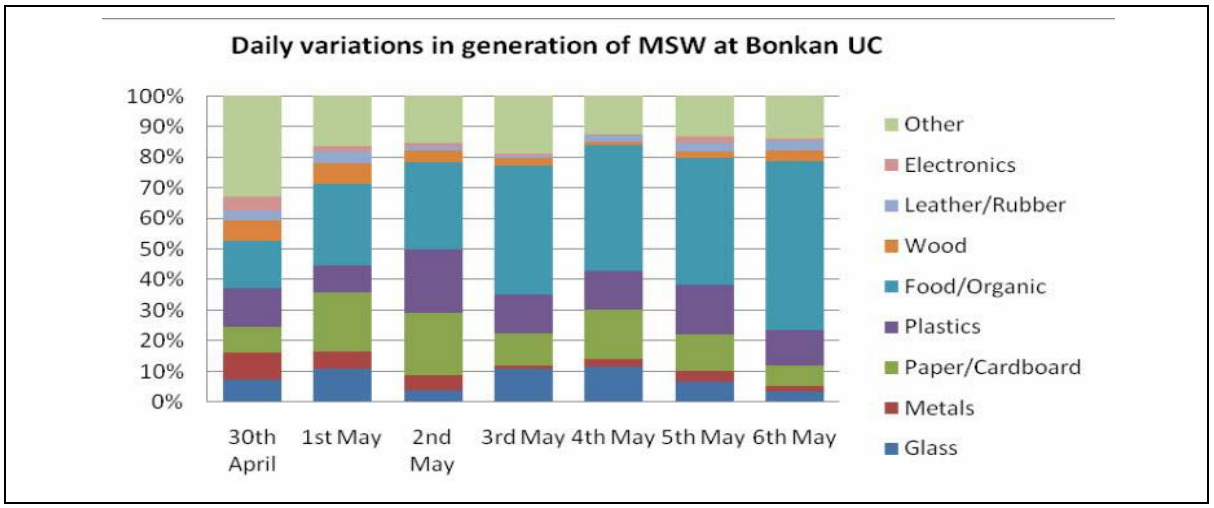


Figure 3-8: Daily Variations In Generation Of Different Components MSW at Bonkan UC



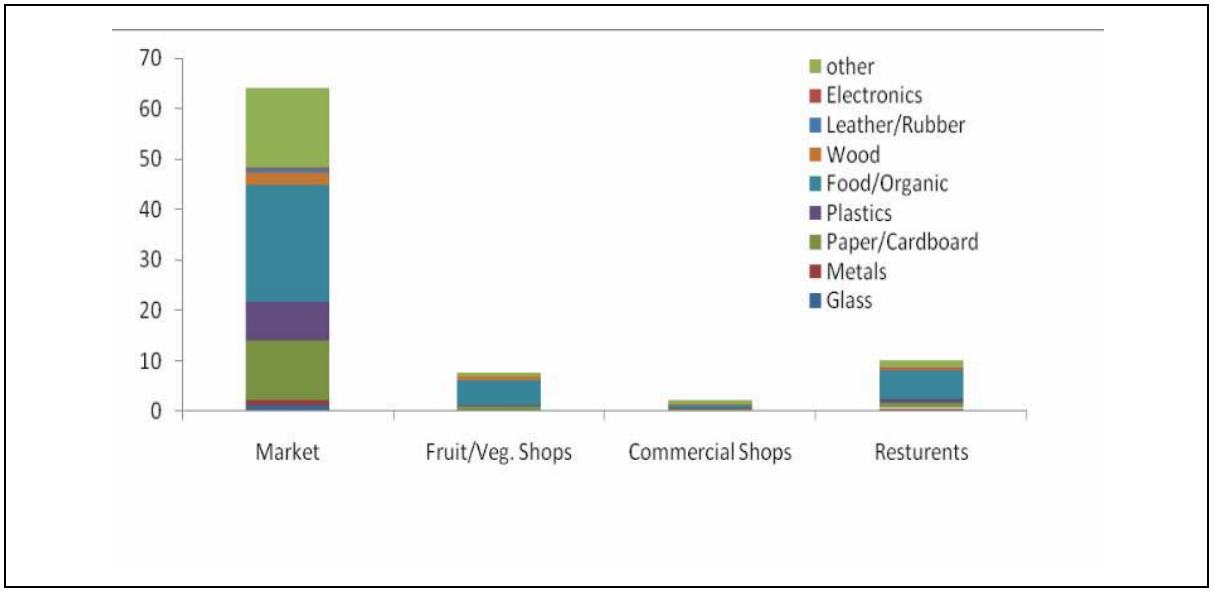
3.3 Waste Generation In Commercial area and Institutes

In addition to residential area, solid waste generation was contributed by commercial areas and institutes. In commercial area, maximum solid waste was generated from markets at the rate of 64 Kg/ per day (Fig.3.9). This generation was observed at Shah Alam chowk Market which consisted of 24 shops (Fig.3.10). Next category was the restaurants, each restaurant generated MSW with an average 10.1 Kg per day, whereas, fruits and vegetables shops generate about 7.6 Kg/ day and most the waste from contributed by fruits and vegetable remains, whereas, Commercial shops generated 2.1 Kg/ day solid waste. Schools, Govt . Offices, Hospitals/ clinics, private institutes and religious facilities produced 4.1, 1.5, 3.7, 2.6 and 1.7 Kg/ day, respectively.

3.4 Density of Municipal Solid Waste

The bulk density was calculated by measuring the volume of MSW transporting vehicle with wastes and then weighing the loaded MSW. The total weight of MSW was divided by volume of the MSW to calculate the density of MSW. Bulk densities (kg/ m3) obtained were calculated from three UCs are presented in Table.3.1,

Figure 3-9: Variations in Generation Of Different Components MSW in Commercial Area



The measured bulk density of the waste in Sialkot is ranging from 159.2 to 198.71 kg/m3. This bulk density is relatively low due to presence of high concentration of low density plastic material and paper/ cardboard material, whereas, the concentration of soil content, fine, gravels and inert waste was relatively low.

3.5 Proportion of Recyclable Components

Materials separated or picked out from mixed wastes such as ferrous and nonferrous metals, papers/ cardboard, glass, plastics, clothing, leathers, books, and household goods, which have re-sale value (UNEP, 2005). Recyclable and non- recyclable components can be segregated by physical separation of MSW. The percentage of recyclable in MSW is directly influenced by the percentage of paper and paperboard, plastics, glass and metals. The process of MSW recycling in developing countries is mainly informal and contributed by scavengers or waste pickers. In Pakistan, the

Figure 3-10: Variations in Generation Of Different Components MSW in Institution

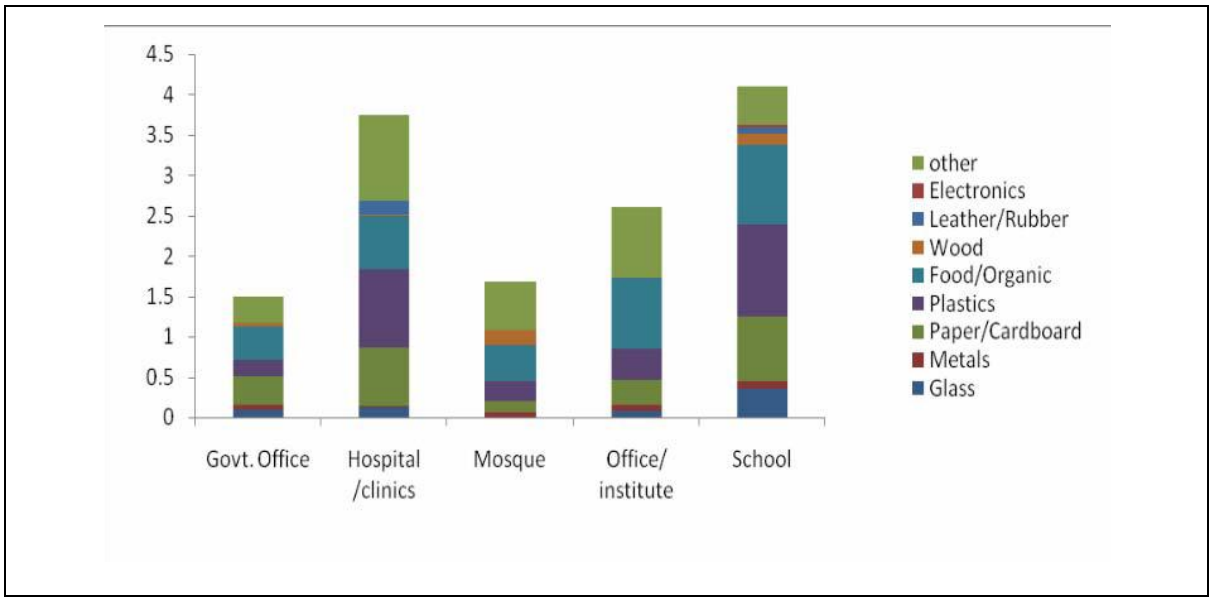


Table 3-1: Daily Variations in Bulk Density of MSW in Residential and Commercial Area

Date	Localities	Weight (Kg)	Volume (m3)	Density (Kg/ m3)
04 May 2010	Bonkan UC	223.75	1.126	198.712
	Shahabpura UC	234.645	1.347	174.198
	Model Town UC	200.321	1.22	164.197
	Commercial Area	119.418	0.75	159.224
05 May 2010	Bonkan UC	200.321	1.06	188.982
	Shahabpura UC	253.47	1.43	177.251
	Model Town UC	234.645	1.48	158.543
	Commercial Area	108.741	0.62	175.388
06 May 2010	Bonkan UC	149.247	0.81	184.255
	Shahabpura UC	158.112	0.91	173.749
	Model Town UC	217.46	1.27	171.228
	Commercial Area	140.4845	0.8	175.605

main recyclables are generally sold to the street hawkers. These street hawker collect the recyclables and sell them to the nearby junkshops (Kabbar Khana) who in turn sold them to recycling factories. The choice of street recyclable collectors also influenced by the availability of particular recycling facility in the city. Local recyclers are more inclined towards the metals. Among the metals, steel, iron, copper and aluminum are the most recycled components which are more income generating and can be sold easily.

During present survey, every household was requested to give all types of the generated waste on daily basis. If the recyclables have some re-sale value then generator household will be paid nominal money as a reward of recyclables. People in this regard cooperated and gave the recyclables as part of their household waste. After initial weighing and segregation of all components of the waste, once again all components of the waste were mixed then recyclers were allowed to collect the recyclables from each sample. After separation each component was weighed and properly entered in data sheets. The details of daily generation of recyclables and other residual waste are given in the Table 3.2. Maximum percentage of recyclables was recorded from Model Town UC (22%) followed by Shahabpura UC (21%),

Bonkan UC (19%) and commercial areas and institutions (18%). Highest percentage f recyclable was recorded from residential area of Model Town UC as compared to non- residential areas (commercial area and institutions.

Second major segregated component was the glass. Glass component was consist of disposable beverage bottles, broken glass pottery and medicine bottles, whereas, ceramics was not preferred by the recyclers and discarded with the residual MSW. Paper and cardboard products viz, newspapers, office papers, magazines, were the main components of recyclables, whereas, cardboards were included carton, packing of large articles, tetra packs of milk and juices. Major share of paper and cardboards was recyclables.

In case of plastic, different fractions were observed, Such as broken plastic and melamine pottery, plastic bottles for drinks and mineral water, plastic bags, polythene bags and wrappers. During this survey, broken plastic, nylon shoes, thick plastic bags were selected. Polythene bags, wrappers and melamine pottery were of least interest component for the recyclers. The recyclable plastic was then sold to local plastic product manufacturers at Gujranwala and Lahore city.

The result of present study varies from the other studies based on the composition and characterization of solid waste. In this study, people were encouraged to give the primary recyclables to waste collectors; while rest of the studies focused mainly on the waste collection after primary recycling. The recyclables reduce to its minimum level at secondary recycling.

During present study, the overall results of MSW generation varied from other cities of Pakistan due to different prevailing conditions, different methodologies and different objectives. Generally in Pakistan the solid waste generation varies from 0.29–0.6 Kg, whereas, during present study MSW generation was ranged between 0.26–0.36 Kg. MSW generation varies on spatial and temporal scale all over the world (Zeng et al., 2005). There are different factors that directly influence the quantity of MSW generation viz; geographical location, season, income, household structure, life style, pattern of commodity buying and behavior of consumption (Kaosol, 2009). The number of persons in a household has revealed a strong correlation to per capita MSW generation. Higher number of individuals in a household results in reduction the daily MSW generation (Kaosol, 2009). Climate, weather and seasonal changes also influences the MSW generation. Mainly generation of organic waste component fluctuates with changing seasonal condition (World Bank, 2001).

It was not easy to compare the results of present with other MSW generation studies due to lake of uniformity in methodology and waste components. However, comparisons with other studies are possible if we consider the variability in waste characteristics by natural features and seasons.

3.6 Community Response about SWACS

Overall response of the community was appreciative, cooperative and encouraging because people feel the need of solid waste management. People were very happy and enquired the outcomes of study and prospects of SWACS studies. Community warmly welcomes the SWACS study; especially women were more inclined and interested in solid waste management, especially they were keen to know how they can convert the waste into profitable business. Unfortunately, there was a little awareness of basic information about solid waste management. Team leaders of

SWACS have mobilized the community and provided them basic information about the benefits of waste management. There is dire need of social mobilization campaigns to portray their effective role in solid waste management.

Table 3-2: Daily Generation of Recyclable and Residual Waste (Kg) in Residential and Non- Residential Areas.

Collection Date	Bonkan UC		Shahabpura UC		Model Town UC		Commercial/ Institutes	
	R	W	R	W	R	W	R	W
30-Apr-2010	17.695	60.405	42.121	113.363	47.119	115.685	21.498	124.710
01-May-2010	16.913	55.794	23.824	87.791	33.917	88.292	22.902	111.577
02-May-2010	27.122	84.215	39.741	125.738	22.248	77.751	19.077	88.134
03-May-2010	32.623	182.342	34.425	178.611	38.558	158.514	24.549	92.360
04-May-2010	49.916	173.837	54.695	186.959	44.548	178.694	22.638	96.780
05-May-2010	41.207	159.114	51.535	201.935	38.925	177.424	17.668	91.073
06-May-2010	16.797	132.450	29.649	128.463	45.247	172.213	27.759	112.725
Average daily generation	28.896	121.165	39.427	146.123	38.652	138.367	22.299	102.480
Average daily percentage	19%	81%	21%	79%	22%	78%	18%	82%

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APPENDICES

September, 2010

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Annex A-1: Total Waste, Households and Average daily Waste Generation at Model Town UC, Sialkot

Component		Glass	Metals	Paper/ Cardboard	Plastics	Food/ Organic	Wood	Leather/ Rubber	Electronics	Other	Total
Weekly Average	Waste	11.288	4.998	24.466	23.189	76.928	7.954	6.428	2.664	17.480	179.198
	House- Holds	72.143	72.143	72.143	72.143	72.143	72.143	72.143	72.143	72.143	72.143
	Average (KG)	0.162	0.070	0.361	0.335	1.011	0.111	0.099	0.040	0.205	2.415
30 th April, 2010	Waste	12.56	6.713	33.714	36.854	41.854	7.675	12.88	4.286	2.924	162.814
	House- Holds	70	70	70	70	70	70	70	70	70	70
	Average (KG)	0.179	0.096	0.482	0.526	0.598	0.110	0.184	0.061	0.042	2.326
1st May, 2010	Waste	11.449	6.549	22.898	13.098	31.345	12.301	4.751	6.823	4.685	122.209
	House- Holds	53	53	53	53	53	53	53	53	53	53
	Average (KG)	0.216	0.124	0.432	0.247	0.591	0.232	0.090	0.129	0.088	2.306
2nd May, 2010	Waste	7.467	1.67	19.886	14.696	35.447	2.995	8.816	0.101	5.801	96.943
	House- Holds	42	42	42	42	42	42	42	42	42	42
	Average (KG)	0.178	0.040	0.473	0.350	0.844	0.071	0.210	0.002	0.138	2.308
3rd May, 2010	Waste	10.514	4.246	19.557	27.181	108.862	6.231	1.42	1.6	11.706	197.072
	House- Holds	73	73	73	73	73	73	73	73	73	73
	Average (KG)	0.144	0.058	0.268	0.372	1.491	0.085	0.019	0.022	0.160	2.700
4th May, 2010	Waste	13.95	3.582	28.22	24.023	99	9.68	11.734	1.46	28.558	223.242
	House- Holds	87	87	87	87	87	87	87	87	87	87
	Average (KG)	0.160	0.041	0.324	0.276	1.138	0.111	0.135	0.017	0.328	2.566
5th May, 2010	Waste	10.244	9.576	18.982	18.4195	111.241	10.915	4.585	2.525	45.64	234.645
	House- Holds	95	95	95	95	95	95	95	95	95	95
	Average (KG)	0.108	0.101	0.200	0.194	1.171	0.115	0.048	0.027	0.480	2.470
6th May, 2010	Waste	12.83	2.65	28.005	28.05	110.744	5.88	0.81	1.85	23.045	217.46
	House- Holds	85	85	85	85	85	85	85	85	85	85
	Average (KG)	0.150	0.030	0.347	0.380	1.245	0.051	0.009	0.020	0.196	2.227

Annex A-2: Total waste, Households and Average Daily Waste Generation at Shahabpura UC, Sialkot

Component		Glass	Metals	Paper/ Cardboard	Plastics	Food/ Organic	Wood	Leather/ Rubber	Electronics	Other	Total
Weekly Average	Waste	17.489	10.003	27.209	26.459	77.557	10.654	8.459	2.344	18.835	184.894
	House- Holds	85.571	85.571	85.571	85.571	85.571	85.571	85.571	85.571	85.571	85.571
	Average (KG)	0.207	0.124	0.323	0.315	0.899	0.127	0.104	0.027	0.217	2.143
30 th April, 2010	Waste	30.782	33.661	48.29	42.615	73.392	24.028	21.196	1.214	12.216	150.891
	House- Holds	74	74	74	74	74	74	74	74	74	73
	Average (KG)	0.416	0.455	0.653	0.576	0.992	0.325	0.286	0.016	0.165	2.067
1st May, 2010	Waste	10.581	4.161	13.917	18.329	39.336	2.064	8.281	0.781	8.849	111.615
	House- Holds	80	80	80	80	80	80	80	80	80	84
	Average (KG)	0.132	0.052	0.174	0.229	0.492	0.026	0.104	0.010	0.111	1.329
2nd May, 2010	Waste	6.666	5.197	24.447	29.287	58.171	6.313	8.637	0.91	18.645	165.479
	House- Holds	84	84	84	84	84	84	84	84	84	84
	Average (KG)	0.079	0.062	0.291	0.349	0.693	0.075	0.103	0.011	0.222	1.970
3rd May, 2010	Waste	18.355	5.541	21.981	18.918	102.821	14.976	1.56	0.91	22.381	213.036
	House- Holds	89	89	89	89	89	89	89	89	89	89
	Average (KG)	0.206	0.062	0.247	0.213	1.155	0.168	0.018	0.010	0.251	2.449
4th May, 2010	Waste	23.579	9.912	25.6	26.987	109.767	12.47	3.557	3.09	22.637	241.654
	House- Holds	92	92	92	92	92	92	92	92	92	92
	Average (KG)	0.256	0.108	0.278	0.293	1.193	0.136	0.039	0.034	0.246	2.627
5th May, 2010	Waste	23.372	8.815	41.62	27.225	86.642	12.59	13.06	5.955	28.477	253.47
	House- Holds	91	91	91	91	91	91	91	91	91	91
	Average (KG)	0.257	0.097	0.457	0.299	0.952	0.138	0.144	0.065	0.313	2.785
6th May, 2010	waste	9.085	2.737	14.605	21.855	72.77	2.135	2.925	3.545	18.637	158.1123
	House- Holds	89	89	89	89	89	89	89	89	89	89
	Average (KG)	0.102	0.031	0.164	0.246	0.818	0.024	0.033	0.040	0.209	1.777

Annex A-3: Total Waste, Households and Average Daily Waste Generation at Bonkan UC, Sialkot

Component		Glass	Metals	Paper/ Cardboard	Plastics	Food/ Organic	Wood	Leather/ Rubber	Electronics	Other	Total
Weekly Average	Waste	12.156	4.850	19.628	20.428	58.725	4.458	3.465	1.791	19.273	150.063
	House- Holds	74	74	74	74	74	74	74	74	74	74
	Average (KG)	0.160	0.078	0.260	0.265	0.722	0.071	0.050	0.030	0.275	1.993
30 th April, 2010	Waste	5.755	6.868	6.572	9.731	12.269	5.185	2.404	3.466	18.273	78.1
	House- Holds	36	36	36	36	36	36	36	36	36	36
	Average (KG)	0.160	0.191	0.183	0.270	0.341	0.144	0.067	0.096	0.508	2.169
1st May, 2010	Waste	7.9	4.176	13.976	6.383	19.422	4.796	2.839	1.255	8.97	72.707
	House- Holds	44	44	44	44	44	44	44	44	44	44
	Average (KG)	0.180	0.095	0.318	0.145	0.441	0.109	0.065	0.029	0.204	1.652
2nd May, 2010	Waste	4.115	5.785	22.506	22.9291	31.907	4.067	1.551	1.26	11.6	111.337
	House- Holds	76	76	76	76	76	76	76	76	76	76
	Average (KG)	0.054	0.076	0.296	0.302	0.420	0.054	0.020	0.017	0.153	1.465
3rd May, 2010	Waste	23.07	2.216	23.307	26.489	90.662	5.569	1.495	1.185	33.951	214.965
	House- Holds	95	95	95	95	95	95	95	95	95	95
	Average (KG)	0.243	0.023	0.245	0.279	0.954	0.059	0.016	0.012	0.357	2.263
4th May, 2010	Waste	25.633	5.61	36.575	28.141	91.442	2.362	5.575	0.1	21.495	223.753
	House- Holds	95	95	95	95	95	95	95	95	95	95
	Average (KG)	0.270	0.059	0.385	0.296	0.963	0.025	0.059	0.001	0.226	2.355
5th May, 2010	Waste	13.3	6.83	24.185	32.435	82.924	4.015	5.73	4.37	19.135	200.321
	House- Holds	93	93	93	93	93	93	93	93	93	93

Annex B: Total Waste and Average Waste Generation from Commercial Area/ Institutions from Sialkot City

Commercial/ institutes	Average/ Total waste	Total waste	Glass	Metals	Paper/ Cardboard	Plastics	Food/ Organic	Wood	Leather/ Rubber	Electronics
Fruit	Average	7.692	0.029	0.174	0.773	0.246	5.045	0.585	0.000	0.000
Fruit	Total waste	107.6825	0.401	2.44	10.818	3.443	70.627	8.192	0	0
Govt.	Average	1.500	0.088	0.073	0.341	0.214	0.415	0.036	0.000	0.000
Govt.	Total waste	12.002	0.7	0.58	2.727	1.713	3.321	0.29	0	0
Hospitals	Average	3.746	0.119	0.014	0.735	0.971	0.666	0.001	0.171	0.000
Hospitals	Total waste	44.955	1.424	0.17	8.823	11.656	7.993	0.01	2.056	0
Market	Total waste	448.133	10.085	5.853	82.53	53.334	162.243	17.283	4.51	1.651
Markets	Average	64.019	1.441	0.836	11.790	7.619	23.178	2.469	0.644	0.236
Mosque	Average	1.685	0.000	0.058	0.149	0.243	0.451	0.176	0.000	0.000
Mosque	Total waste	21.905	0	0.75	1.931	3.1632	5.859	2.282	0	0
Office	Average	2.604	0.070	0.084	0.310	0.381	0.862	0.000	0.013	0.000
Office	Total waste	20.828	0.56	0.672	2.479	3.046	6.893	0	0.104	0
Restaurants	Total waste	140.573	6.419	2.61	14.803	11.659	82.804	0.56	1.81	1.553
Restaurants	Average	10.041	0.459	0.186	1.057	0.833	5.915	0.040	0.129	0.111
School	Average	4.104	0.348	0.104	0.799	1.145	0.975	0.141	0.075	0.034
School	Total waste	41.036	3.476	1.035	7.988	11.453	9.746	1.412	0.754	0.342
Shops	Total waste	29.457	1.195	0.175	4.801	4.198	9.755	1.135	0	0
Shops	Average	2.104	0.085	0.013	0.343	0.300	0.697	0.081	0.000	0.000

Annex C: Waste Generator Collection Record (Households: Low Income)

Ref	Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		30-Apr-2010		01-May-2010		02-May-2010		03-May-2010		04-May-2010		05-May-2010		05-May-2010	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
1	Munawar Hussain	0.383	3.370	0.299	2.643	0.470	0.963	0.154	2.146	0.319	1.670	0.085	0.430	0.086	0.824
2	Anayat Ullah	0.173	2.980	0.557	5.493	0.196	0.313	0.081	0.381	0.240	1.390	0.428	1.639	0.181	2.194
3	Wilson Masseh	0.010	1.494	0.244	0.509	0.106	1.241	0.688	3.302	0.582	1.728	0.417	1.498	0.105	1.141
4	Muhammad Arshad	0.921	3.116	0.189	1.789	1.086	0.477	0.285	0.743	0.911	1.210	0.118	0.907		2.135
5	Shamas	0.121	0.590	0.574	2.958	1.946	1.374	0.343	1.877	0.155	1.970	0.498	1.508	0.056	0.559
6	Muhammad Akram	0.187	1.429	0.088	0.166		0.220	0.503	1.660	0.136	1.388	0.330	1.530	0.567	2.193
7	Muhammad Imran	0.299	0.600	0.315	1.215	0.750	1.576	0.393	2.326	0.625	1.264	0.083	0.995	0.540	0.690
8	Shafaqat Hussian Mistri	0.566	0.452	0.150	1.120	0.339	0.548	0.737	2.913	0.794	2.084	0.616	2.414		
9	Abdul Gafor	0.377	0.553	0.765	0.887	0.468	1.062	0.426	1.244	0.137	2.157		0.079		2.602
10	Muhammad Sidique	0.603	4.231		0.872	0.604	0.673	0.335	0.605	0.592	0.948	0.441	1.329	0.159	0.366
11	Ghulam Qadir	0.534	2.574	0.051	1.094	0.635	0.513	0.517	2.323	0.860	1.325	0.269	0.889	0.370	2.615
12	Ghulam Mustafa	0.565	0.425		1.092			0.732	1.197					0.064	1.183
13	Babu Khan	0.130	1.685	0.266	0.793	0.266	0.794	0.293	2.529	0.701	2.079	0.396	3.922	0.216	1.929
14	Shair Muhammad	1.608	1.549	0.682	1.695			0.190	2.410	0.621	1.309	0.502	0.826	0.397	2.495
15	Muhammad Jamal	0.127	3.527	0.111	0.754	0.864	1.860		1.003	1.190	2.570	0.325	0.518	0.105	0.080
16	Muhammad Yaqoob	0.604	3.886	0.032	0.593			0.172	2.892	1.185	5.520	0.182	0.442	0.442	0.404
17	Muhammad Yaqoob			0.257	0.588		0.430	0.096	0.734	0.105	0.340	0.447	1.427	0.078	4.442
18	Rasheed Ahmed							0.490	2.548	0.746	2.034	0.313	1.706	0.051	0.859
19	Emanual					0.383	0.483	0.508	0.973	1.009	3.374			0.348	3.857
20	Muhammad Nawaz					0.549	1.004	0.267	2.502	0.476	1.259			0.011	0.201
21	Muhammad Arif					0.380	0.496	0.844	2.396	0.534	1.459			0.002	0.393
22	Muhammad Arif					0.654	0.648	0.670	1.432	0.572	1.440	0.704	1.512	0.204	1.663
23	Rehmat Ali					0.224	0.563	1.151	3.641	0.479	1.721	1.150	4.177	0.427	2.064
24	Muhammad Hameed	0.356	0.947	1.040	0.663	0.590	0.775	0.143	1.830	0.443	1.287	0.743	1.021	0.044	0.431
25	Tariq Butt	0.150	1.056	0.735	0.972	1.026	1.337	0.288	3.436	0.603	2.187	0.120	1.266		0.455
26	Amir Ali	0.101	0.240	0.093	0.209	0.539	0.348	0.698	2.562	0.683	2.017	0.329	2.231		
27	Sabar Hussain	2.028	6.135		1.425		1.249	0.191	0.962	0.362	3.315	0.555	1.439		
28	Muhammad Sajjad	0.763	1.872	0.180	0.501	0.631	0.688	0.428	2.342	0.172	2.208	0.660	3.294	0.137	3.330
29	Muhammad Abbas					0.633	1.146	0.054	0.159	0.919	1.064	0.424	0.562	0.028	2.622
30	Ghulam Sarwer	0.156	0.664			0.565	0.222	0.160	5.765	0.356	1.514	0.093	1.294		1.699
31	Arif					0.350	0.711	0.255	1.930	1.472	3.239	0.342	0.863	0.123	2.577
32	Muhammad Rafique					0.057	1.260	0.344	4.396	0.255	1.680	0.149	1.611	0.187	2.143
33	Muhammad Saeed							0.502	2.632	0.052	3.084	0.085	3.173	0.114	1.281
34	Zar Khan					0.253	0.354	0.357	1.693	0.182	1.408	0.177	1.070		
35	Zuilfqar Ali					0.105	0.828	0.181	1.087	0.876	1.741	0.226	2.623		1.295
36	Shahazad						0.997	0.166	1.099	0.154	1.121	0.187	2.317	0.826	1.823
37	Muhammad Jameel					0.711	2.161	0.636	2.013	1.047	3.871	1.068	1.113	0.951	10.93
38	Muhammad Naseer					0.342	0.407		0.370	0.778	2.564		2.588	0.565	2.380
39	Muhammad Afzal					1.242	1.588	0.414	1.520	0.200	1.200	0.408	0.900	0.069	1.985
40	Bilal Ahmed							0.472	3.470	0.576	0.806			0.158	1.484
41	Ghulam Abbas					0.250	1.018	0.270	1.439	0.610	1.433			0.216	0.231
42	Philips	0.329	0.481	0.065	1.233	0.404	1.074	0.179	0.561	0.343	0.613	0.265	1.309	0.264	2.186
43	Tariq					0.152	0.365	0.093	0.434	1.433	4.216	0.065	0.627	0.120	1.585
44	Shabbir Ahmed									0.539	0.683	0.207	2.040	0.256	1.260
45	Munir Ahmed					0.139	0.934	0.203	2.487					0.289	0.598
46	Muhammad Iftikhar							0.323	2.531	0.523	1.346			0.297	0.278
47	Mukhtar Ahmed							0.272	2.242	0.311	2.574		1.204	0.428	1.372
48	Abid Hussain					0.617	1.208	0.658	1.792	0.441	2.214	0.353	2.640	0.436	2.409
49	Muhammad Arshad					0.107	2.200	0.464	2.610	0.268	1.644	1.128	2.549	0.055	0.570
50						1.227	1.384	0.606	1.020	0.458	0.868	0.630	0.945		
51	Mehar Sadiq			0.132	0.258					0.504	1.044	0.330	2.225	0.044	2.231
52	Dildar							0.099	1.973	0.255	1.620	0.388	2.882		
53	Ilhaj Talib Husain					1.216	0.822	0.148	0.526	0.185	5.078	0.542	2.644		
54	Arif Mighal	0.356	0.410	0.415	1.401					0.368	6.994	0.792	2.209	0.142	1.488
55	Hafiz Shabir							0.144	3.339	0.917	1.531	0.369	5.840	0.093	0.842
56	Muhammad Hussain					0.103	1.745	0.199	1.547	0.872	2.162	0.597	1.071		

Ref	Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		30-Apr-2010		01-May-2010		02-May-2010		03-May-2010		04-May-2010		05-May-2010		05-May-2010	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
57	Muhammad Iqbal							0.092	0.801	0.205	1.634	0.668	5.494		
58	Shoukat Massseh	0.109	0.158	0.080	0.818	0.250	0.921	0.266	3.152	0.545	2.415	0.277	0.992	0.239	1.476
59	Maqsood Masseh					0.962	1.773	0.444	1.811	0.435	0.930	0.497	2.782	0.049	1.266
60	Javaid Masseh	1.784	0.410			0.108	0.558	0.669	1.905	0.090	0.954	2.360	5.205	0.319	3.497
61	Muhammas Ishaq			0.572	0.778	0.743	1.250	0.341	1.548	0.378	1.082	0.728	2.345	0.674	2.406
62	Shahbaz Masseh						1.683	0.084	2.266	0.530	1.089	0.043	2.266	0.148	0.772
63	Muhammad Majeed					0.111	0.136	0.142	0.212	0.046	1.462	1.065	1.267	0.154	1.136
64	Fateh Muhammad					0.473	0.315	0.145	1.414	0.479	0.854	0.382	1.748	0.584	2.452
65	Noor Alim					0.125	2.415	0.866	1.966			0.332	6.827		1.243
66	Abdul Razzaq					0.306	1.375	0.139	2.606	0.371	0.780		1.742	0.278	1.002
67	Manzoor Hussian	0.684	2.091	2.009	2.928	0.745	0.371	0.128	2.069	0.349	1.885	0.770	1.396	0.324	1.172
68	Muhammad Sadiq									0.569	2.061	0.126	1.195	0.745	4.050
69	Muhammad Maqsood					1.363	1.971	0.101	1.577	1.527	3.261	0.677	1.266	0.058	0.939
70	Muhammad Arshad	0.071	0.212	0.948	1.271	0.290	0.692	0.348	0.982	0.510	1.849	0.160	2.082		
71	Muhammad Ajmad	0.307	0.871	0.767	4.204	0.442	0.803		1.386	0.517	1.639	0.615	1.632	0.034	0.861
72	Mudassar Butt					0.495	0.312	0.171	3.018	0.310	0.918	0.550	1.672	0.113	2.537
73	Mubashar Butt					0.119	2.247	0.251	1.379			0.330	1.452		
74	Vicky Shah	0.977	1.370	0.141	0.341	0.818	0.920	0.393	0.986	0.441	1.255	0.933	2.766		
75	Abdul Majeed	0.571	0.954	0.650	1.315		0.776	0.200	1.576	0.442	0.747	0.567	2.518	0.261	3.519
76	Khurram Shahzad					0.467	1.137	0.160	3.490	0.228	1.466	0.497	1.967	0.388	3.440
77	Tariq Mahmood				1.250	0.119	0.240	0.823	2.682	0.272	1.120	0.279	0.546		
78	Gulzar	0.878	2.498	0.093	1.899			0.356	2.062	0.764	1.806	0.139	0.640	0.595	0.910
79	Muhammad Imran							0.116	1.506	0.592	1.060	0.738	1.532	0.218	0.869
80	Danial Masih					0.070	0.112	0.227	1.397	0.778	1.392	0.509	0.758	0.055	0.410
81	Sadique			0.180	0.702	0.276	0.798	0.046	0.121	0.091	1.202	0.769	1.060		
82	Hassan Khan			0.361	0.767			0.648	3.000	0.423	0.842	0.499	0.380	0.234	1.061
83	Nazir Ahmed Taas					0.153	0.819	0.354	4.023	0.668	2.253	0.660	1.170		
84	Munir Lal					0.062	0.585	0.368	1.840	0.587	2.729	1.033	2.730	0.134	0.546
85	Muhammad Shahid	0.292	0.967	0.249	0.948			0.248	0.294	0.270	1.609	0.501	1.117	0.012	1.074
86	Saleem Masih	0.105	3.065	1.830	1.812	0.171	0.409	0.426	2.035	0.615	1.625	0.193	0.254	0.063	1.562
87	Ashiq Ali							0.129	1.297	0.777	2.148	0.600	0.980	0.507	1.957
88	Ashfaq Ahmed					0.507	0.952	0.578	1.909	0.255	1.616	0.262	0.870		
89	Shamas Ul Din					0.551	8.169	0.815	2.098	0.504	0.692	0.059	1.256	0.041	0.978
90	Murtaza					1.391	0.930	0.856	2.446	0.534	1.596	0.622	1.020		
91	Muhammad Azam			0.531	2.176	0.662	1.020	0.378	3.925	0.392	1.377	0.384	1.280		
92	Mohsin			0.127	0.124					0.569	2.795	0.516	1.159	0.033	2.672
93	Muhammad Waris					0.282	0.193		2.203	0.720	2.803	0.275	1.037		1.240
94	Muhammad Nazir Khan					0.071	0.334	0.149	1.605	0.349	2.298	0.460	1.610		1.485
95	Saad Muhammad			1.057	0.976			0.125	1.150			0.575	1.724	0.132	0.648
96	Ghulam Hussain							0.432	2.104	0.524	1.084	0.106	0.249		
97	Muhammad Azam					0.471	0.804	0.463	0.899	0.523	2.683	1.046	3.171		
98	Maqbool Hussain							0.488	1.949	0.397	1.008	0.589	1.210		
99	Muhammad Gulzar	0.467	3.254	0.080	0.950	0.108	0.980	0.832	3.027	0.819	2.406	0.141	0.368	0.141	0.395
100	Muhammad Munir				1.048	0.428	0.960		1.086	0.395	0.855	0.137	1.083	0.012	0.493

Annex D: Waste Generator Collection Record (Households: Medium Income)

Ref	Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		30-Apr-2010		01-May-2010		02-May-2010		03-May-2010		04-May-2010		05-May-2010		05-May-2010	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
1	Kashif Ali	0.932	0.777			0.624	2.892	0.430	0.933	0.333	2.042	0.983	2.495	0.486	3.654
2	Bashir Ahmed	0.260	1.341	0.185	0.320	0.271	0.647	0.515	2.666	1.854	2.026	0.118	1.638	0.239	0.445
3	Ch Abdul Rasheed	0.435	0.649	0.851	2.208	0.851	3.479	0.541	0.371	0.679	2.386	0.451	2.331	0.175	1.146
4	Muhammad Amin	0.128	0.802	0.411	1.067	0.636	0.600	0.094	1.571	0.293	1.216	0.280	1.567	2.331	3.699
5	Muhammad Javed			0.045	2.100	0.742	2.158	0.486	1.889	0.600	1.365	0.255	2.290	0.080	1.164
6	Abdul Ghafar	0.530	0.823			0.409	3.767	0.080	2.415	0.130	1.945	0.428	2.709	0.410	4.154
7	Muhammad Yousaf			0.208	1.852	0.466	0.874	0.123	1.410	0.481	2.489	0.150	1.753	0.018	2.200
8	Sarfraz Ahmed	0.335	0.497	0.031	0.849	0.350	1.370	0.549	3.705	0.850	3.405				
9	Muhammad Imtiaz					0.572	3.068	1.049	1.611	4.731	3.061	0.793	1.662		
10	Hassan Ghafoor					0.890	1.613	0.242	2.274	0.442	2.212	0.414	2.857	0.234	0.326
11	Muhammad Yousaf	0.515	3.706	0.217	1.231	0.626	1.594	0.500	2.456			0.232	2.165	0.122	1.194
12	Muhammad Asif			0.210	1.000	0.098	0.093	0.120	1.149	0.954	1.790				
13	Muhammad Ijaz	0.856	2.180	0.416	0.315	0.369	0.476	0.074	0.616	0.241	3.248	0.697	2.599	0.597	1.538
14	Allah Rakha	1.685	3.077	0.179	0.722	0.166	0.511			0.617	1.537	0.209	2.087	0.875	0.608
15	Muhammad Sain				1.878	1.149	1.236	0.464	0.988	0.178	1.252	0.627	4.584	0.135	0.342
16	Rafique Alam	0.260	0.395	0.224	0.648							0.241	1.312	0.078	0.329
17	Akhtar Raza Mughal	0.736	2.813	0.338	0.463	0.411	0.747	0.308	9.546	1.033	2.087	0.918	5.758	0.785	2.496
18	Abdul Razaq					0.443	1.919	0.950	4.730	0.783	1.898	0.572	0.793	0.310	1.923
19	Mirza Shahid Mahmood	0.163	3.392	0.437	1.527	0.394	0.320	0.118	2.922	0.260	5.010				
20	Abdul Ghafar	0.212	1.110	0.186	1.366	0.139	0.240	0.291	0.788	0.495	1.194	0.847	2.743	1.178	2.239
21	Muhammad Qadeer	1.027	3.424	0.156	1.903	0.315	2.876	0.779	2.886	0.062	3.563	0.231	1.912	0.094	1.187
22	Zahid	1.079	0.722	0.042	0.092	0.300	0.529	0.265	0.570	0.377	1.063	0.268	1.927		
23	Irshad Khan	0.228	1.402			0.450	1.597	0.266	0.738	0.312	3.181	0.288	1.479	0.112	3.187
24	Muhammad Boota	0.583	0.710			0.095	0.926	0.608	1.126	0.153	3.006	0.414	0.653	0.076	1.268
25	Qari Iqbal			0.176	1.310	1.602	0.611	0.170	0.270	0.622	2.068	0.507	1.659	0.676	2.601
26	Ali Hussain	0.158	1.924	0.268	0.265	0.427	0.946	0.240	0.546	1.016	2.738			0.114	2.288
27	Jamia Hajirah	0.200	5.211	0.433	1.080	0.208	0.419	0.176	1.709		3.061	1.159	2.394		
28	Muhammad Usman	1.418	1.913			0.135	0.362	0.716	5.455	0.326	0.945	0.457	0.849	0.225	0.978
29	Muhammad Asif			0.123	0.632	1.317	2.844	0.150	0.390	0.166	2.459	0.474	3.089	0.165	1.329
30	Shahid Butt					1.202	2.481	0.286	1.209	0.244	3.036	0.588	1.637	0.915	1.553
31	Muhammad Amjad	0.511	2.172	0.119	0.155	0.543	1.660	0.417	2.958	0.901	1.559	0.763	3.452	0.093	1.169
32	Muhammad Sarwar	0.448	2.393	0.527	0.363					1.803	3.412	0.831	2.843	0.043	1.162
33	Khalid Hamayoon	0.410	0.292	0.397	0.794			0.314	1.138	0.183	0.635	0.870	3.310	0.590	5.755
34	Haji Amjad Ali	0.788	1.047	0.249	0.896	0.757	0.939	0.583	0.864	0.932	1.578	1.121	2.881		
35	Muhammad Azam	1.111	1.274	0.312	2.269	0.976	1.633	1.356	6.194	0.193	3.180	0.486	2.242	0.392	0.609
36	Muhammad Rafique	0.164	0.213	0.430	1.807			0.295	1.419	0.588	1.295	0.837	2.739	0.112	1.237
37	Muhammad Amir			1.091	1.039			0.885	2.365	0.394	0.945	0.576	7.251	0.544	1.695
38	Shamas Ali	0.585	1.798			0.816	1.052		1.375			0.195	1.308	0.335	0.984
39	Abdul Hameed	0.419	2.752					0.788	2.642	1.354	2.815	0.690	2.749	0.094	1.931
40	Muhammad Aslam	0.158	0.144	0.145	1.066			0.307	0.549	0.574	3.721	0.650	1.024	0.762	4.523
41	Javed Iqbal	0.043	0.172	0.233	0.555	0.305	0.353	1.026	0.799	0.303	1.126	0.179	1.380	0.142	1.313
42	Muhammad Rafique	0.578	0.939	0.052	0.279	0.922	0.764		2.350	0.510	2.234	0.824	2.781		
43	Nadeem Akhtar	0.536	0.560	0.154	1.806	0.241	0.284	0.267	2.118	0.187	2.116	0.472	1.329		
44	Naseer Ahmed			0.342	2.570			0.520	0.915	0.825	1.545	0.293	1.441	0.124	1.394
45	Azeem	0.548	1.274					0.423	4.966	0.419	4.067	0.108	2.070	0.660	0.849
46	Ghulam Khan	0.676	1.226	0.143	0.144	0.592	2.154	0.144	0.621			0.554	3.867	0.214	0.463
47	Muhammad Bashir	0.432	1.483			0.078	0.887	0.990	3.905	1.429	2.273	0.691	2.180	0.567	2.240
48	Ch Usman	0.061	0.461	0.118	0.174	0.493	3.151		2.325	0.918	3.150			0.142	1.969
49	Waqas Ahmed			0.193	0.831	0.380	7.653	1.173	1.517	0.764	2.781	1.328	1.633		
50	Riaz	0.360	0.682	0.737	1.717	0.150	0.243	0.892	1.358	0.112	0.592	0.918	1.350	0.710	0.728
51	Muhammad Ashfaq		2.532	0.237	0.604	1.579	1.033	0.774	0.071	0.169	1.506	0.606	0.910	0.794	1.630
52	Abdul Rehman	0.506	0.874	0.304	0.318	0.198	0.931	0.092	0.813	0.605	3.525	0.688	3.097	1.216	1.213
53	Muhammad Sadique	0.049	1.583	0.062	0.733	0.086	3.059	0.393	1.892	0.656	2.074	0.515	2.020	0.114	1.598
54	Muhammad Nazir	0.655	0.758	0.094	0.320	0.656	2.000	0.246	0.704	0.582	2.124	0.658	2.770	0.070	0.778
55	Muhammad Yaseen			0.355	1.421			0.103	1.447	0.307	1.006	0.747	1.950	0.243	0.760

Ref	Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		30-Apr-2010		01-May-2010		02-May-2010		03-May-2010		04-May-2010		05-May-2010		05-May-2010	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
56	Malik Younas	0.820	1.104	0.089	2.548			0.624	2.506	0.565	2.625	0.387	0.726	0.557	0.723
57	Pro Shujjat	0.227	0.274	0.397	0.342	0.286	0.830	0.352	1.188	0.548	0.895	0.475	2.034	0.153	1.245
58	Mian Tariq Bashir	0.474	0.768	0.447	0.322	0.920	1.758	0.260	2.138	0.286	0.752	0.207	1.079	0.775	1.522
59	Akhtar Ali	0.413	0.595	0.200	1.504	0.894	1.322		1.130	1.059	1.469	0.650	3.149	0.038	1.150
60	Zahida Parveen	1.465	1.685	0.199	0.833	0.340	0.368	0.305	2.485	0.517	0.821	0.189	2.038	0.093	0.128
61	Muhammad Aslam	0.361	0.408	0.009	1.168	0.347	0.251					0.943	2.082	0.317	0.467
62	Abdul Majeed	0.580	3.838	0.439	0.994		2.150	0.866	1.804	0.633	2.454	0.450	1.755		
63	Muhammad Abdullah	0.809	3.233	0.250	0.221	0.488	3.465	0.682	1.183	0.179	0.995	0.857	1.441	0.156	1.362
64	Abdul Ghafar			0.363	0.533	0.726	2.822	0.393	2.671	0.130	2.058			0.020	1.155
65	Muhammad Jaan	0.356	0.562	0.295	3.942	0.102	4.618	0.254	0.341	0.400	1.339	1.190	1.913	0.057	1.246
66	Mian Liqat Ali	0.156	1.987			0.876	1.859	0.211	2.914			0.590	1.909	0.099	4.133
67	Hamid Raza Solehria	0.911	1.611	0.795	2.915	0.584	0.293	0.300	1.272	1.050	1.255	0.406	2.089	0.358	0.310
68	Zulqurnain			0.286	1.008	0.674	1.088	0.483	1.412	0.803	5.466	0.755	1.861	0.061	0.189
69	Malik Sabir			0.336	1.195	0.732	0.869	0.189	0.676	0.496	2.354	0.189	1.157	0.226	0.516
70	Ghulab Din			0.316	0.431	0.183	0.143	0.233	0.732	1.244	1.345	0.518	1.033	0.354	1.424
71	Abdul Ghafoor	1.596	4.299	0.362	2.570	0.117	2.589	1.515	3.110	0.629	1.178	0.690	1.826	0.205	1.134
72	Abdul Aziz Chohan	0.479	0.755	0.466	1.512	0.699	0.649				1.748	1.038	1.344	0.234	1.299
73	Somaira Muqbool	1.668	3.366	0.197	0.220			0.102	0.073	0.543	1.897	0.405	1.856	0.302	0.359
74	Fazal Ilahi	0.222	1.422	0.448	1.975	0.129	0.363	0.445	0.745	0.126	0.583	0.509	1.714	0.697	0.554
75	Javed Mehmood			0.312	0.866	0.161	1.861	0.776	6.151			0.492	1.463	0.153	1.174
76	Malik Ali			0.726	1.882	0.309	4.698	0.451	2.134	0.242	0.643	0.096	2.109	0.104	2.988
77	Meeran Bakhash	0.617	2.018	0.140	1.011	0.263	2.808	0.566	2.350	1.439	3.291	0.434	1.827	0.025	1.101
78	Tahir Mehmood	0.945	2.472	0.353	0.720	0.596	3.452	0.196	2.274	0.185	0.941	0.831	3.411	0.103	1.302
79	Sughran Bagum	0.885	2.026	0.510	0.794	0.252	1.243	0.334	1.416	0.684	1.604	0.198	2.325	0.250	1.167
80	Muhammad Sadique	0.230	0.610			0.706	0.948			0.286	1.454			0.109	0.253
81	Abdul Hafiz	0.365	0.669			0.418	1.780	0.333	2.287	0.294	1.859	1.059	2.269	0.203	1.429
82	Rashid Akhtar	0.708	0.902			0.370	0.690	0.086	0.364	0.357	0.896	0.364	1.188	0.127	0.683
83	Muhammad Aslam			0.326	1.978		2.031	0.695	2.175	0.561	1.202	0.308	1.087	0.390	1.514
84	Rasheed Ahmed			0.156	0.767	0.098	1.900	0.915	0.736	1.187	2.367	0.488	2.628	0.603	1.425
85	Haji Muhammad Hussain	0.304	0.451	0.438	1.602	0.397	0.885	0.330	7.570	0.066	1.764	0.551	2.751	0.502	1.413
86	Rehmat	0.712	1.410	0.132	1.427		0.252	0.350	0.690	1.089	3.236	0.241	5.163	0.693	2.385
87	Ehsan Ilahi	0.170	0.147			0.255	1.743	0.251	0.099	0.352	3.942	0.756	1.839	0.140	2.094
88	Tariq	1.798	3.364		0.638	0.825	1.726	0.132	2.087	0.679	2.852	1.421	1.981	0.289	1.325
89	Nazir Ahmed Taas	0.171	0.202	0.484	1.346			1.173	4.367	0.780	3.418	0.554	3.804	0.477	2.788
90	Naseer Ahmed	0.438	0.468	0.051	0.100	0.313	0.208	1.036	2.139	0.323	1.532	0.338	1.926	0.379	0.226
91	Muhammad Rafique	0.469	2.500	0.441	0.692	0.537	0.321	1.158	3.147	0.224	1.959	0.506	5.105	0.025	0.267
92	Azar	0.069	0.685		1.814		0.887	3.330	3.070	0.670	3.491			0.142	1.563
93	Amir Hamza					0.677	0.344			0.517	1.266	1.110	3.039	0.045	1.062
94	Muhammad Tufail				0.766	0.317	0.891	0.301	2.956			0.358	2.214	0.130	1.266
95	Ali Raza			0.503	1.385			0.674	1.076	0.386	1.108	0.672	1.923	0.162	1.223
96	Muhammad Khalil	1.481	2.191	0.449	0.960	0.309	1.515	0.190	4.110	0.311	0.419			0.856	1.166
97	Abdul Ghani	0.384	3.407	0.315	1.090				1.605	0.722	0.938	0.636	2.727	0.367	0.497
98	Ijaz Ahmed	1.063	0.818	0.661	0.518	0.192	0.523			0.199	0.530	0.647	2.452	0.049	1.352
99	Haji Ghulam Hussain									0.111	2.229	0.732	1.021	0.128	0.994
100	Sadique		1.621	0.503	0.514	0.219	0.606	0.431	1.721	0.880	0.245	0.096	1.169	0.109	1.039

Annex E: Waste Generator Collection Record (Households: High Income)

Ref	Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		30-Apr-2010		01-May-2010		02-May-2010		03-May-2010		04-May-2010		05-May-2010		05-May-2010	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
1	Mian Jahangir							0.183	1.702	0.139	1.746	0.007	1.811	0.572	0.418
2	Abdul Hameed					0.830	2.112	0.739	5.432	0.578	5.593	0.213	8.587	0.635	4.665
3	M Sadiq	0.694	2.134	2.364	3.394	1.151	1.842	0.154	0.386	0.126	0.414	0.240	2.175	0.402	1.654
4	M younas	0.210	0.304					0.299	1.196	0.208	1.287	0.452	1.030	0.332	1.428
5	M Yousaf	0.103	3.640		0.479		0.850	0.430	2.945	0.345	3.030	0.245	0.796		
6	M Ismail	0.668	3.594	1.734	2.404	0.148	0.289					1.750	2.065	0.182	1.375
7	M Ishaq							0.324	1.128	0.253	1.199	0.076	3.004	0.309	5.226
8	Balqees Baighum	1.282	2.445					0.604	0.843	0.457	0.990	0.656	2.134		
9	Iftikhar Ahmed	1.478	1.554	0.768	1.009			1.399	6.151	1.098	6.452	0.617	1.675	0.338	1.592
10	Munir Ahmed Mughal	0.185	0.281		2.880			0.305	1.409	0.235	1.479	0.175	0.820		
11	Mian Idrees	1.263	3.067					0.913	2.337	0.717	2.533	0.416	2.511	0.561	4.399
12	Ch Rehmat Ali	1.117	5.004	0.198	2.592	0.186	0.566		1.375		1.375	0.894	1.747	0.147	3.083
13	Shafeeq	0.451	1.141		0.199			0.810	2.620	0.655	2.775	0.377	2.479	1.846	5.966
14	M Arshad	0.950	0.921	1.779	4.106			0.316	0.540	0.251	0.605	0.147	0.622	0.378	2.032
15	Zuilfqar Ali	1.138	1.565		2.674			1.053	0.772	0.864	0.961		2.197	1.003	1.530
16	M Anwer	0.773	1.759		0.272				2.350		2.350	0.243	0.933	1.292	0.778
17	M Saeed	0.348	1.506			1.049	1.589	0.276	2.109	0.214	2.171	0.150	0.817	0.281	1.634
18	M Ajmal	0.738	2.194	0.261	0.422	2.524	2.427	0.536	0.899	0.424	1.011	0.186	2.434		
19	M Imtiaz	1.333	1.907	0.709	0.992			0.438	4.951	0.332	5.057	0.703	3.364	0.328	4.897
20	M Irfan					0.345	5.423	0.148	0.617	0.116	0.649	0.414	2.094	0.676	1.999
21	Saleem Akhter	0.140	3.696	0.222	2.598			1.016	3.879	0.832	4.063	0.040	2.753	0.269	0.897
22	M Rafeeq	0.686	0.785				3.466		2.325		2.325	0.135	1.685	0.580	1.311
23	Shahbaz Ahmed	0.154	0.198		0.359	1.229	1.798	1.207	1.483	0.969	1.721		1.529	0.494	1.061
24	Allah Ditta	1.438	0.819					0.920	1.330	0.724	1.526	0.556	1.933	0.614	2.091
25	Tariq Mehmood							0.801	0.044	0.614	0.231	0.580	1.952	1.076	4.351
26	Hammad Mohsin					1.389	1.255	0.096	0.809	0.068	0.837	0.078	1.333	0.665	2.830
27	Hafiz Abdul Razzaq					0.134	0.132	0.405	1.880	0.321	1.964	0.393	1.766	0.569	1.486
28	M Latif	0.062	0.142	0.530	0.362			0.254	0.696	0.200	0.750	0.105	2.779	1.357	3.238
29	M Khalil	0.431	0.498	0.398	0.323		0.982		2.895		2.895	0.401	0.865	0.241	2.314
30	Azhar Rasheed	0.175	2.874	0.335	4.789	0.800	1.121	1.053	3.407	0.785	3.675	0.377	3.102	1.206	1.714
31	Malik Khadim	0.202	0.298	0.596	0.894		1.072	1.101	4.024	0.901	4.224	0.276	0.714	0.412	6.653
32	Mujahid Iqbal	0.184	0.573		1.121	0.630	1.038	0.774	4.031	0.625	4.180	1.024	0.500	1.037	2.668
33	Ghulam Qadir	0.670	2.173		2.390	2.054	2.722	0.105	1.445	0.086	1.464	0.107	6.098	0.491	1.167
34	Nasser Ahmeed	2.074	2.047	0.793	1.008	0.348	1.902	0.647	2.483	0.491	2.639		1.952	0.530	0.735
35	M Shabbir	0.726	2.104	0.606	1.575	0.921	0.755	0.363	1.177	0.281	1.259				
36	M Rafeeq	0.558	1.150	0.920	1.320	0.196	1.001	0.268	2.130	0.212	2.186	0.070	1.138	0.361	1.299
37	Haji Saleem Ullah								1.130		1.130	0.123	0.807	0.143	0.417
38	M Ramzan					0.429	0.865	0.316	2.474	0.240	2.550	1.062	2.348	0.344	1.446
39	Amjad Ali	0.202	0.354		0.829								1.589	0.508	0.948
40	M Iqbal	0.397	0.306					0.889	1.781	0.728	1.942	0.201	0.920		
41	M Razzaq	0.998	1.419		1.929			0.713	1.152	0.496	1.369	0.210	0.700	0.044	1.506
42	M Nawaz	0.410	1.622					0.405	2.659	0.325	2.739		0.552	0.067	1.327
43	M Khalid	0.754	1.181	0.842	0.909		1.801	0.262	0.333	0.206	0.389	0.168	0.167		
44	M Rayyaz	0.195	0.457	3.867	3.049	0.242	0.464	0.218	2.907	0.170	2.955	0.078	0.988		0.712
45	M Latif	0.298	1.081	1.794	2.119			0.311	1.262	0.235	1.337	0.204	0.896	1.199	-0.924
46	Sajid Janjua	0.113	0.203					0.499	1.396	0.392	1.503	0.561	1.863		
47	Malik Shakeel	0.704	0.705	3.216	2.722		3.735	0.195	0.670	0.150	0.715	0.425	1.339	0.126	1.364
48	HajiM Nawaz	0.550	0.731				1.563	0.241	0.725	0.189	0.776	0.702	0.964	0.073	5.742
49	Sh M Azam							1.555	3.070	1.273	3.352	0.477	4.880		2.970
50	M Arab Hussain	1.756	4.442		2.422	0.227	0.287					0.266	0.175		
51	M Farooq	0.338	1.399	0.476	0.495			0.105	0.070	0.084	0.091	0.572	1.699		
52	M Rayyaz	0.058	0.537			0.336	1.771	0.456	0.734	0.374	0.816	0.180	0.813	0.266	1.147
53	M Salem	0.624	1.859	1.365	1.433			0.803	6.124	0.609	6.318	0.331	2.759	0.913	1.921
54	Khawar Latif	0.368	1.151	0.796	1.976	0.484	2.232	0.466	2.119	0.361	2.224	0.692	0.672	0.207	2.789
55	M Ishaq	0.987	2.682			0.664	2.675	0.583	2.332	0.461	2.454	0.085	1.846	0.249	0.457
56	M talib	0.911	2.757		2.268			0.203	2.267	0.154	2.316	0.137	1.157	0.369	1.243

Ref	Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		30-Apr-2010		01-May-2010		02-May-2010		03-May-2010		04-May-2010		05-May-2010		05-May-2010	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
57	M Islam	0.077	0.968		1.049		1.292	0.345	1.405	0.270	1.480	0.153	0.962	0.372	1.195
58	Sofi M Zameer	1.170	1.483	1.514	2.865									0.666	1.324
59	Sageer Ahmed	0.611	0.557					0.342	2.278	0.279	2.341			0.702	4.993
60	Khalid Parvaiz							0.089	0.361	0.071	0.379				
61	m Aslam							0.459	0.792	0.361	0.890				
62	Faizan Ali						8.732	0.420	8.880	0.322	8.978	0.228	3.100	0.902	3.493
63	Sofi M Asgher	1.238	4.882				1.573	0.515	2.036	0.368	2.183	0.540	1.251	0.590	3.322
64	M Jameel	0.549	1.058					0.673	2.542	0.535	2.680	0.021	1.390	0.802	2.902
65	Adnan Ahmed	1.018	1.251					0.717	2.153	0.563	2.307	0.941	1.862	1.106	2.425
66	Taswar Hussain	1.005	3.901					0.946	0.705	0.729	0.922	0.501	1.268	0.310	2.785
67	M Hameed						0.544	0.342	7.558	0.260	7.640		0.063	0.781	1.306
68	Anwer Saeed							0.361	0.679	0.283	0.757	0.866	3.449	0.109	0.636
69	Sajid Mehmood							0.258	0.092	0.211	0.139			0.631	1.664
70	Sagheer Ahmed					0.051	0.110	0.138	2.081	0.096	2.123		0.643		1.355
71	Hammad Ahmed							1.207	4.333	0.969	4.571	0.618	2.575	0.372	1.608
72	Mian Shehbaz							1.069	2.106	0.840	2.335	0.694	5.465	0.360	1.840
73	Rizwan							1.195	3.110	0.934	3.371	0.298	6.897	0.479	0.709
74	M Zeshan							3.450	2.950	2.610	3.790	0.193	1.247	0.700	2.505
75	Younas Saddal					1.189	3.360					0.408	0.506	0.298	1.257
76	Sajid Hussain	0.167	0.591	0.198	1.364	0.432	4.012	0.311	2.946	0.240	3.017	0.161	4.625	0.678	1.137
77	M Baber	0.792	0.864				0.517	0.696	1.055	0.546	1.204	0.490	1.641	0.013	0.977
78	Ibrar Saleem	1.048	2.734		1.604			0.195	4.105	0.159	4.141	0.263	2.221	0.899	1.721
79	M Anwaar	0.172	2.263						1.605		1.605	0.027	1.209	1.008	3.196
80	Naeem Hayyat	0.151	2.292	0.361	0.873									0.385	1.524
81	Khawar Latif	1.002	1.003	0.442	0.979								1.318	0.676	0.686
82	Saleem Hayyat			2.644	2.973			0.447	1.705	0.339	1.813	0.348	0.168	0.249	1.537
83	Abdul Sattar			0.394	2.623							0.845	1.870	1.374	3.781
84	Iftikhar Ahmed											0.673	2.839		
85	Abdul Sattar	0.411	1.451	1.037	1.986	1.850	1.877	1.459	3.286	1.107	3.638			0.305	1.610
86	Khalid Javaid	0.427	0.873	1.334	2.048							0.118	1.555	0.570	1.656
87	malik M Rayaz							0.462	3.043	0.378	3.127	0.037	2.890		
88	Azmat Javaid	0.957	2.191		2.453							0.858	1.279	0.753	0.992
89	M yousaf					0.804	1.488	0.312	0.052	0.251	0.009	0.122	1.238	0.570	1.443
90	Khaliq											0.184	0.355	0.053	1.437
91	M Khalil	1.096	3.106		0.866									0.295	0.700
92	Malik Sohail	0.785	2.731						0.985		0.985	0.736	6.217	0.237	2.113
93	Jamsheed				1.075							1.421	2.075	0.853	3.280
94	m Ashraf	0.098	2.245		1.859			0.401	0.046	0.315	0.040	0.161	1.571	0.143	1.012
95	Mian Ishfaq	0.249	0.153		2.805			0.210	1.180	0.162	1.228	0.042	1.887	0.265	0.980
96	Mian Sarfraz Ahmed							1.040	2.186	0.775	2.450	0.021	2.486	0.532	4.518
97	Mian Iftikhar Ahmed							0.570	0.205	0.466	0.309	0.241	2.703	0.167	0.423
98	Mian Ijaz Ahmed	0.641	1.942	0.473	0.336	0.738	3.036					0.048	1.627		
99	Baber Ali	2.171	1.739		0.184			0.858	1.646	0.704	1.800		1.024	1.310	0.760
100	M Haneef	1.396	2.151	0.952	2.038	0.870	3.475	0.336	2.354	0.255	2.435	0.085	3.420	1.041	1.864

Annex F: Waste Generator Collection Record (Institutional)

Ref	Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
School															
1	Govt girls High School	2.816	8.039							0.183	3.277	1.026	3.464	2.720	1.725
2	vision public school	2.424	2.809					2.583	2.065	0.638	1.762	0.263	2.532	3.622	3.533
Religious Facility															
1	jamia hari masjid	0.183	0.733	0.249	0.963	0.070	0.130	0.260	1.000	1.306	2.354	0.032	0.068	0.373	4.917
2	Jamia masjid Hijra	0.128	0.882	0.183	0.429	0.104	1.846	0.251	0.770	0.621	2.394			0.108	1.552
Government															
1	Oldage centre	0.350	1.166					0.447	1.153	0.525	0.375	0.345	1.908	0.278	0.656
2	Information centre	0.327	1.683					0.334	1.085	0.433	0.937				
Office															
1	ELC	0.648	4.651					0.391	1.629	0.429	2.396	0.346	1.163	0.438	0.982
2	shehzad khan associates	0.368	1.235					1.044	2.854			0.394	1.861		1.185
Hospital/clinics															
1	Dr muhammad javed (clinic)	0.725	1.822				4.270	0.172	1.132	0.784	0.996	0.587	0.604	0.120	1.515
2	Mubarik Hospital	1.607	3.458	1.652	4.270	2.242	4.575			3.606	3.549	0.366	3.544	0.415	2.945

Annex G: Waste Generator Collection Record (Commercial)

Name		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010		00-Apr-2010	
		R	W	R	W	R	W	R	R	R	W	R	W	R	W
Shops															
1	saleem amin G. store	0.317	2.578	0.292	2.309	0.657	0.508	0.261	1.520	0.276	1.609	0.711	2.395	0.986	0.574
2	Sarwar G. Store	0.191	1.710	0.970	1.005	0.566	1.698	0.379	2.255	0.296	1.179	0.271	2.419	0.232	1.293
Restaurants															
1	Chaska Charga House	2.443	13.05	1.211	9.072	0.373	8.811	2.337	7.661	0.624	10.96	1.134	5.105	2.557	8.305
2	sh muhammad irfan hotel	1.658	9.387	2.226	9.487	0.935	7.058	1.038	8.826	1.429	7.958	0.762	8.477	0.868	6.817
Markets															
1	Shah Alam Chowk Market	6.534	58.75	11.58	49.00	12.97	47.50	14.72	56.46	8.983	49.64	10.73	45.01	14.05	62.137
2															
Fruits & Veg. shops															
1	Anwer fruit Marchat	0.290	7.542	1.250	21.90	0.337	4.669	0.335	1.079	1.926	3.034	0.303	7.232	0.435	6.180
2	Rehman fruit Shop	0.490	5.204	3.279	13.13	0.816	7.061		2.863		3.682	0.394	5.286	0.546	8.412

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