



**PROJECT  
for  
INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN  
in  
GUJRANWALA**

**INCOMING WASTE COMPOSITION SURVEY AT GONDLANWALA  
DISPOSAL SITE**

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**BY THE GUIDANCE OF JICA PROJECT TEAM**

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**Table of Contents**

|   |            |
|---|------------|
| <b>Table of Contents .....</b>  | <b>i</b>   |
| <b>List of Tables .....</b>   | <b>ii</b>  |
| <b>List of Figures.....</b>   | <b>iii</b> |
| <b>List of Appendices.....</b>  | <b>iv</b>  |
| <b>List of Abbreviations .....</b>  | <b>v</b>   |
| <b>1. INTRODUCTION.....</b>   | <b>1</b>   |
| <b>2. OUTLINE AND PURPOSE OF SURVEY .....</b>                                       | <b>1</b>   |
| <b>3. SURVEY METHOD .....</b>   | <b>1</b>   |
| 3.1 Survey Team Configuration.....  | 1          |
| 3.2 Survey Period.....  | 2          |
| 3.3 Methodology .....   | 2          |
| 3.3.1 Sampling Areas and Number of Samples Selection .....                          | 2          |
| 3.3.2 Selection of Objective Vehicles for Sampling.....                             | 4          |
| 3.3.3 Procurement of Items for Survey.....  | 4          |
| 3.3.4 Survey Plan.....  | 5          |
| 3.3.5 Description of Survey Method.....   | 5          |
| <b>4. DATA PROCESSING AND RESULT OF SURVEY .....</b>                                | <b>7</b>   |
| 4.1 High Income Group .....   | 7          |
| 4.2 Middle Income Group.....  | 7          |
| 4.3 Low Income Group.....   | 8          |
| <b>5. EVALUATION OF SURVEY RESULTS.....</b>   | <b>10</b>  |
| 5.1 Processing of Waste Composition by Weighted Average of Income Groups .....      | 10         |
| 5.2 MRF and Recycling Potential of Incoming Waste at Gondlanwala .....              | 12         |
| 5.3 Bio-gasification and Composting Potential of Incoming Waste at Gondlanwala..... | 15         |
| 5.4 Incineration and RDF Potential of Incoming Waste at Gondlanwala.....            | 17         |
| <b>6. CONCLUSIONS AND RECOMMENDATIONS .....</b>                                     | <b>19</b>  |

|                          |    |
|--------------------------|----|
| 6.1 Conclusions.....     | 19 |
| 6.2 Recommendations..... | 19 |

**LIST OF TABLES**

|         |  |   |
|---------|--|---|
| Table 1 | Survey Team Configuration .....                              | 2 |
| Table 2 | Survey Schedule .....  | 2 |
| Table 3 | Sampling Area and Number of Samples for Survey .....         | 3 |
| Table 4 | Objective Vehicles for Survey .....                          | 4 |
| Table 5 | Procured Survey Items .....                                  | 4 |
| Table 6 | Survey Plan .....  | 5 |
| Table 7 | Waste Categories for Incoming Waste Composition Survey ..... | 6 |

## LIST OF FIGURES

|           |  |    |
|-----------|--|----|
| Figure 1  | Incoming Waste Composition Survey Area .....                                     | 3  |
| Figure 2  | Selective Areas for Incoming Waste Composition Survey .....                      | 4  |
| Figure 3  | Survey Procedures .....  | 6  |
| Figure 4  | High Income Waste Composition at Gondlanwala .....                               | 7  |
| Figure 5  | Middle Income Waste Composition at Gondlanwala .....                             | 8  |
| Figure 6  | Low Income waste Composition at Gondlanwala .....                                | 9  |
| Figure 7  | Income Level Based Composition of Disposed Waste Stream .....                    | 9  |
| Figure 8  | Gujranwala Urban UCs with respect to Income Level .....                          | 10 |
| Figure 9  | Weighted Average Waste Composition of Gujranwala Disposed at Gondlanwala....     | 11 |
| Figure 10 | Weighted Average Waste Composition of Gujranwala Residential Sources .....       | 12 |
| Figure 11 | MRF and Recycling Potential at Gondlanwala .....                                 | 12 |
| Figure 12 | Dry Recyclable Items of Incoming Waste at Gondlanwala .....                      | 13 |
| Figure 13 | MRF and Recycling Potential of Residential Waste at Gujranwala .....             | 14 |
| Figure 14 | Dry Recyclable Items at Gujranwala Residential Sources .....                     | 14 |
| Figure 15 | Bio-gasification and Composting Potential at Gondlanwala .....                   | 15 |
| Figure 16 | Organic Items of Incoming Waste at Gondlanwala .....                             | 15 |
| Figure 17 | Bio-gasification & Composting Potential of Residential Waste at Gujranwala ..... | 16 |
| Figure 18 | Organic Items at Gujranwala Residential Sources .....                            | 16 |
| Figure 19 | Incineration and RDF Potential at Gondlanwala .....                              | 17 |
| Figure 20 | Combustible Items of Incoming Waste at Gondlanwala .....                         | 17 |
| Figure 21 | Incineration & RDF Potential of Residential Waste at Gujranwala .....            | 18 |
| Figure 22 | Combustible Items at Gujranwala Residential Sources .....                        | 18 |
| Figure 23 | Comparison of Incoming Waste Composition Survey and WACS .....                   | 19 |

**LIST OF APPENDICES**

|            |                          |    |
|------------|--------------------------|----|
| Appendix 1 | Survey Data .....        | 20 |
| Appendix 2 | Processed Data .....     | 30 |
| Appendix 3 | Survey Photographs ..... | 35 |

## LIST OF ABBREVIATIONS

|      |  |
|------|--|
| GOPb | Government of the Punjab               |
| GWMC | Gujranwala Waste Management Company    |
| JICA | Japan International Cooperation Agency |
| MRF  | Material Recovery Facility             |
| RDF  | Refuse Derived Fuel                    |
| SWM  | Solid Waste Management                 |
| TOR  | Terms of Reference                     |
| WACS | Waste Amount and Composition Survey    |

## **1. Introduction:**

Gujranwala is an industrial city in Gujranwala District, Punjab Province of Pakistan. It is the fourth most populous Pakistani metropolitan area, and is one of the fast growing cities in Pakistan. Gujranwala is 226 meters (744 ft) above sea level. It shares the borders with Ghakhar Mandi, Alipur Chatha, Kamonke and several small towns and villages. About 80 kilometers (50 miles) south is the provincial capital, Lahore, Sialkot and Gujrat lies to its north. The city has many commercial and industrial centers.

Many factors including uncontrolled population, institutional weaknesses, urbanization, lack of resources, and lack of civic sense towards solid waste disposal have influenced solid waste management (hereinafter referred to as “SWM”) in Punjab. Gujranwala city was identified as the highest priority among the cities (Faisalabad, Gujranwala, Lahore, Multan, Rawalpindi, Sargodha and Sialkot) surveyed by the Japan international cooperation agency (hereinafter referred to as “JICA”) in 2009 regarding SWM.

With this background, “Integrated Solid Waste Management Master Plan in Gujranwala” is being prepared by the technical cooperation of JICA to the Government of the Punjab (hereinafter referred to as “GOPb”). Several surveys and studies have been conducted under the umbrella of this project and incoming waste composition survey is one of them.

Waste composition data plays a crucial role in planning and designing of solid waste system. Data generated from waste composition studies is used in several ways, including determining the quantity of material available for recovery, measuring the effectiveness of existing recycling programs, and right-sizing recycling facilities and intermediate treatment facilities. For the better understanding of the composition of solid waste being disposed in Gujranwala, the JICA project team (hereinafter referred to as “JPT”) has decided to conduct an incoming waste composition survey for one time at the existing disposal site in Gondlanwala. Moreover, JPT has further sub-contracted waste amount and composition survey (hereinafter referred to as “WACS”) in the collection area for three seasons to obtain the per capita waste generation amount and waste composition data for planning the appropriate solid waste system in Gujranwala.

## **2. Outline and Purpose of Survey**

The incoming waste composition survey is a survey for waste composition hauled into the disposal site in addition to the WACS and is carried out only for once during the period of the JICA project. The purpose of the survey is to characterize the waste composition of disposed municipal solid waste streams as a whole. The specific objectives of the survey are;

- Determining the composition of waste collected from Gujranwala waste collection area and hauled to Gondlanwala for disposal,
- Estimating the potential of resource or recyclable materials mixed in the incoming waste at the existing disposal site in Gondlanwala, and
- Comparing the result of the recyclable material ratio with that of the WACS for estimation of the recyclable materials recovered in town.

The results of the survey will be very beneficial in determining the quantity of material available for recovery from disposal site and determining the future needs for recycling facility(s) and intermediate treatment facilities.

## **3. Survey Method**

### **3.1 Survey Team Configuration**

The Waste Managers (Ambreen Ghazanfar and Hina Aslam), Gujranwala Waste Management Company (hereinafter referred to as “GWMC”), Research Associate (Sami Ullah), and Survey Assistants conducted the incoming waste composition survey instructed by the JPT staff in charge (Takasugi & Nakamura). Eight (8) waste pickers working at Gondlanwala disposal site were hired for the Survey Assistants. The **Table 1** depicts the team configuration deployed for the subject survey.



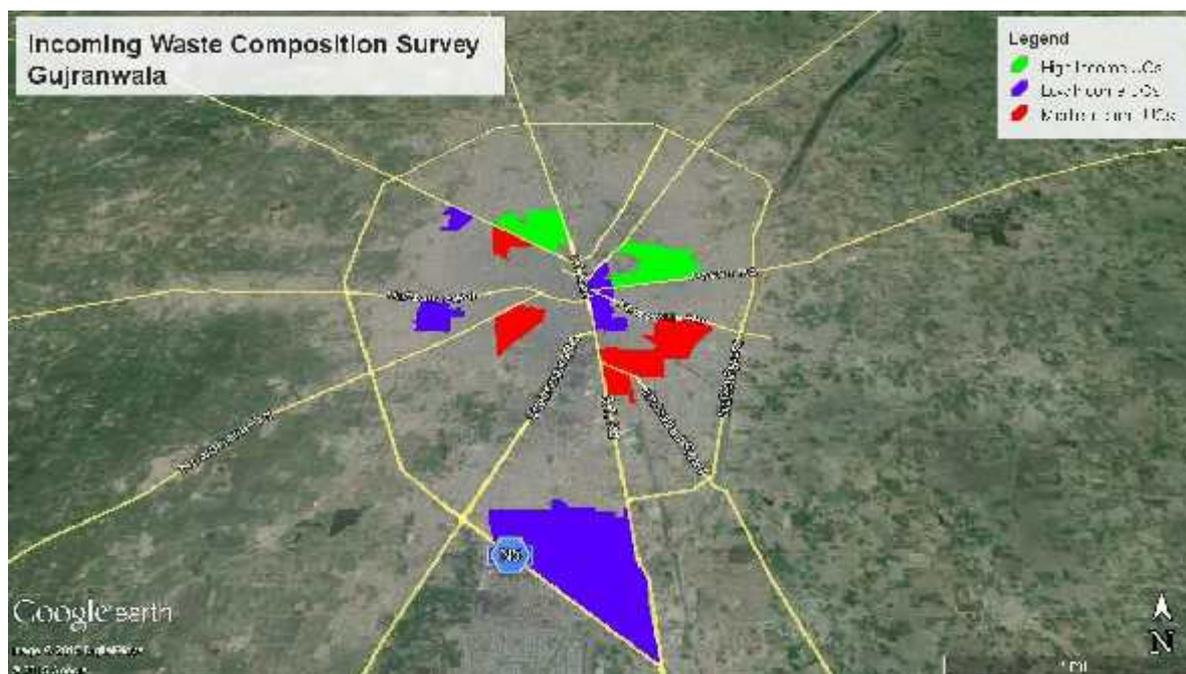


Figure 1: Incoming Waste Composition Survey Area

The criterion for selecting the sampling areas was determined by the income level per that particular union council. Total 10 waste samples were taken from each vehicle coming from the subjective areas. Accordingly, the required number of samples for incoming waste composition survey was selected from 2 vehicles from high income group areas, 4 vehicles from middle income group areas, and 4 vehicles from low income group areas. **Table 3** shows the total number of samples and sampling areas. The areas selected for the survey were shown in **Figure 2**.

Table 3: Sampling Area and Number of Samples for Survey

| Sampling Area            | No. of Sampling Area | No. of Samples per Area | Total No. of Samples |
|--------------------------|----------------------|-------------------------|----------------------|
|                          | A                    | B                       | A x B                |
| High Income Group Area   | 1                    | 2                       | 2                    |
| Middle Income Group Area | 2                    | 2                       | 4                    |
| Low Income Group Area    | 2                    | 2                       | 4                    |
| <b>Total</b>             |                      |                         | <b>10</b>            |



**Figure 2: Selective Areas for Incoming Waste Composition Survey**

### 3.3.2 Selection of Objective Vehicles for Sampling

The objective sampling areas and the vehicles dispatched to each area were decided upon after discussion among the JPT and Waste Managers in consultation with the staff of GWMC. Total 10 vehicles were selected for the survey based on the areas being served by them. The selection of the type of collection vehicle per selected area is shown in **Table 4**.

**Table 4: Objective Vehicles for Survey**

| Type of Area             | Type of Vehicle |                | Total |
|--------------------------|-----------------|----------------|-------|
|                          | Tractor Trolley | Arm Roll Truck |       |
| High Income Group Area   | 1               | 1              | 2     |
| Middle Income Group Area | 2               | 2              | 4     |
| Low Income Group Area    | 2               | 2              | 4     |

### 3.3.3 Procurement of Items for Survey

The different utensils were procured before conducting the survey for 10 samples. The list of items procured for incoming waste composition survey is given in **Table 5**.

**Table 5: Procured Survey Items**

| Sr. No. | Name of Item                                   | Quantity                 |
|---------|--|--------------------------|
| 1.      | Buckets (10-20, 30-40 and 50-100 liter)        | 26                       |
| 2.      | Nylon Rope                                     | 60 m (cut into 4 pieces) |
| 3.      | Canvas Sheets (10m x 10m, 1m x 1m and 3m x 1m) | 3                        |
| 4.      | Shovel   | 2                        |
| 5.      | Rake   | 2                        |
| 6.      | Hoe  | 2                        |
| 7.      | Machete  | 1                        |
| 8.      | Stickers                                       | 3 of A3 size             |
| 9.      | Markers  | 2                        |

|     |  |          |
|-----|--|----------|
| 10. | Cutter   | 1        |
| 11. | Gloves (Rubber / Plastic)                        | 10 pairs |
| 12. | Gloves (Cotton)                                  | 10 pairs |
| 13. | Long Safety Shoes                                | 10 pairs |
| 14. | Safety Masks                                     | 10       |
| 15. | First Aid Kit (Bandages, Scissors, Medical Tape) | 1        |
| 16. | Broom  | 1        |
| 17. | Sieve (5mm mesh)                                 | 1        |
| 18. | Digital Balance                                  | 1        |
| 19. | Extension cable                                  | 2        |
| 20. | Clipboards                                       | 2        |

### 3.3.4 Survey Plan

The final time schedule and the objective vehicles for incoming waste composition survey are shown in **Table 6**.

**Table 6: Survey Plan**

| Sr. No.          | Date       | Income Category        | UC No. | Vehicle Type    | Vehicle No. |
|------------------|------------|------------------------|--------|-----------------|-------------|
| <b>8-12-2014</b> |            | <b>Orientation Day</b> |        |                 |             |
| 1.               | 9-12-2014  | Middle                 | 25     | Arm Roll Truck  | Hino 12     |
| 2.               | 9-12-2014  | High                   | 4      | Tractor Trolley | Holland 1   |
| 3.               | 10-12-2014 | High                   | 16     | Arm Roll Truck  | Hino 10     |
| 4.               | 10-12-2014 | Middle                 | 57     | Tractor Trolley | 9624        |
| 5.               | 10-12-2014 | Low                    | 46     | Tractor Trolley | 9774        |
| 6.               | 11-12-2014 | Middle                 | 28     | Arm Roll Truck  | Hino 13     |
| 7.               | 11-12-2014 | Low                    | 62     | Arm Roll Truck  | Hino 9      |
| 8.               | 11-12-2014 | Middle                 | 40     | Tractor Trolley | Holland 2   |
| 9.               | 12-12-2014 | Low                    | 31     | Arm Roll Truck  | MB 1        |
| 10.              | 12-12-2014 | Low                    | 1      | Tractor Trolley | 6836        |

### 3.3.5 Survey Method and Procedures

The method for incoming waste composition survey was developed by following the requirements in the terms of reference (hereinafter referred to as "TOR") of WACS subcontract and the instructions of the JPT taking into consideration of the site conditions. The composition of 1563.51 kg waste stream from 10 areas was analyzed in the course of the survey. The waste was sorted into 16 pre-determined different fractions. The survey photographs are attached in **Appendix 3**.

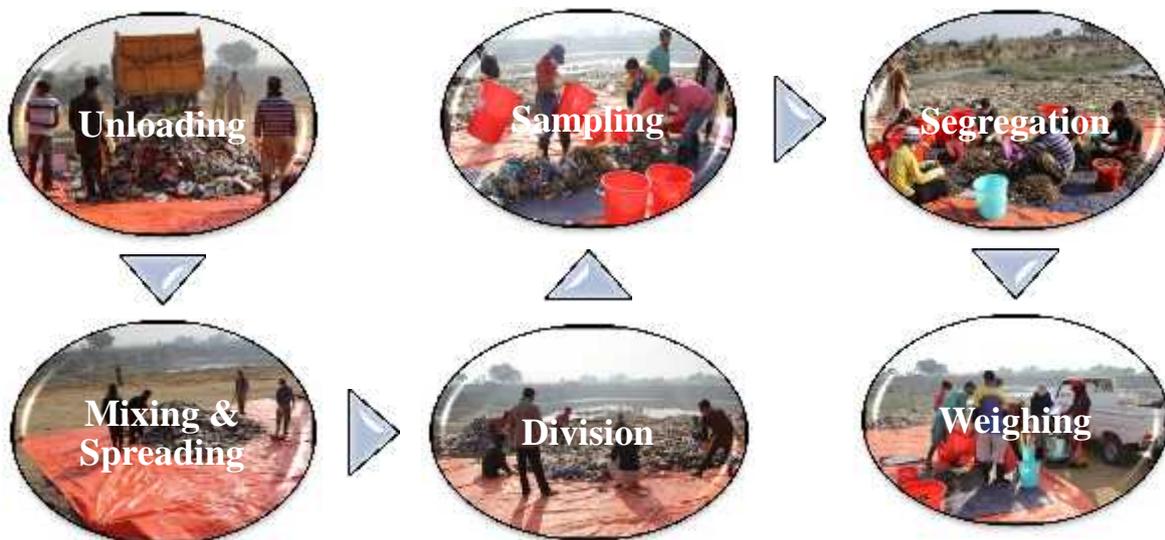
An orientation was conducted one day before the start of the survey by the survey team at Gondlanwala, disposal site of GWMC. Its purpose was to make aware the team (Waste Managers, Research Associate & Survey Assistants) about the survey method & waste categories. The detail of the followed method is as under:

- A part of the loaded waste of about 1 ton from the objective vehicle was unloaded on to the canvas sheet.
- The unloaded waste was spread and mixed uniformly.
- Bulky items mixed in the waste were cut into pieces and distributed uniformly into the spread waste.
- The waste was divided into nine sections of approximately the same volume once the spread waste has become homogeneous.
- The representative sample of about 200 kg was taken from selective or equally from each pile/section for the survey.

- The sample was sorted by the type of waste and put into each container. **Table 7** shows the waste segregation categories.
- The net weight of each category of waste was weighed and recorded. **Figure 3** shows the above procedures.

**Table 7: Waste Categories for Incoming Waste Composition Survey**

| Sr. No. | Waste Categories                                      |
|---------|---|
| 1.      | Kitchen Waste   |
| 2.      | Paper (Recyclable/Clean Paper)                        |
| 3.      | Paper (Other Dirty Non-Recyclable Paper)              |
| 4.      | Textile   |
| 5.      | Grass and Wood  |
| 6.      | Plastic (Recyclable/Clean Plastics)                   |
| 7.      | Plastic (Other Dirty Non-Recyclable Plastics)         |
| 8.      | Leather and Rubber                                    |
| 9.      | Metal (Recyclable Metal)                              |
| 10.     | Metal (Non-Recyclable Metal)                          |
| 11.     | Bottle and Glass (Recyclable Bottles and Glasses)     |
| 12.     | Bottle and Glass (Non-Recyclable Bottles and Glasses) |
| 13.     | Ceramics, Stone and Soil etc.                         |
| 14.     | Domestic Hazardous Waste                              |
| 15.     | Sieve Remainings                                      |
| 16.     | Miscellaneous   |

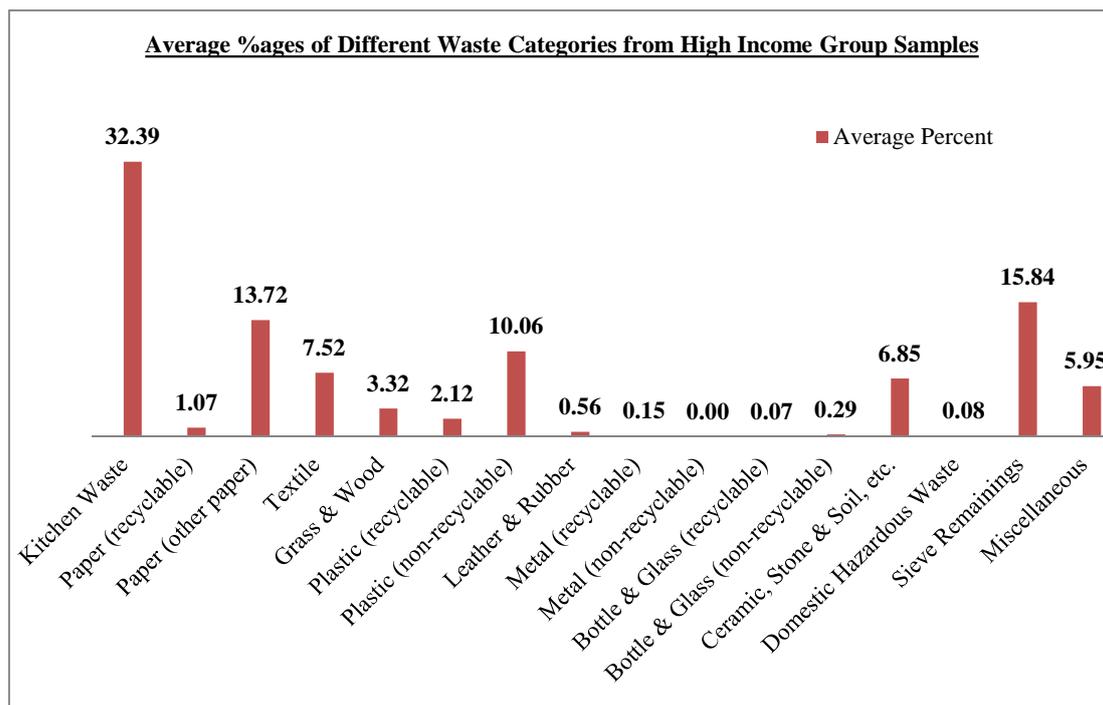


**Figure 3: Survey Procedures**

#### 4. Data Processing and Result of Survey

##### 4.1 High Income Group

**Figure 4** shows the average composition of waste at the disposal site, Gondlanwala from selected high income group areas. The related tables are attached in **Appendix 1** and **Appendix 2**. The content of kitchen waste (organic portion) is seen to be higher (32 %) in this income group. Other prominent waste components in high income group are sieve remainings 16 %, non-recyclable paper 14 %, non-recyclable plastic 10 % and ceramic, stone and soil, etc. 7 %, respectively. The waste items which are unidentified and cannot be sorted further are weighed under the category of sieve remainings. Mostly sieve remainings comprise of small pieces of paper, plastic, fruit and vegetable peels. The material passed through the sieve, human hair and cow / animal dung fall under the category of miscellaneous.



**Figure 4: High Income Group Waste Composition at Gondlanwala**

##### 4.2 Middle Income Group

The content of disposed waste from middle income group is shown in **Figure 5**. The proportion of kitchen waste or in other word biodegradable waste is the highest (i.e., 28 %) among all other categories. The other major items are sieve remainings, miscellaneous, textile, non-recyclable paper, non-recyclable plastic and inert materials. Their percentages by weight are 18 %, 14 %, 9 %, 9 %, 8 % and 8 %, respectively.

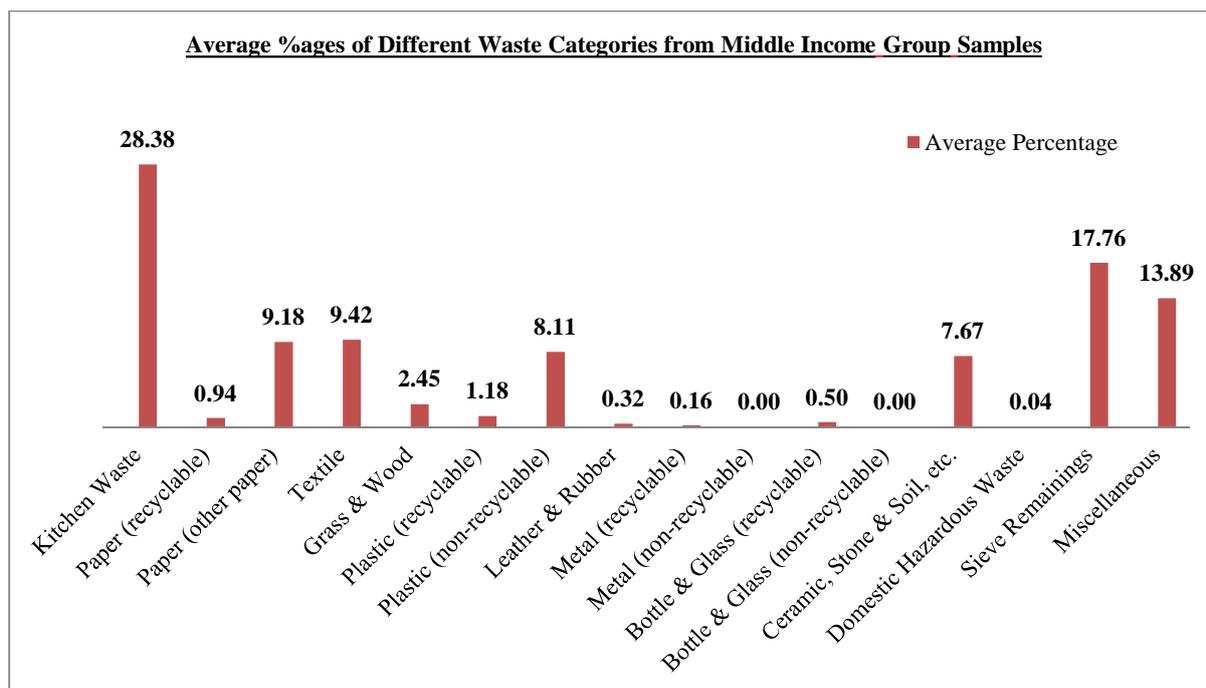
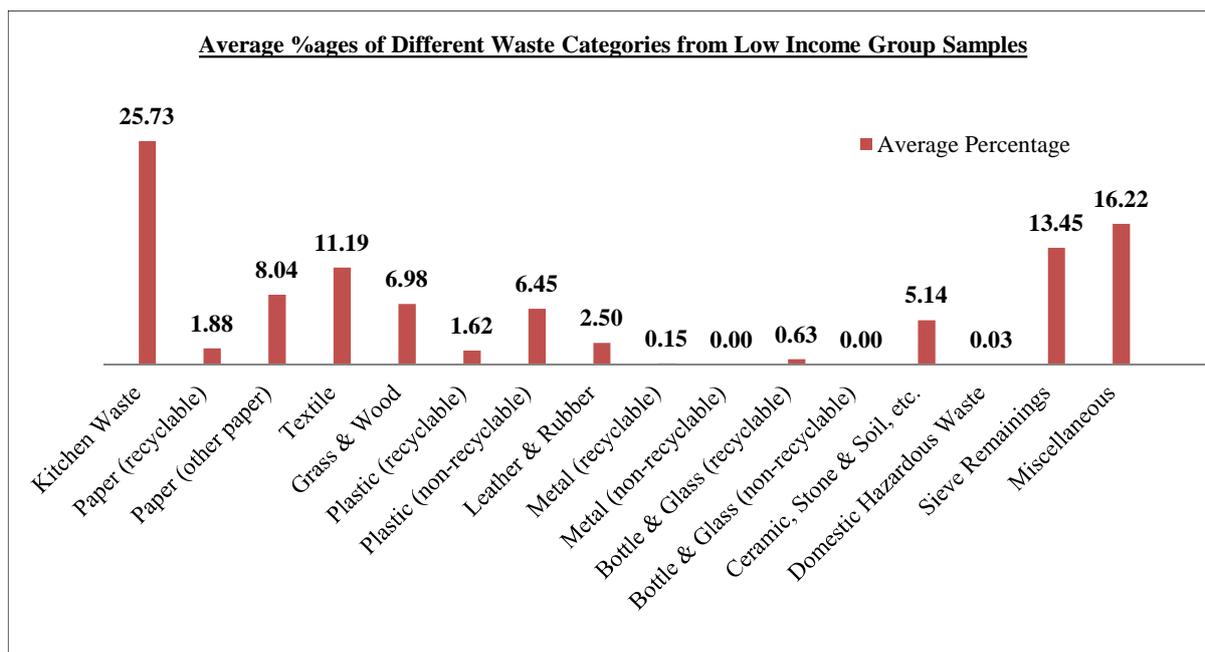


Figure 5: Middle Income Group Waste Composition at Gondlanwala

### 4.3 Low Income Group

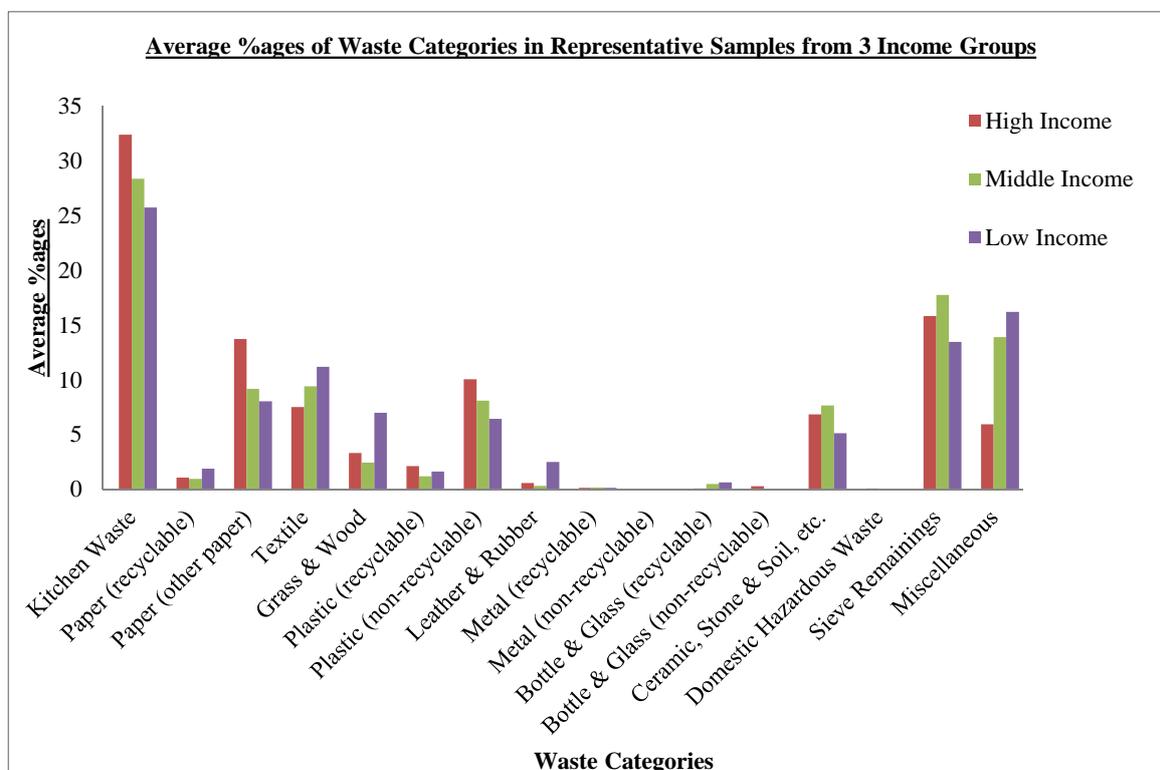
Figure 6 represents the composition of waste from low income group being disposed. The proportion of kitchen waste amounts to 26 %, which is lower as compared to high and middle income groups. The percentages of other noticeable components weigh miscellaneous 16 %, sieve remainings 14 %, textile 11 %, non-recyclable paper 8 %, grass and wood 7 %, non-recyclable plastics 6 %, and inert materials 5 %, respectively.

The interesting results drawn from low income group are the percentages of grass & wood, and leather & rubber. Their percentages are comparatively high as compared to high and middle income groups. The reason is that the subjective vehicle for particular income group serves the leather and auto markets and some institutions along with residential areas.



**Figure 6: Low Income Group Waste Composition at Gondlanwala**

**Figure 7** sums up the average percentages of different waste categories in representative samples at Gondlanwala from three (3) income groups. The figure shows that the kitchen waste is in the highest proportion (i.e., 25 to 32 %) among all waste categories in three income groups. The other prominent waste categories among all income groups are sieve remainings (more than 10 %) and miscellaneous. The comparison depicts that there is as such no big difference in the percentages of each waste component for three income groups.

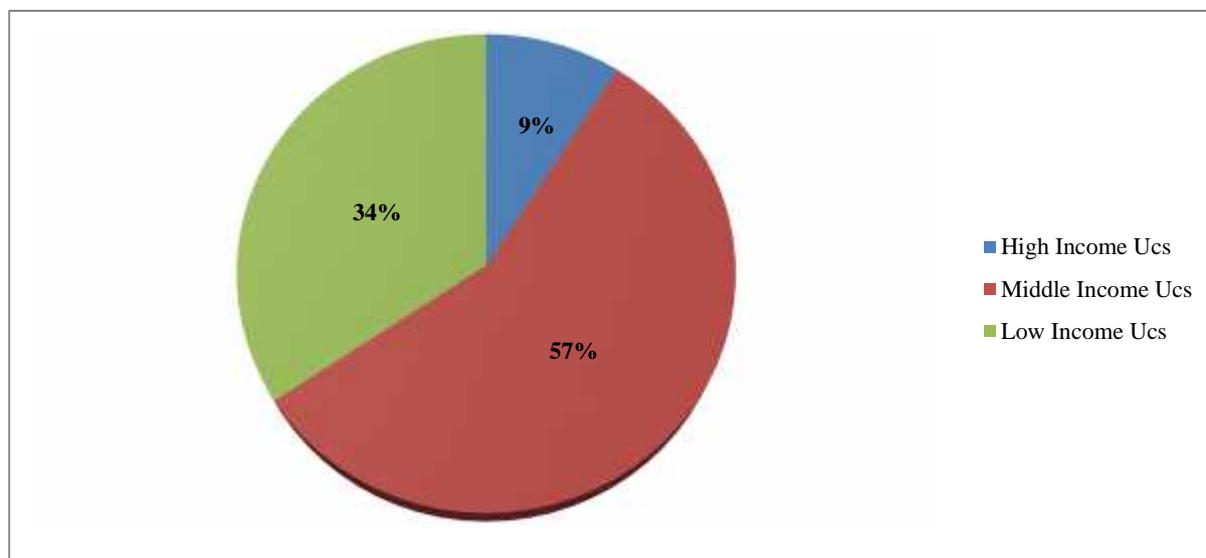


**Figure 7: Income Level Based Waste Composition at Gondlanwala**

## 5. Evaluation of Survey Results

### 5.1 Processing of Waste Composition by Weighted Average of Income Groups

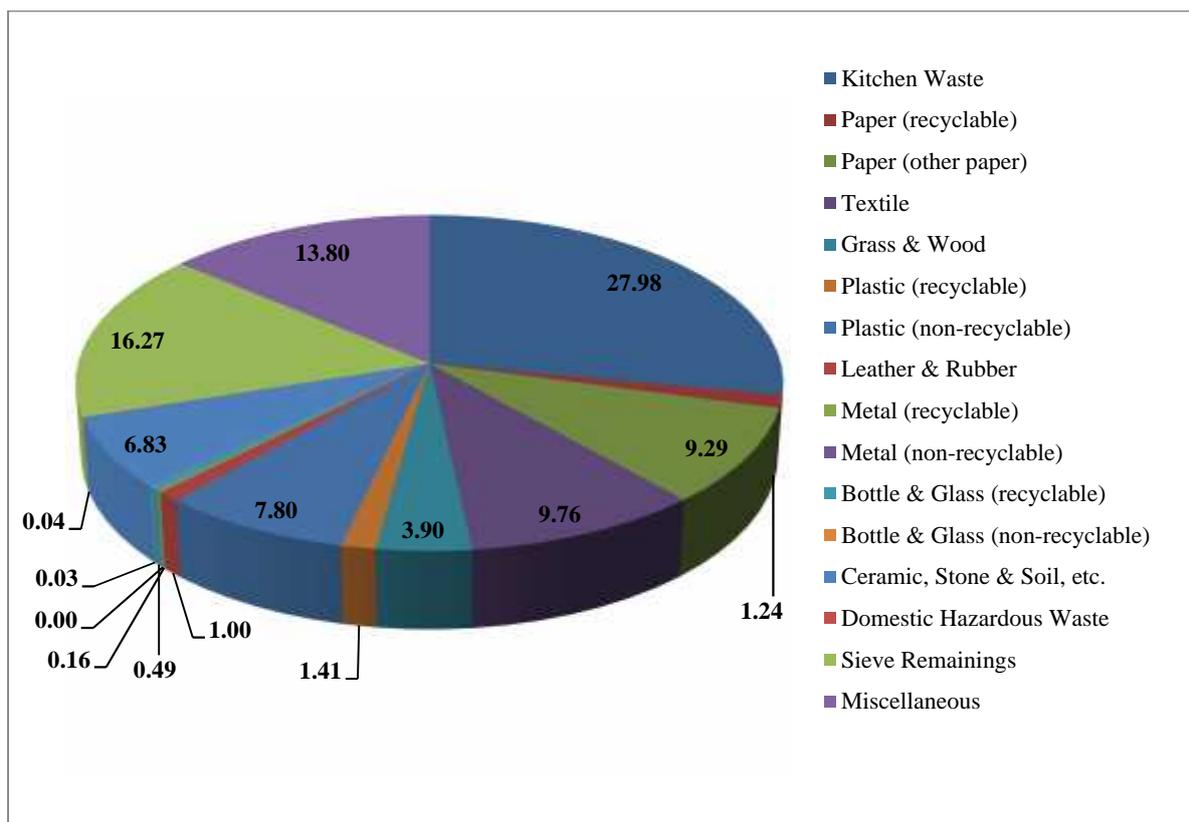
Total ten (10) samples representative of three income groups were subjected to incoming waste composition survey at the disposal site, Gondlanwala. The income status has been assigned to each urban union council on the basis of the infrastructure (road / street width). **Figure 8** shows the summary of Gujranwala urban union councils regarding to the income level.



**Figure 8: Gujranwala Urban UCs with respect to Income Level**

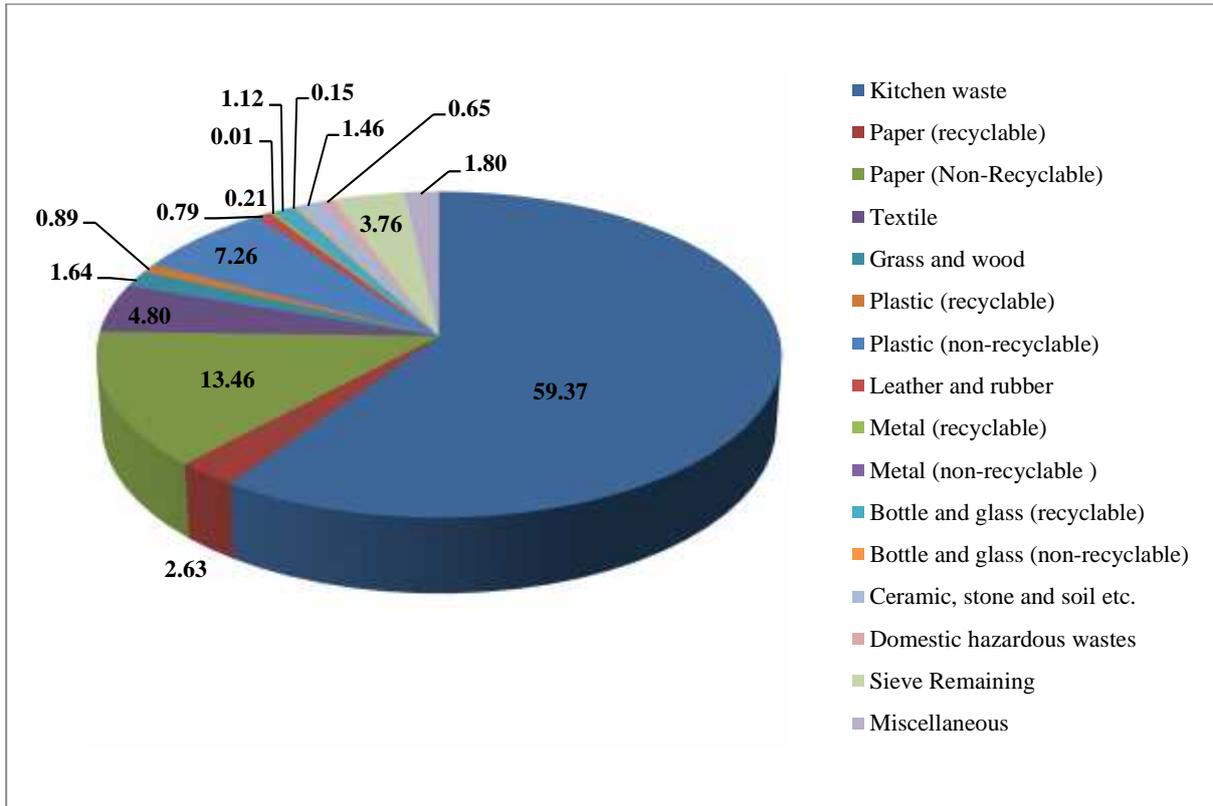
On an assumption, Gujranwala city has been divided into high income level (10 %), middle income level (60 %) and low income level (30 %). Moreover, the results of two composition surveys (WACS and incoming waste composition survey) were compared to assess the potential of possible resource recovery and intermediate treatment options including material recovery facilities (hereinafter referred to as “MRF”), composting plant, refuse derived fuel plant (hereinafter referred to as “RDF”), bio-gasification, waste-to-energy plant, etc.

**Figure 9** portrays the weighted average percent composition of Gujranwala waste being disposed at Gondlanwala. It can be seen from the figure that the kitchen waste contributes to 28 % of total waste, thereby representing the largest fraction and followed by sieve remains with 16 %, miscellaneous with 14 % and non-recyclable paper with 9 %. The composition of domestic hazardous waste in waste reaching at Gondlanwala is almost negligible (0 %). Only very small amounts of recyclables (paper 1.24 %, plastic 1.41 % and glass 0.49 %) were found in waste at disposal site, Gondlanwala.



**Figure 9: Weighted Average Waste Composition of Gujranwala Disposed at Gondlanwala**

Figure 10 shows the weighted average percentage composition of waste generating from Gujranwala residential dwellings. On average, almost 59 % kitchen waste results from residential sources. Other eminent waste categories are non-recyclable paper (13 %), non-recyclable plastic (7 %), textile (5 %) and sieve remainings (4 %).



Data Source: 2<sup>nd</sup> WACS Report, February 2015, JICA Project Team

Figure 10: Weighted Average Waste Composition of Gujranwala Residential Sources

5.2 MRF and Recycling Potential of Incoming Waste at Gondlanwala

The recycling potential of Gujranwala disposed waste is shown in **Figure 11**. The calculation table is annexed in **Appendix 2**. Very small amounts of dry recyclables were observed in waste at the disposal site, Gondlanwala. The weighted average of recyclables amounts to around 4 % out of total waste disposed amount.

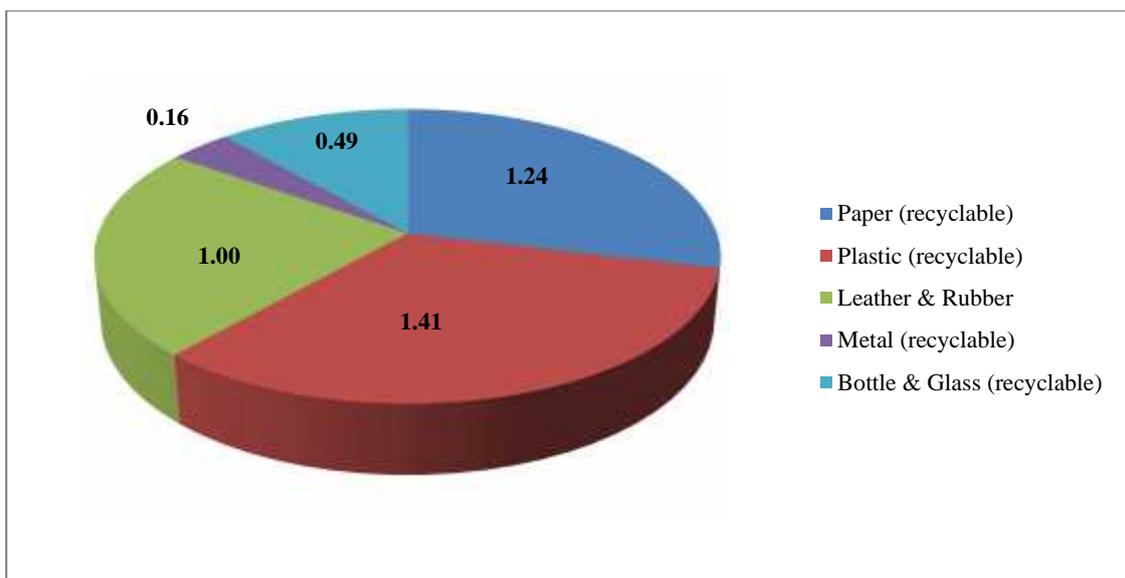
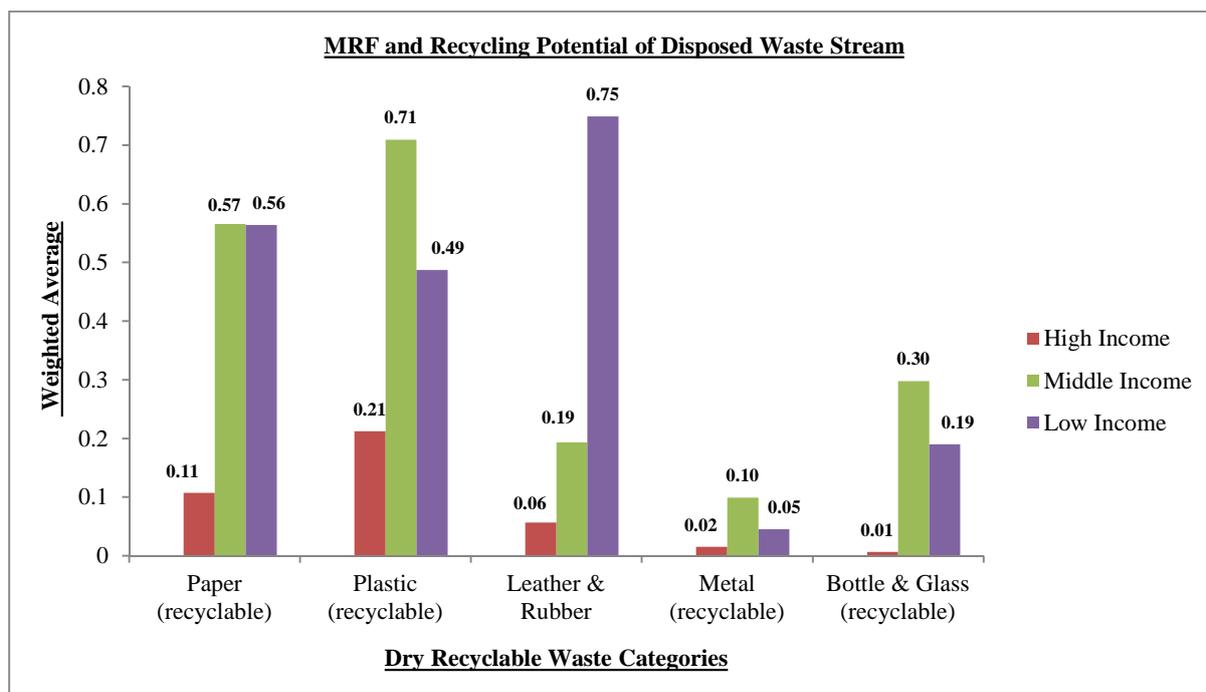


Figure 11: MRF and Recycling Potential at Gondlanwala

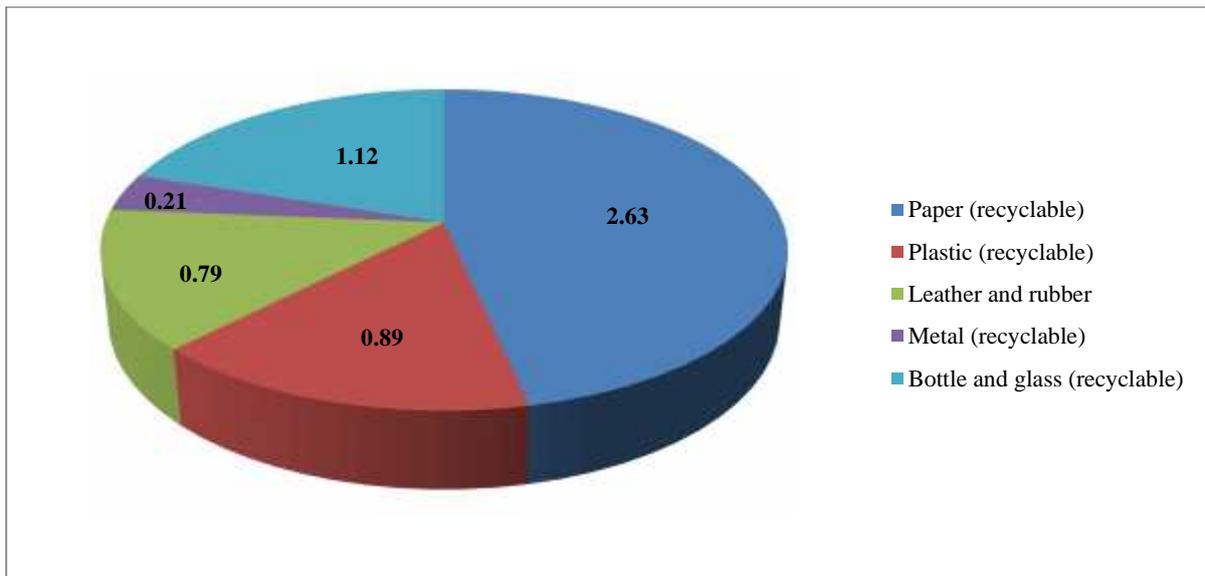
The percentages of different recyclables including paper, plastic, metal, bottle & glass, and leather & rubber being disposed along with solid waste collected from three (3) income groups by arm-roll trucks and tractor trolleys are indicated in **Figure 12**.

The incoming waste composition survey points out that the discharge of recyclables from high income group is very few. It is due to the reason that most of the recyclables are segregated by maids / servants in high income areas. Moreover, recyclables' sorting activity is also being done at containers by town scavengers and by crew staff of collection vehicles (tractor trolleys). The recycling potential of comingled waste from middle and low income groups is relatively high particularly regarding paper and plastic. It depicts relatively low trend at source segregation in these income groups.



**Figure 12: Dry Recyclable Items of Incoming Waste at Gondlanwala**

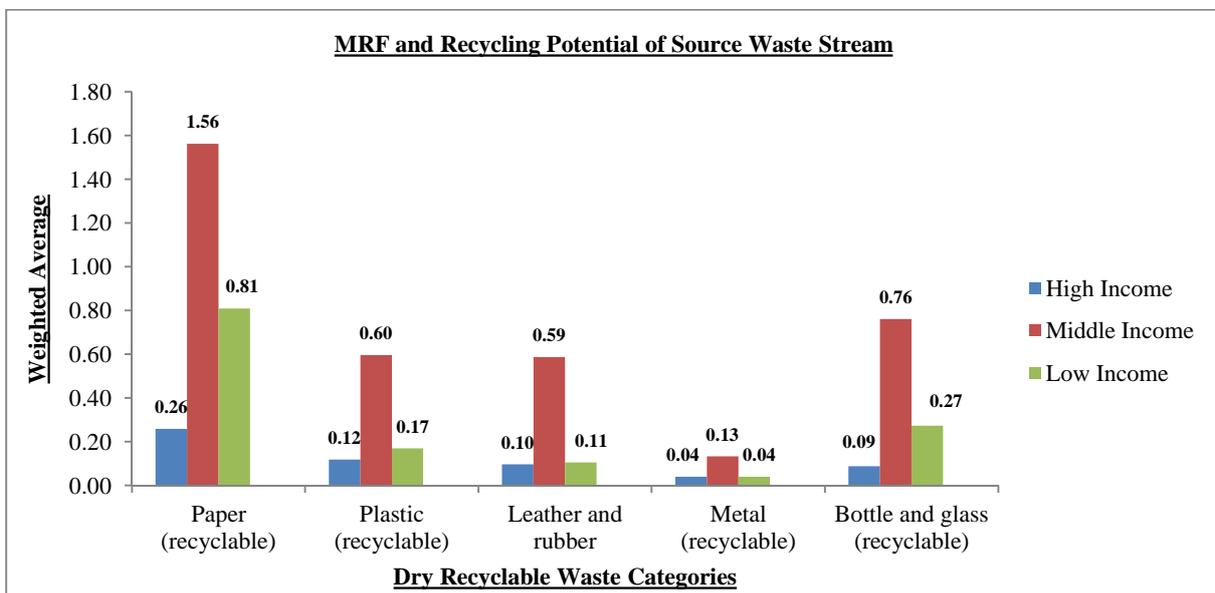
The recycling potential of Gujranwala residential source waste is shown in **Figure 13**. The calculation table is annexed in **Appendix 2**. The weighted average of dry recyclables is estimated to about 6 % out of total waste generated from residential dwellings.



Data Source: 2<sup>nd</sup> WACS Report, February 2015, JICA Project Team

**Figure 12: MRF and Recycling Potential of Residential Waste at Gujranwala**

The percentages of dry recyclables in waste emanating from households are shown in **Figure 14**. The high income source waste shows weak recycling potential. Middle and low income groups' waste streams have shown considerable percentage for paper 2 % as compared to other recyclable categories. Among the three (3) income groups, the highest weighted recycling potential is observed in middle income group (i.e., about 4 %).



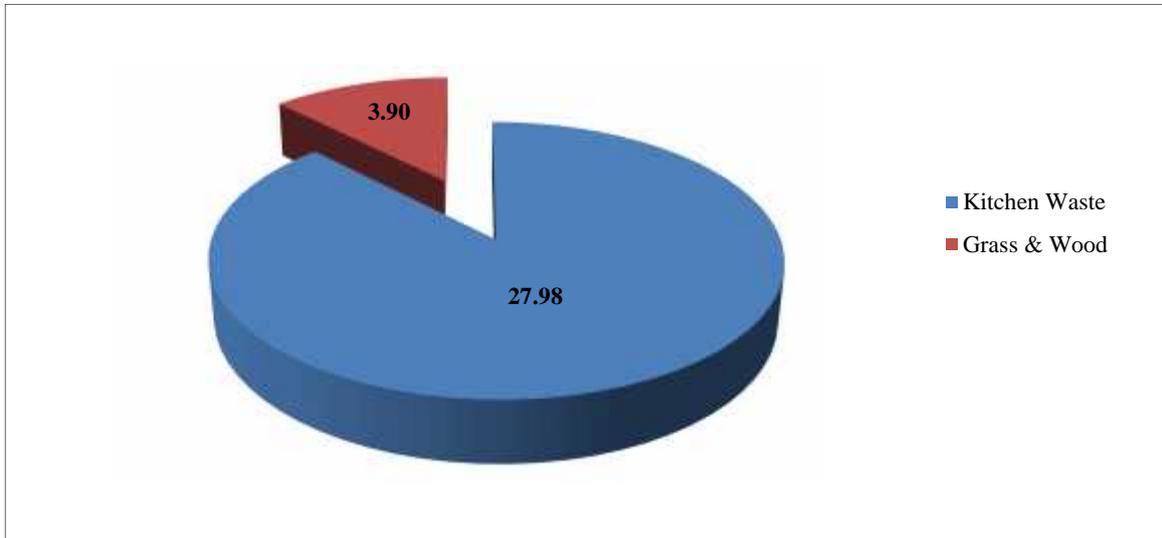
Data Source: 2<sup>nd</sup> WACS Report, February 2015, JICA Project Team

**Figure 14: Dry Recyclable Items at Gujranwala Residential Sources**

The results of both composition surveys have not strengthened the idea of centralized material recovery facility option.

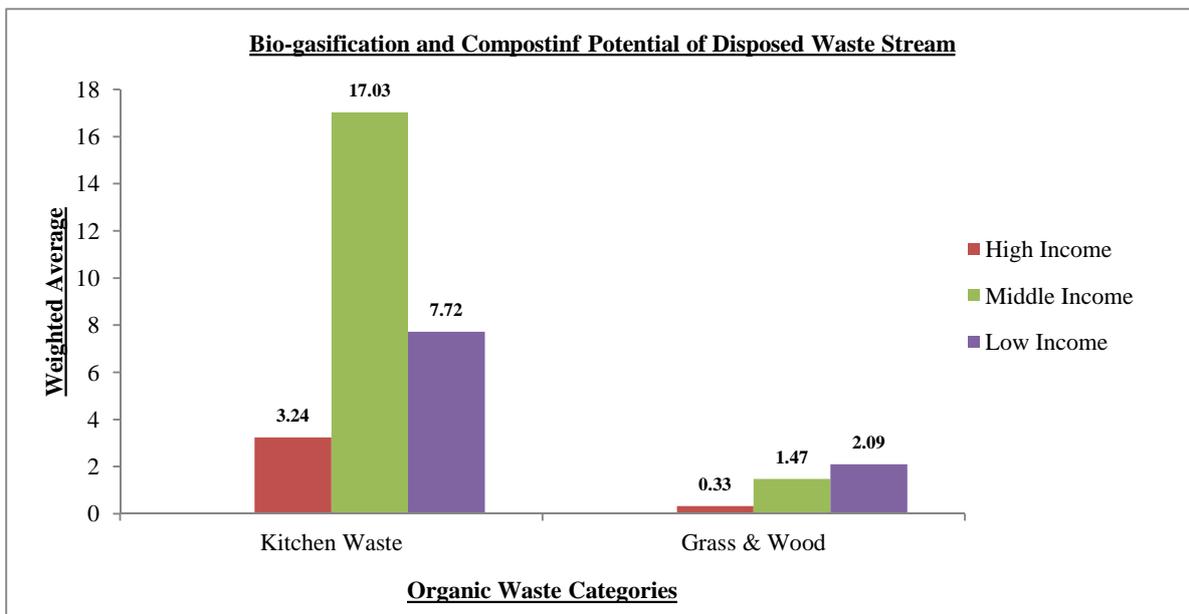
### 5.3 Bio-gasification and Composting Potential of Incoming Waste at Gondlanwala

Among the possible resource recovery options, bio-gasification and composting is found to be feasible as the organic content in waste disposed at Gondlanwala is figured about 32 %. The **Figure 15** summarizes this weighted average and the reference table is attached in **Appendix 2** for more details.



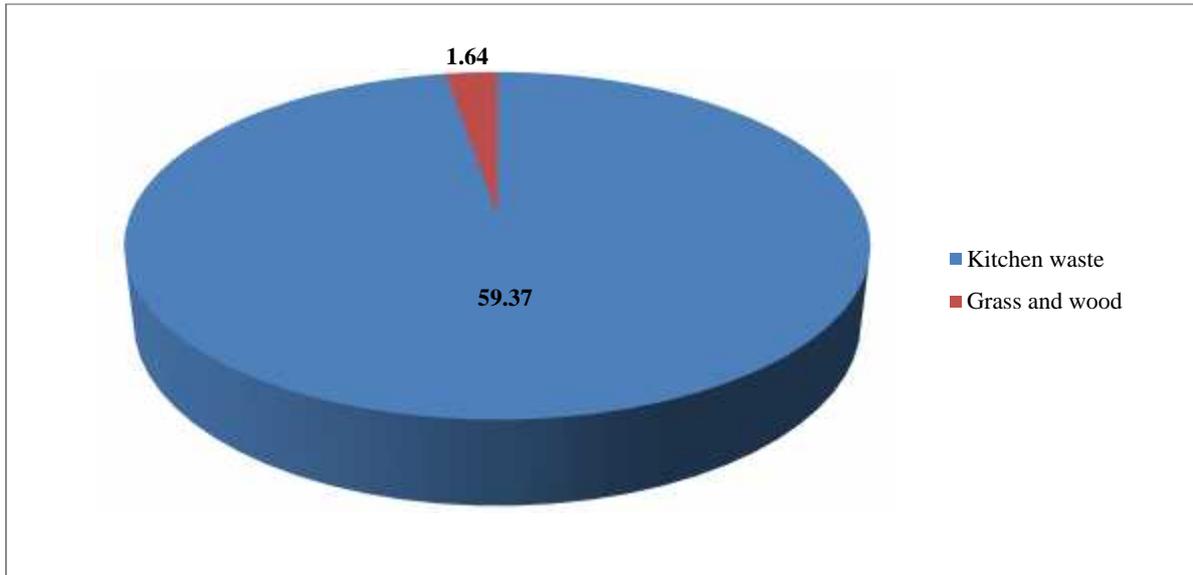
**Figure 15: Bio-gasification and Composting Potential at Gondlanwala**

The percentage of waste composition of organic waste includes kitchen waste and grass & wood is found to be the highest among all categories in both composition surveys. The organic content of discharged waste from three income groups is depicted in **Figure 16**. The highest proportion of kitchen waste comes to Gondlanwala from middle income level group. The generation of kitchen waste in high income group is the lowest that is about 3 %.



**Figure 16: Organic Items of Incoming Waste at Gondlanwala**

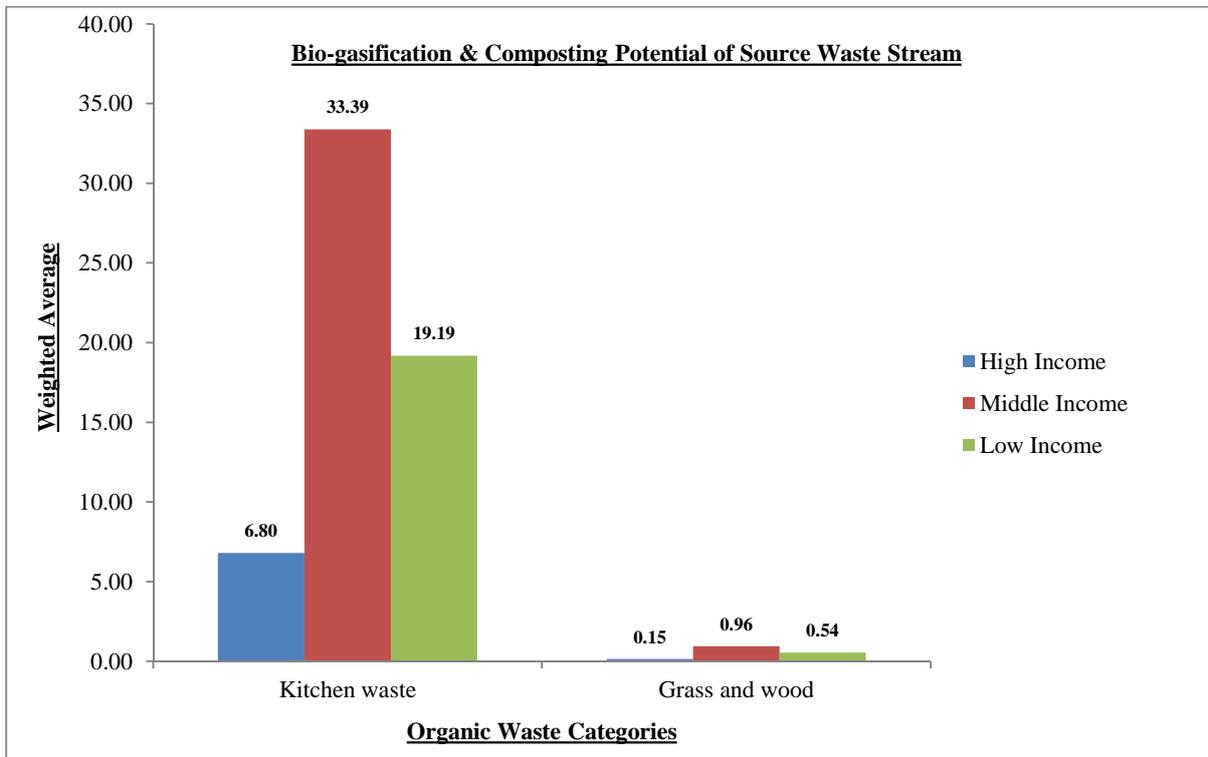
The weighted average of organic content in Gujranwala residential sources' waste is estimated to about 61 %, showing the viability of bio-gasification and composting. The **Figure 17** summarizes this weighted average and the reference table is attached in **Appendix 2** for more details.



Data Source: 2<sup>nd</sup> WACS Report, February 2015, JICA Project Team

**Figure 17: Bio-gasification & Composting Potential of Residential Waste at Gujranwala**

Figure 18 shows the weighted average of organic content in waste obtained from the objective residential sources. The WACS results regarding kitchen waste percentages are compatible with those of incoming waste composition survey. WACS shows that middle and low income groups discharge more kitchen waste (34 % and 20 %, respectively) than that of the high income group (i.e., 7 %).

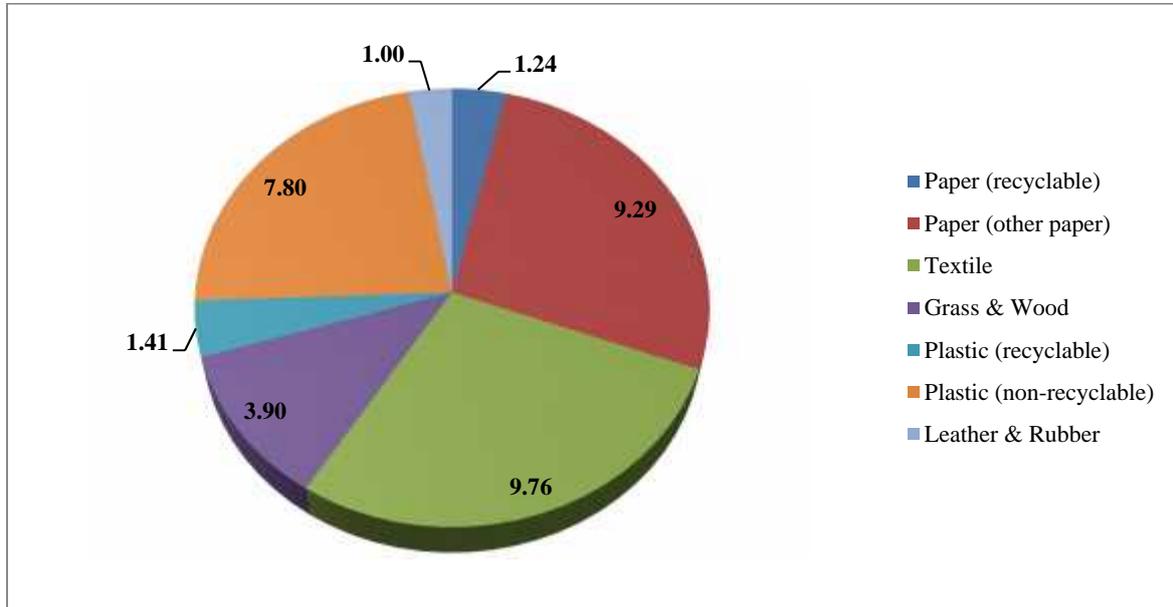


Data Source: 2<sup>nd</sup> WACS Report, February 2015, JICA Project Team

**Figure 18: Organic Items at Gujranwala Residential Sources**

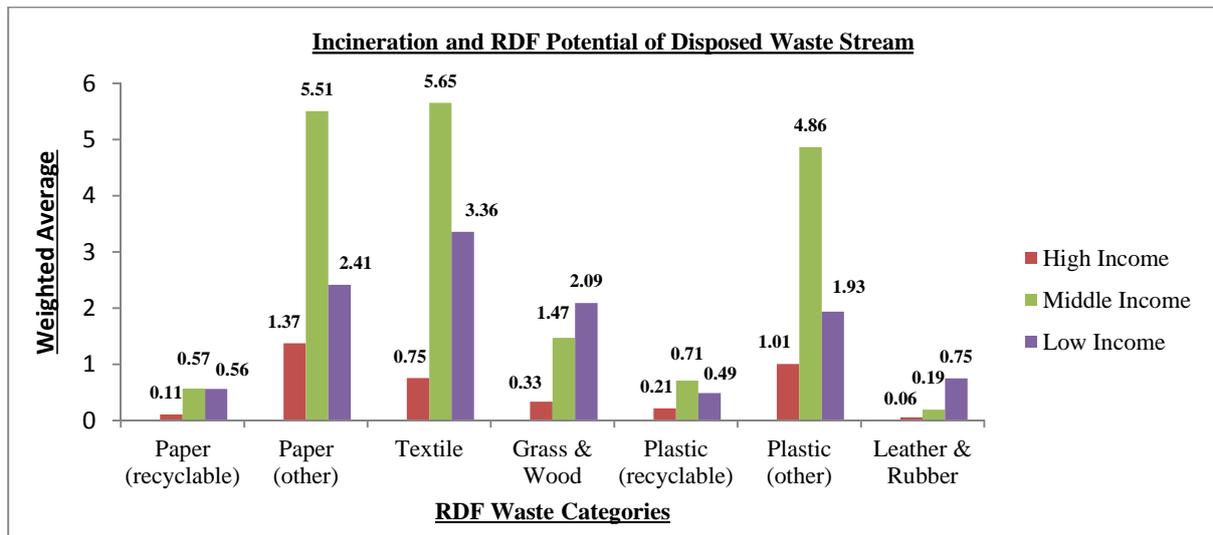
### 5.4 Incineration and RDF Potential of Incoming Waste at Gondlanwala

The RDF potential of the overall disposed waste stream at Gondlanwala is estimated to about 34%. **Figure 19** portrays the splitting of incineration and RDF potential of disposed waste into individual categories. The reference tables are attached in **Appendix 2**.



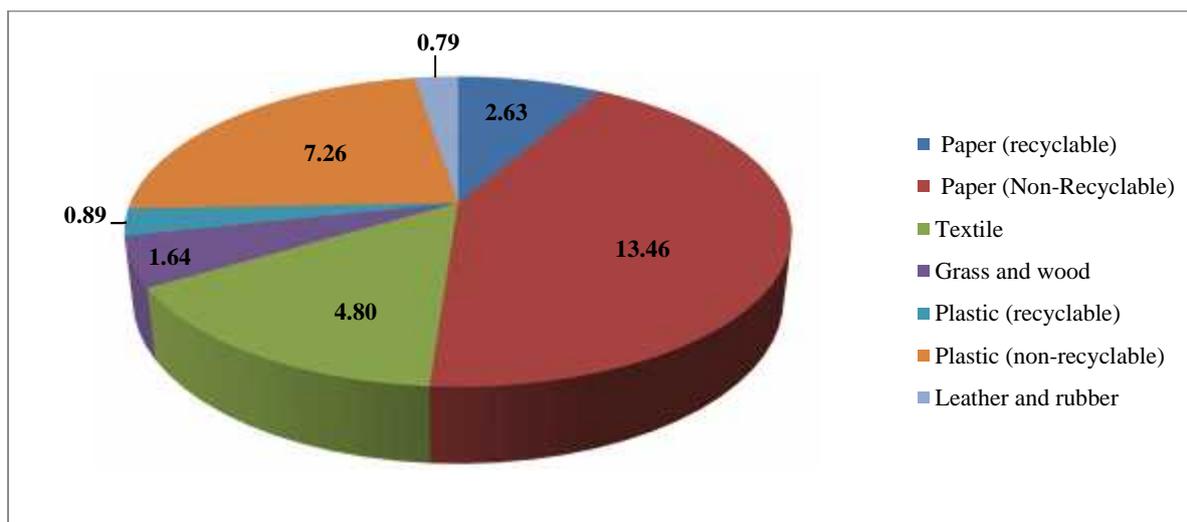
**Figure 19: Incineration and RDF Potential at Gondlanwala**

**Figure 20** shows the percentages of combustible items mixed in waste streams from three income level areas. The commingled waste hauled to Gondlanwala for disposal has appreciable amounts of prominent combustible waste items including textile and non-recyclable paper & plastic. The waste hauled to disposal site from middle income areas has the highest percentages of combustible categories, on average amounting to about 19 %.



**Figure 20: Combustible Items of Incoming Waste at Gondlanwala**

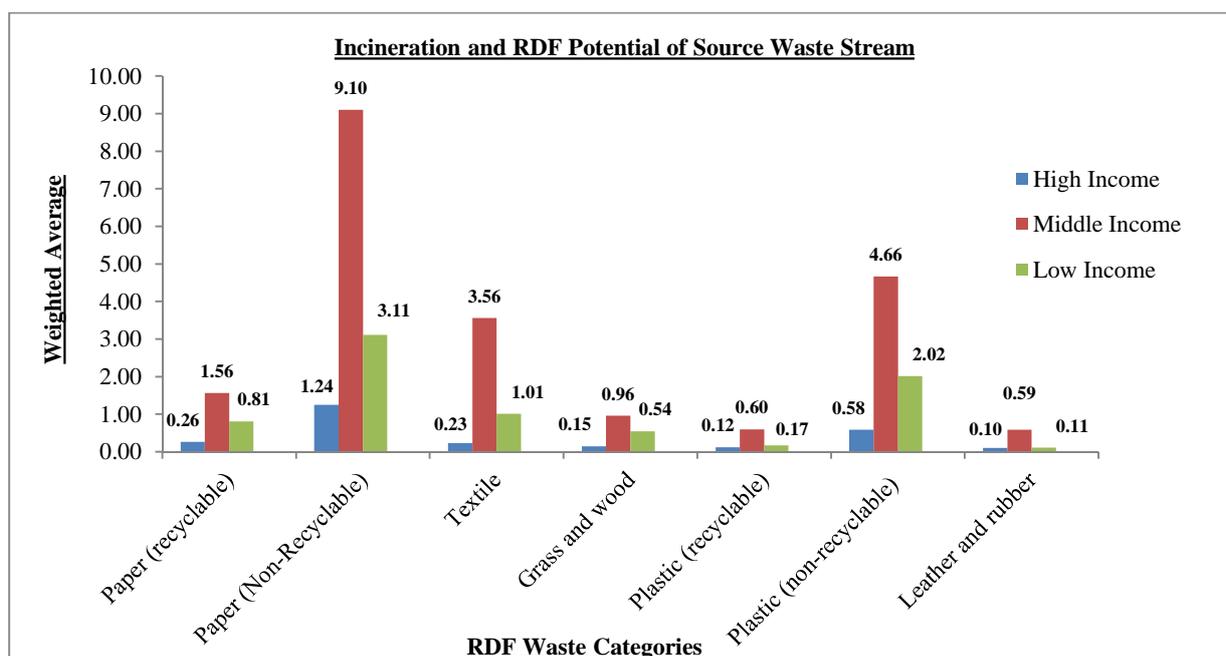
The incineration and RDF potential of residential source waste is estimated to about 31 % (**Figure 21**).



Data Source: 1st WACS Report, November 2014, JICA Project Team

**Figure 21: Incineration & RDF Potential of Residential Waste at Gujranwala**

On the other hand, the weighted average of combustible waste items generating from residential sources is shown in **Figure 22**. The percentages for non-recyclable paper (13 %), non-recyclable plastic (7 %) and textile (5 %) in waste stream originating from source are mounting among other combustible waste classes.

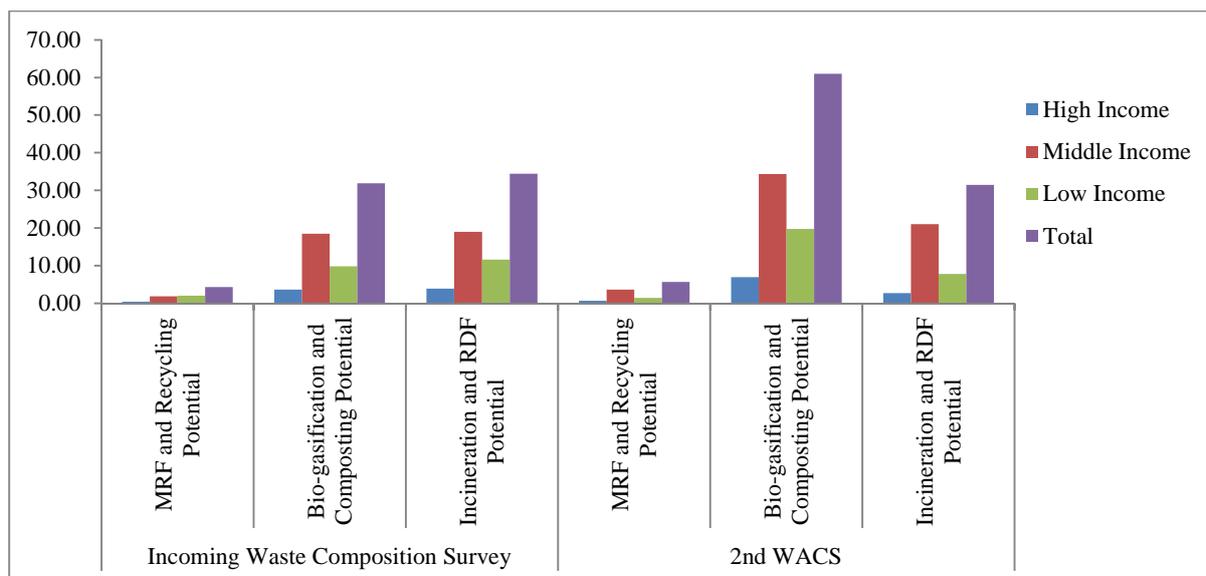


Data Source: 2<sup>nd</sup> WACS Report, February 2015, JICA Project Team

**Figure 22: Combustible Items at Gujranwala Residential Sources**

The results of both composition surveys (incoming waste composition survey and WACS) have demonstrated appreciable amounts of combustible items at source and disposed wastes' arising. These combustible waste categories can be incorporated into incineration and/or RDF plant.

**Figure 23** shows the comparison of two (2) composition surveys at three (3) income groups. The MRF and recycling potential option is found to be the weakest among all income groups. Whereas the middle income group has shown the highest capacity for the composting and RDF potential.



**Figure 23: Comparison of Incoming Waste Composition Survey and WACS**

## 6. Conclusions and Recommendations

### 6.1 Conclusions

The following conclusions can be drawn from the analysis of ten (10) waste samples subjected to incoming waste composition survey:

- The waste stream reaching for disposal at Gondlanwala from collection area (64 urban union councils) has the high percentage of organic waste represented by kitchen waste and grass and wood (about 32%). These wastes are good biodegradable waste. So, the municipal waste from Gujranwala has good potential for bio-gasification and/or compost if GWMC manages to collect organic waste separately.
- The combustible waste ratio represented by plastics, paper, etc. in Gujranwala is high. So, installation of incineration plant and/or RDF plant can be a good option for the strategies for waste reduction and renewable energy generation.
- The amount of dry recyclables or resource materials hauled to Gondlanwala is considerably low. Accordingly, the option for construction of centralized material recovery facilities is negative.

### 6.2 Recommendations

- The material recovery options can be prioritized as follows on the basis of the results of the incoming waste composition survey:

Small-scale MRF < Bio-gasification and/or Composting < Incineration and/or RDF

- Most of the recyclables have already been sorted at sources by dwellers and at the waste discharge points at waste containers by the waste pickers and sold in the recycling market. This existing system shall be maintained or strengthened by the support and/or assistance of GWMC.
- The middle income group may be the suitable target group for pilot scale projects for resource recovery.
- Incoming waste composition survey should be carried out at least once in a year for obtaining the basic information for 3R activities and intermediate treatment facilities.

| Sample No. 01                                     |                                 | Date: 09-12-2014              |              |              |              | Sampling Place: Gondlanwala Disposal Site       |            |             |             |                          |              |              |             |                    |            |
|---|---------------------------------|-------------------------------|--------------|--------------|--------------|---|------------|-------------|-------------|--------------------------|--------------|--------------|-------------|--------------------|------------|
| Climate: Sunny & Dry                              |                                 | Plate No. of Vehicle: Hino 12 |              |              |              | Type of Vehicle: Arm Roll Truck                 |            |             |             |                          |              |              |             |                    |            |
| UC No. & Location: 25 & Jumma Bazar, Kashmir Road |                                 |                               |              |              |              | Nominal Category of Area by the Project: Middle |            |             |             |                          |              |              |             |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam          |                                 |                               |              |              |              | Recorded by: Ambreen Ghazanfar                  |            |             |             |                          |              |              |             |                    |            |
| Sr. No.   | Item                            | Weight of Bucket + Item (kg.) |              |              |              | Weight of Bucket (kg.)                          |            |             |             | Net Weight of Item (kg.) |              |              |             | Total Net Wt. (kg) | Ratio (%)  |
| 1   | Kitchen Waste                   | 26.35                         | 4.45         | 6.16         | 10.33        | 1.67  | 0.46       | 0.46        | 1.67        | 24.68                    | 3.99         | 5.7          | 8.66        | 43.03              | 26.22      |
| 2   | Paper (recyclable)              | 3.59                          | -            | -            | -            | 1.67  | -          | -           | -           | 1.92                     | -            | -            | -           | 1.92               | 1.17       |
| 3   | Paper (other paper)             | 8.79                          | -            | -            | -            | 1.00  | -          | -           | -           | 7.79                     | -            | -            | -           | 7.79               | 4.75       |
| 4   | Textile                         | 8.12                          | 1.63         | -            | -            | 1.00  | 1.00       | -           | -           | 7.12                     | 0.63         | -            | -           | 7.75               | 4.72       |
| 5   | Grass & Wood                    | 3.04                          | 1.96         | 0.99         | -            | 0.58  | 0.58       | 0.36        | -           | 2.46                     | 1.38         | 0.63         | -           | 4.47               | 2.72       |
| 6   | Plastic (recyclable)            | 3.41                          | -            | -            | -            | 1.67  | -          | -           | -           | 1.74                     | -            | -            | -           | 1.74               | 1.06       |
| 7   | Plastic (non-recyclable)        | 16.32                         | -            | -            | -            | 1.67  | -          | -           | -           | 14.65                    | -            | -            | -           | 14.65              | 8.93       |
| 8   | Leather & Rubber                | 0.67                          | -            | -            | -            | 0.58  | -          | -           | -           | 0.09                     | -            | -            | -           | 0.09               | 0.05       |
| 9   | Metal (recyclable)              | 0.86                          | -            | -            | -            | 0.58  | -          | -           | -           | 0.28                     | -            | -            | -           | 0.28               | 0.17       |
| 10  | Metal (non-recyclable)          | -                             | -            | -            | -            | -   | -          | -           | -           | -                        | -            | -            | -           | -                  | -          |
| 11  | Bottle & Glass (recyclable)     | 0.84                          | -            | -            | -            | 0.46  | -          | -           | -           | 0.38                     | -            | -            | -           | 0.38               | 0.23       |
| 12  | Bottle & Glass (non-recyclable) | -                             | -            | -            | -            | -   | -          | -           | -           | -                        | -            | -            | -           | -                  | -          |
| 13  | Ceramic, Stone & Soil, etc.     | 7.69                          | -            | -            | -            | 1.00  | -          | -           | -           | 6.69                     | -            | -            | -           | 6.69               | 4.08       |
| 14  | Domestic Hazardous Waste        | 0.36                          | -            | -            | -            | 0.36  | -          | -           | -           | 0.00                     | -            | -            | -           | 0.00               | 0.00       |
| 15  | Sieve Remainings                | 22.05                         | 22.83        | -            | -            | 1.00  | 1.00       | -           | -           | 21.05                    | 21.83        | -            | -           | 42.88              | 26.13      |
| 16  | Miscellaneous                   | 4.58                          | 11.67        | 18.78        | -            | 0.46  | 0.46       | 1.67        | -           | 4.12                     | 11.21        | 17.11        | -           | 32.44              | 19.77      |
| <b>Sub - Total</b>                                |                                 | <b>106.67</b>                 | <b>42.54</b> | <b>25.93</b> | <b>10.33</b> | <b>13.7</b>                                     | <b>3.5</b> | <b>2.49</b> | <b>1.67</b> | <b>92.97</b>             | <b>39.04</b> | <b>23.44</b> | <b>8.66</b> | <b>164.11</b>      | <b>100</b> |
| <b>Total</b>                                      |                                 | <b>185.47</b>                 |              |              |              | <b>21.36</b>                                    |            |             |             | <b>164.11</b>            |              |              |             |                    |            |

| Sample No. 02                            |                                 | Date: 09-12-2014                              |              |              |                        |             |             | Sampling Place: Gondlanwala Disposal Site |              |              |                    |            |
|--|---------------------------------|---|--------------|--------------|------------------------|-------------|-------------|---|--------------|--------------|--------------------|------------|
| Climate: Sunny & Dry                     |                                 | Plate No. of Vehicle: Holland 1               |              |              |                        |             |             | Type of Vehicle: Tractor Trolley          |              |              |                    |            |
| UC No. & Location: 4 & Model Town        |                                 | Nominal Category of Area by the Project: High |              |              |                        |             |             |   |              |              |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam |                                 | Recorded by: Ambreen Ghazanfar                |              |              |                        |             |             |   |              |              |                    |            |
| Sr. No.                                  | Item                            | Weight of Bucket + Item (kg.)                 |              |              | Weight of Bucket (kg.) |             |             | Net Weight of Item (kg.)                  |              |              | Total Net Wt. (kg) | Ratio (%)  |
| 1  | Kitchen Waste                   | 26.70   | 6.65         | 20.02        | 1.67                   | 0.46        | 1.67        | 25.03                                     | 6.19         | 18.35        | 49.57              | 30.24      |
| 2  | Paper (recyclable)              | 2.97  | -            | -            | 1.67                   | -           | -           | 1.30                                      | -            | -            | 1.30               | 0.79       |
| 3  | Paper (other paper)             | 17.46   | 7.17         | -            | 1.00                   | 1.00        | -           | 16.46                                     | 6.17         | -            | 22.63              | 13.81      |
| 4  | Textile                         | 10.80   | -            | -            | 1.00                   | -           | -           | 9.80                                      | -            | -            | 9.80               | 5.98       |
| 5  | Grass & Wood                    | 5.47  | 4.61         | 3.48         | 1.00                   | 1.00        | 0.58        | 4.47                                      | 3.61         | -            | 8.08               | 4.93       |
| 6  | Plastic (recyclable)            | 4.08  | -            | -            | 1.67                   | -           | -           | 2.41                                      | -            | -            | 2.41               | 1.47       |
| 7  | Plastic (non-recyclable)        | 10.46   | 8.79         | 3.51         | 1.67                   | 1.67        | 1.00        | 8.79                                      | 7.12         | 2.51         | 18.42              | 11.24      |
| 8  | Leather & Rubber                | 1.87  | -            | -            | 0.58                   | -           | -           | 1.29                                      | -            | -            | 1.29               | 0.79       |
| 9  | Metal (recyclable)              | 0.71  | -            | -            | 0.58                   | -           | -           | 0.13                                      | -            | -            | 0.13               | 0.08       |
| 10                                       | Metal (non-recyclable)          | -   | -            | -            | -                      | -           | -           | -   | -            | -            | -                  | -          |
| 11                                       | Bottle & Glass (recyclable)     | -   | -            | -            | -                      | -           | -           | -   | -            | -            | -                  | -          |
| 12                                       | Bottle & Glass (non-recyclable) | 1.28  | -            | -            | 0.34                   | -           | -           | 0.94                                      | -            | -            | 0.94               | 0.57       |
| 13                                       | Ceramic, Stone & Soil, etc.     | 11.09   | -            | -            | 1.00                   | -           | -           | 10.09                                     | -            | -            | 10.09              | 6.16       |
| 14                                       | Domestic Hazardous Waste        | 0.37  | -            | -            | 0.34                   | -           | -           | 0.03                                      | -            | -            | 0.03               | 0.02       |
| 15                                       | Sieve Remainings                | 23.31   | 9.58         | -            | 1.00                   | 1.00        | -           | 22.31                                     | 8.58         | -            | 30.89              | 18.84      |
| 16                                       | Miscellaneous                   | 9.34  | -            | -            | 1.00                   | -           | -           | 8.34                                      | -            | -            | 8.34               | 5.09       |
| <b>Sub - Total</b>                       |                                 | <b>125.91</b>                                 | <b>36.80</b> | <b>27.01</b> | <b>14.52</b>           | <b>5.13</b> | <b>3.25</b> | <b>111.39</b>                             | <b>31.67</b> | <b>20.86</b> | <b>163.92</b>      | <b>100</b> |
| <b>TOTAL</b>                             |                                 | <b>189.72</b>                                 |              |              | <b>22.9</b>            |             |             | <b>163.92</b>                             |              |              |                    |            |

| Sample No. 03                                    |                                 | Date: 10-12-2014              |              |              |                        |             |   | Sampling Place: Gondlanwala Disposal Site |              |              |                    |            |
|--|---------------------------------|-------------------------------|--------------|--------------|------------------------|-------------|---|---|--------------|--------------|--------------------|------------|
| Climate: Sunny & Dry                             |                                 | Plate No. of Vehicle: Hino 10 |              |              |                        |             |   | Type of Vehicle: Arm Roll Truck           |              |              |                    |            |
| UC No. & Location: 16 & Rex Cinema, Pasroor Road |                                 |                               |              |              |                        |             | Nominal Category of Area by the Project: High |   |              |              |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam         |                                 |                               |              |              |                        |             | Recorded by: Ambreen Ghazanfar                |   |              |              |                    |            |
| Sr. No.  | Item                            | Weight of Bucket + Item (kg.) |              |              | Weight of Bucket (kg.) |             |   | Net Weight of Item (kg.)                  |              |              | Total Net Wt. (kg) | Ratio (%)  |
| 1  | Kitchen Waste                   | 20.74                         | 7.23         | 22.28        | 1.67                   | 0.46        | 1.67  | 19.07                                     | 6.77         | 20.61        | 46.45              | 34.55      |
| 2  | Paper (recyclable)              | 3.48                          | -            | -            | 1.67                   | -           | -   | 1.81                                      | -            | -            | 1.81               | 1.35       |
| 3  | Paper (other paper)             | 14.24                         | 6.10         | -            | 1.00                   | 1.00        | -   | 13.24                                     | 5.10         | -            | 18.34              | 13.64      |
| 4  | Textile                         | 5.20                          | 6.77         | 3.22         | 1.00                   | 1.00        | 1.00  | 4.20                                      | 5.77         | 2.22         | 12.19              | 9.07       |
| 5  | Grass & Wood                    | 1.70                          | 1.64         | -            | 0.46                   | 0.58        | -   | 1.24                                      | 1.06         | -            | 2.30               | 1.71       |
| 6  | Plastic (recyclable)            | 4.58                          | 1.82         | -            | 1.00                   | 1.67        | -   | 3.58                                      | 0.15         | -            | 3.73               | 2.77       |
| 7  | Plastic (non-recyclable)        | 8.75                          | 6.53         | -            | 1.67                   | 1.67        | -   | 7.08                                      | 4.86         | -            | 11.94              | 8.88       |
| 8  | Leather & Rubber                | 1.04                          | -            | -            | 0.58                   | -           | -   | 0.46                                      | -            | -            | 0.46               | 0.34       |
| 9  | Metal (recyclable)              | 0.88                          | -            | -            | 0.58                   | -           | -   | 0.30                                      | -            | -            | 0.30               | 0.22       |
| 10   | Metal (non-recyclable)          | -                             | -            | -            | -                      | -           | -   | -   | -            | -            | -                  | -          |
| 11   | Bottle & Glass (recyclable)     | 0.64                          | -            | -            | 0.46                   | -           | -   | 0.18                                      | -            | -            | 0.18               | 0.13       |
| 12   | Bottle & Glass (non-recyclable) | -                             | -            | -            | -                      | -           | -   | -   | -            | -            | -                  | -          |
| 13   | Ceramic, Stone & Soil, etc.     | 11.14                         | -            | -            | 1.00                   | -           | -   | 10.14                                     | -            | -            | 10.14              | 7.54       |
| 14   | Domestic Hazardous Waste        | 0.54                          | -            | -            | 0.34                   | -           | -   | 0.20                                      | -            | -            | 0.20               | 0.15       |
| 15   | Sieve Remainings                | 18.92                         | -            | -            | 1.67                   | -           | -   | 17.25                                     | -            | -            | 17.25              | 12.83      |
| 16   | Miscellaneous                   | 0.55                          | 10.07        | -            | 0.46                   | 1.00        | -   | 0.09                                      | 9.07         | -            | 9.16               | 6.81       |
| <b>Sub-Total</b>                                 |                                 | <b>92.40</b>                  | <b>40.16</b> | <b>25.50</b> | <b>13.56</b>           | <b>7.38</b> | <b>2.67</b>                                   | <b>78.84</b>                              | <b>32.78</b> | <b>22.83</b> | <b>134.45</b>      | <b>100</b> |
| <b>Total</b>                                     |                                 | <b>158.06</b>                 |              |              | <b>23.61</b>           |             |   | <b>134.45</b>                             |              |              |                    |            |

| Sample No. 04                            |                                 | Date: 10-12-2014                                |              |              |             | Sampling Place: Gondlanwala Disposal Site |             |             |             |                          |              |              |             |                    |            |
|--|---------------------------------|---|--------------|--------------|-------------|---|-------------|-------------|-------------|--------------------------|--------------|--------------|-------------|--------------------|------------|
| Climate: Sunny & Dry                     |                                 | Plate No. of Vehicle: 9624                      |              |              |             | Type of Vehicle: Tractor Trolley          |             |             |             |                          |              |              |             |                    |            |
| UC No. & Location: 57 & Gobind Gargh     |                                 | Nominal Category of Area by the Project: Middle |              |              |             |   |             |             |             |                          |              |              |             |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam |                                 | Recorded by: Ambreen Ghazanfar                  |              |              |             |   |             |             |             |                          |              |              |             |                    |            |
| Sr. No.                                  | Item                            | Weight of Bucket + Item (kg.)                   |              |              |             | Weight of Bucket (kg.)                    |             |             |             | Net Weight of Item (kg.) |              |              |             | Total Net Wt. (kg) | Ratio (%)  |
| 1  | Kitchen Waste                   | 28.21   | 15.82        | 3.91         | -           | 1.67                                      | 1.67        | 1.00        | -           | 26.54                    | 14.15        | 2.91         | -           | 43.60              | 24.48      |
| 2  | Paper (recyclable)              | 3.16  | -            | -            | -           | 1.67                                      | -           | -           | -           | 1.49                     | -            | -            | -           | 1.49               | 0.84       |
| 3  | Paper (other paper)             | 9.53  | 9.99         | 1.23         | -           | 1.00                                      | 1.00        | 1.00        | -           | 8.53                     | 8.99         | 0.23         | -           | 17.75              | 9.96       |
| 4  | Textile                         | 11.31   | 3.57         | -            | -           | 1.00                                      | 1.00        | -           | -           | 10.31                    | 2.57         | -            | -           | 12.88              | 7.23       |
| 5  | Grass & Wood                    | 3.40  | 1.14         | -            | -           | 0.46                                      | 0.46        | -           | -           | 2.94                     | 0.68         | -            | -           | 3.62               | 2.03       |
| 6  | Plastic (recyclable)            | 3.44  | 2.76         | -            | -           | 1.67                                      | 1.67        | -           | -           | 1.77                     | 1.09         | -            | -           | 2.86               | 1.61       |
| 7  | Plastic (non-recyclable)        | 4.70  | 9.97         | 2.79         | 1.59        | 1.67                                      | 1.67        | 1.67        | 1.00        | 3.03                     | 8.30         | 1.12         | 0.59        | 13.04              | 7.32       |
| 8  | Leather & Rubber                | 1.85  | -            | -            | -           | 0.58                                      | -           | -           | -           | 1.27                     | -            | -            | -           | 1.27               | 0.71       |
| 9  | Metal (recyclable)              | 0.51  | -            | -            | -           | 0.34                                      | -           | -           | -           | 0.17                     | -            | -            | -           | 0.17               | 0.10       |
| 10                                       | Metal (non-recyclable)          | -   | -            | -            | -           | -   | -           | -           | -           | -                        | -            | -            | -           | -                  | -          |
| 11                                       | Bottle & Glass (recyclable)     | 1.64  | -            | -            | -           | 0.46                                      | -           | -           | -           | 1.18                     | -            | -            | -           | 1.18               | 0.66       |
| 12                                       | Bottle & Glass (non-recyclable) | -   | -            | -            | -           | -   | -           | -           | -           | -                        | -            | -            | -           | -                  | -          |
| 13                                       | Ceramic, Stone & Soil, etc.     | 19.78   | 0.72         | -            | -           | 1.00                                      | 0.46        | -           | -           | 18.78                    | 0.26         | -            | -           | 19.04              | 10.60      |
| 14                                       | Domestic Hazardous Waste        | 0.41  | -            | -            | -           | 0.34                                      | -           | -           | -           | 0.07                     | -            | -            | -           | 0.07               | 0.04       |
| 15                                       | Sieve Remainings                | 5.65  | 20.54        | 11.16        | -           | 0.58                                      | 1.00        | 1.00        | -           | 5.07                     | 19.54        | 10.16        | -           | 34.77              | 19.52      |
| 16                                       | Miscellaneous                   | 1.66  | 36.20        | -            | -           | 0.46                                      | 1.00        | -           | -           | 1.20                     | 25.200       | -            | -           | 26.4               | 14.82      |
| <b>Sub-Total</b>                         |                                 | <b>95.25</b>                                    | <b>90.71</b> | <b>19.09</b> | <b>1.59</b> | <b>12.9</b>                               | <b>9.93</b> | <b>4.67</b> | <b>1.00</b> | <b>82.35</b>             | <b>80.78</b> | <b>14.42</b> | <b>0.59</b> | <b>178.14</b>      | <b>100</b> |
| <b>Total</b>                             |                                 | <b>206.64</b>                                   |              |              |             | <b>28.50</b>                              |             |             |             | <b>178.14</b>            |              |              |             | <b>178.14</b>      | <b>100</b> |

| Sample No. 05                            |                                 | Date: 10-12-2014                             |               |             |             |                        |             |             |             | Sampling Place: Gondlanwala Disposal Site |              |             |             |                    |            |
|--|---------------------------------|--|---------------|-------------|-------------|------------------------|-------------|-------------|-------------|---|--------------|-------------|-------------|--------------------|------------|
| Climate: Sunny & Dry                     |                                 | Plate No. of Vehicle: 9774                   |               |             |             |                        |             |             |             | Type of Vehicle: Tractor Trolley          |              |             |             |                    |            |
| UC No. & Location: 46 & Mubarak Colony   |                                 | Nominal Category of Area by the Project: Low |               |             |             |                        |             |             |             |   |              |             |             |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam |                                 | Recorded by: Ambreen Ghazanfar               |               |             |             |                        |             |             |             |   |              |             |             |                    |            |
| Sr. No.                                  | Item                            | Weight of Bucket + Item (kg.)                |               |             |             | Weight of Bucket (kg.) |             |             |             | Net Weight of Item (kg.)                  |              |             |             | Total Net Wt. (kg) | Ratio (%)  |
| 1  | Kitchen Waste                   | 32.55  | 20.11         | 3.31        | -           | 1.67                   | 1.67        | 0.34        | -           | 30.88                                     | 18.44        | 2.97        | -           | 52.29              | 23.06      |
| 2  | Paper (recyclable)              | 4.08   | -             | -           | -           | 1.67                   | -           | -           | -           | 2.41                                      | -            | -           | -           | 2.41               | 1.06       |
| 3  | Paper (other paper)             | 9.48   | 2.68          | 0.80        | -           | 1.00                   | 1.00        | 0.34        | -           | 8.48                                      | 1.68         | 0.46        | -           | 10.62              | 4.68       |
| 4  | Textile                         | 7.29   | 9.27          | 0.70        | 5.38        | 1.00                   | 1.00        | 0.58        | 1.00        | 6.29                                      | 8.27         | 0.12        | 4.38        | 19.06              | 8.40       |
| 5  | Grass & Wood                    | 2.32   | 0.49          | -           | -           | 0.58                   | 0.34        | -           | -           | 1.74                                      | 0.15         | -           | -           | 1.89               | 0.83       |
| 6  | Plastic (recyclable)            | 1.79   | 3.96          | -           | -           | 0.58                   | 1.67        | -           | -           | 1.21                                      | 2.29         | -           | -           | 3.50               | 1.54       |
| 7  | Plastic (non-recyclable)        | 9.34   | 7.68          | 1.46        | -           | 1.67                   | 1.67        | 0.58        | -           | 7.67                                      | 6.01         | 0.88        | -           | 14.56              | 6.42       |
| 8  | Leather & Rubber                | 1.10   | -             | -           | -           | 0.58                   | -           | -           | -           | 0.52                                      | -            | -           | -           | 0.52               | 0.23       |
| 9  | Metal (recyclable)              | 0.54   | -             | -           | -           | 0.34                   | -           | -           | -           | 0.20                                      | -            | -           | -           | 0.20               | 0.09       |
| 10                                       | Metal (non-recyclable)          | -  | -             | -           | -           | -                      | -           | -           | -           | -   | -            | -           | -           | -                  | -          |
| 11                                       | Bottle & Glass (recyclable)     | 1.26   | -             | -           | -           | 0.46                   | -           | -           | -           | 0.80                                      | -            | -           | -           | 0.80               | 0.35       |
| 12                                       | Bottle & Glass (non-recyclable) | -  | -             | -           | -           | -                      | -           | -           | -           | -   | -            | -           | -           | -                  | -          |
| 13                                       | Ceramic, Stone & Soil, etc.     | 14.87  | 1.61          | -           | -           | 1.00                   | 0.46        | -           | -           | 13.87                                     | 1.15         | -           | -           | 15.02              | 6.62       |
| 14                                       | Domestic Hazardous Waste        | 0.36   | -             | -           | -           | 0.34                   | -           | -           | -           | 0.02                                      | -            | -           | -           | 0.02               | 0.01       |
| 15                                       | Sieve Remainings                | 18.53  | 14.54         | -           | -           | 1.00                   | 1.00        | -           | -           | 17.53                                     | 13.54        | -           | -           | 31.07              | 13.70      |
| 16                                       | Miscellaneous                   | 33.53  | 43.28         | -           | -           | 1.00                   | 1.00        | -           | -           | 32.53                                     | 42.28        | -           | -           | 74.81              | 32.99      |
| <b>Sub-Total</b>                         |                                 | <b>137.04</b>                                | <b>103.62</b> | <b>6.27</b> | <b>5.38</b> | <b>12.89</b>           | <b>9.81</b> | <b>1.84</b> | <b>1.00</b> | <b>124.15</b>                             | <b>93.81</b> | <b>4.43</b> | <b>4.38</b> | <b>226.77</b>      | <b>100</b> |
| <b>Total</b>                             |                                 | <b>252.31</b>                                |               |             |             | <b>25.54</b>           |             |             |             | <b>226.77</b>                             |              |             |             |                    |            |

| Sample No. 06  |                                 | Date: 11-12-2014                                |              |              |             | Sampling Place: Gondlanwala Disposal Site |             |             |             |                          |              |              |             |                    |            |
|--|---------------------------------|---|--------------|--------------|-------------|---|-------------|-------------|-------------|--------------------------|--------------|--------------|-------------|--------------------|------------|
| Climate: Dry, Passing Clouds                         |                                 | Plate No. of Vehicle: Hino 13                   |              |              |             | Type of Vehicle: Arm Roll Truck           |             |             |             |                          |              |              |             |                    |            |
| UC No. & Location: 28 & Railway Track, Asghar Colony |                                 | Nominal Category of Area by the Project: Middle |              |              |             |   |             |             |             |                          |              |              |             |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam             |                                 | Recorded by: Ambreen Ghazanfar                  |              |              |             |   |             |             |             |                          |              |              |             |                    |            |
| Sr. No.  | Item                            | Weight of Bucket + Item (kg.)                   |              |              |             | Weight of Bucket (kg.)                    |             |             |             | Net Weight of Item (kg.) |              |              |             | Total Net Wt. (kg) | Ratio (%)  |
| 1  | Kitchen Waste                   | 26.22   | 24.21        | 17.9         | -           | 1.67                                      | 1.67        | 1.67        | -           | 24.55                    | 22.54        | 16.23        | -           | 63.32              | 39.18      |
| 2  | Paper (recyclable)              | 3.33  | -            | -            | -           | 1.67                                      | -           | -           | -           | 1.66                     | -            | -            | -           | 1.66               | 1.03       |
| 3  | Paper (other paper)             | 14.58   | 7.65         | -            | -           | 1.00                                      | 1.00        | -           | -           | 13.58                    | 6.65         | -            | -           | 20.23              | 12.52      |
| 4  | Textile                         | 11.26   | 9.80         | -            | -           | 1.00                                      | 1.00        | -           | -           | 10.26                    | 8.8          | -            | -           | 19.06              | 11.79      |
| 5  | Grass & Wood                    | 2.64  | 1.93         | -            | -           | 0.58                                      | 0.58        | -           | -           | 2.06                     | 1.35         | -            | -           | 3.41               | 2.11       |
| 6  | Plastic (recyclable)            | 3.21  | -            | -            | -           | 1.67                                      | -           | -           | -           | 1.54                     | -            | -            | -           | 1.54               | 0.95       |
| 7  | Plastic (non-recyclable)        | 7.08  | 6.99         | 6.83         | 0.62        | 1.67                                      | 1.67        | 1.67        | 0.34        | 5.41                     | 5.32         | 5.16         | 0.28        | 16.17              | 10.00      |
| 8  | Leather & Rubber                | 0.90  | -            | -            | -           | 0.58                                      | -           | -           | -           | 0.32                     | -            | -            | -           | 0.32               | 0.20       |
| 9  | Metal (recyclable)              | 0.90  | -            | -            | -           | 0.58                                      | -           | -           | -           | 0.32                     | -            | -            | -           | 0.32               | 0.20       |
| 10   | Metal (non-recyclable)          | -   | -            | -            | -           | -   | -           | -           | -           | -                        | -            | -            | -           | -                  | -          |
| 11   | Bottle & Glass (recyclable)     | 0.92  | -            | -            | -           | 0.46                                      | -           | -           | -           | 0.46                     | -            | -            | -           | 0.46               | 0.28       |
| 12   | Bottle & Glass (non-recyclable) | -   | -            | -            | -           | -   | -           | -           | -           | -                        | -            | -            | -           | -                  | -          |
| 13   | Ceramic, Stone & Soil, etc.     | 4.15  | -            | -            | -           | 1.00                                      | -           | -           | -           | 3.15                     | -            | -            | -           | 3.15               | 1.95       |
| 14   | Domestic Hazardous Waste        | 0.44  | -            | -            | -           | 0.34                                      | -           | -           | -           | 0.1                      | -            | -            | -           | 0.1                | 0.06       |
| 15   | Sieve Remainings                | 12.78   | 10.36        | -            | -           | 1.00                                      | 1.00        | -           | -           | 11.78                    | 9.36         | -            | -           | 21.14              | 13.08      |
| 16   | Miscellaneous                   | 6.12  | 0.37         | 6.05         | -           | 0.46                                      | 0.34        | 1.00        | -           | 5.66                     | 0.03         | 5.05         | -           | 10.74              | 6.65       |
| <b>Sub-Total</b>                                     |                                 | <b>94.53</b>                                    | <b>61.31</b> | <b>30.78</b> | <b>0.62</b> | <b>13.68</b>                              | <b>7.26</b> | <b>4.34</b> | <b>0.34</b> | <b>80.85</b>             | <b>54.05</b> | <b>26.44</b> | <b>0.28</b> | <b>161.62</b>      | <b>100</b> |
| <b>Total</b>   |                                 | <b>187.24</b>                                   |              |              |             | <b>25.62</b>                              |             |             |             | <b>161.62</b>            |              |              |             |                    |            |

| Sample No. 07   |                                 | Date: 11-12-2014                             |              |              |                        |             |             | Sampling Place: Gondlanwala Disposal Site |              |              |                    |            |
|---|---------------------------------|--|--------------|--------------|------------------------|-------------|-------------|---|--------------|--------------|--------------------|------------|
| Climate: Dry, Windy & Passing Clouds                        |                                 | Plate No. of Vehicle: Hino 9                 |              |              |                        |             |             | Type of Vehicle: Arm Roll Truck           |              |              |                    |            |
| UC No. & Location: 62 & Tarran Wala Galla, Gondlanwala Road |                                 | Nominal Category of Area by the Project: Low |              |              |                        |             |             | Recorded by: Ambreen Ghazanfar            |              |              |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam                    |                                 | Recorded by: Ambreen Ghazanfar               |              |              |                        |             |             |   |              |              |                    |            |
| Sr. No.   | Item                            | Weight of Bucket + Item (kg.)                |              |              | Weight of Bucket (kg.) |             |             | Net Weight of Item (kg.)                  |              |              | Total Net Wt. (kg) | Ratio (%)  |
| 1   | Kitchen Waste                   | 21.66  | 23.18        | 10.86        | 1.67                   | 1.67        | 1.67        | 19.99                                     | 21.51        | 9.19         | 50.69              | 34.12      |
| 2   | Paper (recyclable)              | 3.15   | -            | -            | 1.67                   | -           | -           | 1.48                                      | -            | -            | 1.48               | 1.00       |
| 3   | Paper (other paper)             | 14.49  | 2.30         | 0.47         | 1.00                   | 1.00        | 0.34        | 13.49                                     | 1.30         | 0.13         | 14.92              | 10.04      |
| 4   | Textile                         | 9.18   | 8.01         | 1.94         | 1.00                   | 1.00        | 1.00        | 8.18                                      | 7.01         | 0.94         | 16.13              | 10.86      |
| 5   | Grass & Wood                    | 2.29   | -            | -            | 0.58                   | -           | -           | 1.71                                      | -            | -            | 1.71               | 1.15       |
| 6   | Plastic (recyclable)            | 4.48   | -            | -            | 1.67                   | -           | -           | 2.81                                      | -            | -            | 2.81               | 1.89       |
| 7   | Plastic (non-recyclable)        | 9.67   | 4.51         | 0.35         | 1.67                   | 1.67        | 0.34        | 8.00                                      | 2.84         | 0.01         | 10.85              | 7.30       |
| 8   | Leather & Rubber                | 0.72   | 1.12         | -            | 0.58                   | 0.58        | -           | 0.14                                      | 0.54         | -            | 0.68               | 0.46       |
| 9   | Metal (recyclable)              | 0.87   | -            | -            | 0.58                   | -           | -           | 0.29                                      | -            | -            | 0.29               | 0.20       |
| 10  | Metal (non-recyclable)          | -  | -            | -            | -                      | -           | -           | -   | -            | -            | -                  | -          |
| 11  | Bottle & Glass (recyclable)     | 1.97   | -            | -            | 0.46                   | -           | -           | 1.51                                      | -            | -            | 1.51               | 1.02       |
| 12  | Bottle & Glass (non-recyclable) | -  | -            | -            | -                      | -           | -           | -   | -            | -            | -                  | -          |
| 13  | Ceramic, Stone & Soil, etc.     | 9.86   | -            | -            | 1.00                   | -           | -           | 8.86                                      | -            | -            | 8.86               | 5.96       |
| 14  | Domestic Hazardous Waste        | 0.46   | -            | -            | 0.34                   | -           | -           | 0.12                                      | -            | -            | 0.12               | 0.08       |
| 15  | Sieve Remainings                | 12.06  | 9.65         | -            | 1.00                   | 1.00        | -           | 11.06                                     | 8.65         | -            | 19.71              | 13.27      |
| 16  | Miscellaneous                   | 1.01   | 19.22        | -            | 0.41                   | 1.00        | -           | 0.60                                      | 18.22        | -            | 18.82              | 12.67      |
| <b>Sub-Total</b>  |                                 | <b>91.87</b>                                 | <b>67.99</b> | <b>13.62</b> | <b>13.63</b>           | <b>7.92</b> | <b>3.35</b> | <b>78.24</b>                              | <b>60.07</b> | <b>10.27</b> | <b>148.58</b>      | <b>100</b> |
| <b>Total</b>  |                                 | <b>173.48</b>                                |              |              | <b>24.90</b>           |             |             | <b>148.58</b>                             |              |              |                    |            |

| Sample No. 08                            |                                 |                               | Date: 11-12-2014                                |              |                        |             |             | Sampling Place: Gondlanwala Disposal Site |              |              |                    |            |
|--|---------------------------------|-------------------------------|---|--------------|------------------------|-------------|-------------|---|--------------|--------------|--------------------|------------|
| Climate: Dry & Windy                     |                                 |                               | Plate No. of Vehicle: Holland 2                 |              |                        |             |             | Type of Vehicle: Tractor Trolley          |              |              |                    |            |
| UC No. & Location: 40 & Data Ganj Baksh  |                                 |                               | Nominal Category of Area by the Project: Middle |              |                        |             |             |   |              |              |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam |                                 |                               | Recorded by: Ambreen Ghazanfar                  |              |                        |             |             |   |              |              |                    |            |
| Sr. No.                                  | Item                            | Weight of Bucket + Item (kg.) |   |              | Weight of Bucket (kg.) |             |             | Net Weight of Item (kg.)                  |              |              | Total Net Wt. (kg) | Ratio (%)  |
| 1  | Kitchen Waste                   | 22.95                         | 10.52   | 0.54         | 1.67                   | 1.67        | 0.46        | 21.28                                     | 8.85         | 0.08         | 30.21              | 23.63      |
| 2  | Paper (recyclable)              | 2.61                          | -   | -            | 1.67                   | -           | -           | 0.94                                      | -            | -            | 0.94               | 0.74       |
| 3  | Paper (other paper)             | 9.99                          | 4.13  | 0.36         | 1.00                   | 1.00        | 0.34        | 8.99                                      | 3.13         | 0.02         | 12.14              | 9.49       |
| 4  | Textile                         | 10.70                         | 9.12  | -            | 1.00                   | 1.00        | -           | 9.70                                      | 8.12         | -            | 17.82              | 13.94      |
| 5  | Grass & Wood                    | 2.05                          | 1.93  | 1.53         | 0.58                   | 0.58        | 0.58        | 1.47                                      | 1.35         | 0.95         | 3.77               | 2.95       |
| 6  | Plastic (recyclable)            | 3.09                          | -   | -            | 1.67                   | -           | -           | 1.42                                      | -            | -            | 1.42               | 1.11       |
| 7  | Plastic (non-recyclable)        | 7.75                          | 3.47  | 0.36         | 1.67                   | 1.67        | 0.34        | 6.08                                      | 1.80         | 0.02         | 7.90               | 6.18       |
| 8  | Leather & Rubber                | 0.99                          | -   | -            | 0.58                   | -           | -           | 0.41                                      | -            | -            | 0.41               | 0.32       |
| 9  | Metal (recyclable)              | 0.83                          | -   | -            | 0.58                   | -           | -           | 0.25                                      | -            | -            | 0.25               | 0.20       |
| 10                                       | Metal (non-recyclable)          | -                             | -   | -            | -                      | -           | -           | -   | -            | -            | -                  | -          |
| 11                                       | Bottle & Glass (recyclable)     | 1.49                          | -   | -            | 0.46                   | -           | -           | 1.03                                      | -            | -            | 1.03               | 0.81       |
| 12                                       | Bottle & Glass (non-recyclable) | -                             | -   | -            | -                      | -           | -           | -   | -            | -            | -                  | -          |
| 13                                       | Ceramic, Stone & Soil, etc.     | 18.87                         | -   | -            | 1.00                   | -           | -           | 17.87                                     | -            | -            | 17.87              | 13.98      |
| 14                                       | Domestic Hazardous Waste        | 0.39                          | -   | -            | 0.34                   | -           | -           | 0.05                                      | -            | -            | 0.05               | 0.04       |
| 15                                       | Sieve Remainings                | 16.72                         | -   | -            | 1.00                   | -           | -           | 15.72                                     | -            | -            | 15.72              | 12.29      |
| 16                                       | Miscellaneous                   | 2.80                          | 0.37  | 16.91        | 0.41                   | 0.34        | 1.00        | 2.39                                      | 0.03         | 15.91        | 18.33              | 14.34      |
| <b>Sub-Total</b>                         |                                 | <b>101.23</b>                 | <b>29.54</b>                                    | <b>19.70</b> | <b>13.63</b>           | <b>6.26</b> | <b>2.72</b> | <b>87.60</b>                              | <b>23.28</b> | <b>16.98</b> | <b>127.86</b>      | <b>100</b> |
| <b>Total</b>                             |                                 | <b>150.47</b>                 |   |              | <b>22.61</b>           |             |             | <b>127.86</b>                             |              |              |                    |            |

| Sample No. 09                            |                                 | Date: 12-12-2014                             |              |              |             |             | Sampling Place: Gondlanwala Disposal Site |             |             |             |             |                          |              |              |             |             |                    |            |  |
|--|---------------------------------|--|--------------|--------------|-------------|-------------|---|-------------|-------------|-------------|-------------|--------------------------|--------------|--------------|-------------|-------------|--------------------|------------|--|
| Climate: Sunny & Dry                     |                                 | Plate No. of Vehicle: MB 1                   |              |              |             |             | Type of Vehicle: Arm Roll Truck           |             |             |             |             |                          |              |              |             |             |                    |            |  |
| UC No. & Location: 31 & Their Sansi      |                                 | Nominal Category of Area by the Project: Low |              |              |             |             |   |             |             |             |             |                          |              |              |             |             |                    |            |  |
| Surveyor: Ambreen Ghazanfar & Hina Aslam |                                 | Recorded by: Ambreen Ghazanfar               |              |              |             |             |   |             |             |             |             |                          |              |              |             |             |                    |            |  |
| Sr. No.                                  | Item                            | Weight of Bucket + Item (kg.)                |              |              |             |             | Weight of Bucket (kg.)                    |             |             |             |             | Net Weight of Item (kg.) |              |              |             |             | Total Net Wt. (kg) | Ratio (%)  |  |
| 1  | Kitchen Waste                   | 18.99  | 5.55         | -            | -           | -           | 1.67                                      | 0.46        | -           | -           | -           | 17.32                    | 5.09         | -            | -           | -           | 22.41              | 16.62      |  |
| 2  | Paper (recyclable)              | 4.28   | -            | -            | -           | -           | 1.67                                      | -           | -           | -           | -           | 2.61                     | -            | -            | -           | -           | 2.61               | 1.94       |  |
| 3  | Paper (other paper)             | 7.88   | 8.79         | 3.55         | 0.71        | -           | 1.00                                      | 1.67        | 1.00        | 0.34        | -           | 6.88                     | 7.12         | 2.55         | 0.37        | -           | 16.92              | 12.55      |  |
| 4  | Textile                         | 12.26  | 8.56         | 7.46         | -           | -           | 1.00                                      | 1.00        | 1.00        | -           | -           | 11.26                    | 7.56         | 6.46         | -           | -           | 25.28              | 18.75      |  |
| 5  | Grass & Wood                    | 2.96   | 4.06         | 3.04         | 2.83        | 1.36        | 0.58                                      | 0.58        | 0.58        | 0.58        | 0.58        | 2.38                     | 3.48         | 2.46         | 2.25        | 0.78        | 11.35              | 8.42       |  |
| 6  | Plastic (recyclable)            | 2.58   | -            | -            | -           | -           | 1.67                                      | -           | -           | -           | -           | 0.91                     | -            | -            | -           | -           | 0.91               | 0.67       |  |
| 7  | Plastic (non-recyclable)        | 9.95   | -            | -            | -           | -           | 1.67                                      | -           | -           | -           | -           | 8.28                     | -            | -            | -           | -           | 8.28               | 6.14       |  |
| 8  | Leather & Rubber                | 2.42   | 0.59         | -            | -           | -           | 0.58                                      | 0.46        | -           | -           | -           | 1.84                     | 0.13         | -            | -           | -           | 1.97               | 1.46       |  |
| 9  | Metal (recyclable)              | 0.79   | -            | -            | -           | -           | 0.58                                      | -           | -           | -           | -           | 0.21                     | -            | -            | -           | -           | 0.21               | 0.16       |  |
| 10                                       | Metal (non-recyclable)          | -  | -            | -            | -           | -           | -   | -           | -           | -           | -           | -                        | -            | -            | -           | -           | -                  | -          |  |
| 11                                       | Bottle & Glass (recyclable)     | 0.92   | -            | -            | -           | -           | 0.58                                      | -           | -           | -           | -           | 0.34                     | -            | -            | -           | -           | 0.34               | 0.25       |  |
| 12                                       | Bottle & Glass (non-recyclable) | -  | -            | -            | -           | -           | -   | -           | -           | -           | -           | -                        | -            | -            | -           | -           | -                  | -          |  |
| 13                                       | Ceramic, Stone & Soil, etc.     | 11.10  | -            | -            | -           | -           | 1.00                                      | -           | -           | -           | -           | 10.10                    | -            | -            | -           | -           | 10.10              | 7.49       |  |
| 14                                       | Domestic Hazardous Waste        | 0.37   | -            | -            | -           | -           | 0.34                                      | -           | -           | -           | -           | 0.03                     | -            | -            | -           | -           | 0.03               | 0.02       |  |
| 15                                       | Sieve Remainings                | 15.36  | 8.23         | -            | -           | -           | 1.00                                      | 1.00        | -           | -           | -           | 14.36                    | 7.23         | -            | -           | -           | 21.59              | 16.01      |  |
| 16                                       | Miscellaneous                   | 7.34   | 0.37         | 6.27         | -           | -           | 0.41                                      | 0.34        | 0.41        | -           | -           | 6.93                     | 0.03         | 5.86         | -           | -           | 12.82              | 9.51       |  |
| <b>Sub-Total</b>                         |                                 | <b>97.20</b>                                 | <b>36.15</b> | <b>20.32</b> | <b>3.54</b> | <b>1.36</b> | <b>13.75</b>                              | <b>5.51</b> | <b>2.99</b> | <b>0.92</b> | <b>0.58</b> | <b>83.45</b>             | <b>30.64</b> | <b>17.33</b> | <b>2.62</b> | <b>0.78</b> | <b>134.82</b>      | <b>100</b> |  |
| <b>Total</b>                             |                                 | <b>158.57</b>                                |              |              |             |             | <b>23.75</b>                              |             |             |             |             | <b>134.82</b>            |              |              |             |             |                    |            |  |

| Sample No. 10                            |                                 | Date: 12-12-2014                             |              |              |             |             |             |             |             |                        |             | Sampling Place: Gondlanwala Disposal Site |             |             |             |             |             |                          |              |              |             |             |             |             |             |                    |            |
|--|---------------------------------|--|--------------|--------------|-------------|-------------|-------------|-------------|-------------|------------------------|-------------|---|-------------|-------------|-------------|-------------|-------------|--------------------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|--------------------|------------|
| Climate: Dry & Sunny                     |                                 | Plate No. of Vehicle: 6836                   |              |              |             |             |             |             |             |                        |             | Type of Vehicle: Tractor Trolley          |             |             |             |             |             |                          |              |              |             |             |             |             |             |                    |            |
| UC No. & Location: 1 & Kashmir Town      |                                 | Nominal Category of Area by the Project: Low |              |              |             |             |             |             |             |                        |             |   |             |             |             |             |             |                          |              |              |             |             |             |             |             |                    |            |
| Surveyor: Ambreen Ghazanfar & Hina Aslam |                                 | Recorded by: Ambreen Ghazanfar               |              |              |             |             |             |             |             |                        |             |   |             |             |             |             |             |                          |              |              |             |             |             |             |             |                    |            |
| Sr. No.                                  | Item                            | Weight of Bucket + Item (kg.)                |              |              |             |             |             |             |             | Weight of Bucket (kg.) |             |   |             |             |             |             |             | Net Weight of Item (kg.) |              |              |             |             |             |             |             | Total Net Wt. (kg) | Ratio (%)  |
| 1  | Kitchen Waste                   | 20.28  | 18.96        | -            | -           | -           | -           | -           | -           | 1.67                   | 1.67        | -   | -           | -           | -           | -           | -           | 18.61                    | 17.29        | -            | -           | -           | -           | -           | -           | 35.9               | 29.13      |
| 2  | Paper (recyclable)              | 6.01   | -            | -            | -           | -           | -           | -           | -           | 1.67                   | -           | -   | -           | -           | -           | -           | -           | 4.34                     | -            | -            | -           | -           | -           | -           | -           | 4.34               | 3.52       |
| 3  | Paper (other paper)             | 5.00   | 3.02         | -            | -           | -           | -           | -           | -           | 1.00                   | 1.00        | -   | -           | -           | -           | -           | -           | 4.00                     | 2.02         | -            | -           | -           | -           | -           | -           | 6.02               | 4.88       |
| 4  | Textile                         | 7.42   | 2.88         | -            | -           | -           | -           | -           | -           | 1.00                   | 1.00        | -   | -           | -           | -           | -           | -           | 6.42                     | 1.88         | -            | -           | -           | -           | -           | -           | 8.3                | 6.73       |
| 5  | Grass & Wood                    | 6.43   | 2.09         | 2.24         | 3.28        | 4.32        | 2.79        | 3.20        | 2.47        | 1.67                   | 0.58        | 0.58                                      | 0.58        | 0.34        | 0.58        | 0.34        | 0.58        | 4.76                     | 1.51         | 1.66         | 2.70        | 3.98        | 2.21        | 2.86        | 1.89        | 21.57              | 17.50      |
| 6  | Plastic (recyclable)            | 2.92   | 3.36         | -            | -           | -           | -           | -           | -           | 1.67                   | 1.67        | -   | -           | -           | -           | -           | -           | 1.25                     | 1.69         | -            | -           | -           | -           | -           | -           | 2.94               | 2.39       |
| 7  | Plastic (non-recyclable)        | 5.70   | 3.37         | 1.96         | 0.65        | -           | -           | -           | -           | 1.67                   | 1.67        | 0.46                                      | 0.58        | -           | -           | -           | -           | 4.03                     | 1.70         | 1.50         | 0.07        | -           | -           | -           | -           | 7.3                | 5.92       |
| 8  | Leather & Rubber                | 6.30   | 3.17         | 2.90         | -           | -           | -           | -           | -           | 1.67                   | 0.58        | 0.46                                      | -           | -           | -           | -           | -           | 4.63                     | 2.59         | 2.44         | -           | -           | -           | -           | -           | 9.66               | 7.84       |
| 9  | Metal (recyclable)              | 0.78   | -            | -            | -           | -           | -           | -           | -           | 0.58                   | -           | -   | -           | -           | -           | -           | -           | 0.20                     | -            | -            | -           | -           | -           | -           | -           | 0.2                | 0.16       |
| 10                                       | Metal (non-recyclable)          | -  | -            | -            | -           | -           | -           | -           | -           | -                      | -           | -   | -           | -           | -           | -           | -           | -                        | -            | -            | -           | -           | -           | -           | -           | -                  | -          |
| 11                                       | Bottle & Glass (recyclable)     | 1.58   | -            | -            | -           | -           | -           | -           | -           | 0.46                   | -           | -   | -           | -           | -           | -           | -           | 1.12                     | -            | -            | -           | -           | -           | -           | -           | 1.12               | 0.91       |
| 12                                       | Bottle & Glass (non-recyclable) | -  | -            | -            | -           | -           | -           | -           | -           | -                      | -           | -   | -           | -           | -           | -           | -           | -                        | -            | -            | -           | -           | -           | -           | -           | -                  | -          |
| 13                                       | Ceramic, Stone & Soil, etc.     | 1.57   | -            | -            | -           | -           | -           | -           | -           | 1.00                   | -           | -   | -           | -           | -           | -           | -           | 0.57                     | -            | -            | -           | -           | -           | -           | -           | 0.57               | 0.46       |
| 14                                       | Domestic Hazardous Waste        | 0.35   | -            | -            | -           | -           | -           | -           | -           | 0.34                   | -           | -   | -           | -           | -           | -           | -           | 0.01                     | -            | -            | -           | -           | -           | -           | -           | 0.01               | 0.01       |
| 15                                       | Sieve Remainings                | 12.56  | 3.04         | -            | -           | -           | -           | -           | -           | 1.67                   | 0.58        | -   | -           | -           | -           | -           | -           | 10.89                    | 2.46         | -            | -           | -           | -           | -           | -           | 13.35              | 10.83      |
| 16                                       | Miscellaneous                   | 3.53   | 0.64         | 10.33        | -           | -           | -           | -           | -           | 0.41                   | 0.46        | 1.67                                      | -           | -           | -           | -           | -           | 3.12                     | 0.18         | 8.66         | -           | -           | -           | -           | -           | 11.96              | 9.70       |
| <b>Sub-Total</b>                         |                                 | <b>80.43</b>                                 | <b>40.53</b> | <b>17.43</b> | <b>3.93</b> | <b>4.32</b> | <b>2.79</b> | <b>3.20</b> | <b>2.47</b> | <b>16.48</b>           | <b>9.21</b> | <b>3.17</b>                               | <b>1.16</b> | <b>0.34</b> | <b>0.58</b> | <b>0.34</b> | <b>0.58</b> | <b>63.95</b>             | <b>31.32</b> | <b>14.26</b> | <b>2.77</b> | <b>3.98</b> | <b>2.21</b> | <b>2.86</b> | <b>1.89</b> | <b>123.2</b>       | <b>100</b> |
| <b>Total</b>                             |                                 | <b>155.1</b>                                 |              |              |             |             |             |             |             | <b>31.86</b>           |             |   |             |             |             |             |             | <b>123.24</b>            |              |              |             |             |             |             |             |                    |            |

| WEIGHTED PERCENT AVERAGE FOR HIGH INCOME GROUP SAMPLES |                                 |               |            |               |            |             |
|--|---------------------------------|---------------|------------|---------------|------------|-------------|
| Sr. No.  | Item                            | High 1        |            | High 2        |            | Average (%) |
|  |                                 | Net Wt. (kg)  | Ratio (%)  | Net Wt. (kg)  | Ratio (%)  |             |
| 1  | Kitchen Waste                   | 49.57         | 30.24      | 46.45         | 34.55      | 32.39       |
| 2  | Paper (recyclable)              | 1.30          | 0.79       | 1.81          | 1.35       | 1.07        |
| 3  | Paper (other paper)             | 22.63         | 13.81      | 18.34         | 13.64      | 13.72       |
| 4  | Textile                         | 9.80          | 5.98       | 12.19         | 9.07       | 7.52        |
| 5  | Grass & Wood                    | 8.08          | 4.93       | 2.30          | 1.71       | 3.32        |
| 6  | Plastic (recyclable)            | 2.41          | 1.47       | 3.73          | 2.77       | 2.12        |
| 7  | Plastic (non-recyclable)        | 18.42         | 11.24      | 11.94         | 8.88       | 10.06       |
| 8  | Leather & Rubber                | 1.29          | 0.79       | 0.46          | 0.34       | 0.56        |
| 9  | Metal (recyclable)              | 0.13          | 0.08       | 0.30          | 0.22       | 0.15        |
| 10   | Metal (non-recyclable)          | -             | -          | -             | -          | -           |
| 11   | Bottle & Glass (recyclable)     | 0.00          | 0.00       | 0.18          | 0.13       | 0.07        |
| 12   | Bottle & Glass (non-recyclable) | 0.94          | 0.57       | 0.00          | 0.00       | 0.29        |
| 13   | Ceramic, Stone & Soil, etc.     | 10.09         | 6.16       | 10.14         | 7.54       | 6.85        |
| 14   | Domestic Hazardous Waste        | 0.03          | 0.02       | 0.20          | 0.15       | 0.08        |
| 15   | Sieve Remainings                | 30.89         | 18.84      | 17.25         | 12.83      | 15.84       |
| 16   | Miscellaneous                   | 8.34          | 5.09       | 9.16          | 6.81       | 5.95        |
| <b>TOTAL</b>   |                                 | <b>163.92</b> | <b>100</b> | <b>134.45</b> | <b>100</b> | <b>100</b>  |

| WEIGHTED PERCENT AVERAGE FOR MIDDLE INCOME GROUP SAMPLES |                                 |               |            |               |            |               |            |               |            |             |
|--|---------------------------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|-------------|
| Sr. No.  | Item                            | Middle 1      |            | Middle 2      |            | Middle 3      |            | Middle 4      |            | Average (%) |
|  |                                 | Net Wt. (kg)  | Ratio (%)  |             |
| 1  | Kitchen Waste                   | 43.03         | 26.22      | 43.60         | 24.48      | 63.32         | 39.18      | 30.21         | 23.63      | 28.38       |
| 2  | Paper (recyclable)              | 1.92          | 1.17       | 1.49          | 0.84       | 1.66          | 1.03       | 0.94          | 0.74       | 0.94        |
| 3  | Paper (other paper)             | 7.79          | 4.75       | 17.75         | 9.96       | 20.23         | 12.52      | 12.14         | 9.49       | 9.18        |
| 4  | Textile                         | 7.75          | 4.72       | 12.88         | 7.23       | 19.06         | 11.79      | 17.82         | 13.94      | 9.42        |
| 5  | Grass & Wood                    | 4.47          | 2.72       | 3.62          | 2.03       | 3.41          | 2.11       | 3.77          | 2.95       | 2.45        |
| 6  | Plastic (recyclable)            | 1.74          | 1.06       | 2.86          | 1.61       | 1.54          | 0.95       | 1.42          | 1.11       | 1.18        |
| 7  | Plastic (non-recyclable)        | 14.65         | 8.93       | 13.04         | 7.32       | 16.17         | 10.00      | 7.90          | 6.18       | 8.11        |
| 8  | Leather & Rubber                | 0.09          | 0.05       | 1.27          | 0.71       | 0.32          | 0.20       | 0.41          | 0.32       | 0.32        |
| 9  | Metal (recyclable)              | 0.28          | 0.17       | 0.17          | 0.10       | 0.32          | 0.20       | 0.25          | 0.20       | 0.16        |
| 10   | Metal (non-recyclable)          | -             | -          | -             | -          | -             | -          | -             | -          | -           |
| 11   | Bottle & Glass (recyclable)     | 0.38          | 0.23       | 1.18          | 0.66       | 0.46          | 0.28       | 1.03          | 0.81       | 0.50        |
| 12   | Bottle & Glass (non-recyclable) | -             | -          | -             | -          | -             | -          | -             | -          | -           |
| 13   | Ceramic, Stone & Soil, etc.     | 6.69          | 4.08       | 19.04         | 10.69      | 3.15          | 1.95       | 17.87         | 13.98      | 7.67        |
| 14   | Domestic Hazardous Waste        | 0.00          | 0.00       | 0.07          | 0.04       | 0.10          | 0.06       | 0.05          | 0.04       | 0.04        |
| 15   | Sieve Remainings                | 42.88         | 26.13      | 34.77         | 19.52      | 21.14         | 13.08      | 15.72         | 12.29      | 17.76       |
| 16   | Miscellaneous                   | 32.44         | 19.77      | 26.40         | 14.82      | 10.74         | 6.65       | 18.33         | 14.34      | 13.89       |
| <b>TOTAL</b>   |                                 | <b>164.11</b> | <b>100</b> | <b>178.14</b> | <b>100</b> | <b>161.62</b> | <b>100</b> | <b>127.86</b> | <b>100</b> | <b>100</b>  |

| WEIGHTED PERCENT AVERAGE FOR LOW INCOME GROUPS |                                 |               |            |               |            |               |            |               |            |             |
|--|---------------------------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|-------------|
| Sr. No.  | Item                            | Low 1         |            | Low 2         |            | Low 3         |            | Low 4         |            | Average (%) |
|  |                                 | Net Wt. (kg)  | Ratio (%)  |             |
| 1  | Kitchen Waste                   | 52.29         | 23.06      | 50.69         | 34.12      | 22.41         | 16.62      | 35.90         | 29.13      | 25.73       |
| 2  | Paper (recyclable)              | 2.41          | 1.06       | 1.48          | 1.00       | 2.61          | 1.94       | 4.34          | 3.52       | 1.88        |
| 3  | Paper (other paper)             | 10.62         | 4.68       | 14.92         | 10.04      | 16.92         | 12.55      | 6.02          | 4.88       | 8.04        |
| 4  | Textile                         | 19.06         | 8.40       | 16.13         | 10.86      | 25.28         | 18.75      | 8.30          | 6.73       | 11.19       |
| 5  | Grass & Wood                    | 1.89          | 0.83       | 1.71          | 1.15       | 11.35         | 8.42       | 21.57         | 17.50      | 6.98        |
| 6  | Plastic (recyclable)            | 3.50          | 1.54       | 2.81          | 1.89       | 0.91          | 0.67       | 2.94          | 2.39       | 1.62        |
| 7  | Plastic (non-recyclable)        | 14.56         | 6.42       | 10.85         | 7.30       | 8.28          | 6.14       | 7.30          | 5.92       | 6.45        |
| 8  | Leather & Rubber                | 0.52          | 0.23       | 0.68          | 0.46       | 1.97          | 1.46       | 9.66          | 7.84       | 2.50        |
| 9  | Metal (recyclable)              | 0.20          | 0.09       | 0.29          | 0.20       | 0.21          | 0.16       | 0.20          | 0.16       | 0.15        |
| 10   | Metal (non-recyclable)          | -             | -          | -             | -          | -             | -          | -             | -          | -           |
| 11   | Bottle & Glass (recyclable)     | 0.80          | 0.35       | 1.51          | 1.02       | 0.34          | 0.25       | 1.12          | 0.91       | 0.63        |
| 12   | Bottle & Glass (non-recyclable) | -             | -          | -             | -          | -             | -          | -             | -          | -           |
| 13   | Ceramic, Stone & Soil, etc.     | 15.02         | 6.62       | 8.86          | 5.96       | 10.10         | 7.49       | 0.57          | 0.46       | 5.14        |
| 14   | Domestic Hazardous Waste        | 0.02          | 0.01       | 0.12          | 0.08       | 0.03          | 0.02       | 0.01          | 0.01       | 0.03        |
| 15   | Sieve Remainings                | 31.07         | 13.70      | 19.71         | 13.27      | 21.59         | 16.01      | 13.35         | 10.83      | 13.45       |
| 16   | Miscellaneous                   | 74.81         | 32.99      | 18.82         | 12.67      | 12.82         | 9.51       | 11.96         | 9.70       | 16.22       |
| <b>TOTAL</b>                                   |                                 | <b>226.77</b> | <b>100</b> | <b>148.58</b> | <b>100</b> | <b>134.82</b> | <b>100</b> | <b>123.24</b> | <b>100</b> | <b>100</b>  |

| <b>CUMULATIVE WEIGHTED PERCENT AVERAGE FOR GUJRANWALA AT DISPOSAL SITE, GONDLANWALA</b> |                                 |                          |                            |                         |                          |
|---|---------------------------------|--------------------------|----------------------------|-------------------------|--------------------------|
| <b>Income Group Ratios</b>  |                                 |                          |                            |                         |                          |
| <b>Assumption</b>   |                                 | <b>High</b>              | <b>Middle</b>              | <b>Low</b>              | <b>Weighted Avg. (%)</b> |
|   |                                 | <b>10%</b>               | <b>60%</b>                 | <b>30%</b>              |                          |
| <b>Sr. No.</b>  | <b>Item</b>                     | <b>High Income Group</b> | <b>Middle Income Group</b> | <b>Low Income Group</b> |                          |
| 1   | Kitchen Waste                   | 32.39                    | 28.38                      | 25.73                   | 27.98                    |
| 2   | Paper (recyclable)              | 1.07                     | 0.94                       | 1.88                    | 1.24                     |
| 3   | Paper (other paper)             | 13.72                    | 9.18                       | 8.04                    | 9.29                     |
| 4   | Textile                         | 7.52                     | 9.42                       | 11.19                   | 9.76                     |
| 5   | Grass & Wood                    | 3.32                     | 2.45                       | 6.98                    | 3.90                     |
| 6   | Plastic (recyclable)            | 2.12                     | 1.18                       | 1.62                    | 1.41                     |
| 7   | Plastic (non-recyclable)        | 10.06                    | 8.11                       | 6.45                    | 7.80                     |
| 8   | Leather & Rubber                | 0.56                     | 0.32                       | 2.50                    | 1.00                     |
| 9   | Metal (recyclable)              | 0.15                     | 0.16                       | 0.15                    | 0.16                     |
| 10  | Metal (non-recyclable)          | -                        | -                          | -                       | -                        |
| 11  | Bottle & Glass (recyclable)     | 0.07                     | 0.50                       | 0.63                    | 0.49                     |
| 12  | Bottle & Glass (non-recyclable) | 0.29                     | 0.00                       | 0.00                    | 0.03                     |
| 13  | Ceramic, Stone & Soil, etc.     | 6.85                     | 7.67                       | 5.14                    | 6.83                     |
| 14  | Domestic Hazardous Waste        | 0.08                     | 0.04                       | 0.03                    | 0.04                     |
| 15  | Sieve Remainings                | 15.84                    | 17.76                      | 13.45                   | 16.27                    |
| 16  | Miscellaneous                   | 5.95                     | 13.89                      | 16.22                   | 13.80                    |
| <b>TOTAL</b>  |                                 | <b>100</b>               | <b>100</b>                 | <b>100</b>              | <b>100</b>               |

| <b>CUMULATIVE WEIGHTED PERCENT AVERAGE FOR GUJRANWALA RESIDENTIAL SOURCES</b> |                                   |                          |                            |                         |                          |
|---|-----------------------------------|--------------------------|----------------------------|-------------------------|--------------------------|
| <b>Income Group Ratios</b>  |                                   |                          |                            |                         |                          |
| <b>Assumption</b>   |                                   | <b>High</b>              | <b>Middle</b>              | <b>Low</b>              | <b>Weighted Avg. (%)</b> |
|   |                                   | <b>10%</b>               | <b>60%</b>                 | <b>30%</b>              |                          |
| <b>Sr. No.</b>  | <b>Item</b>                       | <b>High Income Group</b> | <b>Middle Income Group</b> | <b>Low Income Group</b> |                          |
| 1   | Kitchen waste                     | 67.97                    | 55.65                      | 63.95                   | 59.37                    |
| 2   | Paper (recyclable)                | 2.60                     | 2.60                       | 2.70                    | 2.63                     |
| 3   | Paper (Non-Recyclable)            | 12.44                    | 15.17                      | 10.36                   | 13.46                    |
| 4   | Textile                           | 2.28                     | 5.93                       | 3.37                    | 4.80                     |
| 5   | Grass and wood                    | 1.46                     | 1.59                       | 1.80                    | 1.64                     |
| 6   | Plastic (recyclable)              | 1.19                     | 0.99                       | 0.57                    | 0.89                     |
| 7   | Plastic (non-recyclable)          | 5.82                     | 7.77                       | 6.72                    | 7.26                     |
| 8   | Leather and rubber                | 0.97                     | 0.98                       | 0.35                    | 0.79                     |
| 9   | Metal (recyclable)                | 0.40                     | 0.22                       | 0.13                    | 0.21                     |
| 10  | Metal (non-recyclable )           | 0.02                     | 0.00                       | 0.01                    | 0.01                     |
| 11  | Bottle and glass (recyclable)     | 0.88                     | 1.27                       | 0.91                    | 1.12                     |
| 12  | Bottle and glass (non-recyclable) | 0.21                     | 0.20                       | 0.03                    | 0.15                     |
| 13  | Ceramic, stone and soil etc.      | 0.55                     | 1.84                       | 1.02                    | 1.46                     |
| 14  | Domestic hazardous wastes         | 0.62                     | 0.85                       | 0.26                    | 0.65                     |
| 15  | Sieve Remaining                   | 1.68                     | 4.01                       | 3.96                    | 3.76                     |
| 16  | Miscellaneous                     | 0.91                     | 0.91                       | 3.86                    | 1.80                     |
| <b>TOTAL</b>  |                                   | <b>100</b>               | <b>100</b>                 | <b>100</b>              | <b>100</b>               |



**Figure 1: Orientation for Survey**



**Figure 2: Arrangements for Survey**



**Figure 3: Unloading of Waste from Arm Roll Truck**



**Figure 4: Unloading of Waste from Tractor Trolley**



**Figure 5: Unloaded Waste Sample**



**Figure 6: Mixing & Leveling of Sample**



**Figure 7: Homogenized Waste Sample**



**Figure 8: Division of Sample into 9 Sections**



**Figure 9: Selection of Representative Sample**



**Figure 10: Segregation of Sample into 16 Items**



**Figure 11: Sorting of Major Recyclables**



**Figure 12: Screening Activity**



**Figure 13: Sieving**



**Figure 14: Sorting after Sieving**



**Figure 15: Sieve Remainings**



**Figure 16: Weighing**



**Figure 17: Recording of Weight of Waste Item**