



GUIDELINES
FOR
SOLID WASTE MANAGEMENT ASSESSMENT (BASELINE
SURVEY) IN SECONDARY CITIES AND SMALL TOWNS
IN ASIA AND THE PACIFIC

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Contents

1.	Introduction	3
2.	Estimation of waste generation and composition	4
	Solid Waste Generation and Physical Composition Study	5
	Selection of Sample Area for the Survey	5
	Procedure for Collection and Analysis of Data	5
3.	Examination of existing waste management and recycling systems	9
	Formal collection system	9
	Analysis of operations of a current landfill site	10
	Analysis of the performance of existing compost plants	10
	Informal collection system	15
	Actors and location	15
	Number and income of actors	15
	Quantity and price of collected recyclables	15
4.	Institutional capacity and ongoing initiatives	16
5.	Assessment of Community Needs	17
6.	Identification of Possible Options for Recycling	18
7.	Information for carbon financing opportunities	19
8.	Marketing of compost and its use in agriculture	20
9.	Annex	21
	Required equipment	21
	Questionnaires	22

1. Introduction

Determining an appropriate waste management strategy can be a complicated and challenging endeavor for municipalities. When making decisions and designing waste management strategies, governments must consider multiple components, such as the quantity and composition of waste produced in the urban area, the waste management and recycling systems present, local needs and willingness to pay for improved services, as well as the broader policy, institutional and cultural contexts. For this, a solid waste management assessment (baseline survey) of local conditions can generate critical information and data to support appropriate decision making.

Based on experience undertaking and facilitating these assessments in a range of towns and cities across Asia-Pacific, ESCAP and Waste Concern have developed this set of guidelines to assess municipal solid waste and solid waste management conditions. These guidelines can support policy makers, practitioners and communities to better analyze and understand their local conditions. Solid waste management assessments can be carried out at the neighborhood or ward level, or for the entire town or city.

These guidelines are organized into key sections, as outlined below:

1. Waste generation and composition
2. Waste management and recycling systems (formal and informal)
3. Institutional capacity and ongoing initiatives
4. Community needs
5. Recycling options
6. Market for outputs

2. Estimation of waste generation and composition

From a planning point of view, the total amount of waste generated in a city is very important because equipment and facilities are provided and designed based on the amount of generated waste. In this step of the planning process, the physical and chemical composition of solid waste is also analyzed. Based on knowledge of the amount of solid waste and its physical and chemical composition, waste disposal and resource recovery systems can be designed.

The main objectives of the waste generation estimation are:

- To determine the volume required for on-site storage, transportation, transfer facilities and disposal of solid waste;
- To identify potentials of solid waste recycling/resource recovery;
- To estimate the expected life span of the disposal site.

The data collected from the survey can be used to:

- Identify the daily generation rates in kg/cap/day for residential waste and in kg/sq./day for commercial and institutional waste;
- Calculate the density of waste generated;
- Identify the composition of waste generated in percentage by weight.

The total quantity of waste generated in a city can be estimated by following the steps below:

Step 1: Calculate the per capita domestic waste generated in the city, following the procedures outlined in Steps 1-5 below.

Step 2: Calculate the non-domestic waste generated in the city. Follow the procedures mentioned in section 2. Alternatively, if the domestic waste generation rate is known, the non-domestic waste generation rate can be roughly estimated by multiplying the domestic waste generation rate by 0.7. For instance, if the domestic waste generation rate of a city is found to be 0.2 kg/cap/day, then the per capita waste generated from non-domestic sources of the city is equivalent to $0.2 * 0.7 = 0.140$ kg/cap/day.

Step 3: Calculate the total quantity of per capita waste generation rate. For example, the total waste generation rate in the city is the waste generated rate from domestic sources + waste generation rate from non-domestic sources. For the example in step 2, the total waste generation rate in the city would be 0.34kg/cap/day ($0.20+0.14 = 0.34$ kg/cap/day).

Step 4: Estimate the present population of the city. National statistics publications can be used to estimate a city's target population. Since the information provided in the publication is based on the census, it needs to be updated to estimate the current population as well as the projected year. For instance, if provisions are to be made for the population in the year 2010, then the target population can be determined by the following formula:

$$P_t = P_o (1+r)^n$$

where P_t = Population in the projected year t (in this case 2010)

P_o = Population in the base year

r = growth rate

n = number of years

Step 5: To determine the total quantity of waste generated in the city, multiply the present population of the city by the total per capita waste generation rate. For example, supposing that the total present population of a city is estimated at 50,000 and the waste generation rate is estimated at 0.322 kg/cap/day, the total waste generated per day would be $50,000 * 0.322 = 16,100$ kg/day, or 16.1 metric tons/day.

Solid Waste Generation and Physical Composition Study

Selection of Sample Area for the Survey

- Define several residential areas which represent different socio-economic population groups (low, middle and upper income groups);
- Select 60 to 100 households for each of the residential areas defined in step 1 above;
- Identify a predominantly business area where a large number of shops and offices are located;
- Select 50 shops and offices for the business area defined in step 3 above.

Alternatively, business areas can be further divided into more specific categories such as hotels and restaurants, offices, shops and stores, and workshops. Select approximately 10 to 20 samples for each category.

Collect the waste generated in the above areas once a day at a fixed time for 8 successive days to allow variation over the week (the sample of the first day will be discarded as it may contain waste accumulated from 2 or more days).

Procedure for Collection and Analysis of Data

- Provide the households selected for survey with the sacks/bags and ask them to accumulate the generated waste in the sacks/bags;
- Collect the sacks/bags from houses and shops/offices according to the pre-specified collection route. In order to make the collection process efficient, the workers may need to collect the bags and place them at certain locations prior to loading them onto the truck;
- Repeat the above step for each sample area;
- Weigh each sample bag and record the weight in the data sheets (Table 2.2) according to the numbers assigned to households, shops and offices;

- Randomly select 25 bags from those collected in each sample area and record the household or shop/office numbers of these bags in the data sheet for volume measurement (Table 2.3 and 2.4);
- Open these bags and empty the contents into the bucket until it becomes full. The bucket will then be emptied and the contents spread over the plastic sheet. Repeat this process until all 25 bags for each sample area are emptied. Count the number of bucket full-loads to record the number for volume estimation;
- Separate the waste on the plastic sheet into different types (e.g., vegetable matter, bones, paper, textiles, plastics, leaves/wood, leather/rubber, and glass/ceramic). The separated waste will be put into different buckets for weight measurement;
- Measure the weight of each type of waste and record it in the data sheet;
- Dump all the waste properly and clean the equipment.

Repeat the above mentioned steps daily for the duration of the study.

Market Waste

Are there any large vegetable markets in the town?

What is the total amount of waste that is collected from markets per day? (Please specify for the different markets)

What is the composition of the market waste?

Is there a large proportion of meat and fish waste?

How is waste collected, transported and disposed from markets?

Table1. Format for Recording Data for Daily Generation Rate of Solid Waste

House No.*	Family Size**	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Total
1.									
2.									
3.									
4.									
5.									
.									
.									
100.									
Total	A								B

* Shop/Office No. for commercial waste

** Floor Area for commercial waste

Waste Generation Rate (kg/person/day): $B/A/7$

Table 2. Format for Recording Volume of the Waste

Day	1	2	3	4	5	6	7	Total
No. of Bucketful Load								
Daily Total Volume*								

* Total volume computed for the 25 plastic bags selected

Table 3. Format for Recording Corresponding Weight

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
House Wt. No.	House Wt. No.	House Wt. No.	House Wt. No.	House Wt. No.	House Wt. No.	House Wt. No.
Total a	b	c	d	e	f	g

Total Weight B = (a + b+ c+ d+ e+ f+ g) Kg, Mean density: B/A (kg/m^3)

Table 4. Format for Recording Data for Physical Composition of Waste

Composition	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Total Weight	%
Vegetable								a	$\frac{a}{A} \times 100$
Bones								b	$\frac{b}{A} \times 100$
Paper								c	
Textile									
Plastic									
Grass/Wood									
Leather/Rubber									
Metals									
Glass/Ceramic									
Miscellaneous									
Total								A	100

3. Examination of existing waste management and recycling systems

This section examines the existing systems of solid waste management and recycling in the city, including a performance analysis of existing landfills and compost plants. In order to have a comprehensive picture of the existing system of resource recovery in a city, it is necessary to include surveys of both the formal and informal sector.

An important part of the examination is the mapping of the recycling chain, including the informal waste collection and recycling sector. Ongoing and planned initiatives in solid waste management should also be included to provide a complete picture of the current situation and available resources.

Formal collection system

1. What is the city's annual budget for solid waste management?

Type	USD
Street cleaning	
Waste collection	
Land filling/disposal	
Other (please specify)	

2. How much waste is collected by the formal waste collection sector (per day)?
3. How many staff is employed for waste collection?
4. How many staff is employed in waste management in total?
5. What type of equipment is used?
6. How is waste transported?
7. How many trucks are used by the city for the collection of waste? Please mention the capacity of each truck, the number of trips made per day and fuel consumption per day.
8. Are there any transfer stations?
9. Are there collection fees for households and businesses? If yes, please specify.
10. Are there special collection systems for hazardous waste and hospital waste?
11. Does the formal sector collect recyclable waste?
12. Approximately how much of the formal sector's income comes from selling recyclable wastes?
13. How are the recyclables disposed?

Analysis of operations of a current landfill site

1. Do you have a sanitary landfill in the city?
2. If yes, how long has it been operational?
3. How far is the landfill from the city?
4. What is the total area of the landfill/crude dump/controlled landfill? (Including the depth/height)
5. What is the amount of waste brought to the plant (tons/day)?
6. Please describe the landfill site:
 - a. Unmanaged landfill site with no cover and compaction
 - b. Managed landfill site with cover and compaction
 - c. Landfill site with cover, compaction, liner, gas collection system and leachate collection system
7. Do you have a landfill gas collection system in the landfill?
8. Is the landfill gas vented, flared or used for electricity generation?
9. If landfill gas is used for electricity generation, what is the capacity?
10. What is the methane concentration level in the landfill gas? If no data is available, please conduct a test to collect the methane concentration data.

Analysis of the performance of existing compost plants

In cases where more than one compost plant is operating, planned or constructed, please include separate answers for all plants.

- How many compost plants are in the city?
- What are their respective capacities? (tons/day)
- Where are the plants located?

Input to the plant

1. Amount of waste brought to the plant (tons/day).
2. What percentage of the waste brought to the plant is organic?
3. Total waste composted per day (tons/day).
4. How many households are served by the plant?
5. Source of waste (used for composting):

Household (%)	Market (%)	Others (%) (Please specify)

6. Do you bring mixed waste to your plant? If yes, do you sort it at the plant?
7. If no sorting is done for mixed waste, please provide reasons.
8. What is the average moisture content of waste used for composting processes?
9. Is there any seasonal variation in the moisture content of waste? If yes, please provide data.

Outputs from the plant

1. Daily production of compost (kg/day).
2. Monthly production of compost (tons/month).
3. What is the average price of compost (per ton)?
4. Do you have different prices for different compost qualities or quantities? If yes, please specify.
5. Do you sell compost in bulk or bag?
6. Do you have any seasonal variation in compost sale? If yes, please mention the season.
7. Do you have any problems with marketing of compost? If yes, please specify.
8. Do you regularly test the quality of your compost?
9. If yes, please mention the frequency of the quality test.
10. Please provide us with a copy of lab test results.
11. What does it cost to test the quality of compost to comply with standards?

Operations

1. Days of operation in a week
2. Days of operation in a year
3. Total number of workers:

Male	Female

4. Total number of waste collectors:

Male	Female

5. Total number of supervisory staff:

Male	Female

6. Amount of energy consumed per month (KWH).

7. Amount of fuel consumed per month:

Diesel (litre)	
Petrol (litre)	

8. Amount of water consumed per month (m³ or litre/month).
9. List all of the mechanical equipment used in your compost plant.
10. Operational cost:

Salaries & Bills	USD/month
a. Salary of workers	
b. Salary of waste collectors	
c. Salary of all other staff	
d. Water bill	
e. Electricity bill	
f. Other operation and maintenance cost (Please specify)	

11. Income:

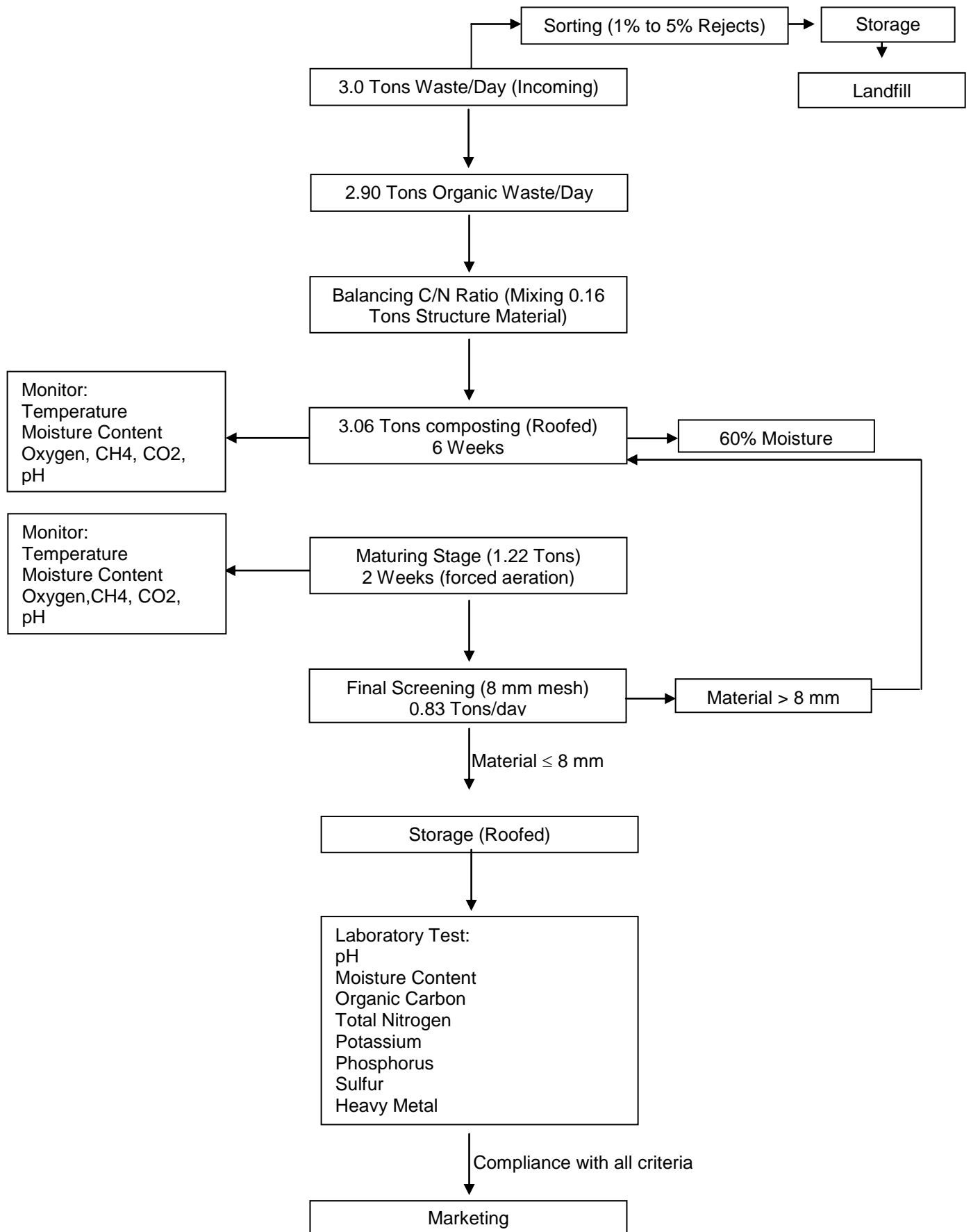
Income Type (monthly average)	USD
a. Sale of compost	
b. Annually from sale of compost	
d. Sale of recyclables	
e. Collection fee	

12. What is the total capacity of the plant?

13. Are you running the plant at full capacity? If no, please specify the capacity it is running at and the reason for not reaching full capacity.

Investments and infrastructure

1. What is the total investment for construction of the compost plant?
 - a. With land cost
 - b. Without land cost
2. How long has the plant been in operation?
3. List any barriers faced in implementing the compost project in your city.
4. What is the total area of your compost plant?
5. How much of the total area of the compost plant is currently used for production processes and how much land is vacant?
6. Please provide a flow diagram of the composting process.
7. Please provide a mass balance of the composting process. An example of a mass balance is shown below.



Conduct a time and motion study of the compost plant including the following data:

TIME AND MOTION STUDY

Activity	Time Required (hr)/day	Manpower	Remarks
Collection of waste			
Transportation of waste to compost plant			
Unloading of waste			
Weighing, sorting, mixing and piling			
Screening of compost			
Bagging of compost			
Cleaning of plant			
Total Waste			
Labor productivity of composting		tons/hr/labor/day	
Labor productivity		tons/hr/labor/day	

Example of Time and Motion Study of Waste Concern

**TIME AND MOTION STUDY
(Evening Shift)**

Activity	Time Required (hr)	Manpower	Remarks
Loading at Kawran Bazar	2		DCC Staff
Travel Time to Katchpur	1.5		
Unloading at Katchpur	1.5	3	Baraka
Sorting weighing, mixing and piling	3.5	5	WC
Total Waste	5.732 tons		
WCC productivity	0.32 tons/hr/labor		sorting+weighing+mixing+piling
Baraka productivity	1.27 tons/hr/labor		unloading

Informal collection system

Actors and location

Conduct a reconnaissance survey in the study area. The objective of this survey is to identify the actors involved in waste recycling. Generally, several actors are involved in the waste recycling trade of cities in least developed countries. Actors may include:

- Households
- Waste Pickers
- Hawkers
- Municipal Waste Collectors
- Small Shops Dealing with Recyclables
- Whole Sale
- Industries (Large and Small)

Usually, shops and industries dealing with recyclable materials are clustered in certain areas of a city. Collect information about the location of these shops and numbers, industries from hawkers, waste pickers, municipal officials or NGOs.

Number and income of actors

To estimate the number of actors, ask each actor to whom they sell their retrieved/collected materials and the number of actors who collect and sell the same material. For instance, hawkers sell their collected materials to small shop owners, so small shop owners can provide information on how many hawkers sell collected materials to their shop. Each shop usually has a fixed number of hawkers who provide them with materials daily.

For example, if there are 50 small shops which buy recyclables and each shop has, on average, 3 to 4 hawkers who provide them with recyclables, the total number of hawkers can be roughly estimated as $50 \text{ shops} \times 3 \text{ hawkers} = 150 \text{ hawkers}$.

Similarly, calculate the number of actors involved in each actor group.

For waste pickers, interview a sample on working conditions (working hours, times and income). The interviews should also give an idea of their interest in working with the IRRC.

Quantity and price of collected recyclables

Conduct a questionnaire survey amongst all actors to collect data about the items collected as well as their quantity and price. Estimate the total quantity of recyclables collected in the city by each actor. For instance, if there are 100 hawkers in an area and each collects an average of 5 kg of paper daily, then the total amount of paper collected by the hawkers in that particular area is $100 \text{ hawkers} \times 5 \text{ kg} = 500 \text{ kg}$.

4. Institutional capacity and ongoing initiatives

Apart from a household questionnaire survey, a structured questionnaire survey can be conducted to record the views of municipal staff and identify institutional weaknesses regarding solid waste management and their views on how best to improve it. In this step, government and donor initiatives on solid waste management should also be mapped.

Please mention any government regulations, guidelines or initiatives on promoting separation at source and 3R.

- Is it required by law to recycle organic waste into compost or biogas? If yes, please describe the regulation on organic waste.
- Is there any government program/policy to promote use of compost (such as the purchase of compost by the government)? If yes, please include the price.
- Are there any governmental standards for compost? If yes, please provide a copy of the standard.
- Do you have any policies/rules/standards for waste management? If yes, please attach a copy.
- Are there any donor supported programmes for landfill or composting? Who is implementing them? What are their main components?

5. Assessment of Community Needs

In addition to the aforementioned surveys, a community needs assessment survey should be conducted. In order to assess community needs, a household sample survey can be conducted among different income groups using a structured questionnaire survey.

The questionnaire format is attached in the annex.

The survey sample size is determined using the following steps:

- Divide the total population into four income groups according to the distribution of monthly household income, as follows:

- i) Low
- ii) Lower Middle
- iii) Middle
- iv) High

- Sample sizes are determined using the simple random sampling formula described below.

Sample size for 1st income group, $n_1 = (N_1/N) \times n$;

Where N_1 = Population in the 1st income group

N = Total population

$$n = (N \times z^2 \times P \times Q) / (N \times d^2 + z^2 \times P \times Q)$$

Here,

P = Proportion of male respondents = 0.5

Q = Proportion of female respondents = 0.5

d = Precision = 7% (assumed)

Z = 1.96 at 95% confidence level

6. Identification of Possible Options for Recycling

This step of the planning process deals with the identification of possible options for solid waste recycling based on the estimated waste generation rate, physical and chemical composition of solid waste and existing patterns of solid waste recycling and resource recovery.

Recycling is very popular in many cities and towns in Asia and the Pacific. However, recycling activities are concentrated on the inorganic portion of waste.

Organic material forms the major portion of the urban solid waste composition in cities and towns of developing countries in Asia and the Pacific. Methods to recover resources from organic material can be highly beneficial to urban local bodies, as it can reduce waste management costs to a great extent. Organic material can be reused in the following ways:

- To feed animals (fodder)
- To improve soil (compost)
- To produce energy (bio-diesel, biogas or briquetting)

Bio-diesel

A survey of possibilities for collecting used cooking oil should be included. Is cooking oil collected? Are there hotels or restaurants that use large quantities of cooking oil? What do they do with the used oil?

Bio-gas production

A survey of possibilities for the production of bio-gas should be included, if considered feasible.

7. Information for carbon financing opportunities

This chapter provides additional information required for the preparation of PINs and the Calculation of Baseline Emission for Carbon Co-Financing.

1. What is the physical composition of waste (lab test required)?

Type	Percent (%)
Organic (compostable)	
Recyclable	
Non-compostable/recyclable	

2. What is the calorific value of solid waste? (lab test required)
3. What is the average moisture content? (lab test required)
4. What is the current bank interest rate for infrastructure projects/industrial projects?
5. What is the amount of total electricity generation in your country/province? (MW/year)
6. What are the sources of energy in your country and province?
 - a) Coal.....%
 - b) Gas.....%
 - c) Diesel..... %
 - d) Hydro%
 - e) Any other%
7. Is there any biogas/incineration/biodiesel plant in your city/province? If yes, please provide details.
8. Is there any tax on carbon credits in your country? If yes, what is the percentage?
9. Please provide a list of permissions required to establish a compost plant/biogas plant/biodiesel plants.
10. Is there any strategy/policy of your government on CDM/carbon trading? If yes, please provide details.
11. What is the rate of corporate tax in your country?
12. What is the price of electricity? (USD/Kwh)
13. What is the price of water? (USD/cubic meter of liter)
14. What is the annual amount of chemical fertilizer consumption in the country?
15. What is the amount of organic fertilizer consumption in the country?
16. Is the government providing any incentives to promote composting in the country?
17. Please provide annual rainfall and temperature data for your city.
18. What is the most common method of municipal waste disposal in your country and city?
 - a) Open dump
 - b) Controlled landfill
 - c) Sanitary landfill
 - d) Semi-aerobic landfill

8. Marketing of compost and its use in agriculture

In order to determine the demand for compost, a survey of farmers is required, while for the supply side, a survey of fertilizer shops is important.

Farmers

Farmers are users of chemical fertilizer/compost and, at the same time, a producer of biomass, which can be used as raw material for compost production. Farmers are also the producers of crops and vegetables utilizing irrigation pumps to irrigate their land.

The questionnaire survey for farmers should be conducted to determine the present use of compost on their crop land, the demand for compost, their ability and willingness to pay for compost and their present agricultural practice in terms of doses and crop type. This survey also aims to understand the energy consumption of farmers in irrigating their agricultural lands. The total sample size will depend upon the number of farmers in the region.

Fertilizer Shops

It is likely that there is a network of fertilizer dealers involved in supplying agricultural products including pesticides, seeds, chemical fertilizers and organic fertilizer/compost. In rural areas, there are fertilizer retail shops.

This questionnaire survey will be conducted among selected dealers and retailers of fertilizer located in the region. Information related to the sales of organic fertilizer, the percentage of chemicals, compost and enriched compost sale and its seasonal demand should be collected.

9. Annex

Required equipment

Conducting the Solid Waste Generation and Physical Composition Study (Chapter 2):

- A handcart or rickshaw van of 1.0 cubic meter capacity for waste collection;
- A number of woven sacks/bags to collect the sample into (old rice or potato sacks can be used). The number of sacks can be calculated as 7 days X (No. of households + No of shops and offices selected for survey);
- Tape or rope to tie the neck of the sack/bag to stop the collected sample from flowing out. Weigh 10 of these sacks so that average weight of each empty sack can be calculated;
- Labels to identify the area the sample was collected from;
- A balance to weigh the sample in the sack;
- Record sheets;
- Shovels, gloves;
- A bucket to measure the volume of the waste and to use as a container for weighing;
- A tape to measure the internal dimensions of the bucket.

Monitoring the CDM-based composting process:

- Landfill Gas Analyzer (including calibration kit)
- Temperature Monitoring Meter (Digital with 2 m probe)
- Moisture Monitoring Meter
- DO meter

Questionnaires

Questionnaire for Household Survey

Date:.....

Name of Surveyor:.....

1. Name of Municipality.....
2. Name of Neighborhood.....
3. Holding No.....
4. Name of the head of the HH.....
5. Educational qualification of the head of the HH.....
 - (a) Illiterate
 - (b) Primary
 - (c) Secondary
 - (d) Higher
6. Profession of the head of the HH.....
 - (a) Government employee
 - (b) Private employee
 - (c) Business
 - (d) Student
 - (e) Housewife
 - (f) Retired
7. Monthly income/expenditure:.....
8. Household size:.....
9. Are you satisfied with your current waste disposal system?

Y / N

10. The current waste disposal system is polluting the environment. Do you agree?

Y / N ; If yes, identify the reason/reasons:

- (a) As there is no dustbin nearby, wastes are disposed of here & there and create nuisance.
- (b) Wastes are not collected regularly.
- (c) Wastes are left around the dustbin.
- (d) Wastes are left on the drain.
- (e) Wastes are left on the road.

11. Who disposes your household waste?

- (a) Servant
- (b) Family member
- (c) Wastes are collected by the city corporation from the house
- (d) Wastes are collected by a locally-recruited person from the house

12. Where is the household waste disposed?

- (a) In the dustbin
- (b) By the side of the road as there is no dustbin
- (c) In an empty space near the house
- (d) Inside the house
- (e) Don't know

13. What are the problems you are facing for disposing your waste?

- (a) No dustbin in the area
- (b) Dustbin is quite far away

- (c) Dustbin is not in the right place
- (d) Dustbin is not in the way of movement
- (e) It is smelly near the dustbin
- (f) No one is at home to dispose of the waste

14. How much are you currently spending for waste disposal per month? (Rp or dong/month)

15. Satisfaction level about the present municipal waste removal system:

- (a) Very good
- (b) Good
- (c) Ok/medium
- (d) Not satisfactory

16. How often do you dispose of your household waste?

- (a) Every day
- (b) Once every two days
- (c) Once every three days

17. You dispose your household waste in:

- (a) Polythene /plastic packet
- (b) Small bucket
- (c) Any other container

18. Generally, when do you dispose of your waste?

- (a) No definite time
- (b) Between 6am to 6pm
- (c) After 6pm

19. How often does the city municipality collect the waste?

- (a) Everyday
- (b) Once in two days
- (c) Once in three days
- (d) Irregularly
- (e) Don't know

20. Which of the following problems (generated from improper waste disposal) are responsible for polluting the local environment?

- (a) Wastes being disposed in the drain and blocking the drain.
- (b) Wastes being disposed in the sewerage line and blocking the line.
- (c) Wastes being disposed on the road and spreading odour.
- (d) Uncollected waste from the drain or dustbin spreading odour.
- (e) Mosquitoes/flyes from the dumped wastes
- (f) Deterioration of the local environment and beauty by the improper disposal of waste here & there.

21. Which system do you prefer for removal of your household waste?

- (a) A collector will collect the waste from the house.
- (b) The collector will come to a certain place at a certain time, you will give him the waste.
- (c) You yourself will dispose the waste in the dustbin.
- (d) You will keep your waste container at a certain time by the roadside and the collector will collect it from there.

22. If your waste is collected directly from your house, how much are you ready to pay monthly for the system?

Rp/ Dong.....

23. If your waste is collected directly from your house, then it will be suitable if it is collected:

- (a) Every day
- (b) Once every two days
- (c) Once every three days

24. When do you prefer for your waste to be collected?

- (a) Morning
- (b) Noon
- (c) Afternoon
- (d) Evening

25. Do you know that from kitchen and vegetable wastes, an organic fertilizer can be made which is good for the environment, does not degrade the fertility of land like other chemical fertilizers, and is very much useful for plants and lands?

Y / N

26. Would you like to use this organic fertilizer in your garden or in the plants' tub?

Y / N

27. Will you agree to separate your kitchen waste from other household waste?

Y / N;

If no, will you agree if you are given two separate containers to segregate your kitchen waste from other wastes?

Y / N

28. Community participation is inevitable for local waste collection system and improvement of the environment – do you agree?

Y / N

29. Do you have any idea about Community Based Organizations (CBO)?

Y / N

30. Community based Organization (CBO)s can improve the local waste removal system and help to provide a better environment. Would you like to participate in these types of activities? Y / N

31. Current priority need:

Facilities	Priority number
Water supply	
Sanitation	
Solid waste management	
Drainage	

Questionnaire for Institutional Survey on Sanitation & Solid Waste Management

Name of Surveyor:.....

Date:.....

Signature of Surveyor.....

1. Name of the Municipality.....
2. Total Road length (Km).....
3. Total length of drain (Km): metalled.....non-metalled.....
4. Any Sanitation Committee/SWM..... Y/ N
5. Municipal budget for Sanitation.....
6. Municipal budget for SWM
7. Government’s grant for Sanitation.....
8. Government’s grant for SWM
9. Internal revenue spent for Sanitation.....
10. Internal revenue spent for SWM.....
11. Number of public toilets.....
12. Area & depth of landfill.....
13. How long the landfill site is in operation.....
14. Number of dustbins/containers.....
15. Number of individuals involved in waste collection, road sweeping, etc.
.....
.....
.....
16. Number of hospitals/clinics.....
17. How hospital/clinical waste is managed
.....
.....

.....
.....
.....

18. Collection, treatment and/or disposal facilities for wastes from pit latrines, septic tanks, etc.

.....
.....
.....

19. Govt. or local govt. activities/projects on Sanitation & SWM sector:

.....
.....
.....
.....
.....
.....
.....

20. On-going govt. or local govt. (public sector) activities/projects on public awareness development for Sanitation & hygiene promotion:

.....
.....
.....

21. Names & activities/projects of national, international and local NGOs working in the Sanitation & SWM sector:

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.....

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22. On-going activities/projects of NGOs on public awareness development for Sanitation & hygiene promotion:

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23. Private sector activities/projects on Sanitation & SWM sector:

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.....

.....

.....

24. On-going private sector activities/projects on public awareness development for Sanitation & hygiene promotion:

.....

.....

.....

.....

25. Institutional arrangements and organizational responsibilities shared for Sanitation and Solid Waste management:

Who is doing what & how		
	Sanitation	SWM
Government		
Private		
NGO		

Survey Questionnaire for Farmers

Code No :

1. Name of Household Head:.....

2. Quantity of Land (Decimal): House.....Own
Agriculture.....Share Cropping

3. Income of the Household
.....Taka

4. Information of Family:

a) Total Members of the Family
.....Male.....Female

b) Number of Earning Family Member
.....Male.....Female

c) Number of Family Member Engaged in Agriculture
.....Male.....Female

d) Number of Family Member Engaged in Non-agriculture
.....Male.....Female

e) Non-agricultural Work (Please Specify)
.....

5. Do you own any trees? If yes:

Name of Tree	Number	Future Plan

6. What is the amount of leaves & branches used as cooking fuel from your own trees per month?kg.

7. Did you participate in social forestry programmes? Yes / No

If yes:

Name of tree	Number	Future plan

8. The names of the crops you cultivate:

Crop	Sowing Time	Weeding time	Harvesting time

9. Number of Animals:

Animal	At present	3-5 years	Above 5 years
a) Cow			
b) Buffalo			
c) Goat			
d) Sheep			
e) Horse			
f) Poultry			
g) Pigeon			
h) Other			

10. What are you using for cultivation? (Please mark the appropriate box)

	At present	3-5 years	Above 5 years
a) Animal			
b) Tractor/Tiller			
c) Animal & Tractor			

11. What do you use for irrigation in your land?

- a) Diesel pump
- b) Electric pump
- c) Rental pump
- d) Other

12. What amount do you spent in a year?

- a) FuelTaka
- b) Electricity BillTaka
- c) RentTaka
- d) MaintenanceTaka
- e) Other.....Taka

13. Which source are you using for irrigation?

- a) River/Canal
- b) Underground Water

14. If you use underground water, please mention the depth of it.

.....Metre(s)

15. Do you face any problems in irrigation? If any, please describe:

.....

16. Do you have any suggestions to solve the irrigation problem?

.....

17. What do you do with poultry waste? (Please mark the appropriate space)

Use	Quantity (Approximate) (Kg/day)
a) Use as fertilizer	
b) Use as fish food	
c) Dispose as waste	
d) Use after 6 months	
e) Other.....	

18. What do you do with cow dung? (Please mark the appropriate space)

Use	Quantity (Approximate) (Kg/day)
a) Use as fuel	
b) Use directly on the land	
c) Use on the land after decomposing	
d) Sell	
e) Dispose as waste	
f) Other	

19. What do you do with agricultural waste? (Please mark the appropriate space)

Use	Quantity (Approximate) (Kg/day)
a) Use as fuel	
b) Dispose as waste	
c) Partially dispose and partially use as fuel	
d) Other	

20. What fuel do you use for cooking purpose?

Fuel	Quantity (Kg/month)
a) Cow dung	
b) Twigs	
c) Leaves	

d) Agricultural waste	
e) Firewood/logs	
f) Charcoal	
d) Other	

21. What is your per month fuel cost for cooking purposes?Taka

22. Do you use kerosene? Yes/No

If yes, for what.....

CostTaka/month

23. Is smoke created during cooking? Yes/No

If yes, what problems are created? (Please mark the appropriate space)

a) Respiratory Problems	
b) Eye Disease	
c) Asthma	
d) Others	

24. What do you do with kitchen waste? (Please mark the appropriate space)

Use	
a) Dispose as waste	
b) Use as poultry food	
c) Partially dispose and partially use as poultry food	
d) Fill low-lying areas	
e) Other	

25. Do you know about compost? Yes/No

26. If yes, describe the usefulness of compost:

- a)
- b)
- c)
- d)

27. Do you produce compost? Yes/No

28. Are you interested in producing compost? Yes/No

29. If not, why?

.....

30. If yes, what materials will you use to produce compost?

Material	Source	Quantity (kg)	Time required to obtain

31. If you don't get compost producing materials, what will you do?

.....

32. What will you do with the produced compost? (Please mark the appropriate space)

Self-use	Sell	Both

33. Who will collect the compost producing materials?

.....

34. Is it possible to get organic waste from adjoining markets? Yes/No

35. If you produce compost, are you facing any problems? Yes/No

36. If yes, what problems are you facing?

- a) Demand of organic materials
- b) It takes time to produce compost
- c) Organic materials must be bought
- d) Lack of appropriate technology
- e) Lack of funds

37. What fertilizer have you used on your land over the last 25 years?

	Kg/Decimal
a) Cow dung	
b) Chemical fertilizer	
c) Water hyacinth	
d) Compost	
e) Enriched compost	
f) Other.....	

38. Do you think that present cultivation cost has increased compared to the past?
Yes/No

39. What amount of fertilizer are you using on your land according to crop patterns?
(Kg/Decimal or Liter/Decimal)

Crop	Urea	Potash	TSP	Insecticide	Compost

40. Do you think that crop production is decreasing day by day? Yes/No

If yes: (Decimal/Kg)

Crop	At present	10 years ago

41. Do you think that soil fertility is decreasing day by day? Yes/No

a) If yes, what do you think is the cause? (Please mark the appropriate space)

a) Scarcity of organic matter in soil	
b) Absence of crop residue	
c) Burning of crop residue	
d) Non-deposition of silt on land due to dams	
e) Other	

a) Which seems to you to be the best organic fertilizer?

1. Cow dung 2. Compost

c) Is there any weather issue leading to decreased soil fertility or crop production? (Please mark the appropriate space)

Issue	
a) Long Summer	
b) Drought	
c) Dense fog	
d) Other.....	

d) Do you change crop pattern due to weather change? Yes/No

If yes, please name the crop:

Main Crop	Changed Crop

42. What are the barriers to producing more crops? (Please write according to serial)

Barriers	Serial
Lack of or high price of chemical fertilizer	
Lack of irrigation (for electricity or diesel)	
Lack of seed	
Decrease in soil fertility	
Lack of agricultural debt	
Other.....	

Fertilizer Shop Survey Questionnaire

01. Name of Owner / Shop

.....

Address

02 Type of Shop: Dealer / Retailer

03. Information about fertilizer sale:

Name of Fertilizer	Sale Quantity/ month	Price/kg or Price/bag	Height sale period (Season)	Total sale quantity in last year
1. Urea				
2. MoP				
3. TSP				
4. Compost				
5. Enriched compost				
6. Pesticide				
7. Other				

04. Has the amount of compost sale been increasing or decreasing in the last 3-5 years?
Increasing / Decreasing

05. If decreasing, what are the causes?

06. If increasing, why has it increased & what is the quantity of increase?
.....

07. How many dealer shops exist in your area & how many dealers sell compost/enriched
compost?
.....

08. How many retailer shops exist in your area & how many retailers sell
compost/enriched compost?

09. If you sell compost/enriched compost, please fill the table:

Compost/enriched compost	Name of Manufacturer & Address	Number of bags	Compost used for (Name of Crop)

--	--	--	--

10. Duration of compost/enriched compost sale:

11. Do you know of the advantages of compost? a) Yes b) No

12. If yes, from where did you acquire the information?

.....

13. Do you supply compost-use procedures to farmers at the time of compost sale?

.....
.....
.....
.....
.....

14. What steps may be taken to increase the sale of compost?

.....
.....
.....
.....
.....