



GUIDELINES FOR PREPARATION OF AN ACTION PLAN FOR RESOURCE  
RECOVERY IN SECONDARY CITIES AND SMALL TOWNS IN ASIA AND THE  
PACIFIC

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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 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

These guidelines have been prepared by Waste Concern and ESCAP to facilitate the development of an action plan for solid waste management in secondary cities and small towns using carbon financing opportunities. The action plan will include the implementation of a joint project between the local government, an NGO partner and ESCAP with the support of Waste Concern.

The guidelines have six main components:

- Estimation of Waste Generation and composition
- Examination of Existing System of Waste Management and Recycling
- Assessment of community needs
- Identification of possible options for recycling
- Information for carbon financing opportunities
- Marketing of compost and its use in agriculture

## 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 based on the amount of generated waste, necessary equipments and facilities have to be provided and designed. In this step of the planning process, physical and chemical composition of solid waste is also analyzed. Based on the knowledge of amounts of solid wastes and physical and chemical composition, waste disposal and resource recovery system 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 the residential waste and in kg/sq./day for the commercial waste, institutional waste;
- Calculate the density of waste generated;
- Identify the composition of waste generated in percentage by weight.

Following steps could be followed to estimate the total quantity of waste generated in a city:

Step 1: Calculate the per capita domestic waste generated in the city. Follow the procedures mentioned 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, non-domestic waste generation rate can be roughly estimated by multiplying 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. From step 2, the total waste generation rate in the city can be calculated  $0.20 + 0.14 = 0.34$  kg/cap/day).

Step 4: Estimate the present population of the city. For estimating the target population of the city, national statistics publications can be used. Since the information provided in the publication is based on the census, they would need to be updated for estimating 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 of the projected year  $t$  ( in this case 2010)

$P_o$  = Population of the base year

$r$  = growth rate

$n$  = number of years

Step 5: To get the total quantity of waste generated in the city multiply the present population of the city by the total per capita waste generation rate. Suppose if the total present population of a city is estimated at 50,000 and the waste generation rate estimated at 0.322 kg/cap/day, then the total waste generated per day is  $50,000 * 0.322 = 16,100$  kg/day or 16.1 metric ton/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;

Alternative, further divide the business areas into more specific categories such as hotels and restaurants, offices, shops and stores, workshops and for each category select approximately 10-20 samples.

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 (Table2.2) according to the numbers assigned to households, shops and offices;

- Select randomly 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 ( Table2.3 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 will be spread over the plastic sheet. Repeat this process until all the 25 bags for each sample area emptied and count the number of bucket full loads which will be recorded for the volume estimation ;
- Separate the waste on the plastic sheet into different types (e.g. vegetable matter, bones, paper, textiles, plastics, leave/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 everyday 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<sup>3</sup>)





### 3 Examination of existing waste management and recycling systems

This part examines the existing systems of solid waste management and recycling in the city, including performance analysis of existing landfills and compost plants. In order to get 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 mapping of the recycling chain, including the informal waste collection and recycling sector. Ongoing and planned initiatives in solid waste management should be 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 (pls 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 collection of waste. Please mention capacity of each truck along with number of trips made per day as well 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 their income comes from selling recyclable wastes?
13. How are the recyclables disposed?

**Analysis of operations of 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 land fill from the city?
4. What is the total area of the landfill/crude dump/controlled landfill? (including the
5. depth/height)
6. What is the amount of waste brought to the plant (tones/day).
7. 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
8. Do you have any landfill gas collection system in landfill?
9. Is the landfill gas vented or flared or used for electricity generation?
10. If landfill gas is used for electricity generation, what is the capacity?
11. Do you know 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 the cases where more than one compost plant is operating, planned or constructed, please include separate answers for all plants.

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

**Input to the plant**

1. Amount of waste brought to the plant (tones/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 (%) (pls 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 the mixed waste, please provide reasons.
8. What is average moisture content of waste used for composting process?
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 problem with marketing of compost? If Yes, then 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 the standards?

**Operations**

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

Male no	Female no

4. Total number of waste collectors:

Male no	Female no

5. Total number supervisory staff:

Male no	Female no

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 the mechanical equipments used in your compost plant.

10. Operational cost:

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

11. Income:

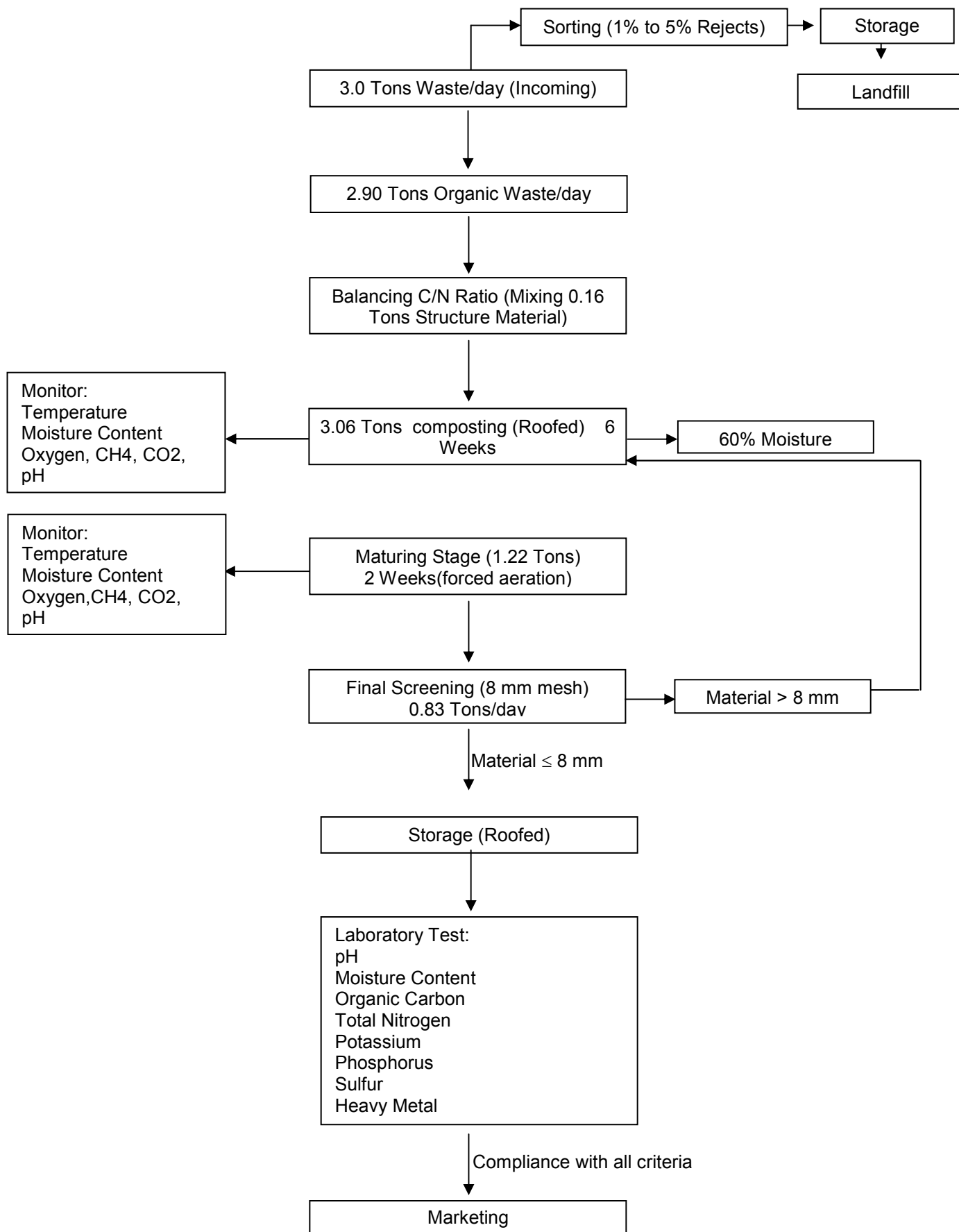
<b>Income Type (Monthly average)</b>	<b>USD</b>
a. Sale of compost	
b. Annually from sale of compost	
d. Sale of recyclable	
e. Collection fee	

12. What is the total capacity of the plant?

13. Are you running the plant at full capacity? If No, please specify what capacity 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. Since how long the plant is in operation? .....
3. List any barriers you have faced in implementing the compost project in your city.
4. What is the total area in your compost plant?
5. How much of the total area of the compost plant is currently used for production process 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 following data:**

**TIME AND MOTION STUDY**

<b>Activity</b>	<b>Time Required (hr)/day</b>	<b>Manpower</b>	<b>Remarks</b>
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 for 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)**

<b>Activity</b>	<b>Time Required (hr)</b>	<b>Manpower</b>	<b>Remarks</b>
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 waste recycling trade of cities of least developed countries. Actors could 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, and 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 how many are there who collect and sell the same material. For instance, hawkers sell their collected materials to small shop owners, so ask small shop owners 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 in average 3-4 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 in 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 recyclable collected in the city by each actor. For instance, if there is 100 hawkers in an area and each collects an average of 5 kg paper daily, then total amount of paper collected by the hawkers in the particular area is  $100 \text{ hawkers} \times 5 \text{ kg} = 500 \text{ kg}$ .

## **4 Institutional capacity and ongoing initiatives**

Apart from household questionnaire survey, structured questionnaire survey could be conducted to record the views of municipal staff to identify institutional weakness 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 government regulations, guide lines 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 purchase of compost by the government, if yes, please mention the price)
- Do you have any Government standards for compost? if yes, please provide a copy of the standard
- Do you have any policy/ 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 aforementioned surveys mentioned, community needs assessment survey should be conducted. In order to assess community needs household sample survey shall be conducted in different income groups using structured questionnaire survey.

Questionnaire format is attached as Annex.

Sample size for the survey will be determined by using following steps:

- The total population of shall be divided 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 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 identification of possible options for solid waste recycling based on the estimated waste generation rate, physical and chemical composition of solid waste and existing pattern of the solid waste recycling and resource recovery.

In many cities and towns in Asia and the Pacific recycling is very popular. However, the recycling activities are concentrated on the inorganic portion of the 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. Ways to recover resource from the organic material can be highly beneficial to the urban local bodies as it can reduce the waste management cost to a great extent. Organic material can be reused in the following ways:

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

### Bio-diesel

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

Survey of possibilities for 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 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 current bank interest rate for infrastructure projects/ industrial projects
5. What is the amount 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/bio diesel 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/bio diesel plants.
10. Is there any strategy/policy of your government on CDM/carbon trading? If yes please provide details.
11. What is rate of corporate tax in your country?
12. What is the price of electricity USD/Kwh
13. What is the price water USD/cubic meter of liter
14. What is annual amount of chemical fertilizer consumption in the country?
15. What is amount of organic fertilizer consumption in the country?
16. Is the government providing any incentive to promote compost in the country?
17. Please provide annual rainfall, temperature data of 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, survey of farmers is required while for supply side survey of fertilizer shops are important.

### Farmers

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

The questionnaire survey on the farmers should be conducted to determine the present use of compost in their crop land, their demand for compost, as well as their ability and willingness to pay compost and also their present practice of agriculture in terms of doses and crop type. This survey also aims to understand about the energy consumption by farmers to irrigate their agricultural lands. 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 starting from pesticides, seeds, chemical fertilizers and organic fertilizer/compost. In the rural areas there are fertilizer retail shops.

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

## 9. Annex

### Required equipment

For conducting the Solid Waste Generation and Physical Composition Study (Chapter 2)

- A hand cart or rickshaw van of 1.0 cubic meter capacity for collection of waste;
- 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 flowing out. Weigh 10 of these sacks so that average weight of each empty sack can be calculated;
- Some labels to identify the area the sample was collected from;
- A balance to weight the sample in the sack;
- Record sheets ;
- Shovels, Gloves;
- A bucket to measure the volume of the waste and also to be used as a container for weighing;
- A tape to measure the internal dimensions of the bucket;

For monitoring 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. 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 off here & there and create nuisance.
- (b) Wastes are not collected regularly.
- (c) Wastes are left around of the dustbin.
- (d) Wastes are left on the drain.
- (e) Wastes are left on the road.

11. Who dispose 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 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 your household waste?

- (a) Everyday
- (b) Once in two days
- (c) once in 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 your waste?

- (a) No definite time
- (b) Within 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/ flies from the dumped wastes
- (f) Deterioration of local environment and beauty for 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) Everyday
- (b) Once in two days
- (c) Once in 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 environment and does not degrade the fertility of land like other chemical fertilizers, on the contrary 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 environment – do you agree?

Y / N

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

Y / N

30. Community based Organization (CBO)s can improve the local waste removal system and can help to provide a better environment. Do you like to participate in this type 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 toilet.....
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.  
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16. Number of hospitals/ clinics.....
17. How hospital/ clinical waste is managed  
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18. Collection, treatment and/or disposal facilities for wastes from pit latrines, septic tanks etc.

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

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

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

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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 activities/ projects of private sectors on public awareness development for Sanitation & hygiene promotion:

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

Who is doing what & how		
	Sanitation	SWM
Government		
Private		
NGO		

## Farmer's Survey Questionnaire

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. Have you any tree? If any :

Name of Tree	Number	Future Plan

6. Amount of leaf & branch used as cooking fuel from 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 name of crop you cultivate :

Crop	Sowing Time	Weeding time	Harvesting time

9. Number of Animal:

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 give the tick mark on appropriate place)

	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) Others .....

12. What amount do you spent in a year?

- a) Fuel .....Taka
- b) Electricity Bill .....Taka
- c) Rent .....Taka
- d) Maintenance .....Taka
- e) Others.....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

15. Do you face any problem for irrigation? If any, please mention it

.....  
 .....

16. Do you have any suggestion to solve irrigation problem?

.....

17. What do you do with poltry waste? (Please give the tick mark on appropriate place)

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

18. What do you do with cow dung? (Please give the tick mark on appropriate place)

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

18. What do you do with agricultural waste? (Please give the tick mark on appropriate place)

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 purpose? .....Taka

22. Do you use kerosene? Yes/No

If yes, for what.....Cost  
.....Taka/month

23. Is smoke created during cooking? Yes/No

If yes, What problems are created? (Please give the tick mark on appropriate place)

a) Respiratory Problem	
b) Eye Disease	
c) Asthma	
d) Others .....	

24. What do you do with kitchen waste? (Please give the tick mark on appropriate place)

Use	
a) Dispose as waste	
b) Use as poultry food	
c) Partially dispose and partially use as poultry food	
d) Fill the low-lying area	
e) Others .....	

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 to produce compost? Yes/No

29. If no, why?

.....

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

Material	Source	Quantity (kg)	Getting period

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

.....  
.....

32. What will you do with the produced compost? (Please give the tick mark on appropriate place)

Self use	Sell	Both

33. Who will collect the compost producing materials?

.....

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

35. If you produce compost, are you facing any problem? 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 have to buy
- d) Lack of appropriate technology
- e) Lack of fund

37. What fertilizer are you using in your land for last 25 years?

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

38. Do you think, present cultivation cost has been increased than the previous time?  
Yes/No

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

Crop	Urea	Potash	TSP	Insecticide	Compost

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

If yes: (Decimal/Kg)

Crop	At present	10 years ago

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

a) if yes, cause: (Please give the tick mark on appropriate place)

a) Scarcity of organic matter in soil	
b) Absent of crop residue	
c) Burning of crop residue	
d) Non deposition of silt on land due to dam	
e) Others .....	

b) Which seems to you as the best organic fertilizer?

1. Cow dung      2. Compost

c) Is any weather issue working for decreasing soil fertility or crop production? (Please give the tick mark on appropriate place)

Issue	
a) Long Summer	
b) Draught	
c) Dense fog	
d) Others .....	

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

If yes, mention the name of the crop:

Main Crop	Changed Crop

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

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

## 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. Amount of compost sale increasing or decreasing in last 3-5 year?

Increase / Decrease

05. If decreased, what are the causes? .....

06. If increased, why increased & the quantity

.....

07. How many dealer shop exists in your area & how many dealer sale compost/ enriched compost .....

08. How many retailer shop exists in your area & how many retailer sale compost/ enriched compost .....

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

Compost / enriched compost	Name of Manufacturer & address	Number of bag	Compost used for ( Name of Crop)

10. Duration of Compost/ Enriched compost sale .....

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

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

13. Do you supply the using procedure of compost to the farmers at the time of compost sale?

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

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