QUESTIONNAIRE-I

ECONOMICS OF SOLID WASTE MANAGEMENT IN
TIRUNELVELI CORPORATION

1. Name of the respondent : 

2. Address : 

3. Age : 

4. Sex : 1. Male 2. Female 


10. Income (in Rs. Per month) :
   1. Less than Rs. 3500
   2. 3501 - 5000
   3. 5001 - 7500
   4. 7501 - 10000
   5. 10001 – 15000
   6. 15001-20000
   7. 20001-25000
   8. Rs. 25001 and Above

11. Housing details :
   1. Thatched
   2. Katcha
   3. Semi Pucca
   4. Pucca

12. Ownership status :
   1. Owner
   2. Tenant

13. Type of Family :
   1. Nuclear
   2. Joint

14. Family Members:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name</th>
<th>Relationship</th>
<th>Age</th>
<th>Sex</th>
<th>Marital Status</th>
<th>Education</th>
<th>Occupation</th>
<th>Monthly Income (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Main monthly expenditures of the household (in Rs.)
   A. Housing ______________
   B. Food ________________
   C. Energy Consumption (Electricity, Diesel, Charcoal, Firewood, etc.,)
   D. Phone ________________
   E. Education _____________
   F. Health ________________
   G. Other Expenses specify, ____________________
16. How long have you been staying in this house (in years)? ___________

17. Housing arrangement?
   A. Privately Owned               B. Rented form
   C. Rented from Rented Houses Agency   D. Rented for individual

18. How many Kilograms (approximately) of solid waste are generated in your household per week? _______

19. Do you have a storage receptacle for solid waste in your house or in your compound? _____
   A. Yes                     B. No
   If yes, go to Question 20
   If No, go to Question 21

20. What is it made of?
   A. Plastic      B. Metal         C. Wood (Bamboo)       D. Other (specify) _______

21. What are the main problems you encounter in solid waste storage? ___________________________________________________________________

22. How do you dispose off your solid waste?
   A. Take it to the nearby secondary storage receptacle (Dustbin)
   B. Digging a hole around the house/in the village and bury or burn it
   C. Throw it on an open space or on the street
   D. Throw it in to the nearby river
   E. Private collectors take it
   F. Any other (specify) ____________________________
   If the answer is “E” go to Question 23

23. A) How much do you pay for this service per month? ________________
    B) How many times they collect your waste per week? ________________
    C) Are you satisfied with their service? ____________________________

24. Is your household getting the services of solid waste collection or disposal from the Government?
   A. Yes       B. No
25. Are you satisfied with the existing solid waste collection and disposal service provided by the Corporation?
   A. Yes     B. No

26. What do you suggest to improve this condition?

27. Who do you think is responsible to properly manage solid waste (for instance financing it) in the study area?
   A. Municipal Corporation     B. Households only     C. Both

28. Which of the following do you think is the best institute to handle solid waste management in the study area?
   A. Municipal Corporation     B. Private companies

29. What are your reasons for choosing the Municipal Corporation/private companies?

**Households’ Willingness to Pay for Improved Solid Waste Management**

30. Would your household be willing to pay to improve solid waste management service?
   A. Yes     B. No

31. If yes, how much would you like to pay in the following categories?

<table>
<thead>
<tr>
<th>Willingness to Pay (WTP) ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>
32. What is the maximum amount your household is willing to pay per month (in Rs.)? _______
   Go to Question 33, if the maximum willingness to pay is positive.
   Go to Question 34, if the maximum willingness to pay is 0.

33. In what form should the money be collected?
   A. With water bill  B. With electric bill
   C. On its own       D. Any other (specify) _______________

34. Could you tell me the reason why your household does not want to pay anything for this improved solid waste management?
   A. We are poor and we cannot pay
   B. We satisfied with the current situation (it does not need improvement)
   C. Proper management of solid waste is the responsibility of the Municipal Corporation
   D. Other reasons (specify) _____________________________

35. What measures, if any, do you take to reduce the amount of solid waste your household produces?

36. What new or expanded solid waste services would you like to have made available to you in the future?

37. Do you notice problems with illegal dumping in your neighborhood or at any specific locations within your area? If so, please identify these specific locations.

38. Are you aware about the water pollution due to Municipal Solid Waste : Yes/No
   If yes, how much do you spend per month on pollution i.e.
   A. buying water (for drinking) : Rs.-------
   B. cost of medical treatment   : Rs.-------

39. Do you think that the Municipal solid waste is damaging your health?: Yes/No
   If yes, specify in what way______________________________
40. Do you find any environmental change in your area?
   A. On soil       B. Water Pollution       C. Air pollution       D. Health hazards

41. If any of the above questions is yes, in what way it is damaging
   A. Water logging                                B. Stalinization
   C. Ground water contamination         D. Any other specify__________

42. How does Municipal Solid waste affect the health condition? Tick whichever relevant

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Water borne disease</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Typhoid fever</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Malaria</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diarrhea</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gastro-enteritis</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cholera</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Jaundice</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Encephalitis</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Hepatitis</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Common cold</td>
<td></td>
</tr>
</tbody>
</table>

43. Any one your family members suffered by the following waterborne disease due to Municipal Solid waste?

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Water borne disease</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Typhoid fever</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Malaria</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diarrhea</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gastro-enteritis</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cholera</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Jaundice</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Encephalitis</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Hepatitis</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Common cold</td>
<td></td>
</tr>
</tbody>
</table>
44. If you say any of the above reason is yes, what have you done about it?
   a. Requesting Municipal authority to reduce the waste
   b. Getting help from any voluntary social welfare private institution
   c. Reporting to the Corporation authority to take steps

45. Do you think this problem is going to be solved?
   : Yes/No

46. Difficulties and disadvantages due to the Municipal Solid waste (Specify)--------

47. Whether the Municipal wastes are affecting your daily life?
   : Yes/No

   If yes, specify in what way…………………………..

48. What is your opinion to treat the Municipal waste? Give suggestions to improve.
   a. 
   b. 
   c. 
   d. 
   e. 

49. Do you think that the Municipal solid waste affects the atmosphere?
   : Yes/No

50. Give the reason in what way it affects?

51. Frequency of Disposal:
   a. Everyday   b. Once in two days   c. Once in a week
   d. Once in a month   e. More than one week

52. Vehicle used for clearance
   a. Bullock Cart   b. Hand cart   c. Lorry
   d. Any other specify........................

53. Do you face any problem while disposing the Municipal solid waste?
54. Disposal of Municipal Solid Waste?
   a. Individual   b. Private voluntary organization
   c. Government   d. Any other specify

55. If individual solid waste means, what is your role in this endeavor?
   a. Major role   b. Average role
   c. Minor role   d. None

56. What is the role of the private voluntary organization in Municipal Solid waste treatment?
   a. Major role   b. Average role
   c. Minor role   d. None

57. What is the role of the Corporation in Municipal Solid Waste management?
   a. Major role   b. Average role
   c. Minor role   d. None

58. If the Govt. starts a Bioremediation programme to clean up the environment in your city, what will be your contribution in Rs.----------?

59. What is your opinion about the Municipal solid waste and its implications on the society?

60. What is your opinion on the benefits of the disposal of Municipal solid waste?

61. Do you think public awareness on Municipal solid waste management and other environmental problems is on par with other countries?
    : Yes/No

    If no, specify the reason.
Environmental Quality Status

1. Distance of your residence from Solid Dust bin.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Distance in Km</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than 1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1 to 2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2 to 3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3 to 4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4 and Above</td>
<td></td>
</tr>
</tbody>
</table>

2. Sources of Water for drinking purposes:
   Municipal/Ground water/Purified water/ Water supply through lorry

3. If purified water is being used, how much the cost spending for drinking water per month (approximately) Rs.-------------------

4. Sources of water for cooking purposes:
   Municipal/Ground water/Purified water/ Water supply through lorry

5. Sources of water for other purposes:
   Municipal/Ground water/Purified water/ Water supply through lorry

6. Did you feel that the water you use (the Municipal/Ground water/Purified water/ Water supply through lorry) is contaminated by any means?
   Yes/No
   If yes, Please specify the water------------------------------------------

7. Specify the source of contamination
   a. Inundation during rainy season   b. partially treated municipal water
   c. Untreated municipal water       d. Ground water (bore well)

8. What is the colour of the water do you use for drinking/washing/etc.
   a. Yellow                       b. Blackish
   c. Purple green                 d. Others

9. What is the reason for pollution abnormality in quality of water?
   a. Poor drainage condition       b. Dumping garbage
   c. Poor sanitation               d. Others
10. What is the taste of the drinking water you get from the Municipal source?
   a. Salty           b. Hardness       c. No taste       d. Others

11. Whether the water supplied by the Municipality is sufficient to your domestic requirements    Yes/No

12. If the answer is no, what is the alternative source of water to your family?
   a. Ground water (bore well)             b. Water supplied through lorry
   c. Purified water from market sources

13. Have you suffered any one of the following water borne diseases due to Municipal Solid Waste since last 30 days?

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Water borne diseases</th>
<th>Sources of Water</th>
<th>No. of days unable to work</th>
<th>No. of Hospital visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Typhoid fever</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Malaria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gastro-enteritis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cholera</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Jaundice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Encephalitis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Hepatitis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Common cold</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. Are you personally affected by Municipal Solid Waste?
   1  Not at all       2  A little
   3  Fairly         4  Greatly
15. How much do you agree with each of these statements?

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Strongly agree 1</th>
<th>Agree 2</th>
<th>Undecided 3</th>
<th>Disagree 4</th>
<th>Strongly disagree 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. MSW controls are mostly effective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Corporation should be doing less to control of MSW in your area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. Greater control should be placed on those who make city nuisance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. How much would you support the following ways of Municipal solid waste reducing environmental pollution in your area?

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Strongly support</th>
<th>Support</th>
<th>Undecided / Don’t know</th>
<th>Oppose</th>
<th>Strongly oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Stronger water pollution control and fines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Restrict open dumping yards</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Increased penalties for those who violating rules and regulations of the Corporation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Municipal solid wastes should be treated before discharging into the river</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. Can you mention some diseases related to poor solid waste management?

18. Did any of your family members suffered from ill health as mentioned above disease in the past three months?

   A. Yes                               B. No
QUESTIONNAIRE-II

ECONOMICS OF SOLID WASTE MANAGEMENT IN
TIRUNELVELI CORPORATION

Institutional Data Information (Corporation):

1. What is your annual budget for solid waste management (name the currency):
   (a) capital ____________  (b) operating ______________
   (c) contracting out ______________

2. Who allocate annual budget for your Corporation  ____________________________

3. Current cost of waste management (collection, transport, disposal, administration) __________ / ton – year

<table>
<thead>
<tr>
<th>Year</th>
<th>Collection (in Qty.)</th>
<th>Transport (in No.)</th>
<th>Disposal (in Qty)</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Cost incurred</td>
<td>Cost incurred</td>
</tr>
<tr>
<td>2000-01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001-02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002-03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003-04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004-05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005-06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006-07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. How much deficit / surplus you have annually in Rs.__________________________

5. How much of waste management costs are paid out of general property tax revenue in Rs.__________________________

6. Has your Corporation received funds from international financial sources (International Financial Institutions, Non-Government Organizations, etc.)

Yes ☐ No ☐
7. **Staff details**

<table>
<thead>
<tr>
<th>Unit Numbers</th>
<th>Full-Time</th>
<th>Part-Time</th>
<th>Seasonal staff employed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Unit 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Briefly describe solid waste management regulations (international, national, municipal, by-laws) applicable to operation of your Corporation

________________________________________________________________

**Waste Processing**

1. Describe waste reuse programs which your Corporation may operate directly with your own staff in terms of collection techniques, storage, transportation, sale and profit. This may include the reuse of plastic bags, bottles, paper, cardboard, and cans for domestic purposes: ________________________________

2. Describe waste recycling operation conducted by your Corporation. Typically, recycled are certain types of plastics, rubber tires, wet batteries, aluminum cans, used oil. ________________________________
3. Do you operate?

(a) Municipal or medical waste incineration facility
   Yes ☐ No ☐
   If yes, give operation load _________ hrs/day _________ days/week _________
   weeks/year power generation rate _________ kWh. costs: capital _________
   operating _________

(b) Commercial centralized composting plant
   Yes ☐ No ☐
   If yes, give composting rate _________ tonnes/month _________
   tonnes/year compost markets _________ capital investment _________
   operating cost _________ Economic viability _________ Operating difficulties _________

(c) Community based composting in cooperation with non-government organizations (NGOs), community based organizations (CBOs), and local authorities
   Yes ☐ No ☐
   If Yes, provide details on organizational structure, profitability, processing rate, market _________

(d) does your corporation support residential composting in the area of your operation
   Yes ☐ No ☐
   If yes, provide some details regarding popularity, typical composter locations, approximate composting rate, potential health and sanitation problems, involvement of women, etc. _________

4. Does your corporation participate in public awareness/public education programs?  A. Yes ☐ B. No ☐
   If Yes, describe how (ads in the mass media, public sessions, radio programs, etc.) _________
   If No, state reasons (no need, lack of funds, not sufficient infrastructure, etc.) _________
5. Comment on policy, if any, to encourage women in participation in solid waste management process____________________________________________

6. Can you suggest any other measures that could be useful in helping to control Municipal Solid Waste?

7. Is there any waste collection mechanism provided by the Corporation or Private Business holders?

8. Extent of solid waste management services:
   Approximate number of people served _______________________
   Land area served _________________________________________

Waste Collection, Transfer and Disposal

1. Do you have established municipal waste collection system?
   Yes □ No □

2. What fraction of your Corporation is covered by waste collection on regular basis ________ periodic _______

3. Is waste collection carried out by regular staff or outside collectors’-------------------

4. List approximate number of:
   (a) non-mechanical collection devices (human- and animal-drawn carts, wheelbarrows, pushcarts) ______________________(b) mechanical collection vehicles (open-back trucks, compactor trucks, trailers) ____________________
   average vehicles immobility rate _______ %; reason for vehicles immobility (shortage of trained operators, lack of spare parts, insufficient operational budget, high cost of fuel, etc.)

5. If under equipped, how much investment is needed to purchase required number and type of vehicles for:
   (a) waste collection and transfer ________________________________
   (b) Operation and maintenance of controlled dumps and sanitary landfills ---------
6. What fraction of solid wastes generated within the city is collected

7. Street sweeping: Yes □ No □
   If yes:
   (a) by a private sector, municipal public works staff, or both
   (b) Manually, mechanically, or both
   (c) Usually at what time of the day

8. Do you operate waste transfer station Yes □ No □.
   If yes, give details such as waste volume transferred, number of years in operation, service staff and equipment, waste segregation, operation difficulties etc.

9. Do you operate or supervise:
   Open dumps
   Yes □ No □
   Controlled dumps
   Yes □ No □
   Sanitary landfills
   Yes □ No □

10. Official waste disposal sites (dumps, landfills) are:
    (a) maintained by municipal workers Yes □ No □
    (b) operated by private sector on contract, lease, or other arrangement (please specify)
        Yes □ No □
    (c) equipped with adequate equipment own by municipality
        Yes □ No □
    (c) is equipment rented for periodic adjustments to the sites
        Yes □ No □
    (e) elaborate on equipment in terms of required type and quantity, service and maintenance, staffing, etc.
11. Describe policy of the municipality in dealing with waste pickers/scavengers

General Policy Issues

1. Does your Corporation participate in public awareness/public education programs?
   Yes ☐ No ☐

   If Yes, describe how (ads in the mass media, public sessions, radio programs, etc.) _______________________________________

   If No, state reasons (no need, lack of funds, not sufficient infrastructure, etc.) _______________________________________

2. Comment on policy, if any, to encourage women in participation in solid waste management process _______________________

3. Is your corporation involved in innovative SWM practices?
   (a) People’s participation in the collection, segregation and disposal of waste by forming community based organizations, cooperatives, etc.
       Yes ☐ No ☐

   (b) Developing public-private partnerships leading to the privatization of some aspects of garbage collection, recovery, and disposal
       Yes ☐ No ☐

   (d) administrative restructuring, staff training and supervision to improve efficiency
       Yes ☐ No ☐

   Briefly elaborate for each of the “Yes” answers

xvii