

Table S1. The survey questionnaire used to assess the socio-economic contribution of the informal service providers in Accra.

**ACCRA METROPOLITAN ASSEMBLY & UNIVERSITY OF CAPE COAST
SOLID WASTE INTERVENTION AND ACTION PLAN DEVELOPMENT PROJECT
SURVEY OF INFORMAL SERVICE PROVIDERS**

The Waste Management Department and the Sustainability and Resilience Unit of Accra Metropolitan Assembly (AMA) with the support of the Research Team from the University of Cape Coast are in a collaborative research work to develop interventions in a participatory approach to improve upon Municipal Solid Waste Management in the city. Initial assessment of the MSWM system of the AMA in 2016 showed that the informal waste collection sector was contributing significantly to increased collection coverage (Oduro-Appiah et al., 2017). We also realised that the path to modernization of MSWM in Accra calls for the recognition, institutionalization and integration of the informal waste sector. The Ministry of Sanitation and Water Resources has agreed to the aforementioned and has given directives for the AMA to initiate processes and activities to regularize, support and integrate the informal sector into the formal MSWM system. The initial step is to **assess** their current contribution to collection coverage and also **register** them to determine their numbers, areas of work, equipment used, finances and challenges among others to enable the AMA make informed decisions. The following questions are designed to collect data on the informal MSW collectors within the AMA.

Demographics

| | | | | | | | | | |
|---|---|-------------------------------------|--------------|------------------------|---|-----------------|------------------|----------|----|
| Name: | | | | Telephone No.: | | | | | |
| Evidence of ID card bearing name: | | | Yes | No | Age: | | | | |
| Residential Address: | | | | | | | Married? | Yes | No |
| Nationality: | | | | Household size: | | | | | |
| Are you registered to Health Insurance? | | | Yes | No | Do you contribute to any pension scheme? | | | Yes | No |
| Type of pension scheme | | | SSNIT | Private Insurance | Life Insurance | Group Insurance | Personal Savings | | |
| Sex | | Level of Education Completed | | | | | | | |
| M | F | None | Primary Sch. | Middle Sch. | Junior High | Senior High | Vocational | Tertiary | |
| How many years have you living in Accra? | | | | | | | | | |

Union, Areas of Operation and Equipment

| | | | | | | | | | |
|--|----------------|--------------------|------------------|-----------------------------|--------------|---|--|---------------|-------------|
| Which Union(s) do you belong to? | | | | | | | | | |
| What are the suburbs of your operation? | | | | | | | | | |
| In which sub-metropolitan areas do you operate? | | | | | | | | | |
| Ablekuma Central | Ablekuma North | Ablekuma South | Ayawaso Central | Ayawaso East | Ayawaso West | Ashiedu Keteke | Okaikoi North | Okaikoi South | Osu Klottey |
| Which other municipality do you operate in? | | | | | | | | | |
| Type of equipments used for collection | | | | Means of Acquisition | | | Ownership | | |
| Motorized Tricycle | Non Motorized | Bola Taxi | Others (specify) | Fully Purchased | Work & Pay | Make sales | Yes | No | |
| Entity providing you with the equipment | | | | | | How much do you pay per day to use the equipment? GH¢: | | | |
| ESPA | | Private Individual | | Other (specify): | | | | | |
| Write down the registration numbers of equipment (s): | | | | | | | How many people do you work with? | | |
| Provide name of individual who provided you the equipment(s) : | | | | | | | | | |
| Telephone numbers of individual who provided you with the equipment(s): | | | | | | | | | |

Clients, Collection Frequency, Finances, Disposal and Challenges

| No. of clients (households) per trip | | | | | | | | No. of trips per day | | | | | Frequency of collection per week | | | | | | |
|---|-----|---------------------------|------------------|-----------------------------|--------------|----------------|-----------------|--|--------|--------------|------------------|---------------|----------------------------------|----------------|----|-------|---|---|---|
| 80 | 100 | 120 | 140 | 160 | 180 | 200 | Other(specify): | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | | | | | | | No. of days of work per week? | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| How long have you been in this business? | | | | | | | | What other jobs do you do? | | | | | | | | | | | |
| How much money do you raise when equipment is full (GH¢): | | | | | | | | Place of Disposal | | | | | | | | | | | |
| How much do you spend per day on fuel (GH¢)? | | | | | | | | Achimota | | Adjen Kotoku | | Mortuary Road | | Other(specify) | | | | | |
| How much do you spend per month on maintenance per vehicle (GH¢)? | | | | | | | | Have you been to Kpone Landfill to dump in 2018? | | | | | | | | | | | |
| How much do you pay per trip for disposal (GH¢)? | | | | | | | | Yes | | | | | No | | | | | | |
| How much profit do you make per day (GH¢)? | | | | | | | | Evidence of gloves, nose mask and safety boots in use | | | | | | | | | | | |
| Source of safety gear | | | | | | | | Yes | | | | | No | | | | | | |
| I buy it myself | | | Other (specify): | | | | | Are you working in collaboration with a formal contractor? | | | | | | | | | | | |
| How much do you pay as dues to the Union (GH¢)? | | | | | | | | Yes | | | | | No | | | | | | |
| How much do you make (per month) from recovering valuables from the collected waste? (GH¢): | | | | | | | | | | | | | | | | | | | |
| Is any member of your household involved in any of the informal waste business? | | | | | | | | | | | Yes | | | | No | | | | |
| If yes, who are they to you? | | | Wife/Husband | | | Brother/Sister | | | Nephew | | Niece | | Servant | | | Child | | | |
| If Child, how old is He/She? | | | | Does He/She attends School? | | | | | Yes | | | No | | | | | | | |
| What is your motivation for this work? | | | | | | | | | | | | | | | | | | | |
| Money to Survive | | Environmental cleanliness | | | Unemployment | | | Formal sector inefficiencies | | | Other (specify): | | | | | | | | |

ESPA: Environmental Service Providers Association;

List some of the challenges you experience in your work

- 1.
- 2.
- 3.

What type of help or support do you expect from the municipality?

- 1.
- 2.

Table S2. The questionnaire used to register the informal service providers in Accra

**ACCRA METROPOLITAN ASSEMBLY
SOLID WASTE INTERVENTION AND THE CLEAN ACCRA PROJECT
REGISTRATION OF INFORMAL SOLID WASTE SERVICE PROVIDERS**

The Waste Management Department and the Sustainability and Resilience Unit of Accra Metropolitan Assembly (AMA) with the support of the Research Team from the University of Cape Coast are in a collaborative research work to develop interventions in a participatory approach to improve upon Municipal Solid Waste Management in the city as part of the **CLEAN ACCRA PROJECT**. Recent assessment of 600 informal solid waste collectors in Accra has established that they contribute to the collection of 720 tons (47%) of MSW in Accra. In line with the Ministry of Sanitation and Water Resources request, we have initiated processes and activities to regularize, support and integrate the informal solid waste collectors into the formal MSWM system. The following questions are designed to register and provide identification stickers to the informal MSW collectors within the AMA. The exercise is to enable the department monitor and regulate their activities.

| |
|---------------------|
| Sticker No.: |
|---------------------|

| |
|------------------|
| Passport Picture |
|------------------|

Demographics

| | | | | | | | | | |
|---|---|-------------------------------------|--------------|------------------------|---|-------------|-----------------|----------|----|
| Name: | | | | Telephone No.: | | | | | |
| Evidence of ID card bearing name: | | | Yes | No | Date of Birth: | | | | |
| Residential Address: | | | | | | | Married? | Yes | No |
| Nationality: | | | | Household size: | | | | | |
| Are you registered to Health Insurance? | | | Yes | No | Do you contribute to any pension scheme? | | | Yes | No |
| Sex | | Level of Education Completed | | | | | | | |
| M | F | None | Primary Sch. | Middle Sch. | Junior High | Senior High | Vocational | Tertiary | |
| How many years have you been in this business? | | | | | | | | | |

Union, Areas of Operation and Equipment

| | | | | | | | | | |
|--|----------------|--------------------|------------------|--------------|-----------------------------|----------------|---|------------------|-------------|
| Which Union(s) do you belong to (if any)? | | | | | | | | | |
| What are the suburbs of your operation? | | | | | | | | | |
| In which sub-metropolitan areas do you operate? | | | | | | | | | |
| Ablekuma Central | Ablekuma North | Ablekuma South | Ayawaso Central | Ayawaso East | Ayawaso West | Ashiedu Keteke | Okaikoi North | Okaikoi South | Osu Klottey |
| Type of equipments used for collection | | | | | Means of Acquisition | | | Ownership | |
| Motorized Tricycle | Non Motorized | Bola Taxi | Others (specify) | | Fully Purchased | Work & Pay | Make sales | Yes | No |
| Entity providing you with the equipment | | | | | | | Evidence of valid license to drive | | |
| ESPA | | Private Individual | Other (specify): | | | | Yes | | No |
| Equipment Registration Nos.: | | | | | | | | | |
| Name of individual who provided you the equipment(s) : | | | | | | | | | |
| Telephone numbers of individual who provided you with the equipment(s): | | | | | | | | | |

ESPA: Environmental Service Providers Association;

Table S3. The semi-structured interview guide used to collect data from the facility operations managers to validate data from the survey

ACCRA METROPOLITAN ASSEMBLY
SOLID WASTE INTERVENTION AND ACTION PLAN DEVELOPMENT PROJECT
INTERVIEW GUIDE FOR THE TRANSFER AND BULK TRANSPORT STATIONS

Preamble

The Waste Management Department and the Sustainability and Resilient Unit of Accra Metropolitan Assembly (AMA) is been supported by a research team from the University of Cape Coast, to ascertain the contribution or otherwise of the informal solid waste collectors in the various zonal monopolies in an effort to recognize and regulate their activities. This interview guide is intended to help the research team collect and validate data for planning purpose. Information provided in here would be treated confidential.

Facility details

1. Name of facility:
2. Location of facility:
3. Year of construction and operation of facility:
4. Name of company and or entity managing the facility:
5. Type of entity managing the facility
6. Type of solid waste received at the facility:
7. Type of equipment that brings in solid waste to the facility:
8. Planned solid waste catchment area of the facility:
9. Current solid waste catchment area to the facility:
10. Planned and designed lifespan of the facility:
11. Destination of solid waste from the facility:
12. Average number of trips to receiving destination per day:
13. Average tonnage of waste sent to receiving destination per day:
14. Average round trip distance from facility to disposal site:
15. Average waiting time for tricycles to tip their waste:
16. Please do confirm or otherwise the type of records kept by the facility with evidence:
 - a. Name of tricycle operator
 - b. Type of equipment to the facility
 - c. Tonnage of waste per tipping per tricycle
 - d. Type of waste brought in per tricycle operator
 - e. Source of waste to the site
 - f. Average waiting periods of tipping
 - g. Receipts of payments made by tippers

- h. Protective working gear of clients and their attendants?
- 17. Is there a routine staff who supervises offloading on site?
- 18. Is there inspection of the waste brought in?
- 19. Number of hours of operation per day:
- 20. Starting and closing time of facility:
- 21. Number of days of operation of facility per week:

Solid Waste Tonnages

- 22. Total number of tricycles coming to the facility per day:
- 23. Total number of tricycles that are able to dispose their contents per day:
- 24. Average number of trips per day per each tricycle operator:
- 25. Is there a functioning weighbridge installed and are all weights logged?
- 26. What is the average weight of an empty tricycle?
- 27. What is the average weight of tricycle when full with solid waste? Please provide evidence
- 28. What is the total tonnage of waste per day received at this facility from **informal** service providers?
- 29. What is the total tonnage per day received at this facility from **formal** service providers (if any)?
- 30. How many vehicles from formal service providers do you receive in a day (if any)?
- 31. What is the capacity of the facility?

Finances and Costs

- 32. Official amount paid by tricycle operators per tipping at facility **(GH¢)**:
- 33. Amount paid by tricycle operators per tipping to rakers **(GH¢)**:
- 34. Apart from tipping and raking fees, how much extra do you charge for other activities? **(GH¢)**:
- 35. Do you give out receipt for the monies taken from tricycle operators?
- 36. How many of the tricycles fills one bulk trailer/container?
- 37. How much is paid for tipping one truck/trailer at the disposal and or recycling facility? **(GH¢)**:

Recycling and Recovery

- 38. Is separation of solid waste done on this facility?
- 39. If yes, into how many components is the solid waste separated?
- 40. Who does the separation?
- 41. Are those who do the separation private individuals or they are employed by the facility?
- 42. If they work on their own, how much do they pay to be allowed to use the premise for their activities?
- 43. Are waste pickers allowed to work here also?
- 44. If yes, how many are they?
- 45. How many of them are males and how many are females?

46. How many children are allowed to work here?
47. Does recycling activity go on within the facility?
48. Where do the recovered materials go after separation?

Health and Environmental safety

49. Is environmental and work safety promoted and adhered to at this facility?
50. Do management provide them with protective and safety gear?
51. What disciplinary measures are given to tricycle operators who refuse to wear protective gear?
52. Do you experience periodic accidents on the facility?
53. What type of accidents usually occur at this facility?
54. Does the facility have safety procedures for workers and clients
55. How would you assess the adherence to safety procedures here?
 - a. Weak adherence
 - b. Moderate adherence
 - c. Very high adherence

Details of Interviewee:

Name of responding officer(s):

Qualification and job title of responding officer(s):

Number of years responding officer(s) have been at post:

Telephone #:

Email address:

Number of workers at facility and their job titles: