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# **Fecal Sludge Management: Diagnostics for Service Delivery in Urban Areas**

## Terms of Reference

Final

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## **Preface / Acknowledgements**

This document is supporting material to World Bank Economic and Sector Work on *Fecal Sludge Management: Diagnostics for Service Delivery in Urban Areas* (P146128). The task team leaders were Isabel Blackett and Peter Hawkins the task team members were Zael Sanz Uriarte, Ravikumar Joseph, Chris Heymans and Guy Hutton.

This document is based on work conducted between January 2014 and February 2016 by Oxford Policy Management (OPM) in partnership with the Water, Engineering and Development Centre (WEDC) at Loughborough University. It was authored by Ian Ross (OPM), Rebecca Scott (WEDC), Ana Mujica (OPM) and Mike Smith (WEDC). The broader research team who contributed to the original work included Zach White, Rashid Zaman and Simon Brook from OPM, as well as Mike Smith, Andy Cotton and Sam Kayaga from WEDC. Andy Peal and Pippa Scott (independent consultants) also contributed to certain aspects of the methodology.

The inputs of many other World Bank staff, consultants and data collection firms are acknowledged with thanks from the task team. They have contributed to the research, findings, analysis and reviews but are too numerous to mention.

## Terms of reference for data collection, analysis and producing outputs of diagnostic tools

This document contains a generic terms of reference (TOR) for contracting a firm to carry out data collection, data analysis and production of the outputs of the diagnostic tools. Before being used in any city it will need adaptation and review by the task team leader or project manager who understands the local context. It is designed so the entire package can be delivered by a single firm (which could sub-contract elements, if necessary). In some situations it will be appropriate to adjust it remove tools which are not needed or to add other tasks.

However, the Team leader or project manager may wish to consider other contracting scenarios such as: use of individual consultants for some tasks, separation of data collection and data analysis into two firm contracts, or carrying out some tasks in-house. The TOR is set out in a modular structure to facilitate this process.

Therefore, relevant sections are broken into:

- Part (i) – collection of data (quantitative and qualitative)
- Part (ii) – data analysis: production of data tables and other intermediate outputs
- Part (iii) – data analysis: production of tool outputs

Notes to the commissioning agent are in square brackets.

### A. PROJECT BACKGROUND AND OBJECTIVES

**Client name**

*[Explain background to the agency commissioning the work]*

**Project name**

*[Explain background to the project the work is part of]*

**Objective of the assignment**

1. The objective of this assignment is to collect quantitative and qualitative data on Fecal Sludge Management in *[city]*, and conduct analysis to produce outputs of diagnostic and decision-support tools. The consultant firm will manage all aspects of
  - (i) collection of data (quantitative and qualitative),
  - (ii) data analysis: production of data tables and other intermediary outputs,
  - (iii) data analysis: production of tool output. *[state roles of other contractors if relevant]*

## **B. SCOPE OF WORK**

### **Part (i) – data collection**

The scope of work includes, but is not limited to:

#### **A. Household survey**

2. Obtain the list of all the primary sampling units (PSU) in the city, ideally census enumeration areas, from the national statistics office or the census authority. The consultant company will finalize the sampling frame and draw the sampled PSUs from that, in consultation with the client.

*[The sampling frame is important as it affects what conclusions can be drawn from the data. In some contexts a city-wide sample will be appropriate but in situations where only a small proportion of households use non-networked sanitation, it may be more appropriate to focus sampling on those areas.]*

3. Obtain written letter of approval for the survey from the relevant authority (e.g. national statistics office, Ministry of Water).
4. Review the generic questionnaire (see **Data Collection Instruments**), and adapt it to the local context, in close collaboration with the client. Key areas which may require adaptation include: types of sanitation facilities used, types of sewerage and drainage systems, housing types and tenure arrangements, land ownership, shared/private toilet arrangements, etc.

*[the questionnaire should primarily be focused on the key information required to populate the tools. Other areas may be of interest but should be a secondary concern]*

5. Translate the draft (if necessary), revise data collection instruments into the local language – numbers and length of instruments are indicated in section C below. Paper data collection may be used, but use of personal digital assistants (PDAs) or mobile phones is strongly recommended and will make the data collection and analysis more straightforward.
6. Pretest the survey instruments in a slum or poor community and provide detailed comments on the use of the instruments and quality of data collected, with suggested changes, to be agreed in writing with the client.
7. Arrange recruitment of enumerators of the required level of education (see section E below), and organize a schedule of training for them, to ensure they will fully understand the questions and be able to explain them clearly.
8. Pilot the revised instruments with the trained enumerators in an urban slum community outside the sampled PSUs.
9. Manage all the fieldwork, including transport, communications, meal allowances, quality assurance and other logistics for the field workers.
10. Develop a data entry programme in commonly-used software (e.g. CSPro), carry out double data entry, and initial cleaning of the data (if using paper data collection).

#### **B. Other quantitative instruments**

11. For the other quantitative instruments, carry out the same activities as for the household survey above, including: (i) adaptation to local context (ii) review, finalise and translate the data collection instruments and pre-test them, (iii) recruit and train enumerators, and pilot the instruments with them, (iv) manage fieldwork and data entry. This should be done using the observation protocol, transect walk protocol and fecal sludge sample testing protocol.

Numbers of samples in each case are given below.

12. The observation protocol requires a sanitation specialist to make [X] observations and document aspects of different FSM activities (including physical activities, practices and associated risks) the sanitation chain (from household containment through to end-use or disposal of fecal sludge).
13. The transect walk protocol requires a sanitation specialist to conduct [Y] transect walks through sampled PSUs together with community members who can identify relevant features of the environment.
14. The fecal sludge sample testing protocol requires the collection of [Z] samples of fecal sludge at three stages of the sanitation chain (collection, pre-treatment (at disposal/discharge point) and post-treatment), and to submit these for testing at an agreed laboratory.

### C. Qualitative instruments

15. For the focus group discussions, the consultant should carry out the same activities as for the household survey above, including: (i) review, finalise and translate the data collection instruments and pre-test them, (ii) recruit and train enumerators, and pilot the instruments with them, (iii) manage fieldwork and data entry. This should be done using the focus group discussion guide.
16. The focus group discussion (FGD) guide requires a qualitative research specialist to gather a group of community members from the PSU and conduct a discussion.
17. For the key informant interviews (KIIs), the consultant should undertake a stakeholder mapping in collaboration with the client and in accordance with guidance (see Annex A).
18. Arrange and conduct KIIs with individuals selected in consultation with the client, and write up a transcript of discussions in English. Interviewees may include interviews with governments, service providers, urban planning agencies, with a total of 40-50 interviews of around 1 hour.
19. During and after the KIIs, collect all relevant documents and other secondary data referred to by interviewees, e.g. policy documents, financing frameworks, business plans etc.

### D. General

20. As noted above, the consultant firm is responsible for the following activities with regard to all instruments: sampling, finalization and translation of instruments, pretesting, recruitment and training of staff, piloting, fieldwork management, data entry, data cleaning, transcribing and documenting findings.
21. The consultant firm will provide the equipment and supplies necessary to conduct the safe and effective completion of all activities, including but not limited to: GPS units, PDAs, stationery, equipment for fecal sludge sample collection, procurement of laboratory facilities for testing samples and providing reliable and validated results, computers and software for data entry.
22. The client will provide all draft data collection instruments in English for other language specified by the client, along with protocols describing how they are to be used. The consultant firm will input into draft instruments and then collect the data using those instruments, according to the sampling approach specified in the agreed final protocol. The sample size for each instrument is specified in the paragraphs below.
23. Sample sizes for each instrument are listed below. ***They may be subject to change for any***

***instruments listed below. The consultant should make average unit costs clear in their financial proposal, for ease of comparison when scaling up or down.***

***[the sampling frame, and sample sizes for each instrument, should be debated by the commissioning agency before launching a request for expressions of interest. For the household survey, a specific sample size calculation for the city will be required, depending on the objectives of the study and the level of representativeness required]***

- Household survey questionnaire
  - Interviews with 720 households
  - Sample made up of 12 households from each of the 60 primary sampling units (PSUs)
    - Group 1 – 30 PSUs to be randomly sampled from across the whole city
    - Group 2 – 30 PSUs to be sampled purposively from selected slums, low-income or informal settlements
  - Estimated 45 minutes per questionnaire
- Observation protocol
  - Fully recorded observations at 5 different locations, at all stages of the sanitation chain, giving at least 15 written observation recordings in total, i.e. at (i) household/building containment, (ii) collection through to disposal point, (iii) treatment. The chosen observations should be reflective of the existing fecal sludge management practice and will reflect both manual and mechanical emptying methods. Manual emptying observations may need to be done at night.
  - Estimated 30 minutes per recording, using a sanitary survey format.
- Sample testing
  - Collection of fecal sludge samples from 5 different locations at 3 stages of the sanitation chain, giving 15 samples in total. The stages are (i) before removal from pit/tank (at a time when emptying has been requested), (ii) at the truck/ vessel outflow (tipping point or treatment plant), (iii) after treatment
  - Testing of all 15 samples for the following parameters in an agreed laboratory
    - COD (Chemical Oxygen demand)
    - BOD (Biological Oxygen Demand)
    - NH<sub>4</sub> – Nitrogen (free and saline ammonia)
    - Total Nitrogen
    - Total Phosphorus
    - TS (Total solids)
    - TVS (Total volatile solids)
    - SS (Suspended solids)
    - Helminth eggs (viable)
    - E.coli
    - Calorific value
  - Testing protocols for each test must be accepted in writing by the client before being undertaken.
- Transect walk protocol
  - 40 transect walks, 30 in sub-sample A, 10 in sub-sample B
  - Estimated 45 minutes per transect walk
- Focus Group Discussions (FGDs)
  - 10 FGDs with householders from 10 PSUs. The types of respondents to be selected for these group discussions are indicated in the Annex.
  - The FGD topic guide and questions to be asked are to be agreed with the client in

- advance, and discussions are to be recorded, transcribed and translated into English
- Each FGD to last approximately 1 hour
- Key informant interviews (KIIs)
  - Interviewees may include interviews with governments, service providers, urban planning agencies, with a total of 40-50 interviews of around 1 hour.
  - The KII guide and associated questions to be asked are to be agreed with the client in advance.

#### **Part (ii) – data analysis: production of data tables and other intermediary outputs**

The scope of work includes, but is not limited to:

##### **E. Household survey**

24. Transfer the data into a well-known statistical package (eg. Stata, SPSS) and carry out detailed data cleaning processes included additional checks as recommended by the client
25. Analyse the data to produce all tabulations and cross-tabulations requested by the client, using sampling weights if necessary.
26. Obtain written comments from the client and undertake additional analysis as requested.

##### **F. Other quantitative instruments**

27. Compile the data from the rest of the quantitative instruments (e.g. observations, transect walk protocols, fecal sludge sample testing) and present in a consistent format in Microsoft Excel spreadsheets (to be agreed with the client in advance).
28. Obtain written comments from the client and incorporate.

##### **G. Qualitative instruments**

29. Produce transcripts of FGDs in the agreed language, to be shared with the client.
30. Based on the transcripts, develop a short FGD report (around 20pp) summarising findings. It should arrange findings along key topic areas, based on a table of contents to be agreed with the client before data collection commences. Obtain written comments from the client and incorporate.
31. Compile notes from KIIs in a consistent format such that they can be navigated if the client wishes to look into detail for a particular interview. Notify the client of any significant research questions which remain unanswered.

#### **Part (iii) – data analysis: production of tool outputs**

The scope of work includes, but is not limited to:

32. Prepare draft Fecal Waste Flow Diagrams (city-wide and low-income areas) based on the analysed household data tables and secondary data (e.g. expert opinion on rates and frequency of pit/tank emptying, levels of transportation by tankers to disposal or treatment site, leakage from sewers, treatment plant efficiency). The methodology should be in line with the **Tools and Guidelines** referenced in Annex A below.
33. Prepare a draft City Service Delivery Assessment (CSDA) for the city, based on information from key informant interviews as well as key secondary literature and documents. The methodology should be in line with the **Tools and Guidelines** referenced in Annex A below.
34. Prepare a draft public health risk analysis, based on information from transect walks and key

informant interviews. The methodology should be in line with the **Tools and Guidelines** referenced in Annex A below.

35. Prepare a draft fecal sludge reuse analysis, based on results of the tests of fecal sludge (i) physical characteristics, and (ii) chemical/biological characteristics, as well as key informant interviews.
36. Prepare a draft prognosis for change assessment (political economy analysis) for FSM services in the city, based on all the analysis above and findings from FGDs and KIIs.
37. Draft a single coherent report for the city, including all of the above, based on a table of contents agreed in advance with the client.
38. Obtain written comments on the report from the client and other selected stakeholders identified by the client, and incorporate.
39. Present findings at a workshop with sector stakeholders in the city to validate them, and hold separate side-meetings to test and update the prognosis for change

### C. DELIVERABLES EXPECTED FROM CONSULTANT

*[The times quoted should be sufficient in nearly all circumstances, and in smaller cities under ideal conditions (free-flowing traffic etc.) it may be possible to reduce the overall time to about 18 weeks. Judgement should therefore be exercised in setting the time targets]*

#### Part (i)

| Deliverables  | Weeks from start/delivery date |
|---|--------------------------------|
| Inception report, including updated work plan and methodology                     | 3                              |
| Adaptations for local context and translated instruments and report on pretesting | 6                              |
| Weekly fieldwork progress reports   | 9                              |
| Field work manager's report   | 12                             |
| Transcripts of focus group discussions in English                                 | 14                             |
| Delivery of clean datasets  | 16                             |

#### Part (ii)

| Deliverables   | Weeks from start/delivery date |
|--|--------------------------------|
| Analysed data tables and associated analysis code (e.g. Stata .do files)   | 21                             |
| Data from the rest of the quantitative instruments (e.g. observations, transect walk protocols, fecal sludge sample testing) in Microsoft Excel format | 22                             |
| FGD report and transcripts   | 22                             |

**Part (iii)**

| <b>Deliverables</b>            | <b>Weeks from start/delivery date</b> |
|--------------------------------|---------------------------------------|
| Draft synthesis report         | 23                                    |
| Client Consultations workshops | 25                                    |
| Final synthesis report         | 26                                    |

**D. SPECIFIC INPUTS TO BE PRESENTED BY THE CLIENT**

The client will:

- Provide overall leadership and be the primary point of contact for the consultant company
- Provide technical and managerial inputs on a regular basis.
- Share any relevant background material

**E. SPECIAL TERMS & CONDITIONS / SPECIFIC CRITERIA**

**Timing/Assignment Duration**

The contract will start in month, year and final outputs submitted by month, year, or as agreed.

**Reporting**

The Consultant will report to client name

**Payment Schedule**

Payments will be lump sum based on acceptance by the client of the following:

*[The breakdown of costs between the three modules will be quite situation-specific, so is left to the judgement of the contracting entity]*

**Part (i)**

| <b>Stage</b> | <b>Output</b>   | <b>Payment</b> |
|--------------|---|----------------|
| Inception    | Inception report, including updated work plan and methodology                     | 20%            |
| Inception    | Adapted and translated instruments and report on Pretesting, client consultation, | 10%            |
| Fieldwork    | Brief weekly fieldwork progress reports   | 5%             |
| Fieldwork    | Fieldwork manager's report  | 20%            |
| Data entry   | Transcripts of focus group discussions in English                                 | 20%            |
| Data entry   | Clean datasets  | 25%            |
| <b>Total</b> |   | <b>100%</b>    |

Part (ii)

| Stage         | Output   | Payment     |
|---------------|--|-------------|
| Data analysis | Analysed data tables and associated analysis code (e.g. Stata .do files) | 40%         |
| Data analysis | Data from the rest of the quantitative instruments                       | 30%         |
| Data analysis | FGD report and transcripts   | 30%         |
| <b>Total</b>  |  | <b>100%</b> |

Part (iii)

| Stage               | Output                 | Payment     |
|---------------------|------------------------|-------------|
| Report writing      | Draft synthesis report | 50%         |
| Client consultation | Workshop summaries     | 20%         |
| Report writing      | Final synthesis report | 30%         |
| <b>Total</b>        |                        | <b>100%</b> |

**Required Qualifications and Experience of the consultant company**

The consultant company and key staff must have

- At least 10 years of experience in conducting household surveys from design to clean dataset delivery stages.
- At least 5 years of data collection and survey experience in urban areas.
- Experience in researching urban sanitation, especially in onsite services and /or fecal sludge management
- Experience in conducting focus group discussions
- Experience in taking and testing of samples
- Experience in conducting key informant interviews
- Deep knowledge of the water and sanitation institutional setting in the country;
- Excellent data analysis, writing and communication skills.

**Required Qualifications and Experience of field team members**

| Position      | Minimum academic qualification | Minimum years of experience | Minimum number of similar surveys |
|---------------|--------------------------------|-----------------------------|-----------------------------------|
| Field Manager | Post graduate                  | 10 years                    | 5                                 |

|                         |               |          |   |
|-------------------------|---------------|----------|---|
| Qualitative specialist  | Post graduate | 8 years  | 2 |
| Quality Control Officer | Graduate      | 8 years  | 3 |
| Supervisor              | Graduate      | 5 years  | 2 |
| Enumerator              | High school   | 2 years  | 1 |
| Data Entry Programmer   | Post graduate | 10 years | 5 |
| Data Entry Supervisor   | Graduate      | 5 years  | 3 |
| Data Entry Operators    | High school   | 2 years  | 2 |
| Data Editors            | High school   | 5 years  | 2 |

**Annex A – Essential background documents**

- Summary report
- Tools and Guidelines
- Data collection Instruments

*[if the documents themselves are not provided or are amended, the annex should contain the protocols for the instruments to be used and any associated guidance, to allow more accurate costing of activities]*