

独立行政法人国際協力機構

アフリカ地域  
廃棄物管理情報収集・確認調査

最終報告書

付属文書（3）

2020 年 2 月

独立行政法人  
国際協力機構（JICA）

株式会社エックス都市研究所  
株式会社建設技研インターナショナル

環境
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## 付属文書（３）

- 作成資料１８：コンゴ民主共和国キンシャサ市追加調査報告（第一回：2019年２月８日～17日）
- 作成資料１９：横浜研修生インタビュー調査結果（2019年３月２日）
- 作成資料２０：ケニア共和国ナイロビ市調査報告（2019年３月８日～17日）
- 作成資料２１：コンゴ民主共和国キンシャサ市追加調査報告（第二回：2019年３月２２日～31日）
- 作成資料２２：廃棄物管理環境教育ガイドブック第２回ワークショップ（2019年４月４日～11日）
- 作成資料２３：コンゴ民主共和国キンシャサ市追加調査報告（第三回：2019年５月１０日～19日）
- 作成資料２４：マダガスカル共和国調査報告（2019年６月１日～15日）
- 作成資料２５：ザンビア共和国ルサカ市調査報告（2019年７月１４日～20日）
- 作成資料２６：ジブチ共和国ジブチ市及び地方都市（タジュラ市）調査報告（2019年７月２１日～26日）
- 作成資料２７：アフリカ廃棄物管理基礎理解パンフレット 英文、仏文、日文（2019年８月）
- 作成資料２８：アフリカ廃棄物管理環境教育ガイドブック 英文、仏文、日文（2019年８月）
- 作成資料２９：アフリカ廃棄物管理データブック 英文、仏文、日文（2019年12月）
- 作成資料３０：現地詳細情報シート（コンゴ民主共和国）
- 作成資料３１：アフリカ廃棄物管理環境教育プログラムリスト
- 作成資料３２：アフリカ廃棄物管理環境教育教材リスト

作成資料 18 : コンゴ民主共和国キンシャサ市追加調査報告 (第一回 : 2019 年 2 月 8 日～17 日)

「コンゴ民主共和国キンシャサ市を対象とした追加調査」

## 現地調査報告書 (2019年2月8日～2月17日)

### 1 調査行程等

#### 1.1 調査行程

2019年2月8日～2月17日の工程で、コンゴ民主共和国キンシャサ市にて現地調査を実施した。詳細行程を下表に示す。

No.	Date	Day	Activities	
1	2/8	Fri.	20:40	Dep. Narita (ET0673)
2	2/9	Sat.	07:25	Arr. Addis Ababa
			10:00	Dep. Addis Ababa (ET0841)
			12:10	Arr. Kinshasa
3	2/10	Sun.	Preparation	
4	2/11	Man.	AM	Meeting with JICA Office Collection of proposals (cost estimations) by candidate local companies
			PM	Meeting with RASKIN By the consultant: explanation of the waste flow survey By RASKIN: explanation of the current status of solid waste management in Kinshasa, selection of target communities for the survey, etc.
5	2/12	Tue.	All day	Visit survey target communities (Kalamu, Kinbaseke) Visit local companies (ELIR, FEAPD)
6	2/13	Wed.	All day	Visit survey target community (Gombe) Visit a laboratory (Ministry of Environment) Visit the candidate local companies (GEC, MULINA) Visit laboratories in Kinshasa University
7	2/14	Thu.	All day	Visit a laboratory (OCC) Progress report to JICA Office Visit a laboratory (Strategic Labo.) Visit laboratories in Kinshasa University
8	2/15	Fri.	AM	UNIDO at JICA Office
			PM	Reporting to RASKIN Reporting to JICA Office
9	2/16	Sat.	13:25	Dep. Kinshasa (ET0840)
			19:55	Arr. Addis Ababa
			22:25	Dep. Addis Ababa (ET0672)
10	2/17	Sun	19:20	Arr. Narita

#### 1.2 調査関係者

JICA コンゴ民主共和国事務所

柴田 和直 所長

臼井 拓 所員

MUFWAYA Raymond 所員

## 2 調査の目的

「キンシャサ市を対象とした追加調査」は、将来の案件形成を念頭に、2017年10月の調査を補完するもので、主に以下の2項目からなる。

### 1) 廃棄物フロー調査

キンシャサ市の一部の地域の廃棄物フロー図を作成する。本調査を通じて、実施する方法の同市における適用性を検討し、かつ、廃棄物担当機関の廃棄物フロー図作成に係る能力向上を図る。

現地業務は約1週間で3回行い（2月、3月、5月を予定）、現地業務前後は国内にてデータの解析等準備作業や取りまとめを行う。尚、ごみ量ごみ質調査は、コンサルタントが仕様書案を作成し、JICAコンゴ民主共和国事務所が現地業者に委託する。

当該調査の予算が限られていること、現行の廃棄物管理はほとんど機能しておらず廃棄物フロー作成に必要な収集量や処分量といったデータが無いこと、廃棄物の発生源データ（人口、事業所の種類・数・規模等）が無いことなどから、キンシャサ市全体の廃棄物フローを作成できるような調査は出来ない。この旨をRASKINをはじめとした関係者に説明し、誤解を招かないようにすることも肝要である。

### 2) リサイクル事業者調査及び組織制度調査

キンシャサ市におけるリサイクルの発展可能性を探るために、JICAコンゴ民主共和国事務所や関係機関が承知している零細リサイクル業者を対象に、リサイクル事業の立上げや運営に係る課題などをディスカッション形式で抽出する。また、2017年10月に実施した情報収集確認調査の組織制度分野を補完するため、コミュニオンやその下部組織の廃棄物管理における役割などに係る調査を実施する。現地業務期間は約1週間（5月を予定）とする。

## 3 現地活動

### 3.1 RASKIN

2月11日、RASKINを訪問し、Konde Vantoto局長にキンシャサ市を対象とした追加調査及びごみ量ごみ質調査の趣旨を説明した。その後、Wan Wour Kwetala氏等、計画局のスタッフにごみ量ごみ質調査の目的及び詳細説明を行った。説明の途中、スタッフらは積極的に質問し、かつ、理解を示した。今回のごみ量ごみ質調査には、焼却を計画する際に必要なごみの発熱量がRASKINの要望により含まれている。これにつきRASKINに尋ねたところ、UNIDOが焼却導入を計画しており、RASKINに問い合わせが来ているとのことであった。

2月12～13日、RASKINが事前に選定したごみ量ごみ質調査対象コミュニティのKalamu, Kinbaseke, Gombeを訪問した。この際、RASKINは主体的に調査趣旨の説明と協力依頼を行った。Kalamu, とKinbasekeは理解を示し、ごみが問題となっているエリアに案内などしてくれた。Gombeではごみ量ごみ質調査の実施により直接的な便益があるのかといった質問があり、少々難しいやりとりがあったが、ここでもRASKINが粘り強く説明し、概ね理解を得た。

2月12～14日の間、対象コミュニティとともに委託先候補業者を訪問した。主にコンサルタントが、業者のごみ量ごみ質調査に係る理解度や関連調査経験などに関する聞き取りを行ったが、RASKINも積極的に質問するなどしていた。

業者から仮見積を入手した結果、JICA事務所の予算を上回ることが危惧された。そこで、ごみの発熱量に関する実験分析のうち、元素分析を削除することを提案したが、RASKINはかなり強い難色を示したので、元素分析のサンプル数を減らす方向で調整する旨説明し、概ね了解を得た。

## 3.2 ごみ量ごみ質調査対象地

RASKINが事前に選定した以下のごみ量ごみ質調査対象のコミュニティを視察した。

- Gombe (high-income)
  - 高所得者層の居住エリアであるとともに、各国の大使館、主要省庁、大型商業施設などがある。
  - RASKINによれば、同コミュニティの全域のごみ収集（2次収集）を行っているとのことである。しかし、コミュニティによるとごみ問題は深刻であり、RASKINに対して不満を抱いているようでもあった。
- Kalamu (Middle-income)
  - 中所得者層エリアということであるが、主要幹線道路でも未収集ごみが目立つ。ごみが水路を塞いでいるようなところも見られ、降雨時の浸水による衛生環境の更なる悪化が懸念される。
  - RASKINによれば、同コミュニティでは部分的にごみ収集（2次収集）を行っているとのことである。
- Kimbanseke (low-income)
  - キンシャサ市で最大の人口を抱えるコミュニティで、市の東側に位置し、急速な勢いで居住区が拡大している。市の中心部に近い西側エリアでは人口密度はとて高くくなっているという。一方、東側エリアは農村的な雰囲気を残しつつ、都市化が進行している。
  - RASKINによれば、同コミュニティのごみ収集（2次収集）は行っていない。

### 3.3 ごみ量ごみ質調査現地再委託業者選定

以下のとおり、JICA事務所がごみ量ごみ質調査を委託する業者の選定支援を行った。

- 仕様書案の作成

コンサルタントは、渡航前にごみ量ごみ質調査の仕様書案を作成し、JICA事務所に送付した。

- ショートリストの作成及び仮見積依頼

JICA事務所は、RASKINから聴取の上、以下の5社に仮見積を依頼した。

- GEC

- MULTINA DMK

- HABITAT VERT

- FEAPD

- ELIR

- 委託業務内容の説明及び業者能力の確認

コンサルタントは、仮見積を提出した以下の4社を訪問し、各社の調査内容に係る理解度や経験・能力などを確認した。

- GEC

キンシャサ大学の環境学部にある。廃棄物関連の聞き取り調査経験を有する。RASKINは、キンシャサ市のごみの性状などに言及する際には、同学部の文献を引用することがあるとのことである。

ごみ質調査で必要となる各種実験は、大学内の研究室と連携するとのことであった。コンサルタントは構内のいくつかの研究室を訪問し、実験に必要な機材のあることを確認した。

- MULTINA DMK

キンシャサ大学の農学部にある。廃棄物関連の調査経験を有するとのことであるが、RASKINによると同社の廃棄物関連調査経験は乏しいとのことである。

GEC同様、ごみ質調査で必要となる各種実験は、大学内の研究室と連携するとのことであった。

- FEAPD

開発関連プロジェクトを手掛ける小規模民間業者である。RASKINとはプラスチックリサイクル関連の業務経験がある。また、EU協力時（PARAU）にごみ質調査の経験を有しているとのことである。

ごみ質調査で必要となる各種実験の実施機関について、明確な回答は無かったが可能性としてStrategic Lab.（中国支援による農業研究所）を挙げたので同機関を訪問したが、実験に必要な全ての機材は確認できなかった。

## ➤ ELIR

2014年設立の小規模民間業者である。組織としては、廃棄物関連業務の請負実績はない（自社資金で廃棄物調査実施との記載はあり）。事務所は無いようで、民家にて打合せを行った。

ごみ質調査で必要となる各種実験の実施機関について、明確な回答は無かったが可能性として環境省研究機関とOCCを挙げたのでこれら機関を訪問した。環境省研究機関は主に水質分析機器を揃えており、ごみ質分析に必要な全ての機材は確認できなかった。一方、OCCはごみ試料を扱うことは出来ないとのことであった。

## ● 仮見積比較

各社を訪問して調査方法の詳細を説明した結果、FEAPDを除く3社はさらに見積もりを見直して提出した。その結果を下表に示す。最低価格提示業者はELIRであった。順に、GEC, FEAPD, MULTINAであった。

B/Q item	Description	Unit	Quantity	ELIR	GEC	MULTINA	FEAPD
				USD	USD	USD	USD
1	Interview	Households	60	5,982.00	1,200.00	9,006.00	9,630.99
2	Waste amount	Sample	480	4,574.40	19,200.00	18,816.00	9,806.59
3	Bulk density	Sample	9	1,017.00	450.00	1,703.70	0.00
4	Physical composition, wet-base	Sample	9	1,017.00	450.00	4,130.10	0.00
5	Physical composition, dry-base	Sample	9	1,017.00	585.00	4,130.10	9,807.24
6	Ash content, by laboratory work	Sample	9	5,320.80	540.00	810.00	0.00
7	High calorific value	Sample	9	5,324.40	1,800.00	360.00	0.00
8	Elemental content	Sample	9	5,324.40	9,000.00	810.00	0.00
9	Ash content, by simplified method	Sample	9	1,011.60	405.00	810.00	12,429.98
10	Reporting	Lump sum	1	223.20	5,000.00	23,000.00	2,161.69
Total		-	-	30,811.80	38,630.00	63,575.90	43,836.49

## ● 所感

実験分析を除く作業に特殊な技能・経験を必要とするものは少なく、廃棄物分野のある程度の知識・経験を有する4社は最低限の技術的实施能力を有すると判断する。ただ



し、最初に実施するインタビュー調査及びごみ量調査は多くの作業員と車両等のロジスティックに資金を要することから、実際の契約においては前払い金を配慮する必要がある。

一方、実験分析については注意を要する。廃棄物の発熱量の測定に必要な熱量計は、キンシャサ大学内の研究室のみにて確認できた。GECとMULTINAは学内の研究室を活用するということなので問題はないであろうが、ELIRとFEAPDが言及した研究所では同機材の確認はできなかった。最終見積を依頼する際には、この点に留意することを薦める。

### 3.4 ごみ量ごみ質調査実施スケジュール

JICA事務所によれば、2月18日の週にJICA内手続き、週末から翌週にかけて最終見積依頼から業者選定、3月4日の週に業者との契約といったスケジュールで進めるということである。

実際のごみ量ごみ質調査は、契約締結後2週間以内に着手としているので、早くて3月18日の週、或いは、次週と想定している。よって、コンサルタントの次回の現地入りもこのタイミングとなる。

### 3.5 キンシャサ市の廃棄物管理の現状

#### ● RASKIN

2017年10月時点、RASKIN (Régie d'Assainissement de Kinshasa) の名称はRATPK (Régie d'Assainissement et des Travaux Publics de Kinshasa) であった。以前は廃棄物管理以外の公共事業も実施していたが、より廃棄物管理を主体とする衛生分野に特化することになったので名称を変更したとのことである。

RATPKは、2014年にEUからPARAUプロジェクト (Projet d'Appui à la Réhabilitation et l'Assainissement Urbain) を引き継いだ。プロジェクトは、9つのコミューンに61の中継施設を配し、中継施設から10m3の大型コンテナで、ごみを市の東側にあるMpasa処分場まで運搬するというものであった。2017年10月の段階でも、機材が故障や老朽化により不足し、十分にごみを市街から排除することが出来ていなかったが、今回 (2019年2月) はさらに状況が悪化していることが確認された。RASKINによると十分にごみを排除できているのはGombeのみで、他の8つのコミューンでは部分的にしか排除できていないとのことであった。機能している中継施設は26か所、コンテナは16台のみである。他の15のコミューンの実態は把握されていない。

#### ● 他ドナーの動向

2017年10月調査で報告した世銀のN'Djili川流域のプロジェクトは準備中であり、まだ開始されていない。一方、世銀のプロジェクト対象地区に隣接する地区で、AFD (フランス開発庁) が15百万ユーロ規模の同河川の改善 (ごみの排除など) プロジェクトを実施するとのことである (下記のUNIDOコンサルタントから聞取り)。

2019年2月15日、UNIDOコンサルタントのJICA事務所への訪問に同席した。キンシャサ市の総合的な廃棄物管理改善プロジェクトの提案を作成中で、今年度末までにDRC側に提出するとのことである。DRC側の主カウンターパート機関は工業省で、関係機関として環境省とエネルギー省の名があがっている。出資元は、地球環境ファシリティ（GEF）、DRC政府、同国民間セクター、UNIDOが想定されており、GEFが4百万ドル、他の協調資金が16百万ドルとなっている。プロジェクトの内容は、主に収集改善とWaste to Energyで、技術支援も含まれている。プロジェクト期間は4年間である。

### 3.6 今後のJICAの支援について

案件形成に関してJICA事務所と打合せを行った。主な内容は以下のとおり。

- JICA：2017年10月の調査結果から想定されたマスタープランの作成支援は一案とするが、他の協力案を排除しない。
- JICA：世銀、AFD、UNIDOといったドナーが活動しているので、それらとの重複を避けるだけでなく、協調できるような案件を形成したい。
- コンサルタント：案件の内容によるが、どの機関をカウンターパートとするのかは重要と思料する。マスタープラン作成支援といった内容であると、RASKINがカウンターパートとして適当かは疑問のあるところである。また、現場を主体とする案件ではRASKINが力を発揮できると思われるが、EUプロジェクト以後、ごみの収集運搬能力を急速に落としているので、同機関の持続可能性が憂慮される。
- JICA：カウンターパート機関をどこにするかは重要であると考えており、そのためにRASKINの能力を調査して欲しい。
- コンサル：容器包装等に課す環境税（eco-tax）の議論が為されており、その用途先の一つとして廃棄物管理があがっている。同資金の活用も含めた廃棄物管理に必要な資金確保策（クロスサブシディの適用など）、廃棄物サービス品質基準の設定と民間活用策（調達管理の仕組みなど）、資金調達及び執行機関の会計及び業務監査方法など、廃棄物管理を支える包括的な財務システムの構築といった制度支援も一案であろう。

## 4 コンサルタントの今後の活動について

- JICA事務所と現地業者との契約締結より約2週間後、現地に赴きごみ量ごみ質調査を監督指導する。3月25日の週を想定。
- 4月、ごみ量ごみ質調査結果を分析し、ごみ量ごみ質調査報告書を作成する。
- 5月、現地に赴き、ごみ量ごみ質調査の分析結果をRASKINに説明する。また、案件形成に資する情報収集のために、廃棄物管理の組織制度補完調査、リサイクル業者調査を行う。

## 5 訪問先

今回の調査中の主な訪問先及び関係者は以下のとおり。

【Ministry of the Environment, Sanitation Department】

Ms. Pascaline MBANGU KIKUMBI, Sanitation Director

**【RASKIN】**

Mr. ANDERSON KONDE VANTOTO, General Manager

Mr. WAN WOUR, Expert

Mr. JULIO VENGO, Expert

Mr. MUNENE-ROBERT, Inspector

Mr. YAMBEMBU, Technical Team

Mr. MARIN MONTENESSI, Controller

**【Commune of Gombe】**

Ms. Coco Felicity N'Tumba Yaya, Deputy Mayor

**【Commune of Kalamu】**

Mr. Jean-Claude KADIMA, Mayor of Kalamu

Mr. Gaetan, Head of Sanitation and Public Work

**【Commune of Kimbanseke】**

Mr. Edouard GAMBEMBO, Mayor of Kimbanseke

**【ELIR SARL】**

Mr. Christian ELIR, Managing Director of ELIR SARL

**【FEAPD asbl】**

Mr Henry MATUMONA, Coordinator

**【GEC】**

Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation & Waste Treatment)

**【MULTINA DMK】**

Prof. Charles KINKELA SAVY SUNDA, Managing Director

## **6 別添資料**

- 打合せメモ
- キンシャサ市を対象とした追加調査説明資料
- ごみ量ごみ質調査仕様書案、ごみ量ごみ質調査実施方法説明資料

打合せメモ

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 11 日 9:00 ~ 10:30
3. 場所	JICA DRC
4. 参加者	<p>【JICA DRC】  Shinichi FUJIMOTO, Chargé de la Sécurité  Kazunao SHIBATA, Représentant Résident  Hiraku USUI, Directeur de Programmes (Environnement et Mines)</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) :</p> <p>① Latest version of the schedule / TOR</p> <p>入手資料 (Available materials) :</p> <p>① Documents about security in Kinshasa, DR Congo  ② Proposal GEC  ③ Proposal MULTINA DMK</p> <p>Before the actual meeting about the WACS survey in DRC:</p> <ul style="list-style-type: none"> <li>• Briefing about security measures with Fujimoto san, in charge of security at JICA DRC</li> <li>• Informal discussion about the elections and the situation in DRC following the elections</li> </ul> <p>[JICA] Confirmation of the schedule of the mission</p> <p>Plan was to collect and compare the quotations during this 1<sup>st</sup> meeting (Mon. 2/11) and visit the companies on Tue. 2/12 but so far only 1 company replied. Deadline was today (Mon. 2/11 by noon) so we need to wait until then, and contact the companies by phone if necessary. By meeting and visiting the different companies, it might be already clear if they will be able to conduct the survey or not. Possibility that there will be no competition.</p> <p>JICA Office in DRC will prepare the documents and contract directly with the selected company but need to check the conditions and determine type of contract with HQ in Japan (budget, duration, language, etc.).</p> <p>As a result it is unclear how long it will take to collect the proposals and establish the contract. Confirmation that the budget is about 3,300,000 JPY.</p> <p>[EX] explained the tentative schedule of the survey and process, and agreed it might be tight. EX will come again to supervise the survey and assist the selected company, for ex. by providing examples of reports, etc.</p>	

EX would like to organize meetings with the companies asap.

[JICA] pointed out another possible issue: who can use the laboratory of Kinshasa University? Maybe some companies are denied access. Maybe an official letter of JICA and/or RASKIN might help/be necessary. Visit of the laboratory is planned on Tue. 2/12 at 4pm.

[EX] asked more information about the companies. JICA replied that they had no direct experience with these companies and that the list came from RASKIN. JICA already contacted the companies officially, deadline to submit the proposals is today (Mon. 2/11) at noon.

[JICA] explains the political situation after the elections. There should be soon some changes in the ministries. JICA will try to introduce EX to the new people at the Ministry of the Environment. For now a meeting is scheduled on Tue. 2/12 with the current person in charge at the Directorate of Sanitation (Direction d'Assainissement, DAS).

[EX] reminded the purpose of the survey:

- Presentation during the ACCP Assembly in August 2019
- Explain RASKIN how to conduct a WACS so that they can replicate

EX will come back in March to supervise the survey at the moment of the sampling. According to the tentative schedule, it should be the week of March 10<sup>th</sup> but possibility that it gets postponed for about a week.

The survey is supposed to take place 8 consecutive days, with the 1<sup>st</sup> day being like a training. Ideally the survey should start on a Sunday, but JICA pointed out that Church service takes place on Sunday morning.

EX also plans to come back in May with Tanaka san. This visit will focus on recycling.

[JICA] explained about the public sector. JICA also works with the World Bank on a big project, mainly related to transportation (urban traffic) but also sanitation. It includes the rehabilitation of the landfill in N'djili, procurement of equipment, recycling enterprises, etc.

[EX] explained that depending on the country, the definition of household waste varies and it sometimes includes waste from small businesses that can be assimilated to households (such as restaurants). This time, the survey will focus on household only.

[EX] explained the method of the WACS showing some slides about the quartering method.

JICA agreed that it will be necessary to thoroughly explain the process to the companies.

Meeting finished with arrangements for the meeting with RASKIN that will take place in the afternoon.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 11 日 14:15 ~ 14:45
3. 場所	RASKIN
4. 参加者	<p>【RASKIN】  M. ANDERSON KONDE VANTOTO, General Manager  M. WAN WOUR, Expert  M. JULIO VENGO, Expert  M. MUNENE-ROBERT, Inspector  M. YAMBEMBU, Technical Team  M. MARIN MONTENESSI, Controller</p> <p>【JICA DRC】  M. Kazunao SHIBATA, Représentant Résident  M. Hiraku USUI, Directeur de Programmes (Environnement et Mines)  Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None  入手資料 (Available materials) : None</p> <p>[RASKIN] During his welcome message, the GM of RASKIN assured of his support. RASKIN is very open and willing to help to obtain reliable data</p> <p>[JICA] presented the delegation and the purpose of the mission.  This meeting is to launch the WACS project. After the courtesy visit with the GM, the Japanese consultants will immediately start working with the technical team of RASKIN.  JICA explained:</p> <ul style="list-style-type: none"> <li>• The schedule and process (meetings with local companies, JICA will conclude the contracts, EX will come back to supervise WACS, local company should finish by end of March, in May will do a workshop to share results, possibly inviting other partners such as WB).</li> <li>• The main purpose of the WACS: to obtain reliable data.</li> <li>• That this mission is part of ACCP platform (presentation of the platform). The Annual Meeting of ACCP will take place in August 2019 in Yokohama, Japan, as side event of TICAD VII. Country of DRC and City of Kinshasa will be invited and we hope they will share their experience during this event and act as an example.</li> </ul> <p>[EX] presented the mission and WACS</p>	



Discussion about:

- The collaboration with other partners, esp. project with World Bank (Multisectoral – Urban resilience, including the rehabilitation of the landfill site).
- Changes in the governmental staff due to the recent elections.

[RASKIN] introduced their activity

Brief description of Kinshasa in terms of sanitation/waste management:

- Megalopolis of 12 million inhabitants, 10,000 km<sup>2</sup>, 24 communes
- Stratification: high-middle-low income is an appropriate approach
- Landfill is located 20 km away from the city centre and is managed by RASKIN
- Estimation: production of 9,000 tons/day but only 3,000 tons are discharged at the landfill. They don't know what happens to the remaining 6,000 tons (illegal disposal in the nature, etc.)
- Production is increasing
- Composition: 7 types (organics: 65%, plastic, metals, textiles, paper, glass, other) but everything mixed, no sorting

WACS is very important and will be very useful for them. With reliable data, they'll be able to start some projects.

Aware that time is very limited, so that this meeting with the DG was immediately followed by a meeting with technical team.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 11 日 15:00 ~ 16:30
3. 場所	RASKIN
4. 参加者	<p>【RASKIN】  Mr PHILIPPE GAMBEMBO, DCI (Director of Internal Control)  Mr WAN WOUR, Expert  Mr JULIO VENGO, Expert  Mr MUNENE-ROBERT, Inspector  Mr MARIN MONTENESSI, Controller</p> <p>【JICA DRC】  Mr Hiraku USUI, Directeur de Programmes (Environnement et Mines)  Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) :</p> <p>① Printout of the PowerPoint presentation about the WACS workflow “How to conduct the WACS in Kinshasa City, DRC” (French version)</p> <p>入手資料 (Available materials) : None</p> <p>Confirmation and adjustment of the schedule:</p> <ul style="list-style-type: none"> <li>• RASKIN will join the meeting with the Ministry / DAS and all the meetings/visits of the communes, companies and laboratories.</li> <li>• EX will make a report to JICA and finalize the TOR. JICA will select the local company and conclude the contract.</li> <li>• There will be another meeting at the end of this week before our departure in order to present our evaluation and comments.</li> </ul> <p>[EX] explained the background of the WACS: surveys have been conducted but it is not clear which method was used. This survey will use the right method.</p> <p>As the budget is limited, it will not be complete. We can only do 3 communes but RASKIN should be then able to duplicate.</p> <p>Regarding heat value: it was never done before and RASKIN specifically asked JICA to include it. EX was wondering if there were a specific reason why RASKIN needed this information. RASKIN answered that there was indeed a concrete project for an incineration plant.</p> <p>Regarding companies: so far only 2 companies submitted a quotation (from the 5 companies</p>	

recommended by RASKIN), and both are above budget.

RASKIN presented current system:

- Waste are burned/buried in some areas (except Gombe where it's collected)
- Some recycling by carters
- RASKIN uses tipper trucks and excavators
- Waste is collected in the morning
- Estimation: 0.5 kg/person and 6 people per household, HH → 3kg/day

[EX] presented the workflow of the WACS using a PowerPoint. During the presentation, following questions / comments arose:

- [EX] For this survey, only households will be considered, not business entities.
- [RASKIN] Number of samples seems low. / [EX] Yes, but reliable and have historical data for comparison.
- [EX] How is discharged toilet paper / [RASKIN] It depends if/what kind of toilets. Sometimes there's a separate waste bin in the toilets. / [EX] Sanitary items will have to be collected separately during the survey to avoid contamination.
- [RASKIN] How were decided the categories? Why not include specific waste, such as WEEE or batteries (increasing issue). / [EX] Possibility to include it in the contract if deemed necessary. Such observations should be included anyway in the remarks.
- [RASKIN] In some cases, there are more than 1 HH on 1 parcel, and all families share the same waste bin. / [EX] We need only 1 HH but most important is to know how many people generated the amount of waste collected.
- [RASKIN] There might be some tension in the neighbourhood if one HH only is selected and benefit from a special service. / [RASKIN/EX] Need sensitization actions, explain the project (limited in time, etc.).
- [RASKIN] When will be the bags distributed (all at the beginning, new one after each collection)? / [EX] Depends on the local company.

At the end of the meeting, we discussed arrangements for next visits (communes, companies).

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 12 日 9:00 ~ 10:00
3. 場所	Ministry of the Environment, Sanitation Department (Direction d'Assainissement, DAS)
4. 参加者	<p>【Ministry of the Environment, Sanitation Department】 Ms Pascaline MBANGU KIKUMBI, Sanitation Director</p> <p>【RASKIN】 Mr WAN WOUR, Expert Mr JULIO VENGO, Expert Mr MUNENE-ROBERT, Inspector</p> <p>【JICA DRC】 Mr Kazunao SHIBATA, Représentant Résident Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) :</p> <p>① Schedule and Contents of Additional Survey in the Democratic Republic of the Congo (French version)</p> <p>入手資料 (Available materials) : None</p> <p>[JICA] Introduction and Presentation of the mission:</p> <ul style="list-style-type: none"> <li>• Purpose is to identify the current situation (quantity + composition)</li> <li>• Reliable data are necessary for future projects</li> <li>• TICAD Summit end of August in Yokohama, Japan</li> <li>• ACCP Meeting is a side event</li> <li>• This survey will be an example for other countries</li> <li>• Explanation of the schedule of this week</li> <li>• Workshop in May to show the results</li> </ul> <p>[EX] Description and explanation of the WACS</p> <p>[DAS]</p> <ul style="list-style-type: none"> <li>• Very happy, very proud that Kinshasa has been selected. Feels sometimes ashamed about the (waste) situation in Kinshasa and considers it is a great opportunity to share in front of other countries.</li> <li>• JICA = Waste management (much more than any other organization)</li> </ul>	

- Was very impressed by the 1<sup>st</sup> ACCP Summit in Rabat, Morocco
- Ministry wants RASKIN to become an autonomous agency (now under the Ministry) financed by a national fund consisting of sanitation tax and a newly created eco-tax.
- Introduction of eco-tax is under discussion. This eco-tax would be applied on every non-biodegradable item that enters the country. Should be in the Finance Law of 2020 (too late for 2019 because of the elections), new government should vote it soon during a Council of Ministers.
- Ms MBANGU will be in Cape Town on 18-23 Feb. for a Pan-African Conference on Sanitation. After that event, she should change position as she has been promoted, and don't know yet who will take over.

[JICA] explained that JICA and Japanese Embassy need to prioritize projects, and the new Congolese government should show strong political will in this field for JICA to support further projects.

[DAS] reminded that Kinshasa used to be called Kin la Belle ("Kin the Beautiful"). In the budget, security and sanitation represent a big percentage but it is not reflected in the field. In countries like Tunisia or Morocco, it seems that the government participates up to 50%.

[RASKIN] added that the person in charge should be more technical than political.

[JICA] announced that there will be more training places from next FY

[DAS] asked if the training really have to take place in Japan, or if it was not possible to organize them in Congo in order to involve more people?

[JICA] Objective is also that people trained in Japan can train people in DRC ("Train the Trainer")

[RASKIN] highlighted that they're already doing it. They have been running some awareness actions at school level so that kids get raised with the good knowledge and behaviour.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 12 月 2 日 10:30 ~ 10:50 (end of meeting) ~ 11:50 (end of visits)
3. 場所	City Hall of the Commune of Kalamu + Visit of the Commune of Kalamu (including visits of households)
4. 参加者	<p>【Commune of Kalamu】  Mr Jean-Claude KADIMA, Mayor of Kalamu (meeting only)  Mayor's attendant (meeting only)  Mr Gaetan, Head of Sanitation and Public Work (meeting + visit)</p> <p>【RASKIN】  Mr WAN WOUR, Expert  Mr JULIO VENGO, Expert  Mr MUNENE-ROBERT, Inspector</p> <p>【JICA DRC】  Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <p>① Map of the commune of Kalamu</p> <p>[RASKIN] Presentation of the mission and project.</p> <p>[Commune] General description of the commune:</p> <ul style="list-style-type: none"> <li>• 13,000 – 13,800 households, average of 5 people per household</li> <li>• In 2017: 200,377 inhabitants</li> <li>• 18 districts</li> <li>• 386 roads and avenues</li> </ul> <p>EX pointed out that the number of HH / people per HH doesn't match with number of inhabitants, but commune explained that these figures were average / estimations.</p> <p>Description of the commune in terms of sanitation:</p> <ul style="list-style-type: none"> <li>• Mpasalandfill managed by RASKIN</li> <li>• There used to be 14 transfer stations but many have closed during the period June - Dec.</li> </ul>	

2018 and only 5 remaining (among them only 3 are evacuated regularly)

- As a consequence, there are many illegal dumping site (so-called décharges pirates), esp. in the Kalembo river, causing flood problems
- Issues related to mismanagement of waste: pollution, health problem, impede traffic
- At the beginning, the transfer stations were free but then charges applied
- Stations are mainly used by HH living nearby
- Difficult access to vehicles of some roads is a major obstacle for waste collection
- Another challenge that the municipality is facing is that inhabitants of surrounding communes throw their waste in Kalamu because many people transit through this commune (for example to go to work) due to its central location in Kinshasa
- After 3 days, need at least 5 trucks from RASKIN for the evacuation
- Ideally would like to have more than 20 stations in the commune

[EX] asked about the transport from households to the transfer stations. Commune answered that some HH do it themselves if they live nearby, otherwise it's mainly informal (cart-pusher, carter). Some NGOs tried but it didn't work as there was no evacuation after collection.

The meeting was followed by site visits in the commune of Kalamu.

#### Visit 1: Illegal dumping at roundabout in a big shopping street

Kalamu commune is busy 24 hours a day because it's a central point for people going to work. Also, there are many street shoppers.

As a consequence, waste accumulate on the roadsides / roundabouts.

#### Visit 2: Former official dumping site still used illegally

The place was a former official dumping site that was officially closed, but as people are used to this place and there is no alternative, they continue to come and discharge their waste there. As waste is accumulating, it expands up to the road, which is dangerous for car circulation. Waste pickers are present.

#### Visit 3: Bridge over the river

Bridge is blocking the flow so that waste are accumulating at this level

Plants are growing as if it were soil

Cycle: people throw their waste in the ravines → with the rain, waste flow along the river → waste are blocked by the bridge and pile up → evacuate on the ravines up the river

Visit 4: 2 households

a) Household 1:

4 families (5-9 people per family) on 1 parcel sharing one waste container (about 10l).

A cart-pusher comes to collect. It costs about 300 Congolese francs each time (can be more according to quantity).

Sometimes they pick up the trash from the gutters because of health reason (if water stagnates it may attract mosquitoes).

b) Household 2:

1 family (8 family members)

4 buckets

A cart-pusher comes to collect every 3-4 days

Price: 500-1000 Congolese francs depending on quantity

以上



打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 12 日 12:30 ~ 13:00 (end of meeting) ~ 13:50 (end of visits)
3. 場所	City Hall of the Commune of Kimbanseke + Visit of the Commune of Kimbanseke (including visits of households)
4. 参加者	<p>【Commune of Kimbanseke】 Mr Edouard GAMBEMBO, Mayor of Kimbanseke (meeting only) Didier and Gregoire (visit of the commune)</p> <p>【RASKIN】 Mr WAN WOUR, Expert Mr JULIO VENGO, Expert Mr MUNENE-ROBERT, Inspector</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <p>① Data about the commune (“Rapport synthese de recensement exercice 2018”)</p> <p>[JICA] Presentation of the project and explain purpose of our visit</p> <p>[Commune] Brief description of the commune</p> <ul style="list-style-type: none"> <li>• 1,156,742 inhabitants in 2018</li> <li>• 237.80 km2</li> <li>• 1,968 roads</li> <li>• 110,980 parcels</li> <li>• 46 districts (+1 in project)</li> <li>• 649,336 households (total including foreigners)</li> <li>• 628,082 Congolese households</li> <li>• Highest density of the country (4,864 inh/km2)</li> <li>• There are some conflicts with the government regarding land usage. Although the law states that the land belongs to the State, traditional chiefs (so-called “chefs coutumiers”) keeps selling it.</li> </ul>	

In terms of sanitation:

- 3 main roads but in bad condition
- Sanitation is managed by the population itself, people are not used to have an organization managing waste
- Tried to introduce a system in which parcel pays a fee
- Evacuation occurs during the night
- Work together with the provincial government
- Education is important, awareness campaigns are needed
- There used to be one official dumpsite in Pascal but closed since 6 months.

Project with the Belgian Development Agency (CTB):

- “Incubateur” (incubator)
- Machine for making pavers from plastic waste (mainly sachets)
- The project is finished but couldn’t be sustained. They tried to operate it in 2008 but no one would buy the pavers so that they had to stop in 2009.

The meeting was followed by site visits. We could observe that the commune of Kimbanseke is urban-rural.

Visit 1: Dumping site in the nearby commune of Masina

This site is actually located in another commune but citizens of Kimbanseke often discharge their waste there.

It used to be a public field (e.g. to practise sport), but became an illegal dumping site. It has been rehabilitated recently to retrieve the field, but some people continue to throw their waste there.

Visit 2: 2 households

a) Household 1:

- Number of family members / people living in the household: unclear (around 7-9)
- No waste bin
- No collection
- Incineration + Bury in the garden. Enable to heighten the property (lower than street level).
- Don’t know how other people in the neighbourhood manage their waste.
- In the past: gathered the waste, truck collected and brought the waste to the forest where it was burned but there is no more forest.

b) Household 2:

Throw in the street

When full, dig a hole and bury

Full within 2-3 days

No carter nor cart-pusher

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 12 日 14:15 ~ 14:40
3. 場所	ELIR SARL
4. 参加者	<p>【ELIR SARL】 Mr Christian ELIR, Managing Director of ELIR SARL Raphael, Bonga, Héritier, Augustin</p> <p>【RASKIN】 Mr WAN WOUR, Expert Mr JULIO VENGO, Expert Mr MUNENE-ROBERT, Inspector</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>[ELIR] Brief introduction and presentation of the company</p> <p>[EX] asked about their experience, esp. in terms of waste management. ELIR replied that they are a new company (created in 2014). They are not only specialized in environment but work in other fields as well (staff from different background with various skills). They have for ex. experience in beautification of green spaces. Concerning the WACS, the quantity survey is OK and for the composition survey, they know the theory.</p> <p>[EX] asked about the laboratory works. ELIR replied that they have partnerships with private laboratories and that some of ELIR staff also work in laboratories. For this project, ELIR is considering working with the state laboratory that is under the Ministry of the Environment / Sanitation Department (DAS) and is involved in National Sanitation Program (PNA, Programme National d'Assainissement) + OCC (Office Congolais de Contrôle / Congolese Office of Control) for the calorific value. They also considered the laboratory of National Pedagogical University (UPN, Université Pédagogique Nationale) but they don't have the reagents.</p>	

⇒ EX will need to check the laboratories; staff from ELIR will arrange and join the visits

Regarding the proposal, the following has been discussed:

- [EX] explained that the measurement of ash content through the simplified method was not performed in laboratory
- [EX] asked if the price was all inclusive (incl. taxes) / [ELIR] confirmed that yes, it is.
- [EX] would like the BOQ in USD or conversion rate / [ELIR] will resend
- [ELIR] asked about the selection process and the possibility to submit a final proposal / [EX] explained the process

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 12 日 15:30 ~ 16:15
3. 場所	FEAPD Office
4. 参加者	<p>【FEAPD asbl】 Mr Henry MATUMONA, Coordinator Simon (Secretariat), Jean-René</p> <p>【RASKIN】 Mr WAN WOUR, Expert Mr JULIO VENGO, Expert Mr MUNENE-ROBERT, Inspector</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : ① Printout of the quotation</p> <p>[JICA] first explained they couldn't receive their proposal because the file was too big and JICA's mail system doesn't accept compressed files. FEAPD printed the quotation for the meeting, saved the file on EX's USB key and will resend by e-mail.</p> <p>[FEAPD] presented the company, its activities and experience.</p> <ul style="list-style-type: none"> <li>• Exists since 2006</li> <li>• Fields: Environment, Agriculture, Infrastructure, Children in Distress</li> <li>• Works with NGOs, for ex. Ingénieurs sans frontières (Engineers without borders), ADAC, Wallonie-Bruxelles Environment, etc.</li> <li>• e.g. Project in Bandalungwa with Ingénieurs sans frontières for the manufacture of pavers using plastic bags. Also sell plastic/glass bottles and cans to recyclers. In addition to the environmental aspect, it also aims at the empowerment of women with low income.</li> <li>• Experience in public awareness: surveys in N'Djili and Bandalungwa to find out the needs and desires of the population.</li> <li>• Worked with the EU for waste survey in Kinshasa and flood zones.</li> <li>• Collaborate with RASKIN for recycling. RASKIN has delegated FEAPD one station (Bandalungwa/Bakayao) for the recycling. They are in charge of sorting and retrieving</li> </ul>	

recyclable materials (involving women with low income). Delegating another station (République) is planned. For this new case, they are considering asking the households to pre-sort at home.

- Explanations of activities and experience in other fields (agriculture, children)

[EX] asked how the EU survey was conducted.

FEAPAD explained that the survey took place during 45 days in 2013-2014.

It was part of the PARAU program (Projet d'appui à la réhabilitation et l'assainissement urbain / Project to support the rehabilitation and urban sanitation).

It covered all the vehicles that were arriving at the landfill

[EX] explained that this time the survey would be directly at HH level. / [FEAPD] acknowledged and considered it was a good approach as the waste would be “clean”

[FEAPD] asked how the HH were to be selected as communes are very big and it would be complicated to go to every corner of each communes / [EX] explained that the HH will be selected by RASKIN to be representative of the commune.

[EX] asked about the quotation:

- Some lines of the quotation are empty / [FEAPD] some items are grouped, cf. column “observation”.
- BOQ is in EUR but we would need it in USD / [FEAPD] said the conversion rate was 1.15 / [EX] asked for written confirmation by e-mail

[EX] asked about the laboratory works.

FEAPD replied that they were considering contacting UNIKIN and/or Réserve Stratégique (Strategic Reserve, under the Presidency) but it's not confirmed yet. They are planning to contact/confirm the laboratories after conclusion of the contract.

EX warned that the prices have to remain stable after conclusion of the contract, it's a JICA requirement. FEAPD tried to argue that prices of materials (for ex. reagents) may vary from one week to another, and that one needs to be flexible in Congo.

[FEAPD] showed an infrared thermometer (thermoflash temperature) to measure temperature.

At the end of the meeting, we discussed the arrangements to visit the laboratory of Réserve Stratégique.

以上



打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 12 日 17:10 ~ 17:40
3. 場所	Commune of Gombe
4. 参加者	<p>【Commune of Gombe】 Ms Coco Felicity N'Tumba Yaya, Deputy Mayor</p> <p>【RASKIN】 Mr WAN WOUR, Expert Mr JULIO VENGO, Expert Mr MUNENE-ROBERT, Inspector</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>[RASKIN] Introduction of the project</p> <p>[Commune] asked why this project was important and highlighted that the commune of Gombe was a strategic commune (with VIP, etc.)</p> <p>[RASKIN] explained the importance of having reliable data, a complete database, for ex. to attract foreign investors.</p> <p>[Commune] asked about the process. They require an official mission letter, etc.</p> <p>[RASKIN] acknowledged.</p> <p>[Commune] asked what kind of information and support were needed from their side.</p> <p>[RASKIN] listed all the required information.</p> <p>[Commune] agreed to arrange a meeting with the people in charge who will prepare the required information/documents.</p> <p>At the end of the meeting, we discussed arrangements for a second meeting at the commune of Gombe with the people in charge of population and environment the next day.</p>	

Note:

While waiting before the meeting, EX discussed with RASKIN about their activity in Gombe. [RASKIN] explained that their main job was public hygiene and fight against illegal dumping sites. They collect and transport waste from the transfer stations to the landfill. They have tried to collect directly from households but it didn't work, mainly because of organizational and political issues. Pre-collect is mostly informal, with very few companies and no big.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 13 日 10:35 ~ 11:15
3. 場所	Commune of Gombe
4. 参加者	<p>【Commune of Gombe】</p> <p>Ms Annie: Head of Municipal Administration</p> <p>Mr Mkama: Head of Environment Department</p> <p>Mr Baziota BINAUD: Assistant of the Head of Municipal Administration</p> <p>Head of Population Department</p> <p>【RASKIN】</p> <p>Mr WAN WOUR, Expert</p> <p>【JICA DRC】</p> <p>Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】</p> <p>Mr Ikuo MORI, Senior Consultant</p> <p>Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>After a presentation of the project, the Commune briefly presented a description of Gombe.</p> <p>Estimation:</p> <ul style="list-style-type: none"> <li>• 10,872 households</li> <li>• 68,276 inhabitants</li> <li>• 10 districts (9 on land and 1 on river Congo)</li> <li>• 210 roads &amp; avenues</li> <li>• 12,600 km2</li> <li>• 2 million visitors/day (from other 23 communes of Kinshasa, RDC and Brazzaville)</li> <li>• VIP commune with personalities, such as ministers and ambassadors</li> <li>• Central Market is not managed by the Commune but has been privatized</li> </ul> <p>In terms of sanitation:</p> <ul style="list-style-type: none"> <li>• Private company (Miss Propre) assigned by the government</li> <li>• Carts are not convenient / adapted for collection in Gombe</li> <li>• The commune tried to install some waste bins along the roads but people were throwing waste next to them (not inside)</li> </ul>	

- Pick-up by street children (so-called “shegué”).
- Would need waste bins at every corner but would require regular evacuation, otherwise it would overflow.

Discussions about the respective roles between RASKIN and the Communes and how they could/should collaborate:

- There was a decree from the governor to make RASKIN in charge of SWM.
- As a result, some communes abandoned some of their activities/projects.
- The Commune of Gombe doesn't feel that the situation has improved since RASKIN is in charge.
- RASKIN argues that the problem is mainly due to the politics. The government sometimes decides PPP leaving aside the institutions in charge.
- Gombe considers that the communes have the contacts, they know their population, their needs, etc. better.
- RASKIN is worried that the money might get diverted if managed by the communes.

[JICA] informed the commune that for small projects, they can contact the Japanese embassy.

Due to limited time, we were not able to visit the commune of Gombe nor households.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 13 日 11:45 ~ 12:10
3. 場所	Laboratory of the Ministry of Environment / DAS
4. 参加者	<p>【Laboratory】 Mr Roger, Head of the laboratory Laboratory staff</p> <p>【ELIR】 1 staff</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>Laboratory of the Ministry of the Environment / Department of Sanitation 3 sections: Physical-Chemical, Microbiological, Vector (entomological) Mainly for water analysis</p> <p>Laboratory includes following equipment (non-exclusive list):</p> <ul style="list-style-type: none"> <li>• Thermostatic cabinet</li> <li>• BOD meter</li> <li>• Phenol kit</li> <li>• Cyanid kit</li> <li>• Jar test</li> <li>• Distiller</li> <li>• Precision scale</li> <li>• Laboratory oven that goes up to 100 degrees (NOT furnace)</li> <li>• Glassware</li> <li>• Thermal reactor</li> <li>• Conductivity meter</li> <li>• PH meter</li> </ul>	

- Water bath
- COD meter
- Multiparameter (MD610, MD200)
- Portable equipment
- Turbidity meter

Further equipment is available in the storage room.

On this site, they also have an oven that goes up to 200 degrees. For higher temperature, it is possible to go to another site where there's an oven that goes up to 1000 degrees.

However, they don't have a calorimeter.

ELIR said they would use the laboratory of OCC for the measurement of calorific value.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 13 日 12:50 ~ 13:15 (end of meeting) ~ 13:35 (end of laboratory visit)
3. 場所	GEC Office + Laboratory, University of Kinshasa / Faculty of Sciences
4. 参加者	<p>【GEC】 Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation &amp; Waste Treatment) Laboratory staff for laboratory visit</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>[GEC] started with a presentation of its organization and activities. Prof. BIEY MAKALY is Professor at the University of Kinshasa and can thus have a consulting company (bureau d'études) within the University. Prof. BIEY MAKALY obtained a Ph.D. in waste management in 2001. Participated/Organized seminars and published reports on the topic. GEC conducts field surveys every year.</p> <p>[GEC] made following comments / had following questions regarding the project:</p> <ol style="list-style-type: none"> <li>1) Representativeness of 20 HH → [EX] explained it was because of budget limit, but that it shows RASKIN the right method for duplication</li> <li>2) Sometimes, there are several HH on one parcel → [EX] RASKIN had same question and we saw the case during our visits. Important is to know the number of people in the HH that generated the waste collected.</li> <li>3) Is it possible to conduct the measurement work out of the target commune? → [EX] replied it was possible but the labelling and transport must be appropriate.</li> <li>4) Waste Flow Diagram → [EX] explained it was not part of the TOR for this survey</li> <li>5) Regarding the density, is it with or without compaction? → [EX] explained it was without</li> </ol>	

compaction as we don't know the pressure they will use; just let the bucket drop 3-4 times from about 30 cm high.

[RASKIN] pointed out that their data were coming from GEC and asked how they actually obtained them. [GEC] explained that they conduct yearly surveys, add a column and calculate average.

[EX] asked to re-send the quotation following the model of the TOR (all costs included in the listed items).

[EX] asked about the laboratory works.

[GEC] explained they will use the laboratories of the University of Kinshasa

The meeting was immediately followed by the visit of one of the laboratory of UNIKIN.

[EX] explained the laboratory works.

This laboratory has following equipment (non-exclusive list):

- Spectrophotometer (liquid)
- Laboratory oven that goes around 100 degrees to dry
- Dry matter oven that goes up to 1000 degrees

Chromatography can be done in another laboratory of UNIKIN

Calorimeter is in the Laboratory of Physics

The Head of Laboratory highlighted that they were limited with equipment but that all the staff had great skills and that they could conduct any survey if we provide the equipment.

以上



打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 13 日 13:50 ~ 14:20 (end of meeting) ~ 14:50 (end of laboratory visit)
3. 場所	MULTINA DMK Office + Laboratory, University of Kinshasa / Faculty of Agronomic Sciences
4. 参加者	<p>【MULTINA DMK】  Prof. Charles KINKELA SAVY SUNDA, Managing Director  2 Assistants  Laboratory staff for laboratory visit</p> <p>【RASKIN】  Mr WAN WOUR, Expert</p> <p>【JICA DRC】  Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>[MULTINA] briefly introduced the company and its experience.</p> <ul style="list-style-type: none"> <li>• In contact with RASKIN and governmental province but no experience in waste, they are more specialised in agronomy / agriculture.</li> <li>• Already worked with Japanese researchers.</li> </ul> <p>Regarding the project, [MULTINA] made following comments:</p> <ul style="list-style-type: none"> <li>• Regarding number of HH: from statistical point of view, at least 30 households should be considered</li> <li>• Regarding the stratification into 3 levels (high-medium-low income): this is a general approach but in Kinshasa 5 strata have been identified by demographers (they agreed to send documentation to support this statement)</li> <li>• However, they understand the survey is limited due to budget constraints and will adapt to our conditions</li> </ul> <p>[EX] reviewed some of the points of proposal as there were some misunderstandings:</p> <ul style="list-style-type: none"> <li>• Selected households don't sort the waste. All the categories are collected in 1 bag and</li> </ul>	

separation is performed by the Contractor as part of the survey.

- The composition analysis only covers the waste collected on day 3, day 5 and day 7. The waste of these days are not mixed with the waste of previous days.
- BOQ: asked them to re-send the quotation following the model of the TOR (all costs included in the listed items)

[MULTINA] acknowledged the additional information and will send a revised proposal by next day.

The meeting was immediately followed by the visit of one of the laboratory of UNIKIN (Physico-Chemistry).

[EX] check the equipment and asked the laboratory staff how they intend to conduct the laboratory works.

Calorimeter is in another laboratory that it was not possible to visit that day. [MULTINA] agreed to arrange an appointment, tentatively for the following day.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 14 日 9:55 ~ 10:10
3. 場所	Laboratory OCC (Office Congolais de Controle)
4. 参加者	<p>【OCC】 M. Makengo NKEBO, Head of Division, Technical Coordination</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>This laboratory was mentioned by ELIR for measuring the calorific value.</p> <p>In introduction, the laboratory exposed the problems they are facing with the treatment of their own waste. Waste are collected but the laboratory has no idea where they are discharged.</p> <p>The laboratory OCC doesn't have the equipment to measure the calorific value (no calorimeter) nor to conduct elemental content analysis.</p> <p>OCC mainly conducts water surveys, and currently has no experience with solid waste.</p> <p>The visit of the laboratory would require a special authorisation but it won't be necessary.</p> <p style="text-align: right;">以上</p>	

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 14 日 10:40 ~ 11:45
3. 場所	JICA DRC
4. 参加者	<p>【JICA DRC】  M. Kazunao SHIBATA, Représentant Résident  M. Hiraku USUI, Directeur de Programmes (Environnement et Mines)</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (note taker)</p>
<p>配布資料 (Handouts) :</p> <p>① Comparison of the 4 BOQ</p> <p>入手資料 (Available materials) : None</p> <p>[EX] reported about the mission so far.</p> <ul style="list-style-type: none"> <li>5 companies have been contacted but only 4 sent a proposal. We tried to contact the last one (mail/phone/on site) but got no answer.</li> <li>In terms of price, all proposals are above budget but ELIR and GEC are the closest to the limit.</li> <li>We visited several laboratories. So far, we couldn't confirm that any laboratory could conduct all the analysis, but further visits are planned. Especially the calorimeter to measure calorific value is difficult to find. It seems that the facilities of the University of Kinshasa (UNIKIN) are the most appropriate as there are many laboratories among the different faculties with equipment that complement each other.  UNIKIN laboratories: could confirm (6) Ash Content and (8) Elemental Content, but still need to confirm that one of the laboratories has a calorimeter for (7) Calorific Value.</li> <li>ELIR: cheapest BOQ but we visited the 2 laboratories they mentioned and they don't meet the requirements. The laboratory of the Ministry of Environment is rather specialised in water analysis and OCC doesn't deal with waste. Furthermore, no one has a calorimeter. Could try to see if ELIR couldn't use UNIKIN laboratories.  Another concern is if ELIR has the financial capacity to launch the survey. In addition, we didn't see their office.</li> <li>FEAPD: small office, worked with the EU in the past for waste analysis (= they have experience). But we couldn't visit the laboratory yet. Also, the company said that prices may vary (EX explained it was not possible).</li> <li>GEC: located in UNIKIN, experience in interview survey. They don't seem to have much experience in field survey but as it is not too complicated, it shouldn't be a problem if</li> </ul>	

we explain and supervise.

- MULTINA-DMK: also located in UNIKIN, but no experience in waste and very expensive.

In conclusion:

- ⇒ From budget point of view: ELIR and GEC are best
- ⇒ ELIR is the cheapest, but disqualified because of laboratory work
- ⇒ GEC would be the last remaining, could try to negotiate the price (maybe report)

[JICA] will ask a new quotation to pre-selected companies based on final TOR. This will be the final proposal and JICA will take the cheapest, so that it must be confirmed that the pre-selected companies are really able / have the capacity to conduct the survey.

As the budget is around 34,000 USD, we may need to cut an item.

- Calorific value: to what extent does it need to be precise? EX can determine it through the other analysis. However, RASKIN seems to really want it.
- Elemental content: can remove the item or reduce the number of samples, as it is quite expensive and EX can determine it from other data.

Discussion about payment conditions (possibility to pay in advance).

Discussion about the schedule: concern that end of March might be difficult for these companies.

[EX] will present its evaluation and suggestions to RASKIN and meet JICA again to finalize.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 14 日 14:40 ~ 14:55
3. 場所	Laboratory Réserve Stratégique
4. 参加者	<p>【Réserve Stratégique】 Blaise, Serge and Timothée</p> <p>【RASKIN】 Mr WAN WOUR, Expert Ms Nadège and Colette, Communication</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>Laboratory of the Presidency In collaboration with China Main purpose: agriculture, but also micro-biology and other fields</p> <p>[EX] explained the expected laboratory works for the WACS</p> <p>Laboratory staff showed the equipment (spectrophotometer x 2, oven up to 1300 degrees, desiccator x 2, crusher, hood with UV lamps, etc.)</p> <p>The Laboratory Réserve Stratégique cannot do all the required work, especially the measurement of the calorific value as they don't have a calorimeter. For this item, they would have to work with a partner (for ex. UNIKIN or private laboratories).</p> <p><u>Notes:</u></p> <ul style="list-style-type: none"> <li>• One of the person working at the laboratory Réserve Stratégique also works at UNIKIN</li> <li>• The laboratory Réserve Stratégique seems to be barely used</li> </ul> <p style="text-align: right;">以上</p>	

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 14 日 16:25 ~ 16:45
3. 場所	Laboratories of Chemistry and Physics, Faculty of Polytechnic, University of Kinshasa
4. 参加者	<p>【Laboratories】 Laboratories staff</p> <p>【MULTINA-DMK】 Prof Charles KINKELA SAVY SUNDA + 1 assistant</p> <p>【RASKIN】 Mr WAN WOUR, Expert Ms Nadège and Colette, Communication</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>First went to the laboratory of chemistry, then visited the laboratory of physics.</p> <p>Laboratory staff showed the equipment in the different laboratories (heating stirrer, etc.)</p> <p>There's a calorimeter in the laboratory of physics. Reportedly newly acquired, but a bit old-fashioned. Maker: Heidolph</p> <p>[EX] explained the survey and process of the WACS / laboratory works.</p> <p style="text-align: right;">以上</p>	

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 15 日 11:20 ~ 12:10
3. 場所	JICA DRC
4. 参加者	<p>【Consultants for UNIDO】 Mr Andreas KARNER, Partner and Senior Consultant, ConPlusUltra Ltd. Mr Thomas WACLAVICEK, Water and Sanitation Expert, hydrophyl GmbH Mr Serge</p> <p>【JICA DRC】 Mr Kazunao SHIBATA, Représentant Résident Mr Hiraku USUI, Directeur de Programmes (Environnement et Mines) Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant (note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>The purpose of this meeting was to understand what each organization was doing.</p> <p>[UNIDO] presented its mission. Consultants' team from Austria for UNIDO Project: Waste to Energy for Solid Waste Management in Kinshasa Concept stage started 2 years ago</p> <p>World Bank, Agence Française de Développement and EU delegation are also preparing projects and planning new initiatives.</p> <p>There are major challenges, support is needed at different level and must refer to past experiences.</p> <p>The UNIDO delegation is in contact with RASKIN and is doing / planning site visits. According to their observations, the collection is inefficient. They have identified intermediate collection sites and lack of transport equipment as key issues / major barriers.</p> <p>Develop demonstration activities:</p> <ol style="list-style-type: none"> <li>1) Improve waste sorting/collection (has to focus on some selected communes)</li> <li>2) Look for opportunities <ol style="list-style-type: none"> <li>a) World Bank plans to rehabilitate the landfill of Mpasas (originally scheduled for this March but postponed to 1<sup>st</sup> half of next year). Then waste should come regularly. The delegation suspects RASKIN's figures to be overestimated because RASKIN doesn't have the capacity to transport the announced quantities. Retrieve landfill gas at landfill site. There is an existing (small) power plant that they're planning to rehabilitate.</li> <li>b) Biogas and/or composting (fertilizer, etc.) Depends on the localization of the plant. For this option, sorting should occur in the town and not at the landfill (otherwise too much to transport) but there is a space issue in the city.</li> <li>c) Improve value chain. For components with high calorific value.</li> </ol> </li> </ol>	



Small incineration plant directly in the city (or for the cement industry).

As a summary:

- Plan rehabilitation / new landfill
- Want to produce energy out of waste
- Projects are realistic only if the landfill is rehabilitated
- Situation in the landfill is unclear, don't know the quantity (waste is discharged by RASKIN and also private companies)
- Don't know if statistics are realistic

WtE project of UNIDO:

- Budget: 4 million grant GEF + 16 million from different origin (Ministry of Industry of Congo, private sector, etc.) = 20 million in total
- 4-year project: confirmation end of April/beginning of May (this summer at the latest) and should start end of this year.
- Main partner is the Ministry of Industry, but it's more realistic if shared by different ministries so it will be an interministerial agreement and they also work with the Ministries of Environment, Energy and Planning + RASKIN.
- Issue with RASKIN is political + capacity.

Parallel project of AFD:

- River Engineering (eastern part of the city), Water supply facilities
- Want to move to waste sector by cleaning the river banks
- Expect to generate some money from the waste collected
- Should start before end of this year (4-year project), 15 million EUR

2 additional components:

- Policy level: improve policy related to waste and energy
- Developing replication strategy: start in some communes, then duplicate in others

[JICA] presented its activities and current ACCP and WACS projects

- JICA has not decided any big project yet
- But Japanese government wants to support SWM
- Since 2017: ACCP (35 countries), SDG 11.6 and other targets
- For now, provide support little by little, through small projects, e.g. provide data & capacity development
- Currently: conduct WACS for waste characterization (survey with local consultant in March and then workshop in May)
- Based on the WACS project, JICA will consider additional projects

[UNIDO] asked about JICA's activities regarding capacity building?

[JICA] explained about data collection method, etc. + Training in Japan

Discussion about the situation at national/provincial level during the transition period (unclear, uncertain) and the environmental fund (eco-tax, etc.)

[EX] asked about the origin of the project.

[UNIDO] explained that it was initially a proposal of UNIDO to the Congolese government with GEF (funds greenhouse gas mitigation projects). Official submission by the government. The consultants' team has been hired by UNIDO to arrange the details.

[EX] explained about the WACS

- Limited budget → Limited to households (no business entities) and 3 communes
- Explains methodology to RASKIN for replication
- Reference

[UNIDO] was wondering about the possibility to collaborate and conduct projects together, and asked if the results of the WACS will be public.

[JICA/EX] replied that the results of the WACS will be public and one of the objective is that the data can be used for various projects.

Discussion about capacity building of RASKIN (appears has a major challenge), and the role of NGOs and SMEs (some activities but would need more - e.g. Makala Bio, a local SME producing coal from bio waste that is sold in supermarkets).

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 15 日 14:15 ~ 14:50
3. 場所	RASKIN
4. 参加者	<p>【RASKIN】  Mr PHILIPPE GAMBEMBO, DCI (Director of Internal Control)  Mr WAN WOUR, Expert  Mr JULIO VENGO, Expert  Mr MUNENE-ROBERT, Inspector  Mr GODARD, in charge of Operations and Evacuation  + 2</p> <p>【JICA DRC】  Dr Raymond MUFWAYA, Directeur Adjoint des Programmes  M. Hiraku USUI, Directeur de Programmes (Environnement et Mines)</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (translation, note taker)</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>After a thank you message from [RASKIN], [EX] presented its evaluation and suggestions.</p> <p>In terms of budget, all the quotations are above budget. As RASKIN really wants the calorific value, [EX] suggested to remove the item “Elemental Content”.</p> <p>In response, [RASKIN] expressed feelings of dissatisfaction and frustration and would like JICA to increase the budget. Through the EU project, they already have an idea of the quantities and what they really need now is information about the chemical characteristics.</p> <p>[RASKIN] made following comments/suggestions:</p> <ol style="list-style-type: none"> <li>1) RASKIN has started to contact the laboratories to obtain quotations directly, hoping to get better prices.</li> <li>2) Assign 1 company to 1 commune (i.e. contract with 3 companies in total) so that each company can really focus on its work and data will be more reliable. Another staff from RASKIN disagreed with this option as the results wouldn’t be comparable anymore.</li> </ol> <p>[EX] reminded that the survey was only a reference, and re-explained the reason why we</p>	

suggest to remove the item “Elemental Content”. We have historical values in Japan and can use these data to deduce the figures. However, if RASKIN really wants the data for Kinshasa, another option would be to reduce the number of samples (1 per commune instead of 3).

At the end of the meeting [EX] explained the next steps: ask for final BOQ, JICA will select the company and contract. EX will come back in about one month to supervise.

以上

打合せメモ	
1. 用件	WACS DRC
2. 日時	2019 年 2 月 15 日 16:00 ~ 16:40
3. 場所	JICA DRC
4. 参加者	<p>【JICA DRC】  M. Kazunao SHIBATA, Représentant Résident  M. Hiraku USUI, Directeur de Programmes (Environnement et Mines)</p> <p>【株式会社エックス都市研究所】  Mr Ikuo MORI, Senior Consultant  Ms Christine YOLIN, Consultant (note taker)</p>
<p>配布資料 (Handouts) :</p> <p>① Draft report コンゴ民主共和国キンシャサ市を対象とした追加調査</p> <p>入手資料 (Available materials) : None</p> <p>[EX] could confirm the presence of a calorimeter only at the University of Kinshasa</p> <ul style="list-style-type: none"> <li>• GEC and MULTINA-DMK should be able to conduct all the required analysis</li> <li>• ELIR and FEAPD: could not confirm their capacity to provide the calorific value</li> </ul> <p>[EX] reported about the meeting with RASKIN and the expressed dissatisfaction.</p> <p>[EX] explained that for the Elemental Analysis, we can use historical data we have in Japan, but if RASKIN really wants data from Kinshasa, we can reduce the number of samples. If we analyze only one sample, the price should be cheaper / within budget.</p> <p>⇒ JICA and EX agreed to reduce the number of samples for the Elemental Analysis: only 3 instead of 9.</p> <p>[EX] reminded that this survey gives the method, and that RASKIN can duplicate later on.</p> <p>Consideration to have the report just in French to reduce price.</p> <p>Discussion about payment conditions (if pre-payment is possible). Need to check financial statements of the Contractor. Some financial documents were available in GEC's proposal (about 130 万 JPY of asset, stable during the past 3 years).</p> <p>Budget for the WACS: 34,790 USD</p> <p>Discussion about the schedule:</p> <p>[EX] would like to come back for the sampling and the 1<sup>st</sup> laboratory work.</p> <p>[JICA] asked to add in the TOR that the Contractor has to start the sampling within 2 weeks after signature of the contract.</p> <p>[EX] plans to come back again in May. Not very flexible as Tanaka san is busy.</p> <p>Discussion about institutional organization, the introduction of eco-tax and the participation of the private sector.</p> <p>To do (EX must send to JICA by Monday):</p> <ul style="list-style-type: none"> <li>• Updated TOR: number of samples for the Elemental Analysis and schedule</li> <li>• Make a list of required information: experience/achievements and financial statements</li> </ul> <p style="text-align: right;">以上</p>	

## キンシャサ市追加調査説明資料

## Schedule and Contents of Additional Survey in the Democratic Republic of the Congo

### A. Tentative schedule of the survey

Tentatively, it is planned that Japanese Consulting Firm (EX Research Institute Ltd.) will visit Kinshasa three (3) times, at late January, end February and middle May. Each visit will be one week.

Survey	2019	Jan	Feb	Mar	Apr	May	Jun
A.1 Waste Flow Survey			■	■		■	
WACS by a local company			□				
A.2 Recycling Business and Institutional System Survey						■	

### B. Additional Survey in the Democratic Republic of the Congo

#### B.1 Waste Flow Survey

This survey is to make a waste flow diagram of three communes in the Kinshasa city. The purpose is to verify the applicability of the method used in this survey and to strengthen the capacity of RASKIN to prepare waste flow diagrams. Also the survey tries to consider the relationship between the concept of SDG 11.6.1 indicator proposed by UN-Habitat and the method adopted in this survey.

#### Output:

- Results of the household waste amount and composition survey
- Waste flow diagram of 3 communes

#### Method:

##### 1st Field Survey

1. Lecture RASKIN on how to prepare a waste flow diagram. At the same time, discuss the current waste disposal problem, feature of each district, etc., and select 3 communes with different characteristics (different income level) as objects of waste amount and composition survey.
2. Explain the methods of survey on waste amount and composition survey (WACS) to a local contractor selected by the JICA office.

##### The 2nd field survey

3. Supervise the WACS and give instruction as appropriate.
4. Check data on population etc. collected by RASKIN and give further instructions if necessary.

##### The 3rd field survey

5. Obtain and analyze results of the WACS prior to the 3<sup>rd</sup> field survey. Similarly, obtain data collected by RASKIN and create draft waste flow diagrams.
6. Explain the results of analysis on the WACS and the process of preparing the waste flow diagram.

And, discuss ways of application of the method to other areas.

Points to remember:

- A local company to conduct the WACS will be selected and contracted by the JICA office. The consultant prepares a draft specification.
- Assuming that RASKIN will present the findings at the ACCP annual meeting in August 2019.
- Considering the local fragile waste management system, a method for preparing a waste flow diagram is to be considered with available data.

## B.2 Recycling Business Survey and Institutional System Survey

In order to explore the possibility of development of recycling in Kinshasa city, the survey is to grasp the current situation of small recycling business. In addition, in order to complement the information of the institutional system surveyed in October 2017, a survey, especially, on the role of the commune and its sub-organizations in waste management will be conducted.

Output:

- Survey report on small and medium enterprises' recycling business trends
- Complementary report on the solid waste management institutional system in Kinshasa City

Method:

### a. Recycling business survey

1. A workshop will be held inviting small and medium enterprises in recycling business who are selected by the JICA office and RASKIN for finding and confirming their problems and challenges in launching and operating the recycling business.
2. Results of the discussion above is to be compiled in a report.

### b. Institutional system survey

1. The survey is to be carried out targeting the three communes where the Waste Amount and Composition Survey is made. Roles of communes, sub-organizations and other community units in solid waste management is to be surveyed. In addition, a complementary survey on relationship between Kinshasa City Government and RASKIN is to be conducted.
2. RASKIN is recently modified from RATPK. Therefore, interviews will be conducted on changes, new missions and so on from the previous organization.
3. Visit Kinshasa City Department overseeing RASKIN and conduct interviews.

Points to remember:

- When visiting a commune, be careful about safety.



## Calendrier et Contenu de l'Enquête Complémentaire en République Démocratique du Congo

## A. Calendrier provisoire de l'Enquête

À titre provisoire, il est prévu que le Cabinet de Conseil Japonais (EX Research Institute Ltd.) se rende à Kinshasa trois (3) fois, en février, mars et mi-mai. Chaque visite durera une semaine.

Enquête	2019	Jan.	Fév.	Mars	Avril	Mai	Juin
A.1 Enquête sur les Flux de Déchets			■	■		■	
Enquête sur la Quantité et la Composition des Déchets (WACS) par une entreprise locale			□				
A.2 Enquête sur le Marché du Recyclage et sur le Système Institutionnel						■	

## B. Enquête Complémentaire en République Démocratique du Congo

## B.1 Enquête sur les Flux de Déchets

Cette enquête a pour objectif de réaliser un diagramme de flux de déchets de trois communes de la ville de Kinshasa. Le but est de vérifier l'applicabilité de la méthode utilisée dans cette enquête et de renforcer la capacité de la RASKIN à préparer des diagrammes de flux de déchets. L'enquête tente également de considérer la relation entre le concept de l'indicateur de l'ODD 11.6.1 proposé par ONU-Habitat et la méthode adoptée dans cette enquête.

## Livrables :

- Résultats de l'enquête sur la quantité et la composition des déchets ménagers
- Diagramme de flux de déchets de 3 communes

## Méthode :

1<sup>ère</sup> Enquête de Terrain

1. Enseigner à la RASKIN comment préparer un diagramme de flux de déchets. Dans le même temps, discuter des problèmes actuels concernant l'élimination des déchets, des caractéristiques de chaque district, etc., et sélectionner 3 communes ayant des caractéristiques différentes (niveau de revenu différent) comme objets de l'Enquête sur la Quantité et la Composition des Déchets (WACS).
2. Expliquer les méthodes d'enquête de l'Enquête sur la Quantité et la Composition des Déchets (WACS) à un contractant local sélectionné par le Bureau de la JICA.

2<sup>ème</sup> Enquête de Terrain

3. Superviser la WACS et donner les instructions appropriées.
4. Vérifier les données sur la population, etc. recueillies par la RASKIN et donner des instructions supplémentaires si nécessaire.

3<sup>ème</sup> Enquête de Terrain

5. Obtenir et analyser les résultats de la WACS avant la 3<sup>ème</sup> enquête de terrain. De même, obtenir les données

recueillies par la RASKIN et créer une version préliminaire des diagrammes de flux de déchets.

6. Expliquer les résultats d'analyse de la WACS et le processus de préparation du diagramme de flux de déchets. Puis discuter des moyens d'appliquer la méthode à d'autres zones.

Points à retenir :

- Une entreprise locale chargée de réaliser la WACS sera sélectionnée et contractera avec le Bureau de la JICA. Le Consultant prépare un projet de spécification.
- Considérant que RASKIN présentera les conclusions lors de la réunion annuelle de l'ACCP en août 2019.
- Compte tenu du fragile système local de gestion des déchets, une méthode de préparation d'un diagramme de flux de déchets doit être envisagée avec les données disponibles.

## B.2 Enquête sur le Marché du Recyclage et sur le Système Institutionnel

Afin d'explorer les possibilités de développement du recyclage dans la ville de Kinshasa, l'enquête a pour but de comprendre la situation actuelle des petites entreprises de recyclage. En outre, afin de compléter les informations sur le système institutionnel obtenues lors de l'enquête d'octobre 2017, une enquête, portant notamment sur le rôle de la commune et de ses sous-organisations dans la gestion des déchets, sera menée.

Livrables :

- Rapport d'enquête sur les tendances du marché du recyclage des petites et moyennes entreprises
- Rapport complémentaire sur le système institutionnel de gestion des déchets solides dans la ville de Kinshasa

Méthode :

### a. Enquête sur le Marché du Recyclage

1. Un atelier où seront invitées des petites et moyennes entreprises du secteur du recyclage sélectionnées par le Bureau de la JICA et la RASKIN sera organisé afin de déterminer et confirmer leurs problèmes et difficultés lors du lancement et de l'exploitation d'une activité de recyclage.
2. Les résultats de la discussion ci-dessus doivent être compilés dans un rapport.

### b. Enquête sur le Système Institutionnel

1. L'enquête doit être menée en ciblant les trois communes où est réalisée l'Enquête sur la Quantité et la Composition des Déchets (WACS). Les rôles des communes, des sous-organisations et des autres entités communautaires dans la gestion des déchets solides doivent être étudiés. En outre, une enquête complémentaire sur les relations entre le Gouvernement de la Ville de Kinshasa et la RASKIN doit être menée.
2. La RASKIN est issue d'une évolution récente de la RATPK. Par conséquent, des entretiens portant sur les changements, les nouvelles missions, etc., par rapport à l'organisation précédente seront menés.
3. Visiter le département de la ville de Kinshasa qui supervise la RASKIN et mener des entretiens.

Points à retenir :

- Lors des visites de communes, faire attention à la sécurité.

## ごみ量ごみ質調査仕様書（案）

**Terms of Reference (Draft) for Waste Amount and Composition Survey**  
**For**  
**Data Collection Survey on Solid Waste Management in Africa**

**1. Objective of the Survey**

This Terms of Reference shall be applied to the “Waste Amount and Composition Survey (WACS)” which is to be conducted in Kinshasa City, Democratic Republic of the Congo, in order to obtain data on waste amount and composition of municipal solid waste generated in the city.

**2. Target Area**

The target areas of the survey are three (3) communes in the city. Communes shall be selected in view of income levels of residents, such as one commune from high income area, one commune from middle income area and one commune from low income area. The Client will select those communes before the contact for this survey is concluded.

**3. Scope of Work**

**3.1. Number of Samples**

**a. Interview Survey**

20 households shall be selected from each commune, i.e., **60 households in total** from the three communes for the survey.

Prior to the WACS, an Interview Survey shall be conducted with the selected households. Number of questions will be **between 10 and 20**. Those will ask about the profile of the household, manners of self-disposal, recycling, storage and discharge, primary collection, etc.

**b. Waste Amount and Composition Survey**

The table below shows number of households and samples for the Waste Amount and Composition Survey (WACS). In total, **480 samples** for the Waste Amount Survey, and **9 samples** for the Waste Composition Survey will be taken.

The Waste Amount Survey shall be conducted for eight (8) consecutive days. The Waste Composition Survey shall be carried out on the 3<sup>rd</sup> day, 5<sup>th</sup> day and 7<sup>th</sup> day during the 8 consecutive days.

Generation Source (Household)	Nos. of Selected Commune	Nos. of Households per Commune	Waste Amount Survey			Waste Composition Survey		
			Samples/ Day	Days of Sampling	Total Samples	Samples /Day	Days of Sampling	Total Samples
			AxB	-	CxD	-	-	FxG
	A	B	C	D	E	F	G	H
High Income	1	20	20	8	160	1	3	3
Medium Income	1	20	20	8	160	1	3	3
Low Income	1	20	20	8	160	1	3	3
Total	3	60	60	-	<b>480</b>	-	-	<b>9</b>

### 3.2. Data to be collected.

Data to be obtained through the works are as follows:

a. Information about the selected communes

- Name of the district
- Name of the commune
- Number of households in the commune
- Number of population in the commune
- Brief general description of the commune: with or without waste collection service, water supply, hygiene condition, electricity, etc.

b. Answers of the interview survey

- Answers of each household

c. Waste amount generated in each household on each day by weight (in kg rounded to two decimal places, e.g., 2.30 kg)

The data shall be presented in the following manner for each commune:

Waste amount in the high income area (example)

Unit: kg

No.	1 <sup>st</sup> day	2 <sup>nd</sup> day	xx	xx	xx	xx	7 <sup>th</sup> day	8 <sup>th</sup> day
No. 1	3.12							
No. 2	4.55							
xx								
No. 19	2.30							
No. 20								

d. Bulk density of waste (in kg/l rounded to two decimal places, e.g., 0.25 kg/l)

Waste composition (example)

Composition	High income			Middle income			Low income		
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day
Volume (litre)	38								
Weight (kg)	9.50								
Bulk density (kg/l)	0.25								

e. Physical composition, wet-base (in kg rounded to two decimal places, e.g., 5.12 kg)

Physical composition, wet-base (example)

Unit: kg

Composition	High income			Middle income			Low income		
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day
Food waste	5.12								
Plastic	1.89								
Paper	0.54								
Textiles	0.23								
Grass/wood/bamboo	1.59								
Rubber/leather									
Metals									
Bottles/glass									
Soil/stones/ceramics									
Others									

f. Physical composition, dry-base (in kg rounded to two decimal places, e.g., 3.15 kg)

Physical composition, dry-base (example)

Unit: kg

Composition	High income			Middle income			Low income		
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day
Food waste	3.15								
Plastic	1.30								
Paper	0.35								
Textiles	0.15								
Grass/wood/bamboo	0.57								
Rubber/leather									
Metals									
Bottles/glass									
Soil/stones/ceramics									
Others									

g. Ash content, by laboratory work (in g rounded to one decimal place, e.g., 10.3 g)

Ash content, by laboratory work (example)

Unit: g

Composition	High income			Middle income			Low income		
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day
Before drying at 100 – 110 Celsius	121.5								
Before burning at 800 Celsius	119.8								
Ash after burning	10.3								

h. High calorific value (in J/g, e.g., 3,859)

High calorific value (example)

Unit: J/g

Composition	High income			Middle income			Low income		
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day
High calorific value	3,859								

i. Elemental content (C, H, N, S, Cl, O) (in % rounded to two decimal places, e.g., 48.15%)

Elemental content (example)

Unit: %

Composition	High income			Middle income			Low income		
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day
Carbon, C	48.15								
Hydrogen, H	6.3								
Oxygen, O	40.35								
Nitrogen, N	3.15								
Chlorine, Cl	1.57								
Sulphur, S	0.48								

j. Ash content by the simplified method (in g rounded to one decimal place, e.g., 15.3 g)

Ash content, by simplified method (example)

Unit: g

Composition	High income			Middle income			Low income		
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day
Before burning on a refractory tray	122.8								
Ash after burning	15.3								

### 3.4. Work procedure

In general, the work will be carried out according to the document “Waste Amount and Composition Survey (WACS), - Work procedure of WACS for Kinshasa City, DRC -

The Contractor shall show the Client all necessary tools and facilities such as an interview survey sheet, a record keeping book, a list of staffs, weight scales, buckets, shovels, blooms, plastic sheets, a working site, a laboratory, etc.

### 3.5. Remarks

Other than the data to be collected described above, any findings should be noted and summarized as remarks.

## 4. Work schedule

The waste amount survey shall be started within two weeks after the Contract is signed by both parties.

And, the all works shall be completed and all data be submitted to the Client within **30 days** after the Contract is signed by both parties.

## **5. Reporting**

Two copies in English and French shall be submitted to the Client.

The report shall include all data measured, the method of measurement, pictures of the survey works, and examination on measured data and monitoring remarks.

The report shall be submitted with electronic data containing the reports context. Microsoft Excel and/or Word is preferable for the software used for these reports.

## **6. Safety measures**

The Contractor shall fully pay attention to safety and execute all necessary safety measures during the survey. The Contractor provides safety measures not only for their workers but also for the third parties. The Contractor is solely responsible for any accidents during the survey.

## **7. Communication System**

The Contractor shall establish the communication system and inform the Client about it in written form and maintain it properly during the survey. The Contractor's telephone numbers and personal details (e.g. name) which can be used during the working hours and also out of working hours shall be communicated to the Client before the commencement of the work.

## **8. Contractor's Obligations**

The Contractor shall follow the instructions given by the Client.

All required resources for this survey work such as manpower, vehicles, equipment, instruments, reagent, etc. shall be provided by the Contractor.

## **9. B/Q items**

The work item B/Q (Bill of Quantity) shall cover all related works.

### **BILL OF QUANTITIES**

B/Q item	Description	Unit	Quantity	Unit Rate (USD)	Amount (USD)
1	Interview	Households	60		
2	Waste amount	Sample	480		
3	Bulk density	Sample	9		
4	Physical composition, wet-base	Sample	9		
5	Physical composition, dry-base	Sample	9		
6	Ash content, by laboratory work	Sample	9		
7	High calorific value	Sample	9		
8	Elemental content	Sample	3		
9	Ash content, by simplified method	Sample	9		
10	Reporting	Lump sum	1		
Total		-	-		

Note: If it is difficult to estimate each item, some of items can be get together.



**Termes de Référence (Projet) pour  
l'Enquête sur la Quantité et la Composition des Déchets (WACS)  
Pour  
l'Enquête pour la collecte de données sur la gestion des déchets solides en Afrique**

**1. Objectif de l'Enquête**

Les présents Termes de Référence s'appliquent à l' « Enquête sur la Quantité et la Composition des Déchets (WACS) » qui doit être menée dans la ville de Kinshasa, République Démocratique du Congo, afin d'obtenir des données sur la quantité et la composition des déchets solides municipaux produits dans la ville.

**2. Zone cible**

Les zones cibles de l'enquête sont trois (3) communes de la ville. Les communes devront être sélectionnées en fonction du niveau de revenu des résidents, par exemple une commune d'une zone à revenu élevé, une commune d'une zone à revenu moyen et une commune d'une zone à revenu faible. Le Client sélectionnera ces communes avant la conclusion du contact pour cette enquête.

**3. Étendue des travaux**

**3.1. Nombre d'Échantillons**

**a. Enquête par Entretien**

20 ménages devront être sélectionnés dans chaque commune, soit **60 ménages au total** pour les trois communes pour l'enquête.

Avant la WACS, une Enquête par Entretien devra être menée auprès des ménages sélectionnés. Le nombre de questions sera compris **entre 10 et 20**. Celles-ci porteront sur le profil du ménage, les méthodes d'auto-élimination, le recyclage, le stockage et le rejet, la collecte primaire, etc.

**b. Enquête sur la Quantité et la Composition des Déchets**

Le tableau ci-dessous indique le nombre de ménages et d'échantillons pour l'Enquête sur la Quantité et la Composition des Déchets (WACS). Au total, **480 échantillons** seront prélevés pour l'Enquête sur la Quantité de Déchets et **9 échantillons** pour l'Enquête sur la Composition des Déchets.

L'Enquête sur la Quantité de Déchets devra être réalisée pendant huit (8) jours consécutifs. L'Enquête sur la Composition des Déchets devra être effectuée le 3<sup>ème</sup> jour, le 5<sup>ème</sup> jour et le 7<sup>ème</sup> jour des 8 jours consécutifs.

Source de Production (Ménages)	Nombre de communes sélectionnées	Nombre de ménages par commune	Enquête sur la Quantité de Déchets			Enquête sur la Composition des Déchets		
			Échantillons / Jour	Jours d'échantillon nage	Total des Échantillons	Échantillons / Jour	Jours d'échantillon nage	Total des Échantillons
			AxB	-	CxD	-	-	FxG
	A	B	C	D	E	F	G	H
Revenu élevé	1	20	20	8	160	1	3	3
Revenu moyen	1	20	20	8	160	1	3	3
Revenu faible	1	20	20	8	160	1	3	3
Total	3	60	60	-	<b>480</b>	-	-	<b>9</b>

**3.2. Données à collecter**

Les données à obtenir à travers les travaux sont les suivantes :

**a. Informations sur les communes sélectionnées**

- Nom du district
- Nom de la commune

- Nombre de ménages dans la commune
- Nombre de personnes dans la commune
- Brève description générale de la commune : avec ou sans service de collecte des déchets, alimentation en eau, conditions d'hygiène, électricité, etc.

b. Réponses à l'enquête par entretien

- Réponses de chaque ménage

c. Quantité de déchets produits dans chaque ménage chaque jour en poids (en kg arrondi à deux décimales, par exemple 2,30 kg)

Les données devront être présentées de la manière suivante pour chaque commune :

Quantité de déchets dans la zone à revenu élevé (exemple)

Unité : kg

n°	1 <sup>er</sup> jour	2 <sup>e</sup> jour	xx	xx	xx	xx	7 <sup>e</sup> jour	8 <sup>e</sup> jour
n° 1	3,12							
n° 2	4,55							
xx								
n° 19	2,30							
n° 20								

d. Masse volumique apparente des déchets (en kg/l arrondi à deux décimales, par exemple 0,25 kg/l)

Composition des déchets (exemple)

Composition	Revenu élevé			Revenu moyen			Revenu faible		
	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour
Volume (litre)	38								
Poids (kg)	9,50								
Masse volumique apparente (kg/l)	0,25								

e. Composition physique, base humide (en kg arrondi à deux décimales, par exemple 5,12 kg)

Composition physique, base humide (exemple)

Unité : kg

Composition	Revenu élevé			Revenu moyen			Revenu faible		
	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour
Déchets alimentaires	5,12								
Plastique	1,89								
Papier	0,54								
Textiles	0,23								
Herbe / bois / bambou	1,59								
Caoutchouc / cuir									
Métaux									
Bouteilles / verre									
Terre / pierres / céramique									
Autres									

f. Composition physique, base sèche (en kg arrondi à deux décimales, par exemple 3,15 kg)

Composition physique, base sèche (exemple)

Unité : kg

• Composition	Revenu élevé			Revenu moyen			Revenu faible		
	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour
Déchets alimentaires	3,15								
Plastique	1,30								
Papier	0,35								
Textiles	0,15								
Herbe / bois / bambou	0,57								
Caoutchouc / cuir									
Métaux									
Bouteilles / verre									
Terre / pierres / céramique									
Autres									

g. Teneur en cendres, par travaux de laboratoire (en g arrondi à deux décimales, par exemple 10,3 g)

Teneur en cendres, par travaux de laboratoire (exemple)

Unité : g

• Composition	Revenu élevé			Revenu moyen			Revenu faible		
	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour
Avant de sécher à 100 - 110 degrés Celsius	121,5								
Avant de brûler à 800 degrés Celsius	119,8								
Cendres après la combustion	10,3								

h. Pouvoir calorifique supérieur (en J/g, par exemple 3 859 J/g)

Pouvoir calorifique supérieur (exemple)

Unité : J/g

• Composition	Revenu élevé			Revenu moyen			Revenu faible		
	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour
Pouvoir calorifique supérieur	3 859								

i. Teneur en éléments (C, H, N, S, Cl, O) (en % arrondi à deux décimales, par exemple 48,15%)

Teneur en éléments (exemple)

Unité : %

• Composition	Revenu élevé			Revenu moyen			Revenu faible		
	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour
Carbone, C	48,15								
Hydrogène, H	6,3								
Oxygène, O	40,35								
Azote, N	3,15								
Chlore, Cl	1,57								
Soufre, S	0,48								

j. Teneur en cendres par la méthode simplifiée (en g arrondi à deux décimales, par exemple 15,3 g)

Teneur en cendres par la méthode simplifiée (exemple)

Unité : g

Composition	Revenu élevé			Revenu moyen			Revenu faible		
	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour	3 <sup>e</sup> jour	5 <sup>e</sup> jour	7 <sup>e</sup> jour
Avant combustion sur un plateau réfractaire	122,8								
Cendres après la combustion	15,3								

### 3.4. Procédure de travail

En général, les travaux seront effectués conformément au document « Enquête sur la Quantité et la Composition des Déchets (WACS) - Procédure de travail de la WACS pour la ville de Kinshasa, RDC »

Le Contractant devra montrer au Client tous les outils et installations nécessaires, tels qu'un formulaire d'enquête par entretien, un registre, une liste du personnel, des balances, des seaux, des pelles, des balais, des bâches en plastique, un lieu de travail, un laboratoire, etc.

### 3.5. Remarques

Outre les données à collecter décrites ci-dessus, tout résultat doit être noté et résumé sous forme de commentaire.

## 4. Calendrier des travaux

L'enquête sur la quantité de déchets devra commencer dans les deux semaines suivant la signature du Contrat par les deux parties.

Et, tous les travaux devront être achevés et toutes les données soumises au Client dans les **30 jours** suivant la signature du Contrat par les deux parties.

## 5. Rapport

Deux exemplaires en anglais et en français devront être remis au Client.

Le rapport devra inclure toutes les données mesurées, la méthode de mesure, des photos des travaux d'enquête, un examen des données mesurées et les observations de suivi.

Le rapport devra être soumis avec les données électroniques contenant le contexte du rapport. Les logiciels utilisés pour ces rapports seront de préférence Microsoft Excel et / ou Word.

## 6. Mesures de sécurité

Le Contractant devra faire pleinement attention à la sécurité et mettre en œuvre toutes les mesures de sécurité nécessaires pendant l'enquête. Le Contractant devra mettre en place des mesures de sécurité non seulement pour ses employés, mais également pour les tiers. Le Contractant est seul responsable de tout accident survenant pendant l'enquête.

## 7. Système de communication

Le Contractant devra établir le système de communication, en informer le Client par écrit et en assurer la maintenance correcte pendant l'enquête. Les numéros de téléphone et les informations personnelles (par exemple : le nom) du Contractant, qui pourront être utilisés pendant et hors des heures de travail, devront être communiqués au Client avant le début des travaux.

## 8. Obligations du Contractant

Le Contractant devra suivre les instructions données par le Client.

Toutes les ressources nécessaires pour ces travaux d'enquête, telles que la main-d'œuvre, les véhicules, l'équipement, les instruments, les réactifs, etc. devront être fournis par le Contractant.

## 9. Devis quantitatif (Bill of Quantity, B/Q)

Le devis quantitatif (Bill of Quantity, B/Q) devra couvrir tous les travaux connexes.

### DEVIS QUANTITATIF (BILL OF QUANTITIES, BOQ)

Élément du devis	Description	Unité	Quantité	Taux unitaire (USD)	Montant (USD)
1	Entretien	Ménage	60		
2	Quantité de déchets	Échantillon	480		
3	Masse volumique apparente	Échantillon	9		
4	Composition physique, base humide	Échantillon	9		
5	Composition physique, base sèche	Échantillon	9		
6	Teneur en cendres, par travaux de laboratoire	Échantillon	9		
7	Pouvoir calorifique supérieur	Échantillon	9		
8	Teneur en éléments	Échantillon	3		
9	Teneur en cendres, par la méthode simplifiée	Échantillon	9		
10	Rapport	Montant forfaitaire	1		
Total		-	-		

Remarque : s'il est difficile d'estimer chaque élément, certains éléments peuvent être rassemblés.

## ごみ量ごみ質調査実施方法説明資料

# Waste Amount and Composition Survey (WACS)

Work procedure of WACS for Kinshasa City, DRC

Ikuo MORI, EX Research Institute Ltd.

# Objective of WACS

- The objective of WACS is to obtain basic data about the waste, such as waste generation rate (kg/person/day), bulk density (kg/litre), physical composition and calorific value (kJ/kg).
- Such basic data are essential for proper solid waste management.



# Contents of Work

1. Site selection
2. Selection of households
3. Interview Survey
4. WACS
  1. Data to be obtained
  2. Number of samples
  3. Work flow
5. Reporting

# 1. Site selection

This work shall be carried out by RASKIN.

- Three communes are to be selected with different economic status, such as high income, middle income and low income
- The following data shall be collected
  - Name of the district
  - Name of the commune
  - Number of households in the commune
  - Number of people in the commune
  - Brief general description of the commune: with or without waste collection service, water supply, hygiene condition, electricity, etc.

## 2. Selection of households

This work shall be conducted by RASKIN and the Contractor together.

- 20 households shall be selected from each commune, i.e. 60 households in total for the three communes.
- Households shall be informed about the following:
  - Objective of the survey
  - Schedule of the survey
  - How to prepare waste samples
    - Only waste generated in each day has to be submitted as sample.
    - If there are sanitary items such as diapers, such waste has to be sorted separately from the general waste.
    - Necessary number of bags for sampling has to be delivered to the households.

### 3. Interview Survey

This work shall be conducted by the Contractor. However, it may be carried out at the same time when the samples are collected.

The following page shows a draft questionnaire for this work.

# Questionnaire (draft)

## 1) Number of family members:

- How many family members are living in this household?
- How many persons are usually living or working in your house, such as maid and driver?

## 3) Self disposal

- Do you burn your waste?
- Do you bury your waste?
- Do you dump your waste to vacant area, rivers, etc.?

## 2) Waste collection service:

- Do you have this service?
- How often do you have this service?
- Who collects your waste?

## 4) Recycle

- Do you separate recyclable materials?
- Do you use organic waste for making compost?

## 4. Waste Amount and Composition Survey

### 4.1. Data to be obtained

- The following data shall be obtained:
  - a. Waste generation rate (kg/person/day)
  - b. Bulk density (kg/litre)
  - c. Physical composition (wet-base)
  - d. Physical composition (dry-base)
  - e. Three components: combustible, water and ash contents
  - f. High calorific value (kJ/kg)
  - g. Elemental content (C, H, N, S, Cl, O)

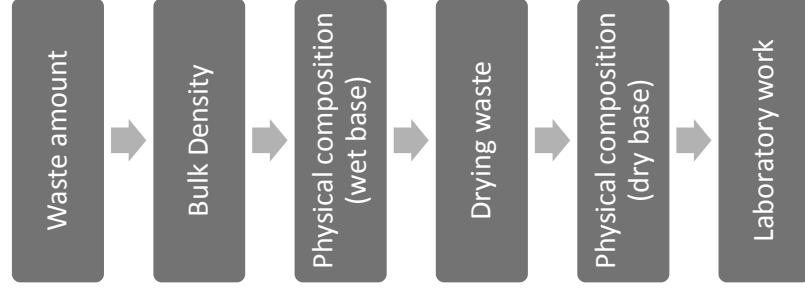
## 42. Number of samples

- In total, 480 samples will be taken for the Waste Amount Survey, and 9 samples for the Waste Composition Survey.
- The waste amount survey shall be conducted for eight (8) consecutive days. The waste composition survey shall be carried out on the 3rd day, 5th day and 7th day of the 8 consecutive days.

Number of Samples

Generation Source (Household)	Nos. of Selected Commune	Nos. of Households per Commune	Waste Amount Survey			Waste Composition Survey		
			Samples/Day	Days of Sampling	Samples Total	Samples /Day	Days of Sampling	Samples Total
	A	B	AxB	-	CxD	-	-	FxG
			C	D	E	F	G	H
High Income	1	20	20	8	160	1	3	3
Medium Income	1	20	20	8	160	1	3	3
Low Income	1	20	20	8	160	1	3	3
Total	3	60	40	-	<b>480</b>	-	-	<b>9</b>

# 43. Work Flow of WACS

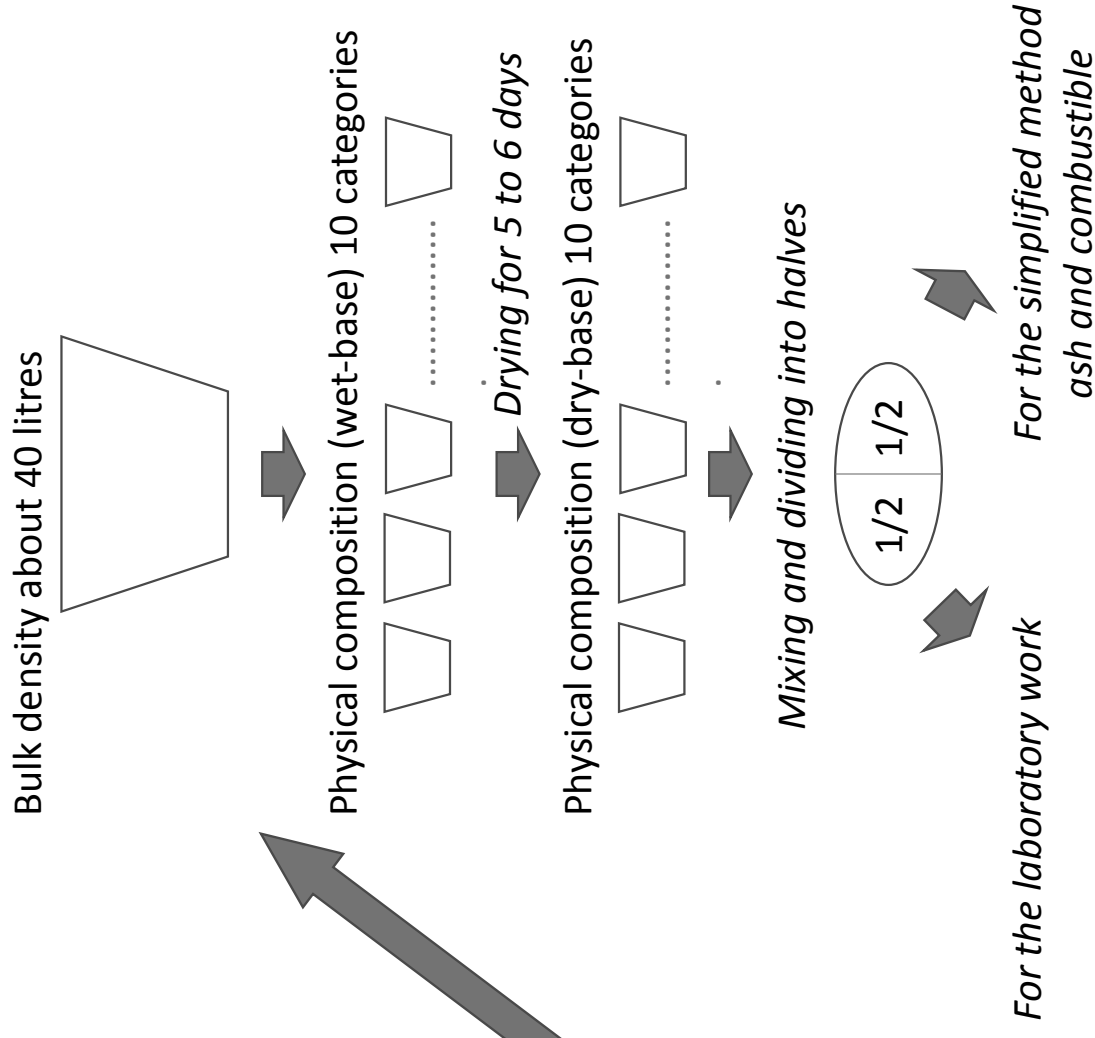
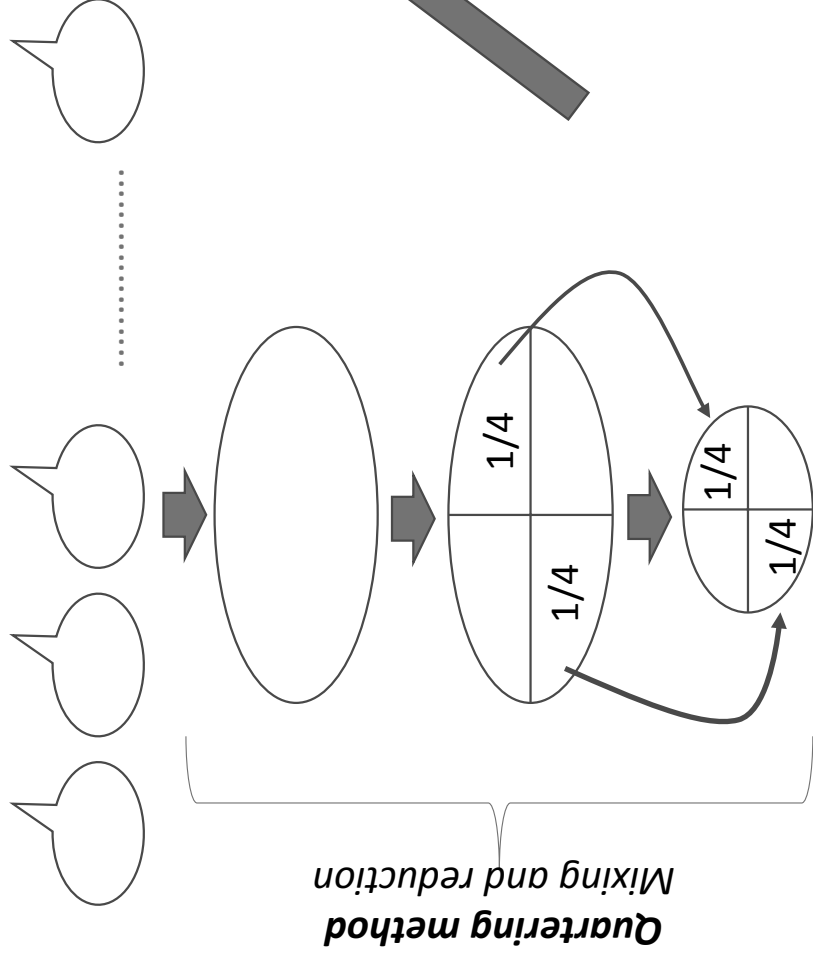


1. Waste amount	11. Collect samples from households 12. Measure samples by weight
2. Bulk density	21. Mix and reduce samples of each commune by the quartering method to approximately 40 litres 22. Measure bulk density of waste
3. Physical composition (wet-base)	31. Classify the waste into 10 categories of physical composition 1) food waste, 2) plastic, 3) paper, 4) textiles, 5) grass/wood, 6) rubber/leather, 7) metals, 8) bottles/glass, 9) soil/stones/ceramics, 10) others 32. Measure each composition by weight (wet-base)
4. Physical composition (dry-base)	41. Dry the samples to constant weight for 5 to 6 days <i>Preferably use a dryer. If it is not available, dry in air under incandescent lamps or similar items.</i> 42. Measure the samples by weight (dry-base)
5. Sample preparation for laboratory works	51. Mix combustibles (1) food waste, 2) plastic, 3) paper, 4) textiles, 5) grass/wood, 6) rubber/leather), and divide them into halves. 52. Take the one half, and cut waste into pieces, less than 3cm 53. Mix the waste and reduce it to about 500 g 54. Pulverize it into less than 1 mm 55. Dry it at 100 - 110 degrees Celsius for 2 to 3 hours 56. Keep it in desiccators
6. Ash content, combustible content	61. Take the sample of 56 and burn it by electric furnace at 800 Celsius for 2 to 3 hours
7. High calorific value	71. Take the sample of 56 and measure high calorific value using bomb meter
8. Elementary analyses	81. Take the sample of 56 and conduct elementary analyses (C, H, N, S, Cl, O)
9. Simplified method for measuring ash and combustible content	91. Take another half of waste of 51, and measure it by weight 92. Burn it on a refractory tray or similar one 93. Measure ash by weight



# Quartering Method

20 samples



# Reporting

Report shall include the following:

- Photos of each step of the work flow
- All experimental records - not only the final values but also all raw data
- Description of the communes
- Answers of the interview survey

# Example of WACS

Waste Amount Survey

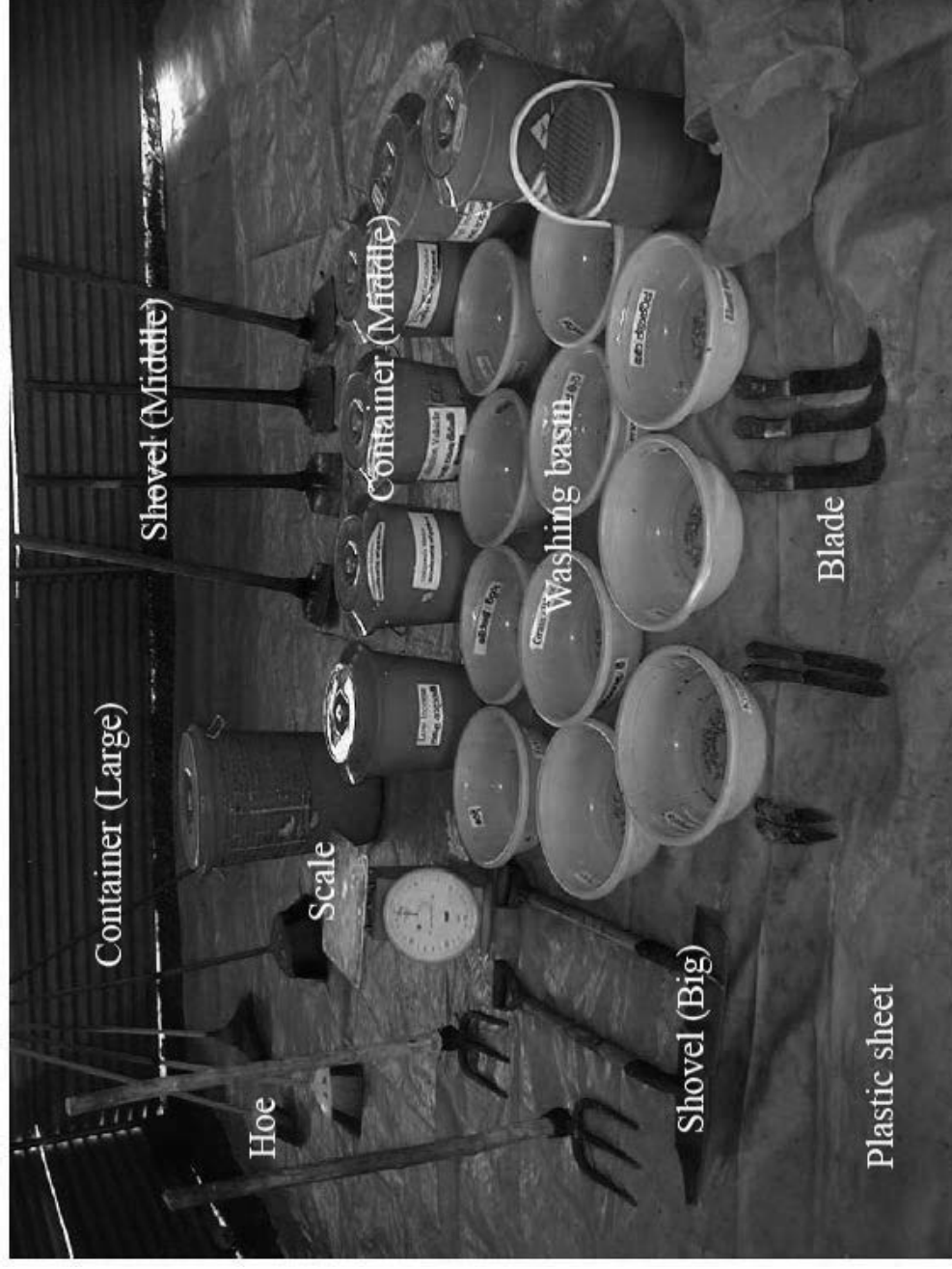


Collection of household waste samples



Weighing of waste samples

Typical tools for WACS



## Waste Composition Survey



Thorough mixing of collected waste samples



After proper mixing, the waste was divided into four segments of approximately the same size and this is repeated until the volume is reduced to the desired volume.



Waste samples were put into a calibrated plastic bucket to record volume and weight.



Analysis of physical composition of waste samples

## Waste Composition Survey



Samples divided into 10 components were measured respectively



The components were dried to analyze their moisture contents



Measurement of moisture contents



Waste was grinded for chemical analysis





Ash contents and volatile solids were analyzed by burning samples



Lower calorific values of wastes were analyzed by using bomb calorimeter

Thank you for your attention.

# Enquête sur la Quantité et la Composition des Déchets (WACS)

Procédure de travail de la WACS pour la ville de Kinshasa, RDC

Ikuko MORI, EX Research Institute Ltd.

# Objectif de la WACS

- L'objectif de la WACS est d'obtenir des données de base sur les déchets, telles que le taux de production de déchets (kg / personne / jour), la masse volumique apparente (kg / litre), la composition physique et le pouvoir calorifique (kJ / kg).
- De telles données de base sont indispensables pour une gestion appropriée des déchets solides.

# Contenu du Travail

1. Sélection des sites
2. Sélection des ménages
3. Enquête par entretien
4. WACS
  1. Données à obtenir
  2. Nombre d'échantillons
  3. Flux de travaux (workflow)
5. Rapport

# 1. Sélection des sites

Ce travail doit être effectué par la RASKIN.

- Trois communes avec des statuts économiques différents, tels que revenu élevé, revenu moyen et revenu faible, doivent être sélectionnées.
- Les données suivantes doivent être collectées :
  - Nom du district
  - Nom de la commune
  - Nombre de ménages dans la commune
  - Nombre de personnes dans la commune
  - Brève description générale de la commune : avec ou sans service de collecte des déchets, alimentation en eau, conditions d'hygiène, électricité, etc.

## 2. Sélection des ménages

Ce travail doit être effectué conjointement par la RASKIN et le Contractant.

- 20 ménages doivent être sélectionnés dans chaque commune, soit 60 ménages au total pour les trois communes.
- Les ménages doivent être informés des éléments suivants :
  - Objectif de l'enquête
  - Calendrier de l'enquête
  - Comment préparer les échantillons de déchets
    - Seuls les déchets produits au cours d'une journée doivent être soumis en tant qu'échantillon.
    - S'il y a des articles sanitaires tels que des couches, ces déchets doivent être soumis séparément des déchets généraux.
    - La quantité nécessaire de sacs pour l'échantillonnage doit être livrée aux ménages.

### 3. Enquête par entretien

Ce travail doit être effectué par le Contractant. Toutefois, il peut être effectué en même temps que le prélèvement des échantillons.

La page suivante présente une ébauche de questionnaire pour ce travail.



# Questionnaire (ébauche)

1) Nombre de membres de la famille :

- Combien de membres de la famille vivent dans ce ménage ?
- Combien de personnes vivent ou travaillent habituellement chez vous, comme par exemple des domestiques et chauffeur ?

3) Auto- élimination :

- Brûlez-vous vos déchets ?
- Enterrez-vous vos déchets ?
- Jetez-vous vos déchets dans des zones inoccupées, des rivières, etc. ?

2) Service de collecte des déchets :

- Bénéficiez-vous de ce service ?
- À quelle fréquence bénéficiez-vous de ce service ?
- Qui collecte vos déchets ?

4) Recyclage :

- Triez-vous les matériaux recyclables ?
- Utilisez-vous les déchets organiques pour faire du compost ?

## 4. Enquête sur la Quantité et la Composition des Déchets

### 41. Données à obtenir

- Les données suivantes doivent être obtenues :
  - a. Taux de production de déchets (kg / personne / jour)
  - b. Masse volumique apparente (kg / litre)
  - c. Composition physique (base humide)
  - d. Composition physique (base sèche)
  - e. Trois composants : teneur en combustibles, eau et cendres
  - f. Pouvoir calorifique supérieur (kJ/kg)
  - g. Teneur en éléments (C, H, N, S, Cl, O)

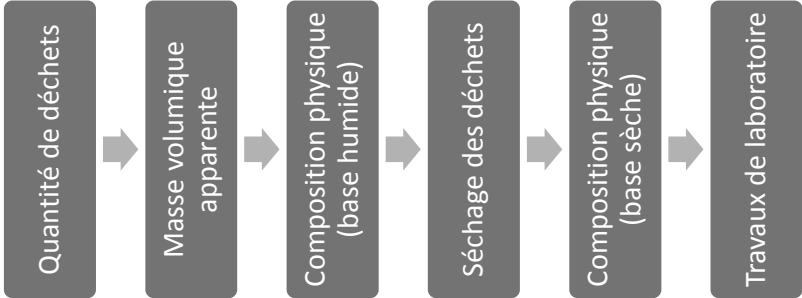
## 42. Nombre d'échantillons

- Au total, 480 échantillons seront prélevés pour l'Enquête sur la Quantité de Déchets, et 9 échantillons pour l'Enquête sur la Composition des Déchets.
- L'Enquête sur la Quantité de Déchets doit être réalisée pendant huit (8) jours consécutifs. L'Enquête sur la Composition des Déchets doit être effectuée le 3ème jour, le 5ème jour et le 7ème jour des 8 jours consécutifs.

Nombre d'échantillons

Source de Production (Ménages)	Nombre de communes sélectionnées	Nombre de ménages par commune	Enquête sur la Quantité de Déchets			Enquête sur la Composition des Déchets		
			Échantillons / Jour	Jours d'échantillonnage	Total des Échantillons	Échantillons/ Jour	Jours d'échantillonnage	Total des Échantillons
	A	B	AxB	-	CxD	-	-	FxG
			C	D	E	F	G	H
Revenu élevé	1	20	20	8	160	1	3	3
Revenu moyen	1	20	20	8	160	1	3	3
Revenu faible	1	20	20	8	160	1	3	3
Total	3	60	40	-	<b>480</b>	-	-	<b>9</b>

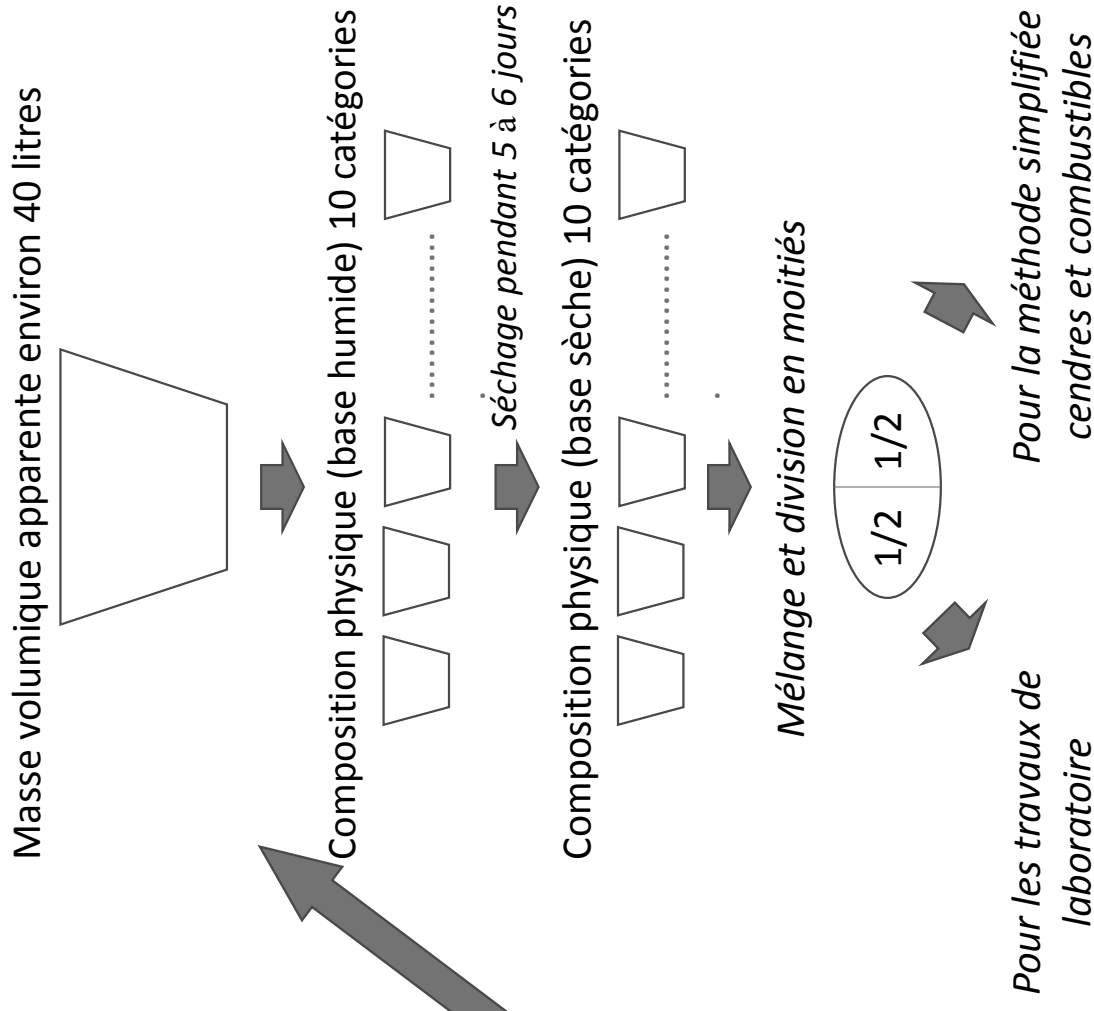
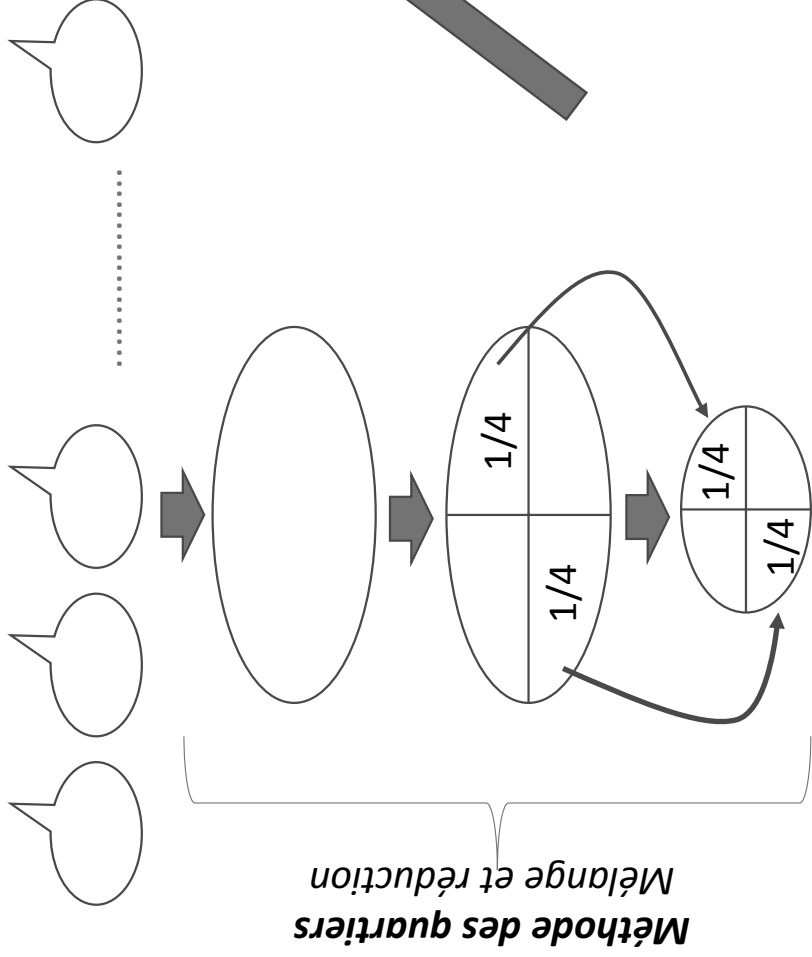
# 43. Workflow de la WACS



1. Quantité de déchets	11. Collecter les échantillons auprès des ménages 12. Mesurer le poids des échantillons
2. Masse volumique apparente	21. Mélanger et réduire les échantillons de chaque commune selon la méthode des quartiers à environ 40 litres 22. Mesurer la masse volumique apparente des déchets
3. Composition physique (base humide)	31. Classer les déchets en 10 catégories selon leur composition physique <i>1) déchets alimentaires, 2) plastique, 3) papier, 4) textiles, 5) herbe / bois, 6) caoutchouc / cuir, 7) métaux, 8) bouteilles / verre, 9) terre / pierres / céramique, 10) autres</i> 32. Mesurer le poids de chaque catégorie (base humide)
4. Composition physique (base sèche)	41. Sécher les échantillons jusqu'à poids constant pendant 5 à 6 jours <i>Utilisez de préférence un séchoir. S'il n'y a pas de disponible, séchez à l'air sous des lampes à incandescence ou similaire.</i> 42. Mesurer le poids des échantillons (base sèche)
5. Préparation des échantillons pour les travaux de laboratoire	51. Mélanger les combustibles ( <i>1) déchets alimentaires, 2) plastique, 3) papier, 4) textiles, 5) herbe / bois, 6) caoutchouc / cuir</i> ) et diviser en deux. 52. Prendre une des moitiés et couper les déchets en morceaux de moins de 3 cm 53. Mélanger les déchets et les réduire à environ 500 g 54. Pulvériser en moins de 1 mm 55. Sécher à 100 - 110 degrés Celsius pendant 2 à 3 heures 56. Conserver dans des dessiccateurs
6. Teneur en cendres, teneur en combustibles	61. Prendre un échantillon du point 56 et le brûler dans un four électrique à 800 degrés Celsius pendant 2 à 3 heures
7. Pouvoir calorifique supérieur	71. Prendre un échantillon du point 56 et mesurer le pouvoir calorifique supérieur à l'aide d'une bombe calorimétrique
8. Analyse élémentaire	81. Prendre un échantillon du point 56 et effectuer une analyse des éléments (C, H, N, S, Cl, O)
9. Méthode simplifiée pour mesurer la teneur en cendres et combustibles	91. Prendre l'autre moitié du point 51 et en mesurer le poids 92. Brûler sur un plateau réfractaire ou similaire 93. Mesurer le poids des cendres

# Méthode des quartiers

20 échantillons



# Rapport

Le rapport doit inclure les éléments suivants :

- Photos de chaque étape du flux de travaux (workflow)
- Tous les enregistrements expérimentaux – pas uniquement les valeurs finales mais également toutes les données brutes
- Description des communes
- Réponses à l'enquête par entretien

# Exemple

Enquête sur la Quantité de Déchets

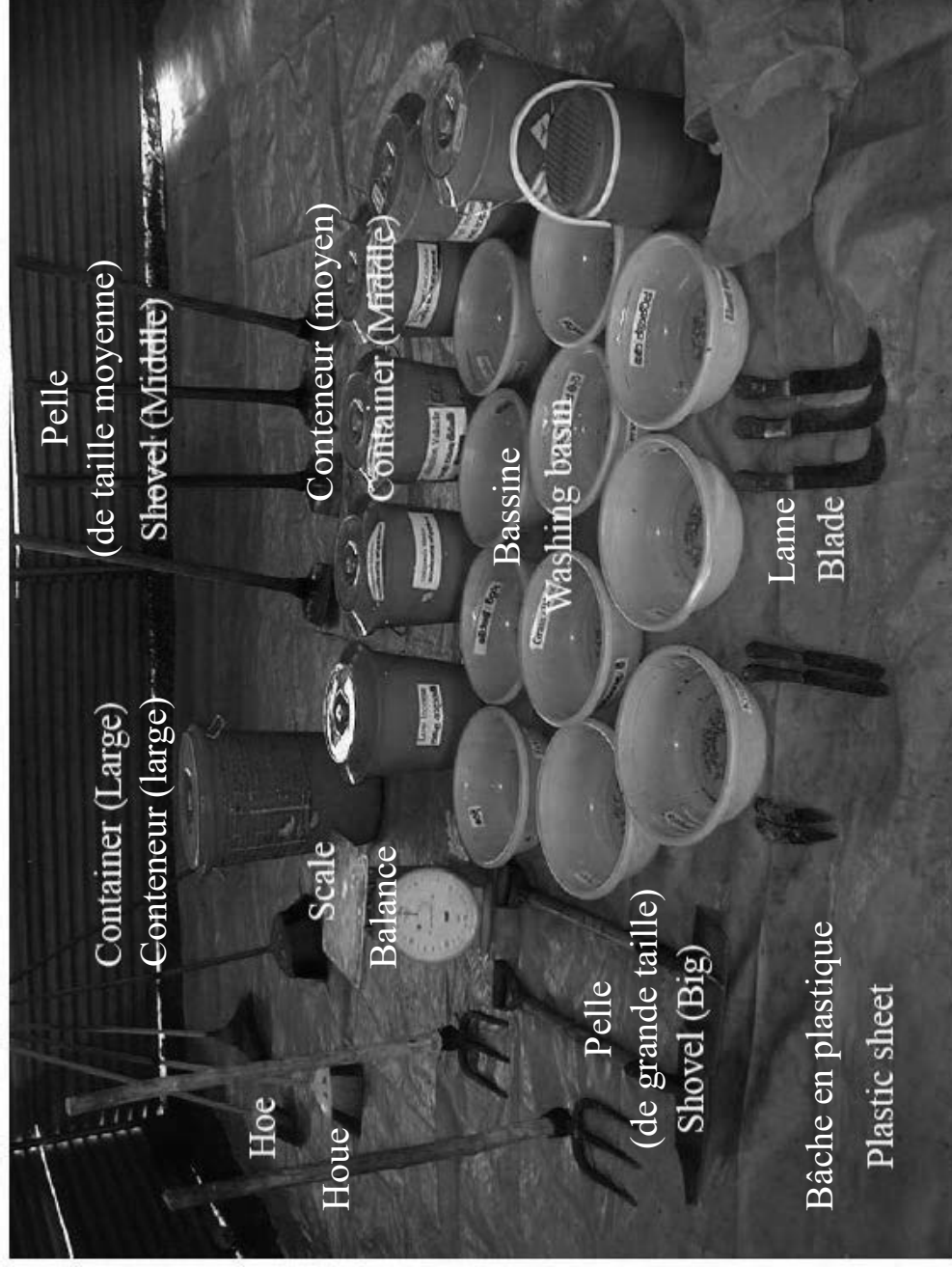


Collecte des échantillons de déchets ménagers



Pesée des échantillons de déchets

## Outils typiques pour la WACS





## Enquête sur la Composition des Déchets



Bien mélanger les échantillons de déchets collectés



Après obtention d'un mélange homogène, les déchets sont divisés en quatre parts ayant approximativement la même taille ; cette opération est répétée jusqu'à ce que le volume soit réduit au volume désiré



Les échantillons de déchets sont mis dans un seau en plastique gradué pour mesurer le volume et le poids



Analyse de la composition physique des échantillons de déchets

## Enquête sur la Composition des Déchets



Les échantillons divisés en 10 catégories sont mesurés respectivement



Les composants sont séchés pour analyser leur teneur en humidité



Mesure de la teneur en humidité



Les déchets sont broyés pour l'analyse chimique



La teneur en cendres et les matières solides volatiles sont analysées en brûlant les échantillons



Le pouvoir calorifique inférieur des déchets est analysé en utilisant une bombe calorimétrique

Merci pour votre attention

作成資料 19：横浜研修生インタビュー調査結果（2019 年 3 月 2 日）

業務：横浜課題別研修生へのインタビュー調査

日時：2019年3月2日（土）

場所：JICA 横浜

JICA 地球環境部：小島（敬称略）

エックス都市研究所：森、ヨーラン

上記日程でコンゴ民主共和国とジブチの2か国からの研修生に対し、案件形成を念頭にインタビュー調査を実施した。

1. コンゴ民主共和国

1) 主な聞き取り事項

研修員：Mr. Jean KANDOLO MUKUNU, Director of Planning

- RATPK から RASKIN への名称変更は、衛生・廃棄物分野に特化するため。RATPK 時はキンシャサ県（Province）の環境部局と公共事業部局の共同下部組織であった。現在は環境部局のみの下部組織となっている。
- RASKIN は後者ではなくキンシャサ県政府内の技術部署である。廃棄物サービス受益者から直接を徴収することではなく、県と国からの資金で活動している。
- 2017 年よりアフリカ開発銀行の支援で衛生セクターのマスタープラン作りが進められている。2017 年は診断編、2018 年は計画編のレポートが策定された。RASKIN は計画編のみを入手しており、現在内容をチェック中である。水分野がメインであり、廃棄物分野は一般的記述に留まっている。
- 市民は衛生税を支払うことになっており、FONAK が所管する。
- 全ての輸入品に環境税を課することが議論されているが、政権が代わり、議論の行方が見えない。
- JICA の支援について：法制度整備が重要である。廃棄物分野に特化したマスタープラン作成支援、JICA が現在支援している都市交通マスタープランのような支援が欲しい。

2) コンサルタントの意見

- 廃棄物分野に関し、世銀、AFD、アフリカ開発銀行等、いくつかのドナーが支援を行っているが、廃棄物分野に特化した支援ではない。UNIDO は地球環境基金を活用した廃棄物分野に特化した支援を行う予定であるが、法制度整備や包括的なマスタープラン作成といった上流側の支援は含まれていないようで、JICA 支援でこの空白を埋めることは意義あることと思われる。

2. ジブチ

1) 主な聞き取り事項

研修員：Mr SAMATAR, Civil Engineer

- 所属機関の OVD は公社で、廃棄物サービスの他に道路の標識や緑地整備なども行っている。
- OVD は財務的に自立した組織であり、レストランや商店などからごみ収集料金を徴収してい



る。

- 最終処分場は EU 支援により 2014～2015 年に建設された。日本の無償資金協力による廃棄物機材が調達された時期と重なる。敷地は広く、長年使用可能。
- 現時点、収集は混合収集だが、分別を導入したい。

2) コンサルタントの意見

- 2014 年に日本の無償資金でゴミ収集車両や重機が調達され、現時点、それらは良好に機能している。また、同時期に世銀により最終処分場が建設されている。よって、ゴミの収集と処分という廃棄物管理の基本的なニーズは満たされていると言える。
- AFD 支援により選別施設が計画されている。資金不足のため AFD は建設を支援しないとのことである。建設費用は 582,000 ユーロと見積もられている。日本の無償資金協力とするには小規模であり、かつ、建設物であるため、日本企業にとっては応札が難しい案件と思われる。また、処分場容量に余裕があるようなので、リサイクルやコンポストによる減量化は喫緊の課題ではないと思われる。

以上

打合せメモ	
1. 用件	ACCP Interview Democratic Republic of the Congo
2. 日時	2019 年 3 月 2 日 10:00 ~ 11:00
3. 場所	JICA Yokohama
4. 参加者	<p>【RASKIN】 Mr. Jean KANDOLO MUKUNU, Director of Planning</p> <p>【JICA】 Ms Eiko KOJIMA, Special Advisor</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None 入手資料 (Available materials) : None</p> <p>[EX] introduced the purpose of the interview and informed about our recent visit to DRC / RASKIN to conduct WACS.</p> <p>[EX] asked if the name change from RATPK to RASKIN in October 2017 reflected a change in the activities of the agency, focusing now on sanitation / waste management. [RASKIN] confirmed.</p> <p>[EX] asked for additional information about the master plan (Plan directeur de gestion des déchets ménagers et assimilés dans la Ville de Kinshasa - en projet) mentioned in the country report p. 4. [RASKIN] explained it was a project supported by the African Development Bank. The main focus is urban water with the objective to improve water management and treatment in the city of Kinshasa. Waste having an impact on water (typically waste discharged in the river), the topic of SWM is also covered. Main organization in charge is the water distribution agency REGIDESO (Régie de distribution d'eau). The commission monitoring the project gathers delegates from provincial and national level, including RASKIN, Sanitation Department of the Ministry of Environment (Direction d'Assainissement, DAS), Office of Roads and Drainage (l'Office de Voirie et de Drainage, OVD). The project started in 2017. The consultant made the diagnosis and submitted a 1<sup>st</sup> report last year. RASKIN just received the 2<sup>nd</sup> evaluation report and is now reading it. RASKIN could already make following important observation: as the plan's main purpose is (potable) water, the part related to waste is insufficiently detailed. [EX] asked about a copy of this 2<sup>nd</sup> report. JICA can provide support for the elaboration of master plans but it is important to avoid duplicates with the activities of other donors. [RASKIN] agreed to send us a copy by e-mail.</p> <p>[EX] asked about RASKIN's activity and organisation. [RASKIN] explained that in 2017, RATPK was under joint authority of the Provincial Ministries of Environment and Public Work. Now that the focus is on Sanitation, RASKIN is under supervision of the Provincial Ministry in charge of Environment. (Note: Provincial Ministries may have several areas of jurisdiction. The Provincial Ministry in charge of Environment is also in charge of Education and Genre.) RASKIN is not a company but provincial government's technical body. RASKIN mainly deals with the transportation of waste from the transfer stations to the landfill, but also does beautification works, such as street cleaning, planting of trees, flowers, etc. for developing green spaces in the city, as well as wastewater treatment. The transportation of waste from the households to the transfer stations is mainly informal.</p> <p>[EX] asked about the role of the communes. [RASKIN] explained that according to the legislation, communes are responsible for providing waste</p>	

services to their population. However, they usually don't have the necessary capacity (technical skills, finance, human resources, etc.) to fulfil their role. RASKIN is trying to support them but they are also limited.

Ideally communes would take their responsibilities while RASKIN supervises and coordinates.

Inter-communal cooperation is possible as well, for ex. the landfill is managed by RASKIN and used by the different communes.

[EX] asked about the financing system.

There's a sanitation tax but it is sometimes difficult to get it paid by the population.

An eco-tax should be introduced on all imported products. There are discussions with the Ministry of Economy on national level regarding the handover of the collected money. Considering the changes in the government following the elections, the outcome is uncertain yet.

RASKIN's revenue mainly comes from the provincial government, but also national government.

RASKIN doesn't receive directly the money from sanitation tax, etc. A fund dedicated to sanitation in Kinshasa (Fonds national d'assainissement de Kinshasa, FONAK) has been set up in parallel. All the money related to sanitation (sanitation tax, donor support, state grant, etc.) are gathered into this fund, which is used to finance the activities of RASKIN. The main reason why a dedicated fund has been created is that the government recognized that sanitation was a priority topic, and in case the money would go into the general fund, there would be a risk that the money get used for other purposes, and there wouldn't be enough left to cover sanitation activities.

[EX] asked about the organizational chart p. 8 of the country report, and the reason why the Commune of Gombe benefits from a dedicated Department ("Direction des Opérations de la Gombe").

[RASKIN] explains that it was a political decision taken 4-5 months ago. Gombe is the commune where all the administrations are located so that the political power wanted to focus on this area.

The creation of this new department raised questions internally (unfair as there are 24 communes in Kinshasa) and tensions with some other departments, esp. with the Technical Department, that had the feeling that responsibilities had been taken away from them.

[EX] asked about the drastic drop in the volume of waste discharged at the landfill between 2017 and 2018 (table p. 17 of the country report)

[RASKIN] explained that this sharp fall was due to various reasons, such as:

- Difficulty to collect in the city
- Poor conditions of the vehicles, with frequent breakdowns
- Landfill is far away (35 km from city centre), and waste get discharged on a shorter distance
- Landfill is getting full, no more available cell, no more bottom liner

[EX] asked about other donors.

[RASKIN] explained that they are in contact with World Bank and AFD (French Development Agency) but projects are slow to start.

UNIDO started discussions on WtE directly with the government, and RASKIN was informed only recently (top-down)

Decision-making power is the provincial governor of Kinshasa

[EX] asked about the needs of RASKIN in terms of support from JICA

[RASKIN] considers the legal framework as essential. A master plan dedicated to waste would be very helpful, similar to the master plan for transportation for which JICA supported the Ministry of Transport.

以上

打合せメモ	
1. 用件	ACCP Interview Djibouti
2. 日時	2019 年 3 月 2 日 11:00 ~ 11:45
3. 場所	JICA Yokohama
4. 参加者	<p>【Office de la Voirie de Djibouti, OVD】 Mr SAMATAR, Civil Engineer</p> <p>【JICA】 Ms Eiko KOJIMA, Special Advisor</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None 入手資料 (Available materials) : None</p> <p>[EX] introduced the purpose of this interview and asked about the equipment Djibouti received from JICA in 2104-2015. [OVD] confirmed that the vehicles were still in use and in good condition. This support from JICA was highly appreciated and really helped improve SWM in Djibouti. (Mr Samatar works at OVD since 6 years, i.e. was already working there when the equipment arrived.)</p> <p>[EX] asked about OVD's scope and organisation. [OVD] explained that their scope includes activities related to roads, such as road signs, sidewalk, street sweeping, green spaces, and covers waste as well. It is a public company but (financially) autonomous. Business entities (such as shops, restaurants, etc.) pay for the collection service. This fee covers more or less all the expenses. Trucks can only access and pick up on the main roads. In slum areas, primary collection (from households to pick up points on main roads) is performed informally. Despite some corrosion/rust due to the climate and geographical conditions (salt from the sea, sand), trucks are still in good conditions. There's a repair workshop with skilled staff to maintain the vehicles. Cleaning staff (women) sweep the roads at night. There's lot of soil and sand. When it rains, mud sometimes overflows on the road. In this case they bring the mud to the landfill.</p> <p>[EX] asked about the landfill's conditions. [OVD] explained that the landfill was constructed by the UE and Colas in 2014-2015 (about same time as the provision of vehicles by JICA). The area is huge and used little by little. About 300 tons/day are discharged at the landfill. Waste is shred and buried, then covered with soil (several layers of waste / soil). Leachate are not treated.</p> <p>[EX] asked about waste sorting and recycling. [OVD] explained that waste is currently not sorted (with the exception of some rags) but they plan to introduce waste sorting.</p> <p>[EX] asked about the AFD project of constructing a sorting unit. [OVD] seemed not really aware of this project. At the moment it's only a project, it has not been implemented yet and there seems to be no concrete action ongoing.</p> <p>[EX] asked about the reason why they want to introduce recycling in Djibouti. [OVD] explained that they would like to follow the example of Japan, implement the 3Rs and achieve the same level of cleanliness. There's already an action plan for reduce.</p>	

Based on the experience gathered during ACCP meetings / Yokohama training, they intend to create an action plan for recycling, including awareness raising.

[EX] asked about communication capacity at OVD.

[OVD] explained that there's no staff in charge of communication at OVD. RTD (Radio TV Djibouti) is in charge of communication and OVD makes suggestions.

To conclude, [OVD] stressed how much JICA support and this training in Yokohama was useful. Their objective is to make Djibouti as clean as Yokohama.

以上

作成資料 20 : ケニア共和国ナイロビ市調査報告 (2019 年 3 月 8 日～17 日)

# ケニア国ナイロビ郡ほか 現地情報収集・確認調査 (2019年3月8日～17日)

## 1 調査行程等

### 1.1 調査行程

2019年3月8日～17日の工程でケニア国ナイロビ郡ほかで現地調査を実施した。詳細行程を下表に示す。また面談（訪問）におけるメモを巻末に添付する。

No.	月日	曜日	時間	面談（訪問）先等
1	3月9日	土	14:30	3月8日 22:20 東京発 (JL7995 [QR807]) ナイロビ着 (JL5581 [QR1335])
2	3月10日	日	15:00	Dr. Oyake
3	3月11日	月	9:00 13:00 16:30	Nairobi City County (NCC), Environment Department Taka Taka Solutions JICAケニア事務所（安全管理ブリーフィングほか）
4	3月12日	火	10:00 11:00 14:00 15:00	JICAケニア事務所 NEMA (National Environment Management Authority) WEMAK (Waste Management Association of Kenya) Mr. Hibrahim, NCC
5	3月13日	水	7:00 10:00 11:30 13:00 14:00	Mr. Makoriほか、NCC Bins Eng. Njengaほか、NaMSIP Mr. Mwangi, NCC Mr. Dancan
6	3月14日	木	8:15 13:00 15:00	ダンドーラ処分場視察 Zoa Taka Taka Taka SolutionsのMRF視察
7	3月15日	金	7:30 10:00 16:00	Mr. Gangloff (EU) ムランガ郡最終処分場視察 Mr. Hibrahim, NCC
8	3月16日	土	10:00 13:00 16:55	借上げ車両返却 チェックアウト ナイロビ発 (JL5580 [QR1336])
9	3月17日	日	17:55	東京着 (JL7994 [QR806])

### 1.2 調査関係者

JICA ケニア事務所  
佐野 景子 所長  
天目石 慎二郎 次長  
宮川 聖史 所員  
John Gitau Mungai 所員

JICA 地球環境部 環境管理グループ環境管理第二チーム  
下平 千恵 企画役/課長補佐

建設技研インターナショナル  
前田 剛和

## 2 廃棄物管理関係機関との面談結果

### 2.1 ナイロビ郡政府関係者

ナイロビ郡政府（Nairobi City County Government）関係者で面談したのは、廃棄物・環境管理セクターの審議官（County Chief Officer）であるマッコリ氏、その下の環境局の局長ムラヤ氏、3名の副局長、サブカウンティの環境管理官ダンカン氏である。その概要以下に整理する。

現在郡政府で進めているごみ発電プロジェクトは、知事が推進しているもので、その内容について疑問を持っている職員もいるようであるが、中止にはできない状況と思われる。今後、プロポーザルを提出した2社との交渉が始まると思われるが、その進捗を注意深く見守る必要がある。

策定から10年近く経過する廃棄物管理に関わるマスタープランであるが、改訂の必要があるとの指摘があった。特に既存のダンドーラ処分場の状況が劣悪であることから、できるだけ早い新規最終処分場の建設が望まれるものの、候補地であるルアイの土地問題に未確定の部分があるほか、ごみの搬入を拒む航空当局の存在があり、早期の着工は困難な状況である。

その解決策のひとつとして、ナイロビ郡の周辺の郡への処分場建設と郡内の中継基地を兼ねたMRF（Material Recovery Facility）の建設という代替案について意見を聞いたところ、反対意見はなかった。ただし、他の郡との交渉は時間を要する、あるいは困難である、との意見も多かった。

収集運搬に関するフランチャイズ制については、残念ながら郡政府として今後積極的に継続実施していく様子は見られなかった。その大きな原因としては、知事が変わったことが大きいと思われる。

今後のJICAに期待する協力については、マスタープランの改訂のほか、住民啓発が重要であり、その支援を望む声もあった。また、現在提出されている円借款の要請書に関しては、内容を見直し、再度提出することとなった。

### 2.2 民間収集業者（PSP）

民間収集業者（PSP: Private Service Provider）としては、現在最大手と考えられるTaka Taka Solutions, Zao Taka, Binsの3社と面談した。

各社とも当然のことながらフランチャイズ制に関わらず、自分たちのビジネスを第一義に考え事業の展開に努めている。3社はいずれもプラスチック袋の使用禁止の影響もあり、自社で収集したごみを分別していた。ただし、ナイロビではリサイクル市場が未発達であることが課題との指摘があった。

ダンドーラ処分場の改善についての要望は非常に強く、ここに行きたくないために他郡の処分場までごみを運んでいる業者も少なからず存在するようである。

ナイロビ郡周辺の郡への処分場建設と郡内の中継基地を兼ねたMRFの建設という案については、反対意見はなかった。ただし、処分場やMRFの土地は政府が関与するのではな



く、民間にまかせるべき、そのほうがうまくいくとの意見が多かった。まずはパイロット的に1ヶ所MRFを建設してみてはどうか、との意見もあった。

## 2.3 その他

国家環境管理庁（NEMA: National Environment Management Authority）は、環境分野全般に関する監督・指導を役割としており、ごみ発電プロジェクトについてもコンサルテーションされるべき、との話であった。新規処分場建設に関しては、EIAが必要である。

EUはナイロビ郡政府が進めるごみ発電プロジェクトの調査を実施したが、その後のプロジェクト実施に関しては関与しておらず、資金援助も考えていないとのことであった。

運輸・インフラ・住宅・都市開発省は、世銀融資のNairobi Metropolitan Improvement Project (NaMSIP) を実施している。このプロジェクトの中で最終処分場に関し、2015年にSeureca（フランスのコンサルタント）がナイロビ郡以外の候補地についてフィージビリティスタディを行っている。この調査に基づき、ムランガに衛生埋立による処分場を建設中で、今回視察に訪れた（面談メモ参照）。非常に協力的で、ナイロビ郡以外に処分場を建設する場合、この省の協力を得ながら進めるのがよいと思われる。

## 3 ダンドーラ処分場の視察

3月14日午前、ナイロビ唯一の既存最終処分場であるダンドーラを視察した。最後に訪れた2016年初頭と比べると、場内の整備はほとんど進歩がなく、状況はかなり悪化していると感じた。2016年までは場内道路の脇に地堀の排水溝を設けている区間があったが、現在はその痕跡がわずかに認められるのみである。また、入り口のトラックスケールも故障中で、ティッピングフィーはこれまでの実績から徴収金額を決めているとのことであった。

ごみの山では炎が上がっているところもあり、煙が立ち上っている箇所が数多く見られ、視界が遮られるほどの場所もあった。ウェストピッカーの活動は従来どおり活発に行われているようであり、収集車の到着を待っているウェストピッカーも多い。

ティカ道路からダンドーラへの道路は中国によって整備されたようで、市内からは大変便利がよかった。この道路整備により、ダンドーラ周辺の街も以前は見られた道路脇のごみの山などはなくなっており、環境改善が進んでいるようである。



処分場入口（右がトラックスケール）



管理棟



道路脇に溜まる浸出水



道路脇の排水溝のあと



ごみから出ている炎



視界が遮られるほどの煙



ごみを搬入してきた車とウェストピッカー



ウェストピッカーによる有価物回収



バックホウによる場内の整地作業



整地・ごみひき均しに使用するブルドーザー

## 4 今後の協力に関する提案

ナイロビ郡政府が知事主導で推進するごみ発電プロジェクトを中断あるいは中止することは極めて難しいと考えられる。しかし、このプロジェクトはその妥当性の検討が不十分であり、かつこのプロジェクトの成否は、ごみの最終処分や中間処理、収集運搬といった廃棄物管理の一連のプロセスに深く影響を与える。従って、現時点では、まずこのごみ発電プロジェクトの成否を見守ることが必要と思われる。

他方、ダンドーラの状況を見ても明らかなように、ナイロビの廃棄物管理の改善は一時たりともその歩みを止めることはできないところまで来ていると判断される。そこで、ごみ発電プロジェクトの実施と同時併行で、ナイロビにおける廃棄物管理の現状を把握した上で、多くの課題を整理し、課題解決のためのアクションの実施に関する優先順位付けを行うことが重要と考える。これによって、ごみ発電プロジェクトの行く末が明らかになった段階で、すぐに次のアクションがとれるように準備しておくことが可能となる。

また、これらの整理に基づいて、約10年前に策定されたマスタープランを改訂し、新たな目標をナイロビ郡政府に提示することも重要と考える。ナイロビの廃棄物管理を考えたとき、最終処分の問題を抜きにはできないことから、ごみ発電プロジェクトの成否に関わらない新たな最終処分場候補地をルアイの他に検討し、選定することもひとつの有力な代替案と思われる。

さらにサブカウンティレベルでの廃棄物管理を含む、環境モニタリングや行政指導が以前に比べかなり強化されている実情より、新たなナイロビ郡外の処分場建設とセットで郡内にMRF（Material Recovery Facility：資源回収施設）を兼ねた中継基地を数か所設置することも検討に値すると考える。

以上

作成資料 2 1 : コンゴ民主共和国キンシャサ市追加調査報告 (第二回 : 2019 年 3 月 22 日 ~ 31 日)

「コンゴ民主共和国キンシャサ市を対象とした追加調査」

## 現地調査報告書 (2019年3月22日～3月31日)

# 1 調査行程等

## 1.1 調査行程

2019年2月8日～2月17日の工程で、コンゴ民主共和国キンシャサ市にて現地調査を実施した。詳細行程を下表に示す。

No.	Date	Day	Activities
1	3/22	Fri.	20:40 Dep. Narita (ET0673)
2	3/23	Sat.	07:25 Arr. Addis Ababa 10:00 Dep. Addis Ababa (ET0841) 12:10 Arr. Kinshasa
3	3/24	Sun.	All day Kimbanseke Town Hall Meeting with GEC, RASKIN Instruction of procedure of WACS Visit sample houses in Kimbanseke Visit sample houses in Kalamu
4	3/25	Man.	AM Meeting with GEC Instruction of procedure of WACS PM Meeting with RASKIN at Kinshasa University Explanation of SDG11.6 Preparation of list of recycling companies to visit Discussion about workshops of WACS and recycling 17:00 Meeting with JICA Office
5	3/26	Tue.	All day Visit sample houses in Gombe Visit the landfill of RASKIN for evaluating the facility
6	3/27	Wed.	All day Supervise the WACS in Kinshasa University (GEC) Visit recycling facilities GEC Studies RECOVAD CEPRADYC
7	3/28	Thu.	All day Visit recycling facilities HARIMEX Benelux Afro Center (BAC) KIN Plast RASKIN, SELTON, SULTANI Check a room for the workshops
8	3/29	Fri.	AM Supervise the WACS in Kinshasa University (GEC) PM AFD, Agence Française de Développement Reporting to JICA Office
9	3/30	Sat.	13:25 Dep. Kinshasa (ET0840) 19:55 Arr. Addis Ababa 22:25 Dep. Addis Ababa (ET0672)
10	3/31	Sun	19:20 Arr. Narita

## 1.2 調査関係者

JICAコンゴ民主共和国事務所

柴田 和直 所長

臼井 拓 所員

MUFWAYA Raymond 所員

エックス都市研究所

森 郁夫

YOLIN Christine

## 2 調査結果

### 2.1 ごみ量ごみ質調査

ごみ量ごみ質調査の委託先であるGECが用意した記録フォーマット、質問票、調査方法、さらにサンプルとなる家々を確認しつつ、準備を行った。調査は3月27日（水）に開始、8日後の4月3日（水）に終了した。ごみ質分析は、3、5、7日目の3日間実施することとなっているが、1日目にトレーニングとして、Kalamu, Kimbasekeのサンプルを対象にごみ質分析（湿ベース）までを行った。

GECの代表であるProf. BIEY MAKALY氏は、廃棄物関連調査経験を有しており、今回のごみ量ごみ質調査手法についても良く理解していた。コンサルタントが修正等を指示した事柄は細かなことに留まっており、おおむね良好に調査を遂行した。

### 2.2 リサイクル施設調査

リサイクル事業者の現状、及び、リサイクル施設の適切性を調査した。調査方法は、施設への訪問調査とした。訪問した業者は、プラスチック関連5社、廃電気電子機器1社であった。

リサイクル業者は、RASKIN所管のもと、キンシャサ市との契約を交わして事業を実施している。どの施設も先進国のリサイクル施設のように周辺環境や労働環境に行届いた配慮が為されているとは言えないが、フェンス、屋根等、最低限の施設は整っていた。

調査にはチェック表を用いた。現地調査前のJICA, UN-Habitatとの打合せにおいて、誰もが使えるような簡素なものしようという考えに基づいて、添付のCheck Sheetを用意した。簡素なものだけに、カウンターパートには理解しやすいものであったようだが、実際に使用してみると問題のあることも判明した。例えば、屋根やフェンスが有るか無いかをチェックするだけを想定していたが、実際には、屋根やフェンスが有るものの一部破損していたりということがあり、このような場合の評価方法は評価者により異なった。また、処分場では、以前は遮水シートがあるセルにごみを埋立て、覆土もしていたが、現在はオープンダンプ状態になっており、このような処分場をどのように評価すべきか、評価者により判断が異なるようであった。

よって、Check Sheetの改善、特に、異なる評価者でも出来るだけ同様な評価となるように改善する必要がある。

## 2.3 キンシャサ市の廃棄物管理の現状

- Mpas 処分場

RASKINが運営する処分場で、EUプロジェクトにて建設されたものである。2017年10月の調査時には、処分場内部に入り視察することが可能であったが、現在はごみが入口からあふれ出し、処分場周辺にも投棄されているといった劣悪な状況となっていた。Landfill コンパクターが1台稼働していたが、この1台ではどうにもならないといった状況であった。

また、幹線道路から処分場までの途中にある橋が壊れ、RASKINの車両はごみを同処分場に搬入できていなかったとのことで、それらごみがどこに投棄されたかは不明である。

- RASKIN

職員に寄れば、27か月給与が未払いであり、現在ストライキ中とのことであった。市中にあるワークショップには何台ものRASKINの車両が停車中であり、ごみが処分場に運搬されていないことが、ここでも窺えた。

4月に知事選が予定されており、その後、RASKINの人事にも変更が予想されとのことであった。

- AFD（フランス開発庁）

AFDは洪水防止を目的としたプロジェクトを2019年末までに開始する予定である。対象地域はNdjili川流域で、世銀プロジェクトの下流側である。コンポーネントには廃棄物も含まれる。

RASKINはAFDのプロジェクトでは、コミュニティから排除したごみを処分場に運搬する重要な役割を担っているが、彼らの現状からして、そのような役割を期待することは難しいということであった。一方、廃棄物処理費用の原資を確保するために設立されたFONAKについて、国の補助金など一定の収入があるようだが、それが適切に廃棄物処理費用に支出されていないのではないかという懸念が聞かれた。

## 2.4 今後のJICAの支援について

案件形成に関してJICA事務所と打合せを行った。主な内容は以下のとおり。

- コンサルタント：支援を行う場合には、受入先となるカウンターパートが重要となる。RASKINの現状をみるに、カウンターパートとして適当であるとは思えない。現在、FONAKが財務面で重要なアクターとなっている。キンシャサ州政府の下、FONAKも巻き込んだ形でプロジェクトの体制が構築できると良いと思われる。ただ、その場合には、州政府環境局の所掌、人員、能力などを把握しておく必要がある。

- JICA：現時点、RASKINがカウンターパートとして適切ではないと考えている。州政府を直接のカウンターパートとする案もあるが、知事選を控えており、かつ、その後の2～3か月は各部局の人事が動く時期であり、動向を見守る必要がある。一方で、大統領府もキンシャサ市の廃棄物問題を憂えているようで、その改善が必要であると認識しているようだ。
- JICA：次回調査時の5月中旬は、州政府の人事が動いている最中であると思われるが、環境局、財務局、FONAKなどの状況を調査することが適当である。

### 3 コンサルタントの今後の活動について

- 5月14日（火）にWACSの結果の共有、5月16日（木）にリサイクル業者のニーズ聴取を目的としたワークショップの開催を予定する。会場として、SULTANI ホテルのカンファレンスルームを予約済みである。これらワークショップの主催をJICAとするか、RASKINとするかは、JICA事務所にて検討する。
- コンサルタントは、WACS委託先のGECと連絡を取りつつ、データを入手しつつ、分析を行い、ごみ量ごみ質調査報告書を作成する。
- 5月10日～19日（東京発着）の予定で現地に赴き、ごみ量ごみ質調査の分析結果の説明、廃棄物管理の組織制度補完調査、リサイクル業者調査を行う。

### 4 訪問先

今回の調査中の主な訪問先及び関係者は以下のとおり。

#### 【RASKIN】

Mr. Jean MUKUNU, Director of Planning

Mr. Wan WOUR, Expert

#### 【Commune of Kimbanseke】

Mr. Edouard GAMBEMBO, Mayor of Kimbanseke

#### 【GEC】

Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation & Waste Treatment)

#### 【RECOVAD】プラスチック

Mr Benoit MPOYI, Responsable Technique et Chargé de Production

#### 【CEPRADYC】プラスチック

#### 【CONGO SALBRITE】プラスチック

Mr Américain Kankonde TSHIKOLOLO, CEO



【Benelux Afro Center】 廃電気電子機器

Ms. Caddy VANGU

【HARIMAX】 プラスチック

Mr. Jaydeep PANDYA

【Clean Plast】 プラスチック

Mr Alexandre SINGA BOYENGÉ, Gestionnaire de Projet (Project Manager)

Mr Tino EKWARI, Superviseur

【AFD】 フランス開発庁

Mr. Bamby PEMBI

## 5 別添資料

- 廃棄物処理施設のチェック・シート
- 打合せメモ

以上

## Check Sheet of a Solid Waste Treatment Facility

Name of the facility:

Address of the facility:

Activity of the facility:

1. Does exist a law or regulation which controls installation and operation of solid waste treatment/disposal facilities from a viewpoint of environment, such as an environmental assessment law?

☐ Not exist

☐ Exist

If exist, name of laws/regulations:

2. Is the said facility covered by the law/regulation?

☐ No

☐ Yes

If yes, does the facility has an environmental permit?

☐ No

☐ Yes

If No, please explain the reason briefly:

### Check list

#### Facility

		Counterpart		
		( )	Comment item	Comment category
State-of-the-art	( ) With high technology, such as sensor for separation, liquidation, etc., of plastic			
Env.-friendly	( ) Wastewater treatment facility			
	( ) Measures for preventing vibration			
	( ) Wall for preventing noise			
	( ) Ventilating equipment			
Controlled	( ) Light for safe working			
	( ) Enclosed facility			
	( ) Weighbridge			
Limited controlled	( ) Roof			
	( ) Fence			
	( ) Gate			
Open	( ) Open air, no control facility			

Consultant		
( )	Comment item	Comment category

#### Operation

		Counterpart		
		( )	Comment item	Comment category
State-of-the-art	( ) High technology equipment is operated as planned			
Env.-friendly	( ) No waste littering on the working			
	( ) Monitoring of treated wastewater			
	( ) Environmental monitoring such as noise, odour, vibration			
Controlled	( ) Appropriate residue disposal			
	( ) Workers with safety shoes, clothes, etc.			
	( ) Reception/storage of materials with gate and wall			
LC	( ) No waste littering around the			
Open	( ) Open air, no safety measures			

Consultant		
( )	Comment item	Comment category

Additional Comments

## Check Sheet of a Solid Waste Disposal Facility

Name of the facility:

Address of the facility:

Activity of the facility:

1. Does exist a law or regulation which controls installation and operation of solid waste treatment/disposal facilities from a viewpoint of environment, such as an environmental assessment law?

☐ Not exist

☐ Exist

If exist, name of laws/regulations:

2. Is the said facility covered by the law/regulation?

☐ No

☐ Yes

If yes, does the facility has an environmental permit?

☐ No

☐ Yes

If No, please explain the reason briefly:

### Check list

#### Facility

		Counterpart		
		( )	Comment item	Comment category
State-of-the-art	<input type="checkbox"/> Gas flaring or treatment			
	<input type="checkbox"/> Leachate treatment			
Sanitary landfill	<input type="checkbox"/> Leachate pond			
	<input type="checkbox"/> Leachate collection pipe			
	<input type="checkbox"/> Bottom liner (clay or synthetic)			
Controlled	<input type="checkbox"/> Gas removal pipe			
	<input type="checkbox"/> Enclosed bank / embankment			
	<input type="checkbox"/> Weighbridge			
Limited controlled	<input type="checkbox"/> Fence			
	<input type="checkbox"/> Gate			
Open	<input type="checkbox"/> No control facility			

Consultant		
( )	Comment item	Comment category

#### Operation

		Counterpart		
		( )	Comment item	Comment category
State-of-the-art	<input type="checkbox"/> Monitoring of landfill gas flow			
	<input type="checkbox"/> Monitoring of treated leachate			
Sanitary landfill	<input type="checkbox"/> Compaction of waste immediately			
	<input type="checkbox"/> Covering with soil or other material immediately			
	<input type="checkbox"/> No existence of waste pickers			
Controlled	<input type="checkbox"/> Compaction of waste within an appropriate time (maybe a few/some days)			
	<input type="checkbox"/> Covering with soil or other material within an appropriate time (maybe a few/some days)			
Lim. contr.	<input type="checkbox"/> Staffed for instruction of waste dumping manner			
Open	<input type="checkbox"/> No staff, uncontrolled			

Consultant		
( )	Comment item	Comment category

Additional Comments

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 24 日 9:00 ~ 11:20 (~13:45 visit Kimbanseke, ~15:30 visit Kalamu)
3. 場所	Kimbanseke City Hall, Kimbanseke (households), Kalamu (households)
4. 参加者	<p>【Commune of Kimbanseke】 Mr Edouard A. GATEMBO, Mayor of Kimbanseke</p> <p>【GEC】 Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation &amp; Waste Treatment) + 2</p> <p>【RASKIN】 Mr WAN WOUR, Expert + 1</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <ol style="list-style-type: none"> <li>① Questionnaire for the interview survey</li> <li>② Data sheet for the weight at household level</li> <li>③ Data sheet for the composition survey</li> <li>④ List of selected parcels for each commune</li> <li>⑤ List of the staff that will conduct the survey</li> </ol> <p>Discussion about the schedule of this 2<sup>nd</sup> visit:</p> <ul style="list-style-type: none"> <li>• Important for EX: visit the working site before the WACS starts + attend Day 3 to supervise the 1<sup>st</sup> composition survey</li> <li>• Official launch on 3/26: not necessary</li> <li>• GEC is organising an information session for all the survey staff on Monday 3/25 at 12 noon at UNIKIN and invited EX/RASKIN/JICA to join</li> <li>• GEC was planning 2 days to explain and raise awareness of the households, but will do only 1 day so that we can have Tue. interview, Wed. Day 1, Fri. Day 3</li> </ul> <p>Discussion about organisation/process of the WACS:</p> <ul style="list-style-type: none"> <li>• <b>Collection:</b> GEC was planning to give 2 bags on the 1<sup>st</sup> day: one for existing waste and another one for the waste of Day 1. EX explained that data of Day 1 won't be taken into account so it's easier to give only 1 bag and waste of Day 1 can be used for practice. EX reminded that sanitary items should not be mixed and GEC confirmed that a bag of another colour will be given. Considering giving this 2<sup>nd</sup> bag only to households who need it (can determine from the interview survey if they have children and/or a bin for toilet paper).</li> <li>• <b>Selection of HH:</b> done by RASKIN, selected only parcels with 1 household. Only houses</li> </ul>	

and no apartment have been considered. Worry that it might create tension between neighbours and/or that neighbours give their waste to the selected household to benefit from free collection. Discussion if should include some apartments/parcels with several HH, anyway GEC will add questions about housing type in the questionnaire. According to RASKIN, HH have already been informed and have accepted to take part in the survey. EX asked for a map of the communes on which selected households are indicated, GEC confirmed they'll record the geographical data and will mark them on a map.

- **Working sheets:** GEC prepared questionnaires and data sheets, and asked EX for confirmation before printing and distributing to the survey staff.
  - Questionnaires:
    - ✧ EX asked to check and confirm that all data from the excel file we sent them are included in the questionnaire.
    - ✧ GEC will add questions about type of housing and garden/trees on the parcel.
  - Data sheet for weight at household level:
    - ✧ As plastic bags may tear, GEC planned to use so-called MPEKO bags, but EX pointed out the risk of leakage or rainwater entering, so that it has been decided to first put the waste into plastic bags and then the plastic bags into MPEKO.
    - ✧ EX asked to add a line "Total weight".
  - Data sheet for the composition survey:
    - ✧ EX explained that laboratory works will take place after drying so that table 3 (Prepare samples for laboratory work) and 4 (Physical composition, dry base) should be reversed.
  - GEC plans to weight twice: at HH level and when arriving on the campus. Column remark can be used to explain the reason in case of difference (for ex. rain, bag fell).
- **Bulk density:** EX explained that GEC can shake a bit the bucket, let it fall from 30cm height, but waste should not be compacted.
- **Staff:** GEC explained that the survey staff will be divided into 2 teams: one will collect the bags at HH while the other one will prepare the site on the campus.

The meeting was followed by a visit of some households in Kimbanseke and Kalamu. It turned out that some addresses were not existing/appropriate for the survey. The list will be updated.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 25 日 11:35 ~ 12:30 (~13:10 training session for survey staff, ~13:40 visit dryer and working site)
3. 場所	UNIKIN
4. 参加者	<p>【GEC】 Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation &amp; Waste Treatment) + 3</p> <p>【RASKIN】 Mr WAN WOUR, Expert + 1</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <p>① Data sheet for the weight at household level (updated) ② Data sheet for the composition survey (updated) ③ Questionnaire for the interview survey (updated)</p> <p>GEC updated the working sheets according to the discussion of previous day and asked EX to check for validation.</p> <p>Data sheet for the weight at household level (updated):</p> <ul style="list-style-type: none"> <li>Line “Total Weight” has been added.</li> <li>This sheet will finally be used every day (not only days 1, 2, 4, 6 and 8 as originally planned).</li> <li>EX asked how the bags will be identified (codes). GEC explained the system (letter for the commune, number for household and date).</li> <li>EX checked the weighing machine.</li> </ul> <p>⇒ Sheet has been approved.</p> <p>Data sheet for the composition survey (updated):</p> <ul style="list-style-type: none"> <li>EX asked to add a line for sanitary/medical waste (such as syringe) in the table for composition in wet base (only in this table as these waste won’t be dried).</li> <li>EX recommended to list the components according to the excel file, with all combustible first, then incombustibles.</li> <li>Confirmation that elemental content will be conducted only once, on Day 5.</li> </ul> <p>⇒ Sheet has been approved.</p> <p>Questionnaire for the interview survey (updated):</p> <ul style="list-style-type: none"> <li>GEC added the questions as discussed previous day (garden, sanitary, etc.).</li> </ul>	

- GEC confirmed that all questions from the excel file were included.
  - EX noticed that there were more questions than necessary (for ex. about plastic waste) and GEC explained it was in anticipation for future needs.
  - EX explained that households were usually asked at the end of such surveys if they had any specific need regarding public services (but not compulsory to include such questions).
- ⇒ Sheet has been approved.

GEC showed working clothes: orange jacket for the staff conducting the interview survey, blue overalls and white cap for those working on the campus (+ gloves, boots, masks, etc.).

GEC asked if students could get a certificate signed by JICA and/or RASKIN at the end of the survey. EX explained that, usually, JICA's payment meant that the work has been conducted successfully and that there were no further certificates.

EX informed about the restitution workshop in May and asked Professor Biey if he would be willing to make a presentation. Professor Biey accepted.

The meeting was followed by the training session for the survey staff.

Survey staff are mainly students.

Professor Biey explained the schedule, process, methodology, purpose, etc.

After the training session, GEC showed EX the dryer and the working site, which is their composting centre.

The site is open air, and EX expressed concerns in case of rain. GEC replied that they were planning to wait until rain is over, and agreed to set up a roof with a plastic sheet if necessary.

GEC explained that remaining waste will be discharged onsite to make compost.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 25 日 13:50 ~ 15:45
3. 場所	UNIKIN
4. 参加者	<p>【RASKIN】 Mr WAN WOUR, Expert Mr Jean MUKUNU KANDOLO, Directeur de Planification</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) :</p> <p>① Evaluation sheet for the visits of the landfill and recycling facilities</p> <p>入手資料 (Available materials) : None</p> <p>EX announced the agenda of this meeting:</p> <ol style="list-style-type: none"> <li>1. Preparation of the 3<sup>rd</sup> visit</li> <li>2. Evaluation of the recycling facilities with regard to SDG 11.6</li> </ol> <p><b>1. Preparation of 3<sup>rd</sup> visit</b></p> <p>EX announced that next visit was planned the week of May 13<sup>th</sup>, but it seems that the 17<sup>th</sup> (Friday) is a bank holiday. RASKIN doesn't mind, but need to check with JICA.</p> <p>There will be one seminar for announcing the WACS results and analysis:</p> <ul style="list-style-type: none"> <li>• Date: Tue. 5/14, morning is better than afternoon according to RASKIN.</li> <li>• Format: workshop with presentations.</li> <li>• About 30 participants. EX asked RASKIN to prepare a list of institutions to invite. JICA will prepare a list of donors (WB, UNIDO, AFD, etc.).</li> <li>• Need to define location, refreshments and budget.</li> <li>• RASKIN may have a room, but need to confirm with another department and would like budget for food &amp; beverage.</li> <li>• Price will depend on number of people.</li> </ul> <p>2<sup>nd</sup> workshop will be about recycling business:</p> <ul style="list-style-type: none"> <li>• Date: Thu. 16<sup>th</sup> morning.</li> <li>• Same format/conditions as 1<sup>st</sup> workshop.</li> <li>• About 10 participants. EX asked RASKIN to prepare a list of companies.</li> </ul> <p>Apart from the workshops, EX would like to interview institutions and asked RASKIN to prepare a list.</p> <p>EX already met the Ministry of Environment, FONAK, Communes.</p> <p>RASKIN suggested during the meeting: Ministries of Public Work &amp; Plan, Land Affairs, Finance &amp; Economy, Cabinet of the Governor, Sanitation Directorate (DAS).</p>	



## **2. Evaluation of the recycling facilities with regard to SDG 11.6**

EX presented the request from UN-Habitat/JICA Tokyo.

RASKIN explained that recyclers are mostly informal and hard to identify, esp. because they try to avoid taxes.

EX presented the evaluation sheets and asked for visiting the final disposal site and some recycling facilities.

Regarding authorisation/permit: RASKIN explained that recycling companies were registered with the Ministry of Economy as any other business, and not with the Ministry of Environment.

There is no environmental permit but RASKIN gives an agreement (1-year authorization) to operators (NGOs, SMEs). It's usually a voluntary action because they need an official document to obtain a market. RASKIN has an evaluation grid they can provide to EX.

Larger companies (such as HARIMEX) can sign contracts with the Governor through the Ministry of the Environment.

To conclude the meeting, EX and RASKIN confirmed the schedule (RASKIN will arrange the visits).

- Tuesday: visit the landfill from 12 noon.
- Wednesday afternoon and Thursday all day: visit recycling facilities.
- Friday: no need to report to RASKIN as Mr Wan will be with us all the time

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 25 日 17:00 ~ 17:40
3. 場所	JICA DRC
4. 参加者	<p>【JICA DRC】</p> <p>Mr Kazunao SHIBATA, Représentant Résident</p> <p>Mr Hiraku USUI, Directeur de Programmes (Environnement et Mines)</p> <p>【株式会社エックス都市研究所】</p> <p>Mr Ikuo MORI, Senior Consultant</p> <p>Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>EX started by explaining that the main objective of this visit was to supervise the WACS. Also, there is a request from JICA Tokyo, UN-Habitat regarding SDG 11.6</p> <p><b>Regarding WACS</b>  EX reported about schedule so far:  On Sun. 3/24: meeting with GEC to check the survey documents prepared by GEC and visit of households in Kimbanseke and Kalamu.  On Mon. 3/25: meeting with GEC at UNIKIN to finalize documents and procedure, attended the training session for the survey staff and visited the working site.  Professor Biey seemed to have understood the WACS thoroughly and be capable to conduct the work as expected. Only concern is that the working site doesn't have a roof, so there's some worry in case of rain (wait or set up a plastic sheet).  EX shared the request from GEC about a certificate signed by JICA for the students. JICA confirmed it's not common practice and will be difficult.</p> <p><b>Regarding SDG 11.6</b>  EX presented the request from UN-Habitat/JICA Tokyo who would like to take the opportunity of the WACS to test the target methodology.  EX slightly modified the check list that was provided.  During this stay, EX and RASKIN will visit the landfill and recycling facilities, fill out the check lists in parallel and compare if there's any difference.</p> <p><b>Regarding 3<sup>rd</sup> visit</b>  EX announced that next visit was planned the week of May 13th, but it seems that the 17th (Friday) is a bank holiday. RASKIN and JICA are OK but worry if institutions/companies will be available. EX informed that an additional person will come, and asked JICA for support for the visa.  EX reported about the discussion with RASKIN regarding the 2 workshops (WACS and recycling business) and the request to establish lists of institutions and companies to invite. EX asked JICA to make a list of donors to invite.  Workshop to present WACS results: Tue. 5/14 morning, around 30 participants, Professor Biey and RASKIN will probably make a presentation.</p>	

Workshop about recycling business: Thu. 5/16 morning, around 10 companies.

Location: RASKIN might be able to provide a room but can't provide the drinks, and is asking JICA to do it.

EX intends to interview institutions, such as Ministry of Finance/Economy, Environment, and Public Works. RASKIN recommended to meet the Governor, but EX not sure if appropriate. EX already met FONAK in 2017 but according to JICA it would be worth visiting again.

JICA informed EX that the French Development Agency AFD had some knowledge, i.a. regarding budget. AFD currently works on a project related to flood prevention and waste management, including set up of a drainage system and cleaning river banks. AFD and WB seem to have difficulties working with RASKIN, and rather collaborate with NGOs/communities. JICA will share with EX documentation received during a meeting with WB and the contact details of AFD in order to arrange a meeting before returning to Japan.

EX will visit JICA again on Friday for reporting.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 26 日 12:15 ~ 13:30
3. 場所	Mpasa landfill
4. 参加者	<p>【CET-MPASA】 Mr Louis-Paul LUWERE, Chef de Centre Mr. Ernest KABEYA, Technicien Assainissement</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>CET explained that the landfill of Mpasa was built in 2010, during PARAU project (2010-2016). At the beginning, 250 ha have been allocated and PARAU used 30 ha. With time, 130 ha have been stolen (population building houses), and they risk to lose the remaining 90 ha if the space is not used.</p> <p>The PARAU project mainly targeted waste of 9 communes. 61 transfer stations had been built. Landfill received 1800 m<sup>3</sup> of waste per day that were placed into cells. Landfill was fully equipped.</p> <p>Current situation:</p> <ul style="list-style-type: none"> <li>• Only 6-7 transfer stations are remaining.</li> <li>• Number of trucks has drastically decreased.</li> <li>• No new cell is constructed: waste is piled up, compacted (have 1 compactor BOMAG), burned in open air.</li> <li>• In 2018, the landfill only received an average of 3899,65 m<sup>3</sup> of waste per month. (Note: There was a pick in April following some emergency measures to collect waste that was accumulating.)</li> <li>• Waste is discharged outside, often during the night because trucks don't want to pay fees. Waste is pushed inside.</li> <li>• Most of the equipment is out of order.</li> </ul> <p>As a result, the landfill do not fulfil its role anymore, and loses both raw material and space.</p> <p>CET mentioned some reasons for this situation:</p> <ul style="list-style-type: none"> <li>• Bridge to access the landfill is broken (originally built for trucks transporting waste, and trucks carrying cement for illegal building were too heavy). Therefore large trucks can't access anymore and discharge waste in open space, ravines, etc.</li> <li>• Administrative and financial issues, difficulty to get money from FONAK</li> </ul> <p>Landfill staff did a report to their hierarchy, and now expect the hierarchy to do something.</p>	

EX explained the evaluation for UN-SDG and filled out the check list by asking to the landfill staff about the equipment of the facility and the operations. The facility was state-of-the-art at the end of the PARAU project, but since everything is broken/nothing functions anymore.

EX asked the CET about the main needs. Answer was:

- 1- Weighbridge
- 2- Facilities for incineration. Now burn in open air which is bad for health and the environment. CET estimates that the calorific value is 3200kcal/ton (should be 3200kcal/kg), based on figures provided by Professor Biey, UNIKIN.
- 3- Training in Japan to learn how Japanese landfills are managed.

The meeting was followed by a visit of the landfill. EX could observe:

- Waste pickers on site (CET said they have a list)
- Waste spreading from the entrance
- Impossibility to enter the landfill anymore
- Open burning
- Gas flaring machine installed by a French company as part of CDM, but used only once
- Former constructed wetland (bassins de lagunage): used to be 3 ponds but now empty and site is damaged by erosion.
- Heavy equipment broken down

RASKIN expressed some wishes:

- Capacity building for maintenance
- Technical assistance for drivers and landfill staff (ex. Japanese volunteers, training in Japan)
- Open a new landfill on the west side of the city, as the current landfill is too far away.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 27 日 10:40 ~ 11:05 (meeting with RASKIN) and 11:15 ~ 15:10 (WACS)
3. 場所	UNIKIN
4. 参加者	<p>【GEC】 Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation &amp; Waste Treatment) + Survey staff</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <p>① Working sheets for the survey staff, consisting of process explanation and sheet to record data</p> <p>Before the WACS, EX had a discussion with RASKIN regarding workshops' program and guests.</p> <p>GEC conducted composition analysis of Day 1 as training. EX could supervise process and check equipment, etc.</p> <p>Comments:</p> <ul style="list-style-type: none"> <li>• Professor Biey has understood the survey and is managing the students properly.</li> <li>• Survey staff is wearing protection clothes.</li> <li>• One person is appointed to take notes.</li> <li>• Large amount of earth/soil and grass/leaves.</li> <li>• Sieve was missing to separate earth/soil from organic waste. GEC made holes in a bucket and said they'll bring and use a real sieve from Day 3.</li> <li>• Food waste include cassava leaves because they are used as food packaging (considered as kitchen waste in opposition to garden waste).</li> </ul> <p>Results:</p> <ul style="list-style-type: none"> <li>• Kimbanseke: 226 kg/m<sup>3</sup></li> <li>• Kalamu: 266 kg/m<sup>3</sup></li> <li>• Gombe: truck had an accident and waste fall on the road, couldn't conduct the survey</li> </ul> <p style="text-align: right;">以上</p>	

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 27 日 15:20 ~ 15:40
3. 場所	UNIKIN
4. 参加者	<p>【GEC】 Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation &amp; Waste Treatment)</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>During this visit, EX obtained following information / observed the following:</p> <ul style="list-style-type: none"> <li>• Pilot unit, 3<sup>rd</sup> year.</li> <li>• Mainly create plastic paving stones out of plastic waste mixed with sand. Also create bricks to build housing. New project: prefabricated covered gutters.</li> <li>• Mainly use bags in PE and PP, mixed with some PET bottles (took a while to find the right balance).</li> <li>• Fireplace with a blower to heat the plastic and sand, and the mixture is then poured into moulds.</li> <li>• Plastic paving stones are quite cheap (13 USD/m<sup>2</sup>) compared to normal pavement (20-30 USD/m<sup>2</sup>)</li> <li>• In contact with Road Office (Office de la Voirie).</li> <li>• Project in Barumbu Commune, Beltchika Avenue.</li> </ul> <p>Parallel project related to the treatment of wastewater.</p> <p><u>Note</u>: facility was not operating during the visit.</p> <p>EX and RASKIN filled out the check-list in parallel and results will be compared.</p> <p style="text-align: right;">以上</p>	

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 27 日 16:00 ~ 16:30
3. 場所	RECOVAD (Réseau Collecte Valorisation Déchets)
4. 参加者	<p>【RECOVAD】 Mr Benoit MPOYI, Responsable Technique et Chargé de Production</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <p>① Pamphlet of the company</p> <p>During this visit, EX obtained following information / observed the following:</p> <ul style="list-style-type: none"> <li>• NGO operating since 2010</li> <li>• 3 rooms: 1) with a fireplace to melt manually in a pot and pour into moulds that are on tables, 2) for storage and 3) with a machine operated by riding bikes.</li> <li>• Mainly create plastic paving stones out of plastic waste and sand.</li> <li>• Many shapes.</li> <li>• Normal colour is black, but possible to do coloured stones using chemicals.</li> <li>• RECOVAD buys the waste from waste pickers.</li> <li>• Collection is performed mostly by women who are trained by RECOVAD to identify the different plastic types.</li> <li>• Work on order only (not enough space for storage).</li> <li>• Consider there is a marketing problem, as people don't know about this solution (lack of awareness).</li> </ul> <p>Quantity:</p> <ul style="list-style-type: none"> <li>• 5 pots/day with 30kg per pot (for parcel: 25 kg plastic bags and 5 kg PET, for road: 100% bags for better resistance).</li> <li>• Limited by the quantity of moulds.</li> <li>• Plastic residues are reused (put into the pot again), so that there are no waste.</li> </ul> <p><u>Note:</u> facility was not operating during the visit, but a waste picker was bringing/sorting waste.</p> <p>EX and RASKIN filled out the check-list in parallel and results will be compared.</p> <p style="text-align: right;">以上</p>	



打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 27 日 16:45 ~ 17:15
3. 場所	CEPRADYC
4. 参加者	<p>【CEPRADYC】</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>During this visit, EX obtained following information / observed the following:</p> <ul style="list-style-type: none"> <li>• NGO</li> <li>• Recycle plastic waste by transforming it into items, such as household articles, pipes of various sizes for electrical cables and recessed boxes (boîtes encastrées).</li> <li>• Mainly hard plastic but also use bags for the pipes.</li> <li>• Good quality.</li> <li>• Boss is an electromechanical engineer with long experience in the plastic industry. He created all the machines and self-repair on site.</li> <li>• Machines are made in DRC, nothing imported.</li> <li>• Process: chip, grind, wash to remove impurities, dry, and create HH items and pipelines.</li> <li>• Quantity: 400 kg/day, limited due to lack of space</li> <li>• Residue: water/sand are discharged without treatment, while plastic/production waste are reused</li> </ul> <p>EX informed CEPRADYC about the workshop in May.</p> <p>EX and RASKIN filled out the check-list in parallel and results will be compared.</p> <p style="text-align: right;">以上</p>	

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 28 日 9:55 ~ 11:30
3. 場所	HARIMEX, Maluku
4. 参加者	<p>【HARIMEX】 Mr Jaydeep PANDYA, Administrative Director Mr Philippe LUNG, Administrator</p> <p>【Provincial Ministry of the Environment】 Mr Pierrot IKABA KUNA, Secrétaire Permanent</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) :</p> <ul style="list-style-type: none"> <li>• Pellets (showed, not given)</li> <li>• Video explaining collection system (showed, not given)</li> </ul> <p>入手資料 (Available materials) :</p> <p>RASKIN presented the context and purpose of the visit (WACS, recycling facilities' survey).</p> <p>HARIMEX introduced its activities:</p> <ul style="list-style-type: none"> <li>• Mr PANDYA has been working in the scrap business for over 20 years. The business became bad, and export drastically decreased.</li> <li>• Signed in 2016 a 20-year convention of public service delegation with the Ministry. Currently in the implementation phase.</li> <li>• Started investment in 2015 and signed contract in October 2018 (blocked all that time), very long to do business in Kinshasa/DRC.</li> <li>• 3 units:             <ol style="list-style-type: none"> <li>1. Recycling of plastic (40,000 tons/year)</li> <li>2. Cable manufacturing unit for electricity in households (low and medium tension)</li> <li>3. Car battery</li> </ol> </li> <li>• Plastic usage: boxes for car batteries, also households items such as buckets, drums, dust bins, etc. that are widely used in Kinshasa.</li> <li>• Located in Maluku (90 km from Kinshasa) for tax exemption. Land comes from the Ministry of Industry but as the city is in charge of waste they also need an agreement with the city.</li> <li>• New site located in Funa (10,000 m<sup>2</sup>) has been identified and should be conceded soon. HARIMEX will shift part of the plant from Maluku to Kinshasa city centre to save on transportation costs as soon as the new site is confirmed, but production will stay in Maluku. The company wants the assurance from the government that they will be able</li> </ul>	

to stay there for a long time because it is a substantial investment (about 300,000 USD for a line and 150,000 USD for the shed).

- Have contracts with corporates (mostly ISO certified, UNILEVER, Coca-Cola Group, etc.) to collect their waste. Is certified by Coca-Cola.
- HARIMEX estimates that they can collect about 35-40% of the 1,500 tons of waste discharged per day.
- Metal, cardboard and glass are already picked up for selling (representing roughly 80% of the waste), so that only plastic and other waste are remaining.
- Welcomes competition but it will take time before other companies will be able to enter the market as they need permissions before starting (from Ministry of Environment, Industry, etc.).
- Plan to invest into a training centre where people could learn how to create small objects with small machines to open small businesses (kind of technology transfer).

#### Challenges/Needs:

- Doing business in Kinshasa/DRC takes time (administration very slow).
- Raw material and collection: HARIMEX is willing to increase capacity but can't collect over a certain range from their factory (up to 4km or so) because over that distance it becomes too expensive / non profitable for a company. HARIMEX can't invest in collection vehicles and consider it is the job of the government. HARIMEX would like to work with the population: local people would keep/collect waste and bring it to HARIMEX who would buy it, thus keeping the environment clean and generate a revenue for the collectors. Project: every communes (9-10 as pilots) sort and crush on the spot (thus reducing transportation costs) and government can pick up at the facility. Could work 24 hours, machines require low maintenance.
- Now companies dump their waste because they don't know what to do with it (no information). HARIMEX need to contact and meet private companies by themselves to introduce their offer (no support from the government).
- Have lots of costs (machinery) and international market is reducing (China's ban, India is closing), although clean plastic is still accepted.
- Need to find an output market. Estimation for Kinshasa is 30,000 tons/month. Biggest clients are India and South-Africa. Estimates 500 tons/month for fibres for India, invest in preform/pellets (maybe 1,000 tons/month), but need to find a way to use the remaining.

The meeting was followed by a visit of the cable unit (not in activity) and HARIMEX showed some machines.

- Intend to employ 300-400 people once the factory will be functioning.
- Machines of the cable unit come from India and are custom-made.
- 26 small crushers coming from China. Heavy crushers (1 ton/hour) are from India.
- 600 tons plastic in stock.
- Now crush and export to South-Africa.
- Plan to have a weigh-bridge in the new plant in Funa.
- No residue as they put all the plastic back into the loop.

Note: HARIMEX is also involved in solar energy in India.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 28 日 12:45 ~ 13:15
3. 場所	Congo Salubrité
4. 参加者	<p>【CONGO SALUBRITE】 Mr Américain Kankonde TSHIKOLOLO, CEO</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>During this visit, EX obtained following information / observed the following:</p> <ul style="list-style-type: none"> <li>Platform of 5 companies for floating waste (Plateforme des recycleurs pour collecte des déchets flottants).</li> <li>CONGO SALUBRITE had a visit from JICA 2 years ago and felt nothing has changed since.</li> <li>Mainly plastic recycling (all types).</li> <li>Collect from bins in the streets.</li> <li>Make pipelines, plastic paving stones, construction material, small boats, etc.</li> <li>New project (launch planned in 2 weeks): collect floating waste from rivers and intend to specialize into this field (not aware of AFD project).</li> <li>Need training for boss (project management) and staff (equipment usage).</li> </ul> <p>Quantity:</p> <ul style="list-style-type: none"> <li>5 tons/day</li> <li>Need machines to increase capacity. Current machines are old and break down often. Can only do small quantities at one time. Current machines are 2<sup>nd</sup> hand from Europe. Don't want equipment from China (bad quality), would like from Japan.</li> </ul> <p>Residue:</p> <ul style="list-style-type: none"> <li>Plastic / production waste is reused so that there are no residue.</li> <li>Water is discharged without treatment, no filter.</li> </ul> <p>EX and RASKIN filled out the check-list in parallel and results will be compared.</p> <p style="text-align: right;">以上</p>	

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 28 日 14:00 ~ 14:20
3. 場所	Benelux Afro Center (BAC)
4. 参加者	<p>【Benelux Afro Center (BAC)】 Ms Caddy VANGU, Manager</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <p>① 1-page summarising the key points to improve e-waste recycling in Kinshasa (“Les points importants pour la bonne évolution du projet de recyclage des DEEE à Kinshasa”)</p> <p>BAC introduced its activities:</p> <ul style="list-style-type: none"> <li>• Only structure that deals with e-waste.</li> <li>• Collect only NTIC. Not enough storage space for bigger appliances such as fridge or TV but would like to expand activity.</li> <li>• Collect from institutions and private companies, but not regularly.</li> <li>• Had a partnership with Europe for a deal: 2 broken computers in exchange of a functioning one. This system enabled schools to equip with computers, but finished now.</li> <li>• Transformation of metals.</li> <li>• 3 people work in the facility + more at the office.</li> <li>• Quantity: in 4 years, collected 60 tons and exported 15 tons.</li> </ul> <p>EX already visited this facility in 2017 and asked about the evolution since then.</p> <p>BAC listed the following changes:</p> <ul style="list-style-type: none"> <li>• In 2018: didn't collect much because focused on export.</li> <li>• Managed to export 1 container in 2018 (to Belgium, Europe)</li> <li>• Tried to create plastic paving stones in partnership with RECOVAD but e-waste plastic contains flame retardants that emit toxic fumes if not burned properly. As burning in open air is too dangerous, the project had to stop.</li> <li>• Acquired a machine to compact plastic, but can't use it properly due to unstable electrical current.</li> </ul> <p>Residue:</p> <ul style="list-style-type: none"> <li>• Export</li> <li>• Metal: sell to melt but low price</li> <li>• Plastic and cathode ray tubes: no solution (store until they find a solution)</li> </ul> <p>Challenges/Needs:</p> <ul style="list-style-type: none"> <li>• Main issue: plastic and cathode ray tubes (can't export, no solution)</li> <li>• Would like to know how e-waste is managed in other countries, for ex. Japan. EX</li> </ul>	

explained about the system (2 groups of manufacturers), and that consumers have to pay a recycling fee when buying a new appliance.

- Financing: at the beginning, BAC was financed by Belgium, but not anymore. BAC collects from public institution for free, and private companies have to participate financially, but they are usually reluctant. BAC thinks that more awareness raising for financial participation is necessary.
- BAC handed out a 1-page summary of their wishes and suggestions for improving e-waste management in Kinshasa.

EX and RASKIN filled out the check-list in parallel and results will be compared.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 28 日 14:50 ~ 15:15
3. 場所	Clean Plast (office)
4. 参加者	<p>【CLEAN PLAST】 Mr Alexandre SINGA BOYENGE, Gestionnaire de Projet (Project Manager) Mr Tino EKWARI, Superviseur</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>CLEAN PLAST introduced its activities:</p> <ul style="list-style-type: none"> <li>• Exists since 1 year, still pilot project.</li> <li>• Mainly collects plastic waste from partners (schools, etc.), and also streets and watercourses.</li> <li>• Makes PVC pipes (called like that, although not really PVC but rather HDPE or PP) and would like to increase range of products. Plastic paving stones are in project. Also would like to do preform but no expertise yet.</li> <li>• Export PET to India with HARIMEX.</li> <li>• June-Dec. 2018: collected 700 tons plastic waste.</li> <li>• 3 working sites + office.</li> <li>• Machines for pipelines are local, rest (crusher, compactor, etc.) are imported, mainly from India or China.</li> <li>• Work closely with HARIMEX.</li> </ul> <p>Challenges/Needs:</p> <ul style="list-style-type: none"> <li>• Difficult to obtain an authorisation/finalize contract from the government. CLEAN PLAST obtained an authorisation letter to operate the business by the time the contract is finalized.</li> <li>• Would like more support from the government, such as subventions. Now try to obtain financing from abroad.</li> <li>• Would appreciate advanced expertise on some technical aspects.</li> <li>• Experienced electricity issues from SNEL, the national electricity company of the DRC.</li> </ul> <p>Notes:</p> <ul style="list-style-type: none"> <li>• Manager of CLEAN PLAST is also manager of PPC, a leading cement company and one of the biggest company in DRC. The original purpose for establishing CLEAN PLAST was to provide plastic raw material to the cement factory (RDF) but the cement company was not ready so that CLEAN PLAST started with projects that were planned for later, and the project to provide material for the cement plant has been postponed.</li> </ul>	

- For the financing, PPC suggested to the government that they (PPC) could support the recycling business and deduct from their taxes, but no feedback so far.
- The son of the boss (CEO?) of PPC is managing CLEAN PLAST.
- Not possible to visit the facility as located on another site (meeting took place in the office).

以上



打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 29 日 9:25 ~ 14:00
3. 場所	GEC (WACS work site)
4. 参加者	<p>【GEC】 Prof. BIEY MAKALY, Head of Department (Environmental Technology and Sanitation &amp; Waste Treatment) + Survey team</p> <p>【RASKIN】 Mr WAN WOUR, Expert</p> <p>【JICA DRC】 Dr Raymond MUFWAYA, Directeur Adjoint des Programmes</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>This was Day 3 of the WACS. GEC conducted the composition survey on Days 1 and 2 for training, results of Day 3 will be the first to be taken into account for the analysis.</p> <p>During the composition survey, EX obtained following information / observed the following:</p> <ul style="list-style-type: none"> <li>• According to the questionnaires, people are not willing to pay anything for waste collection because they can already dump their waste outdoors for free. According to Professor BIEY, people wouldn't discharge their waste in open air if the city was better designed/equipped (for ex. planting lawn, flowers, etc.).</li> <li>• Quantity substantially diminished since Day 1 in all 3 communes (normal as Day 1 contained existing waste that was accumulating).</li> <li>• On the whole, there are less food waste and more garden waste / soil than expected.</li> <li>• Food waste contains mostly leaves, which can make it difficult to distinguish from garden waste (GEC seems to have interpreted food waste as kitchen waste).</li> <li>• Kimbanseke: no food waste at all (normal), and contains more diapers than expected (possibly because of high birth rate).</li> <li>• Gombe: lots of food waste compared to Kalamu and Kimbanseke, but less than expected (very few rest of fruits). Contains more garden waste than expected.</li> <li>• Diapers: GEC confirmed that they give 2 bags of different colours to the households, and explain that sanitary items should be placed into the white bag, but some households still dispose of the diapers into the black bag with the other waste. GEC removes the diapers and weigh them separately after opening the black bag for the composition survey.</li> </ul> <p>Process:</p> <ul style="list-style-type: none"> <li>• Generally the WACS process was followed properly by GEC.</li> <li>• EX noticed that there was almost no soil in the dedicated bucket for Kalamu, although there seemed to be a lot of it in the waste pile. The supervisor explained that the soil was difficult to separate when wet and that they were planning to separate and weigh it after</li> </ul>	

drying. EX explained that there should be at least a rough separation at this stage, and that it can be refined after drying. EX reminded that it had been agreed on Day 1 to use a sieve to separate soil from organic material: what goes through the sieve is considered as soil and what remains is food or garden waste. GEC brought a sieve with very fine mesh. This sieve was used for Kimbanseke and Gombe on Day 3, and GEC agreed to use the same on Days 5 and 7 for consistency (although the mesh could have been a bit bigger).

- GEC built a new dryer using plastic film.
- EX recommended to place the food and garden waste on a tray instead of bucket for quicker drying.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 29 日 15:15 ~ 16:00
3. 場所	JICA DRC
4. 参加者	<p>【AFD, Agence Française de Développement】 Mr Bamby PEMBI, Chargé de Projets (Project Manager)</p> <p>【株式会社エックス都市研究所】 Mr Ikuo MORI, Senior Consultant Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) : None</p> <p>EX introduced its role and mission and explained that Mr Shibata from JICA shared AFD's contact details, i.a. to know more about their project with the World Bank.</p> <p>AFD explained that the purpose of the project was flood prevention and waste management, and that they work in complement to World Bank (WB upstream of the Ndjili river and AFD downstream).</p> <p>Currently in the feasibility studies stage. Received provisional report and wait for final report. Contract is planned to be signed 3<sup>rd</sup> quarter of 2019 and start end of this year.</p> <p>Idea is to separate compost material and plastic to sell for revenue, and what cannot be transformed will be sent to the Mpsa landfill (World Bank is planning to rehabilitate the landfill). Would work with RASKIN and/or private companies (for ex. delegation) and would like to involve the community.</p> <p>The original idea came from a project about potable water, with autonomous units consisting of:</p> <ul style="list-style-type: none"> <li>• Board of Directors (Conseil d'Administration): elected by the population of the quarters</li> <li>• Management Committee (Comité de Gestion)</li> <li>• Association of Potable Water Resources Users (Asurep, Association d'Usagers des Ressources en Eau Potable)</li> <li>• Fedasu, Federation of the Asureps</li> </ul> <p>Specificities of waste:</p> <ul style="list-style-type: none"> <li>• Waste don't generate revenue</li> <li>• Many stakeholders: commune, RASKIN, community, central government</li> </ul> <p>River project:</p> <ul style="list-style-type: none"> <li>• Install real drainage system and take out the waste.</li> <li>• Currently, people use waste which is bad for health and can be dangerous if collapse.</li> <li>• Involve population through Labour-Intensive Public Works approach.</li> <li>• 15 million EUR on 5 years.</li> <li>• Counterpart: provincial government, Ministry of Public Works and Plan (Travaux Public et Plan)</li> </ul>	

- Challenge: many stakeholders and RASKIN is not well-managed (cf. PARAU project)

FONAK has been created for financing waste management. Sources:

- Collect a percentage on the water invoice
- National government: 300,000 USD/month
- The Industry Promotion Fund (FPI, Fonds de Promotion de l'Industrie) and Office Congolais de Contrôle: 100,000 USD/month
- Fédération des Entreprises du Congo (FEC) : 150,000 USD/month

Not directly to FONAK but through Provincial Ministry of Finances.

AFD later gave the example of a fund for the roads based on indirect taxes on gasoline. This fund seems to have been created by the Parliament (unsure though) and work well.

Problems with RASKIN:

- Governor placed family members
- Drivers steal the fuel, sell the trucks' (spare) parts, discharge waste in ravines/open space to avoid distance
- Staff is not paid, no motivation
- Might change with the new government

UNIDO project:

- Energy recovery
- Plastic waste in cement factories

World Bank:

- Fight and manage erosion
- For waste management: improve capacity, rehabilitate landfill, including retrieving the stolen land.

Potable water project:

- 300 million EUR.
- Not only provincial level but also national with different ministries.

AFD asked how JICA was involved in waste in DRC.

EX explained that JICA has been supporting RASKIN by sending some staff to Japan for training, and now the WACS is conducted. Currently considering further support, how to improve (RASKIN has too many problems) and/or support other counterparts.

AFD explains that there are 3 types of problems with RASKIN:

- 1- Staff: need training, lack of motivation (no salary)
- 2- Organisation: lack of tools, process, equipment
- 3- Management and strategy: no direction, don't know where they go

It is questionable if RASKIN should be partner/in charge at 100% or if should rather consider a collaboration with other entities, for ex. SMEs (RASKIN would manage the contracts while the SMEs conduct the collection).

JICA is also considering providing equipment.

AFD explained that they used to bring equipment under an "engagement particulier" (special

commitment). Counterpart has to take measures and provide evidence regularly that everything is on track.

Initiatives from the private sector:

- Electricity (but cheap here)
- Plastic paving stones (2-3 companies have signed contracts with the city)
- Export (but China doesn't buy anymore)

Challenge: Population need awareness, people are not used to sort waste.

Donors are now cautious following the EU project, but waste issue in Africa has an impact on the whole world, as the (plastic) waste ends up in the oceans that are shared by all countries.

AFD asked how we will use these information.

EX explained that these information will be used internally.

EX informed about the next visit in May, during which we will hold a workshop to present the results of the WACS and that AFD will be invited.

以上

打合せメモ	
1. 用件	WACS DRC (2 <sup>nd</sup> visit)
2. 日時	2019 年 3 月 29 日 16:15 ~ 17:10
3. 場所	JICA DRC
4. 参加者	<p>【JICA DRC】</p> <p>Mr Kazunao SHIBATA, Représentant Résident</p> <p>Mr Hiraku USUI, Directeur de Programmes (Environnement et Mines)</p> <p>【株式会社エックス都市研究所】</p> <p>Mr Ikuo MORI, Senior Consultant</p> <p>Ms Christine YOLIN, Consultant</p>
<p>配布資料 (Handouts) : None</p> <p>入手資料 (Available materials) :</p> <p>① Copy of the invitation from UNIDO to JICA for a workshop about energy recovery project</p> <p>EX announced the agenda:</p> <ol style="list-style-type: none"> <li>1. WACS follow-up</li> <li>2. Visit of the landfill and recycling facilities</li> <li>3. Meeting with AFD</li> </ol> <p><b>1. WACS</b></p> <p>Regarding GEC:</p> <ul style="list-style-type: none"> <li>• Professor BIEY has well understood the survey.</li> <li>• Professor is former director of RATPK (during EU project).</li> <li>• Survey is performed by his students who seemed interested and motivated (opportunity to practice for real and acquire concrete experience).</li> <li>• Asked GEC to send us raw data and pictures.</li> </ul> <p>Regarding process:</p> <ul style="list-style-type: none"> <li>• EX explained JICA WACS methodology, incl. the quartering method.</li> <li>• Weigh every day and analyse composition 3 times.</li> <li>• Day 1 (Wed.) was a kind of training and results won't be taken into account because households usually give waste that they have been accumulating for several days.</li> <li>• Day 3 (Fri.): composition survey results will be taken into account for the analysis.</li> </ul> <p>First comments:</p> <ul style="list-style-type: none"> <li>• Lots of garden waste.</li> <li>• Very few food waste (normal for low-income area but there are usually fruits' waste in richer area, but even in Gombe there were only a few bananas).</li> <li>• Composition of households (number of family members) often unclear, and common to have many households on one parcel. For this survey, RASKIN selected parcels with only 1 household, who might be a bit richer than the rest of the commune.</li> <li>• The survey only covers 3 communes, 21 are remaining.</li> </ul> <p><b>2. Landfill and Recycling facilities</b></p>	

- RASKIN provided a list of 27 companies.
- Mainly plastic recyclers making pipes for electrical cables and plastic paving stones.
- Also returned to the e-waste treatment facility already visited in 2017.
- Seems to be complicated/long to obtain permits and approvals.
- RASKIN is in charge of small facilities, while Ministry is taking care of larger companies.
- Visited HARIMEX who is in direct contact with the Ministry and they explained their difficulty to obtain their authorisation, it was a very long process.
- Informed some of the recyclers about the workshop but EX is worried that everyone is going to ask for help.
- Evaluation sheet: seems that there are not much measures regarding the environment. JICA explained about the National Environment Agency (ACE, Agence Congolaise de l'Environnement) who is in charge of Environmental Impact Assessment.

EX reported about the visit of the landfill:

- Waste are discharged in front of the door.
- Would take 2-3 months to clean.
- Bridge is broken, trucks can't access anymore
- Most of the equipment from the EU project is not working anymore.

Note: during our visits, we saw many trucks blocked, and people not working.

### 3. Meeting with AFD

- Met Bamby PEMBI as recommended.
- AFD is planning to launch the project by end of this year.
- Conducted a project related to potable water involving the communities and based on committees, and would like to do something similar with waste.
- Main difference/issue is that water can be sold.
- Worried about RASKIN.
- Discussed FONAK: receive a lot of money but badly managed. EX will try to meet FONAK again.
- RASKIN: don't pay salaries => staff has no motivation, sell vehicles' parts, etc.
- World Bank: plan to rehabilitate the landfill.
- UNIDO: W2E, plastic for cement factory. JICA shared the invitation for the UNIDO workshop.
- Election soon: situation might change/improve with the new governor.

JICA added some input regarding the new (political) administration.

- Minister of the Environment will probably change. Now is a bit unclear who is going to take over.
- Cabinet of the President seems to consider waste as an important topic.

EX and JICA discussed the workshops of May:

- EX visited the room of RASKIN: OK but risk of not being able to use it at the last minute.
  - EX asked SULTANI and SELTON for quotation. SULTANI has a "small" room up to 100 people (less is OK) and 10 USD for coffee break. Wait for reply of SELTON.
  - JICA shared information about the rooms they are sometimes using.
- ⇒ It has been decided to use SELTON. EX will book before leaving. Will probably have to make a deposit. Would be convenient if JICA could conclude the contract.

⇒ Regarding food/drink: some people would appreciate a lunch, but coffee break seems to be enough.

- Regarding guests for the restitution workshop: Mr Wan submitted a list but need to add a few institutions such as the EU, President Office, Provincial Government, etc. JICA will complete and send updated list.

Discussion about ways to support waste management in Kinshasa. It seems a Master Plan would be helpful. A reliable counterpart is necessary.

By the next visit, it will be settled who has been elected and there might be more visibility (for ex. eco-tax).

以上



作成資料 2 2 : 廃棄物管理環境教育ガイドブック第 2 回ワークショップ概要  
(2019 年 4 月 4 日～11 日)

# アフリカ廃棄物分野・住民啓発活動ワークショップ実施報告

## ワークショップの概要

### 背景

アフリカの多くの都市では、急増する都市人口に廃棄物収集サービスの提供が追い付いておらず、不衛生な居住環境が課題となっている。収集サービスを機能させ、衛生環境を改善するには、住民に「ポイ捨てをやめる」、「決められた場所や時間にごみを捨てる」などといった行動変容を促す必要があるが、行政から住民に対して、十分な情報提供や啓発活動が行われておらず、結果として、住民の関心や協力が得られていない。このような背景のもとで、アフリカ地域の廃棄物管理や環境教育（ブラウン系）分野で活動する青年海外協力隊を対象としたワークショップを開催した。

### 目的

本ワークショップの目的は以下のとおりであった。

- 1）アフリカにおける廃棄物管理の課題や取組み、啓発活動の手法について理解を図り、隊員活動に役立てる。
- 2）TICADVⅦにて公表予定の「アフリカ廃棄物管理環境教育ガイドブック」の作成において、隊員からのインプットを図り、ガイドブックや事例集の使い易さや改善点などについて、最終化に向けて議論する。

### 開催期間と場所

- ・ 期間：2019年4月7日（日）～4月10日（水）
- ・ 場所：JICA スーダン事務所 会議室

### 参加者

参加対象者は、隊員が9名、横浜市から3名、JICA 本部およびコンサルタント2名、計15名であった。

	名前	所属
1	平田 萌	カメルーン 29-1次隊環境教育 JOCV
2	國藤アメリー美和子	カメルーン 30-3次隊環境教育 JOCV
3	後藤 彰太	カメルーン 30-3次隊環境教育 JOCV
4	黒松 邦至	スーダン 30-1次隊環境教育 JOCV

5	森 達郎	スーダン 29- 1 次隊環境教育 JOCV
6	七條 孝司	スーダン 29- 3 次隊環境教育 JOCV
7	石黒 雄資	ケニア 29- 3 次隊環境教育 JOCV
8	江川 祐基	ブルキナファソ 29- 2 次隊環境教育 JOCV
9	葛巻 あゆみ	モザンビーク 29- 3 次隊環境教育 JOCV
10	吉房 兵庫	横浜市資源循環局 緑事務所副所長
11	唐沢 孝二	横浜市資源循環局 中事務所
12	栗原 清剛	横浜市資源リサイクル事業協同組合 副理事長
13	小島 英子	JICA 地球環境部 環境管理 G 環境管理第二 T 特別嘱託
14	田中 博子	かいはつマネジメント コンサルタント
15	長安 美恵	エックス都市研究所 コンサルタント

## プログラム

ワークショップの開催に先んじて、参加予定者に対し、次の準備を依頼した。①自己紹介と同時に任地の廃棄物管理状況・活動内容を発表する。②「アフリカ地域廃棄物管理環境教育ガイドブック（案）」に対するコメント・インプットを行う。

治安悪化のため4月9日及び10日午前に予定していた森隊員と七條隊員の配属先への視察はキャンセルとなり、4月10日深夜に早期帰国となったケニア・石黒隊員、モザンビーク・葛巻隊員、ブルキナファソ・江川隊員の3名以外の6名が10日の講義に参加した。

4月7日（日）

内容	発表者	時間
開会式&自己紹介		10:00-10:20
発表：任地での活動・作成教材等の紹介、ごみ処理状況（活動写真や作成教材使用）	隊員9人×約10分	10:20-12:10
講義：廃棄物分野の JICA 事業と ACCP の紹介	JICA 地球環境部・小島	12:10-13:00
講義：横浜市における住民啓発・環境教育活動	横浜市資源循環局緑事務所・吉房副所長	15:00-16:00
Write Shop ①：全体フィードバックおよびガイドブックにかかる隊員からのエピソード収集	隊員、横浜市、JICA、コンサルタント	16:00-17:15
コメント・明日以降の WS の予定等	隊員、横浜市、JICA、コンサルタント	17:15-17:30

4月8日（月）

内容	発表者	時間
視察：ハルツーム州最終処分場		8:00-10:00
視察：ハルツーム州中継基地		10:00-13:00

午後：JICA スーダン事務所近くのホテルへ移動

4月9日（火）

内容	発表者	時間
講義：資源循環局 収集事務所の役割について	横浜市資源循環局中事務所・唐沢	9:20-10:20
講義：横浜市 環境絵日記の取り組み	横浜市資源リサイクル事業協同組合・栗原副理事長	10:30-11:30
講義：ガイドブックの概要説明(ガイドブックの2章・3章の概要および問題分析、関係者分析、計画立案)とスーダンの事例を使った説明	かいはつマネジメント・田中	11:50-13:10
グループワーク：問題分析および計画立案（各配属先の例を使って）	隊員、横浜市、JICA、コンサルタント	14:10-15:10
グループワーク発表	隊員	15:10-16:00
エピソードの内容発表	隊員	16:00-16:30
講義：環境教育プログラムの事例紹介・実施結果	石黒・ケニア（29-3 次隊）	16:30-17:00
参加者からワークショップへのフィードバック	隊員、横浜市、JICA、コンサルタント	17:00-17:30

4月10日（水）

内容	発表者	時間
講義：アフリカにおける廃棄物管理	エックス都市研・長安	09:30-10:30
講義：スーダンを事例としたアフリカ廃棄物管理の課題	JICA 地球環境部・小島	10:30-11:00
講義：ガイドブックの概要説明(環境教育プログラムの作成方法、実施のポイント)	エックス都市研・長安	11:00-12:00

## ワークショップの協議内容と成果

ワークショップで行われた主な協議の内容と成果は以下の通りである。

### 発表・講義

- 第1日目の協力隊員の発表は、活動写真や教材の紹介と共によくまとめられた発表であり、質が高かった。お互いの活動の刺激になり、有意義であったというフィードバックが多か

った。

- 横浜市の講師の発表テーマは①市民の啓発活動の経験、②横浜市資源循環局の活動の内容の説明、③環境絵日記の取り組みに関する説明、であった。参加者からは、現場で活躍されている自治体の方の経験談は、学ぶ点が多かったとのフィードバックが多かった。

### 「アフリカ廃棄物管理環境教育ガイドブック」に関するインプット、フィードバックについて

本ワークショップでは、事前配布したガイドブック（案）（和文）に関して下記のセッションを通し、その最終化に向けた参加者との協議を行い、インプットを得た。

- **全体的なフィードバック①**：参加者の総意として、以下の2点が確認された。①ガイドブックの目次項目はポイントを必要十分に過不足なく網羅しており、修正の必要はない。②全体として図表を挿入し、視覚的な理解を促す要素を増やしてほしい。そのためにガイドブックのページ数が増えても、使い勝手という観点からは特に問題はない。コンサルタントチームとしては、図表は日本人にとっては「わかりやすさ」に繋がるが、C/P 等にとっては必ずしもそうではないことも考えられるため、文章での説明を割愛するのは望ましくないと思料。
- **全体的なフィードバック②**：下記の点については参加者の意見が分かれた。①比較的社会人経験の長い参加者からは、ガイドブックの文体（書きぶり）にやや違和感を覚えた（子供扱いされている、等）、説明の仕方が必要以上に懇切丁寧ではないか、とのフィードバックがあった。②他方、若手の参加者からは、ガイドブック（案）の文体に親しみを覚えたのでこのままとしてほしく、また、C/P と共に使う、という観点からも説明も現状のまま詳しい方が良く、とのフィードバックがあった。コンサルタントチームとしては、やはり②の読者層の意見に照準を合わせるべきと思料する。
- 協力隊員のエピソードの収集：各章の巻頭の各場面におけるエピソードのインプットを得た。
- 主として新任の隊員のケースを対象として、今後取り組むべきプロジェクトの問題分析、（簡易版 PDM を使った）計画立案のワークショップを実施した。その結果、「活動」と「プロジェクト目標」を論理的につなげた形で計画立案を行う点について、必ずしも明確な理解が得られていないことがわかった。この点はガイドブックにおいてできる限りわかり易く説明する。

### 現地視察

第二日目には、ハルツーム市の最終処分場、および中継基地への視察を以下のとおり行った。

- Khartoum 中継基地

Khartoum State Cleaning Corporation (KSCC)の職員より施設の説明があった。ハルツーム州の人口は 1200 万人、一人当たりのごみ排出量は 0.8 kg/人/日。Khartoum 中継基地のキャパシティは 800 トン/日であるが、収集機材や重機不足のため現在 400 トン/日しか処理できていない。現在

100 台の収集車輛が、戸別収集か定点定時収集で家庭ごみを集めこの中継基地に持ってきて、その後ごみを圧縮した後、大型トラックに移し替え処分場まで運搬している。以前人身事故があったため、ウェストピッカーの資源物の抜き取り行為は禁止している。

参加者からは、個別の資源物について、スーダン国内でどのようにリサイクルされているか、中継基地のソフト面での問題点などについて質問があった。

#### ● Jebel 最終処分場

最終処分場を管理している Khartoum State Cleaning Corporation (KSCC)の職員より施設の説明があった。敷地面積は、40 ha で、2000 年 6 月より稼働している。日量 1,500M3 トンのごみが運搬されている。ブルドーザーやエクスカベーターなどの重機は、日本の無償資金協力により供与された。ウェストピッカーは延べ 500 名ほどいるとの話であり、彼らの活動がオペレーションの妨げになっているようであった。また適切な処理（敷均、転圧、覆土）もされていないようであった。

### 全体所感

#### ワークショップ参加への意欲・受講態度

参加者は非常に良く事前準備を行ってきており、初日の「任地での活動紹介」の質も高かった。講義やグループワークに際して、参加者は疑問やコメントが生じた場合には、その都度非常に積極的に質問を行っており、講義で得られた知識をさらにワークショップで補完する努力も見られた。講師陣からも参加隊員の知識欲と熱心な態度に対して好評を得た。よって研修員の参加意欲は高く、受講態度も良好であった。特に現地情勢が極めて流動的な中、受講者が一貫して極めて協力的な姿勢であったことは非常にありがたいことであったと思料する。

#### ワークショップの開催地選定の決定について

今般のスーダンにおけるワークショップの開催について、その治安状況（また、その背景となっている政治状況）の不安定さから、JICA 本部、現地事務所、コンサルタントの間で検討を行ってきたにも関わらず、今般のような事態に至ってしまった。よって、今後このような事態の起こる可能性のある場所において研修を予定する際には、今回の教訓を踏まえて更なるリスクマネジメントの徹底が必要と思料する。

以上。