資料－5 ソフトコンポーネント計画書

フィリピン国

メトロセブ水道区汚泥管理計画

準備調査

ソフトコンポーネント計画書

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フィリピン国　メトロセブ水道区汚泥管理計画　準備調査
ソフトコンポーネント計画書（案）

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フィリピン国　メトロセブ水道区汚泥管理計画

ソフトコンポーネント計画

(1)　ソフトコンポーネントを計画する背景

本プロジェクトは、ほとんどのセプテージが適切に収集・処理されていないメトロセブにおいて、MCWD の給水サービス区域である 6 つの地域のセプテージを収集して適切に処理するため、Cebu 市内にセプテージ処理プラント（以下、STP という）を建設するとともにセプテージ運搬車等の機材調達を実施する。これにより、住民の衛生環境とメトロセブ地域の水環境改善に貢献する。

プロジェクトに必要な施設や機材の整備そのものが、MCWD にとっての大きな課題であるが、セプテージ管理は、収集・脱水・水処理・脱水汚泥ケーキ処分からなる一連のプロセス管理であり、施設・機材の整備だけでは、セプテージの管理はできない。そのため、本プロジェクトでは、施設・機材の整備に平行して、セプテージ管理プロセスに係る作業計画・作業手順を整備し、ハードとソフト両面からの改善を図る。

なお、本プロジェクトにおいて施設・機材の運営・維持管理（O&M）を含むセプテージ管理事業の実施機関になる MCWD の課題を以下のように整理する。

1)　セプテージの計画収集量

本プロジェクトでは、表-1 に示すように、2025 年に約 400m^3/日のセプテージを収集・処理することを計画している。約 400m^3/日が、本プロジェクトで MCWD が収集・処理するセプテージ処理量である。また、2030 年にはプロジェクト対象地域の北部に STP を追加建設し、計画収集量を約 750m^3/日へ増加させる計画である。同追加 STP については、本プロジェクトの後に別のプロジェクトとして計画される予定である。

表-1　セプテージ計画収集量

項目	2025 年			2030 年		
	水道契約者	水道非契約者	合計	水道契約者	水道非契約者	合計
計画収集量（m^3/日）	321.38	71.07	392.45	349.91	396.44	746.35

出典：　JICA 調査団

2)　MCWD のセプテージ処理事業の管理体制

MCWD の既存事業の中心は上水道事業である。セプテージを含む汚水処理事業は組織の役割の一つであるが、プロジェクト対象地域の推定セプテージ発生量が 700m^3/日以上であることに対し、水質処理まで含む既存のセプテージ処理事業は、PPP 事業者が実施する Mactan 島のセプテージ収集・処理事業（能力 150m^3/日）しかない。

同 PPP 事業は、DFBO 契約で民間会社が実施しているものであり、セプテージの収集・脱水・水処理・脱水汚泥ケーキ処分の一連のプロセスのすべてを民間会社へ委ねている。そのため、MCWD は、収集、脱水や水処理のプラント運転、脱水汚泥ケーキの運搬等の実務を実施しておらず、事業を直接的に実施する体制や能力はない。

また、セプテージ処理の対象になるセプティックタンク台帳が整備されておらず、MCWD には、セプティックタンクの容量・材質・形式・使用年数・設置場所・引抜作業可能性・引抜履歴等の情報に基づく巡回収集スケジュールの作成や巡回収集管理の実施も困難である。

2018 年 3 月現在、セプテージ管理に係る MCWD の作業及び組織の状況は、以下に要約される。

- セプテージ管理ユニット等の専門部署はない。事業企画部内に担当者を置き、PPP の事業者との折衝を実施している。
- セプテージ処理料金については、上水道料金に上乗せする形で住民から徴収される。そのため、MCWD の上水道契約者については、MCWD が料金徴収を実施している。
- 毎月、PPP 事業者が収集・処理したセプテージ量を検査し、同数量分の対価を契約に応じて支払う。
- セプテージ処理プラントや収集機材の所有者は民間会社であり、運転・維持管理は、同民間会社の責任で実施される。そのため、MCWD は、運転・維持管理の計画やモニタリングを実施していない。
- 環境遵守証明（以下、ECC という）の申請と環境管理活動は民間会社の責任で実施されているため、MCWD には、分離液の水質に応じた施設運転修正等の指示や活動監視システムがない。

そのため、本プロジェクトでは、施設・機材の運転と維持管理を包括的に民間会社へ外部委託する方針であるが、Mactan 島の PPP 事業とは異なり、①MCWD が施設・機材の所有者かつ運営・維持管理の責任者になる、②事業オーナーとして ECC の申請者になり水質等の環境管理・運転管理責任を負うとともに同活動の現場実務を担当する包括的外部委託先を管理する必要がある、③4)で後述する既存のセプテージ収集会社をプロジェクトに取り込むため収集車の配車計画管理は MCWD の直営作業になる等、これまでになかった責任や活動が存在する。そのため、包括的外部委託先の活動を監視しつつ事業を円滑に管理するための体制及び能力開発が必要になる。

3) プロジェクト対象地域の MCWD 以外のセプテージ処理事業

プロジェクト対象地域内では、上述の PPP 活動以外に、Cebu 市がセプテージ脱水と脱水後の分離液を安定化池で処理する事業を実施している。本プロジェクトは、同処理施設のリハビリ・拡張の形に位置づけられるが、同処理事業に MCWD は関与していない。

Cebu 市の事業は、基本的にセプテージの受け入れと脱水機の運転活動であり、セプテージ引抜・収集は既存のセプテージ収集会社が実施している。そのため、Cebu 市や MCWD には、水処理設備も備えた STP の運営ノウハウやセプテージの引抜・収集作業に係る活動実績やノウハウはなく、本プロジェクトの実施と同時に、STP 及びセプテージ引抜・収集の運営維持管理に係る能力を醸成する必要がある。

4) 既存のセプテージ収集会社の活用

上述のように、Cebu 市の既存脱水施設へセプテージを収集・運搬している既存セプテージ収集会社が存在する。本プロジェクトで MCWD が包括的外部委託先を通じてメトロセブ内のセプテージ収集・運搬する事業を開始すると、既存セプテージ収集会社に対する民業圧迫になる恐れがある。そのため、MCWD では、本プロジェクトの中に既存セプテージ収集会社の活動を取り込み、既存セプテージ収集会社もセプテージ収集・運搬の民間委託先として活用する計画である。

同活用に対しては、MCWD が既存セプテージ収集会社と以下のような民間委託契約をする方針で準備を進めている。

- セプテージの収集量や回数に基づく委託契約を締結する。なお、あらかじめ、既存セプテージ収集会社へ発注する最低収集委託量等の条件を設定する。
- セプテージ収集車両の配車を MCWD が実施し、同民間会社が不利益を受けないように収集作業を委託する。
- 既存セプテージ収集会社は、セプテージ引抜対象家庭から直接的な料金収受を行わず、MCWD がセプテージ処理料金を対象家庭から収受する。
- 既存セプテージ収集会社は、委託契約に基づき、MCWD からセプテージの収集量や回数に基づく収集作業料金の支払いを受ける。

5) セプテージ引抜管理台帳（セプティックタンク台帳）の整備

MCWD は水道の顧客台帳を整備しており、顧客の住所・氏名・水使用量・料金収受状況等は調査・検索できるようになっている。そのため、水道契約者に対するセプテージ引抜管理台帳（セプティックタンク台帳）整備作業は、水道顧客台帳をベースにすることで、比較的簡易になると想定される。ただし、水道非契約者については住所・氏名等の顧客としての登録から開始する必要がある。

水道顧客台帳をベースにする場合でも、登録すべき情報は、セプティックタンクの容量・材質・形式・使用年数・設置場所・引抜作業可能性（アクセスや引抜開口部有無）・引抜履歴等、これまでになかったものになる。そのため、改めてセプテージ引抜管理台帳の様式を作成する必要がある。

また、台帳に記載される情報、特に住所と引抜作業可能性（アクセスや引抜開口部有無）は、セプテージ収集の巡回スケジュール作成に関わるため、台帳様式作成と台帳への情報登録は、収集作業に先立って実施する必要がある。ただし、セプテージの計画収集対象区域内の世帯数は、2025 年には約 470 千件に上ると推定され、このうち、水道契約者だけでも約 226 千件になるため、プロジェクト開始前に全セプティックタンクの現況調査をして台帳に登録することは非常に困難である。この背景下、以下の手順と方法で台帳を整備する必要がある。

- 本プロジェクトの施設建設・機材調達作業中、セプテージ引抜管理台帳の様式を作成し、専門家の助言を受けつつ、台帳への記入・登録を開始する。
- 安定したプロジェクトの立ち上がりを期し、試運転開始前に、少なくとも、1 ヶ月間分のセプテージ収集スケジュールを作成できる量の台帳登録が必要である。これは、顧客件数として約 3,700 件と想定され、本件で提案するソフトコンポーネント期間中での対応が必要である。
- 試運転期間中及び本格的な施設・機材稼働後においても、収集スケジュール作成のために、少なくともセプテージ収集作業の 1～2 ヶ月前には事前調査と台帳登録が必要である。そのため、台帳登録作業は、ソフトコンポーネント終了後も MCWD が継続する。
- 台帳登録作業には、多大な人的リソースの投入を必要とする。既存の MCWD の組織では困難なため、台帳登録作業は、包括的外部委託先の業務に含めるものとし、MCWD は台帳作成状況及び内容の適切性に係る管理作業を実施する。

6)　セプテージ管理事業に係る住民啓発

本プロジェクトでは、これまでに実施していないセプテージ収集・処理に対し、課金してサービスを提供する事業を導入する。このためには、十分な住民説明とともに、住民の協力意識向上が必要である。MCWD には、給水に係る広報・住民啓発活動の実績はあるが、これまでに事業経験がないセプテージや汚水処理に係る啓発活動に必要な事例・公開する情報・住民にお願いする事項・媒体に係る知見がない。そのため、事業の開始に当たり、これらの情報を身に着け、適切な住民啓発活動を開始する必要があり、以下のように課題が整理される。

- 課金して汚水処理する公共サービスを導入する際に我が国の地方自治体が展開した広報活動や住民説明・住民啓発活動の事例を学び、教訓や有効だった活動を参考に住民啓発活動の計画を作成する。
- 我が国で活用されている住民啓発媒体（リーフレットや映像等）を参考に、住民理解を促進するために公開すべき情報を整理し、メトロセブで有効な住民啓発媒体を作成する。
- 我が国の事例も参考に、セプテージ管理事業立ち上げ時の住民への広報を効率的に実施するためのキャンペーンを実施する。

7) 住民に課金するセプテージ処理料金

本プロジェクトの実施に当たり、MCWD は、セプテージ処理料金を住民へ課金することになる。この料金は、Mactan 島で実施されている PPP 事業で課金されている料金と同程度になるように設定される方針である。

Mactan 島では、水道契約者に対して、水道使用量 1m^3 当たり 2.20PHP が水道料金に上乗せされる形で徴収されており、一軒当たりの平均的な水使用量（20m^3/月）の場合、44.00PHP/月になる。5 年に一度のセプテージ収集の場合、料金は 2,640.00PHP/回に換算される。この料金の課金については、十分に住民へ説明し、住民の理解を得る必要がある。

なお、水道非契約者のセプテージを引抜く際は、水道料金と同時に毎月少額ずつの徴収ができないため、セプテージ収集の都度、2,640.00PHP/回程度の料金を収受する必要がある。また、非契約者からの料金収受の方法には、①申し込み時に MCWD へ前払い、②引抜作業時の請求書発行と MCWD への後払い、③バキューム車クルーによる引抜作業時の代理現金収受等が想定される。これらの代替案について、セプテージ収集を担当する包括的外部委託先や既存セプテージ収集会社も含めた関係者で協議し、最適な方法の導入が必要である。

8) セプテージ管理ユニットの設置

上述の状況を受け、MCWD では、本プロジェクトと並行してセプテージ処理事業の実施のためにセプテージ管理ユニットを設置する計画である。同ユニットは、8 名の専従職員で構成され、主要業務は表-2 のように計画される。

水質・法務・財務・広報等の活動は、表-3 のように既存部所の職員が必要に応じて兼務する形でユニットの活動支援を開始する。

表-2　セプテージ管理ユニットの概要

要員	専従/兼務	要員数	主な役割
ユニットリーダー	専従	1 名	セプテージ管理事業の全体マネジメント
ユニット副リーダー	専従	1 名	セプテージ収集量、処理量、水質、収集頻度、収集済/未収集顧客数等、技術的な民間委託先の実施状況管理総括
収集車両配車及び収集状況管理クラーク	専従	2 名	水道契約者/非契約者双方に係る収集済/未収集顧客の管理、日々の収集車両配車スケジュール管理、セプテージ台帳への収集情報記録、マニフェスト管理、収集車両維持管理状況管理
台帳管理クラーク	専従	2 名	水道契約者/非契約者双方に係る各顧客のセプテックタンク情報の調査、引抜開口部有無の調査と開口部設置促進、台帳の作成・アップデート管理
STP 運転状況管理クラーク	専従	2 名	STP 運転状況・水質/処理量データ管理、脱水汚泥ケーキの処分量・マニフェスト管理
合計	専従	8 名	

出典：　JICA 調査団

表-3　セプテージ処理事業に必要な既存組織の活動概要

活動	専従/兼務	要員数	主な役割
水質及びセプテージ/脱水汚泥ケーキの性状管理	既存の水質管理部門が兼務	全 20 名（分析・管理項目で分担）	水質及びセプテージ/脱水汚泥ケーキの性状の定期的分析と水質面での STP 運転状況監視、水質状況に応じた STP 運転改善の助言
民間委託契約の法務的管理	既存の法務部が兼務	法務部員が作業	民間委託契約に係る法務的管理作業
料金収受、財務的管理、民間委託先への支払い	既存の財務グループが兼務	顧客サービス部、経理部、財務部が作業	水道料金と同時にセプテージ処理料金の収受、非水道契約者からの料金収受、民間委託先への支払い、セプテージ処理事業に必要な予算措置
広報・住民啓発	既存の渉外部が兼務	渉外部員が作業	セプテージ処理事業開始に係る公聴会や広報活動の実施、セプテージ処理事業の必要性に係る住民理解促進、料金に係る住民理解促進、事業効果の広報

出典：　JICA 調査団

9)　施設・機材の運転・維持管理に係る民間委託計画

上記 2)及び 4)を含み、ここまでに述べた課題に対して、MCWD は民間委託を活用して対応する計画である。民間委託に係る体制・内容は、図-1 及び以下のように整理される。民間委託は、大きく①包括的外部委託と②既存セプテージ収集会社への収集委託に分割される。それぞれ別の TOR で分割した契約になる。

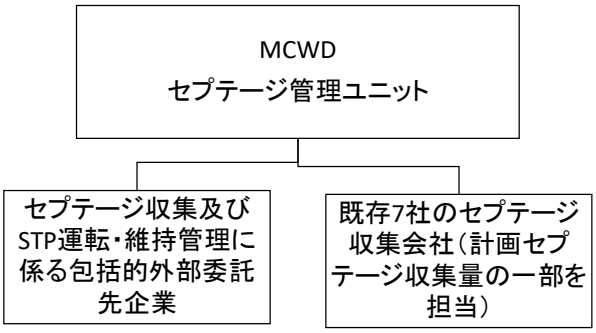


図-1　セプテージの収集・処理に係る外部委託

①　包括的外部委託

フィリピンには、PPP でセプテージ収集・処理を実施する企業や、LGU から委託を受けて STP の運転・維持管理を実施する企業がある。MCWD は、これらの企業に本プロジェクトで建設する STP 及び調達するバキューム車やダンプトラックの運転・維持管理について、日常的なメンテナンスも含め、包括的に外部委託する計画である。包括的外部委託の範囲は、①セプテージ収集、②STP 運転・維持管理、③脱水汚泥ケーキの埋立処分場への運搬、④施設・機材の維持管理を含むものとし、MCWD と包括的外部委託先の主な分担は表-4 のように整理される。

表-4　MCWD と包括的外部委託先の主な分担

分類	MCWD	包括的外部委託先
全般	- 住民や事業所からセプテージ処理料金を収受する。 - セプテージの STP 受け入れ量に基づき、包括的外部委託先へ支払う。 - ECC を含む事業許可を取得する。 - LGUs との調整を実施する。 - 住民啓発を実施する。 - 大規模な施設・機材の拡張・更新の費用	- セプテージの STP 受け入れ量に基づき、委託費を定期的に請求する。 - 委託業務に必要な燃料・油脂類、電気／水道等のユーティリティ料金、消耗品、交換部品、人件費等を負担する。

分類	MCWD	包括的外部委託先
	を負担する。	
セプティックタンク台帳整備	- セプティックタンク台帳の様式を整備し、台帳記入を支援する。 - 台帳に記入されたセプティックタンク情報に基づき、セプテージ収集の優先順位を整理する。	- MCWD の協力を得て、プロジェクト対象地域のセプティックタンクを調査し、容量・アクセス難易・引抜開口部有無等の情報を台帳に記入する。
セプテージ収集	- 本プロジェクトで調達するバキューム車を貸与する。 - 台帳に基づき、日々のセプテージ収集スケジュールを作成し、バキューム車の配車をする。 - 水道非契約者からのセプテージ収集依頼を受け付け、料金収受するとともに、バキューム車配車をする。 - マニフェストに基づき収集記録を台帳に記入する。 - バキューム車の運転・メンテナンス・維持管理状況を管理・監督する。	- セプティックタンクに引抜開口部が無い場合、開口部を設置し、台帳をアップデートする。 - MCWD の配車指示に基づき、バキューム車を運行してセプテージを収集する。（基本的に水道契約者を中心に活動する） - セプテージ収集時にマニフェスト記録を実施する。 - バキューム車のメンテナンス・維持管理をする。
STP 運転	- 本プロジェクトで建設する STP を貸与する。 - 日々の STP 運転記録様式を整備する。 - マニフェストや運転管理に基づき、セプテージ処理量の記録管理を実施する。 - STP の運転・メンテナンス・維持管理状況を管理・監督する。 - 定期的に水質やセプテージ性状を分析して環境影響及び STP 運転状況を監視する。	- STP をマニュアルに従って運転・維持管理する。 - セプテージ受入量・脱水汚泥ケーキ搬出量、STP 運転状況等を記録する。 - セプテージ処理・脱水汚泥ケーキ搬出時にマニフェストに記録する。
脱水汚泥ケーキ運搬	- 本プロジェクトで調達するダンプトラックを貸与する。 - マニフェストに基づき脱水汚泥ケーキ搬出・処分量の記録を管理する。 - ダンプトラックの運転・メンテナンス・維持管理状況を管理・監督する。 - 脱水汚泥ケーキ処分量に基づき、民間の	- 脱水汚泥搬出・埋立処分時にマニフェスト記録を実施する。 - ダンプトラックのメンテナンス・維持管理をする。

分類	MCWD	包括的外部委託先
	埋立処分場へ支払いをする。	

出典：JICA 調査団

② 既存**セプテージ**収集会社への収集委託

4)で述べた既存セプテージ収集会社は 7 社になる。包括的外部委託先を通じて MCWD が本プロジェクトで全てのセプテージを収集すると、既存セプテージ収集会社の既存事業維持が困難になり、プロジェクトが民業圧迫を及ぼす。そのため、これまでの収集作業量実績に基づき、合計 60m³/日のセプテージ収集量を目安にセプテージ収集を既存セプテージ収集会社へ委託する。契約は交渉に基づく随意契約かつ数年度に期限を切った契約が想定されている。

なお、MCWD では、前述の包括的外部委託先が水道契約者を対象にした定期巡回収集を、既存セプテージ収集会社が水道非契約者に対するオンコール収集を分担する方向で調整している。ただし、既存セプテージ収集会社の作業量確保が必要なため、MCWD が配車管理して分担量を日常的に調整する計画である。

MCWD と既存セプテージ収集会社の主な分担は表-5 のように整理される。

表-5　MCWD と既存セプテージ収集会社の主な分担

分類	MCWD	既存セプテージ収集会社
全般	- 住民や事業所からセプテージ処理料金を収受する。 - セプテージの STP 受け入れ量に基づき、セプテージ収集会社へ支払う。	- セプテージ収集量（STP 受け入れ量）に基づき、委託費を定期的に請求する。 - 委託業務に必要な燃料・油脂類、消耗品、交換部品、人件費等を負担する。 - 委託業務継続に必要な機材整備･更新費を負担する。
セプテージ収集	- バキューム車の配車をする。 - マニフェストに基づき収集記録を台帳に記入する。	- MCWD の配車指示に基づき､バキューム車を運行してセプテージを収集する｡(基本的に水道非契約者を中心に活動する) - セプテージ収集時にマニフェスト記録を実施する。 - バキューム車の運転・メンテナンス・維持管理・更新をする。

出典：JICA 調査団

10)　技術協力プロジェクトの必要性

上位計画に当たるメガセブロードマップ 2050 では、メトロセブ全体の広域的な下水道導入が計画されている。しかし、下水道のマスタープランが未整備な上、今後 20～30 年間でのメトロセブ全域への施設整備は困難と考えられる。そのため、セプテージ処理事業と下水道の役割分担や整備手順を考慮したマスタープランが必要であり、MCWD は、マスタープラン作成を中心にした我が国の技術協力の実施を期待している。また、逼迫している廃棄物処分場用地確保問題の背景下、脱水汚泥ケーキの再利用に係る計画策定も期待されている。この背景下、当該技術協力として、表-6 の内容が想定される。

表-6　メトロセブの汚水処理改善技術協力想定

No.	大項目	小項目
1.	汚水・汚泥管理に係る課題抽出能力向上	汚水処理・雨水排水状況に係る基礎調査と課題抽出
		広域汚水管理に係る調整メカニズムと役割分担整理
2.	汚水処理・雨水排水マスタープラン作成能力向上	オンサイト処理、下水道、セプテージ処理等に係る役割分担と整備手順の計画
		公聴会や住民説明・住民理解促進
		関係機関・関係自治体との合意形成及び承認促進
3.	セプテージ処理能力の向上	脱水汚泥ケーキの再利用計画
		本プロジェクトの活動に係る経過モニタリングと改善提案

出典：　JICA 調査団

上記技術協力は、下水道を含むメトロセブ全体の汚水・雨水排水処理の総合的計画策定と脱水汚泥ケーキの再利用計画策定を主目的にしており、本プロジェクトで建設／調達する施設・機材の利用とセプテージ処理事業の開始に係る立ち上がり支援を目的にしたものではない。そのため、本プロジェクトの実施に当たり、MCWD には、以下の項目に対する能力向上活動が必要となる。

- 民間委託内容や契約条件の整理
- セプティックタンク情報の台帳への整理と台帳管理
- セプテージ収集（引抜）のスケジュール作成と収集車両配車管理
- 民間委託する作業の作業状況・実績・成果のモニタリング管理
- セプテージ収集／運搬と処理に係る質・量のモニタリング管理
- 事業開始に伴う住民理解の促進

(2)　ソフトコンポーネントの目標

フィリピンの下水処理場・セプテージ処理場の排水基準は 2016 年に改訂され、排出する窒素やリンに関する規制が導入された。そのため、本プロジェクトでは、これまでフィリピンでほとんど実施されていない下水やセプテージの高度処理を導入する。その一方、排水基準が改定されたばかりのため、MCWD が包括的外部委託で想定している STP の運転・維持管理の委託先は、下水処理／セプテージ処理の経験を有するものの、高度処理の経験がほとんどない。また、MCWD には、下水処理／セプテージ処理の実務を含め、委託作業の監理経験・実績がない。そのため、本プロジェクトでは、以下のように関係者の能力開発を図る。

①　施設建設・機材調達請負会社による初期操作指導

建設する施設及び調達する機材（バキューム車・ダンプトラック）の基本的な操作・維持管理方法については、施設建設や機材調達の完了時に請負会社が初期操作指導を実施する。これは、次記する 3 ヶ月間の試運転期間を通して OJT 方式で実施する。

初期操作指導の主な対象者は以下のとおりである。

- MCWD の STP 運転状況管理クラーク・収集車両配車及び収集状況管理クラーク
- MCWD が調達するオペレーター・運転手（包括的外部委託先に所属）

②　試運転期間の OJT

本プロジェクトでは、3 ヶ月間の試運転を実施期間内に実施する計画である。同期間内では、上述の初期操作指導を実施する。なお、試運転期間中は、STP で実際にセプテージを受入れ、脱水作業及び分離液処理の実務を実施し、この間に STP 運転とセプテージ収集車両の配車等の実務と MCWD によるモニタリング及び委託業務の管理の両面に係る能力開発を OJT で実施する。

試運転期間中の OJT の対象者として、以下のように計画する。

- MCWD の STP 運転状況管理クラーク・収集車両配車及び収集状況管理クラーク
- MCWD が調達するオペレーター・運転手（包括的外部委託先に所属）

③　ソフトコンポーネント

上述の活動を踏まえるとともに並行するように、本プロジェクトの施設建設・機材調達完了後、MCWD のセプテージ管理部門のスタッフが、以下の事項を達成することを目標としてソフトコンポーネントを実施する。なお、実施時期は、試運転開始前の準備時期から試運転終了時までの約 10 ヶ月間を想定する。

- セプティックタンクの台帳を活用しながら、引抜作業実績・巡回収集スケジュール・料金徴収（MCWD の水道契約者以外）管理ができるようになる。

- セプテージ処理プラント及び収集機材の運転・維持管理に関して、包括的外部委託先や既存セプテージ収集会社へ適切な作業指示を実施するとともに、包括的外部委託先や既存セプテージ収集会社の運転・維持管理状況、処理量及び水質等のモニタリング管理ができるようになる。
- MCWD と包括的外部委託先／既存セプテージ収集会社の責任分担を明確化した TOR 等を作成し、トラブルの際に責任分担に応じた対応が迅速に講じられるようになる。
- 住民啓発に必要な情報を整理し、料金支払いやセプテージの定期収集に係る住民協力を得るための広報活動ができるようになる。

(3) ソフトコンポーネントの成果

ソフトコンポーネントの成果を以下に示す。

- セプテージ処理事業の管理体制分野
  - ✓ セプテージの引抜管理ができるようになる。
  - ✓ セプテージ引抜・収集作業及びセプテージ処理プラント運転に係る民間委託業務を管理できるようになる。
- セプテージ管理事業に係る住民啓発分野
  - ✓ 事業の目的や効果の説明とともに住民にお願いする事項等を整理し、セプテージ管理事業への協力に係る住民啓発活動ができるようになる。

(4) 成果達成度の確認方法

本件のソフトコンポーネントの成果確認に係る基本的視点は、施設・機材の運転・維持管理責任を負う MCWD がプロジェクトを円滑に立ち上げるために必要な技術や体制が整ったかどうかになる。そのため、基本的には、事業開始に必要な計画書や管理すべき帳票類が整ったかどうか、MCWD が事業活動を開始したかどうかの確認になる。

ソフトコンポーネントの成果達成の確認法を表-7 に示す。

表-7　成果達成の確認方法

分野	成果	達成度の確認項目
セプテージ処理事業の管理体制	成果 1 セプテージの引抜管理ができるようになる。	✓ セプテージの定期引抜対象のセプティックタンク台帳を作成できるか。 ✓ 上水道非契約者に係る非定期引抜用のセプティックタンク台帳を作成できるか。 ✓ 台帳に基づく引抜スケジュール作成と収集車両の配車計画ができるか。 ✓ 台帳に基づく引抜実績管理ができるか。
	成果 2 セプテージ引抜・収集作業及びセプテージ処理プラント運転に係る民間委託業務を管理できるようになる。	✓ 民間委託のための適切な契約書・仕様書や委託先選定評価基準を作成できるか。 ✓ 機材の維持管理を含め、委託したセプテージ収集作業の実施状況モニタリングシートや実績記録シートが作成できるか。 ✓ 施設の維持管理を含め、委託したセプテージ処理プラント運転作業の実施状況モニタリングシートや実績記録シートが作成できるか。

分野	成果	達成度の確認項目
		✓ 実施状況モニタリングシートや実績記録管理シートに基づき、委託作業の内容と収集・処理実績記録が管理できるか。
セプテージ管理事業に係る住民啓発分野	成果 3 セプテージ管理事業導入に必要な住民啓発活動ができるようになる。	✓ 住民協力を得るために公開が必要な情報を整理し、活動事例を参考に、住民啓発活動の計画やリーフレット等の媒体案を作成できるか。 ✓ セプテージ管理事業の導入を効率的に住民周知するキャンペーンの実施ができるか。

出典： JICA 調査団

(5) ソフトコンポーネントの活動（投入計画）

1) ソフトコンポーネントの内容

ソフトコンポーネントの活動（投入）内容は表-8 に示すとおりであり、所用日数の詳細を表-9 に示す。

表-8　ソフトコンポーネントの活動内容

分野	成果	必要とされる技術	現在及び必要とされる技術レベル	活動内容及び研修項目	活動方法	必要な投入	成果品
セプテージ処理事業の管理体制	成果1 セプテージの引抜管理ができるようになる。	セプティックタンクの情報管理及び引抜スケジュール管理技術	・ MCWD はセプティックタンクの情報や引抜スケジュール管理を実施しておらず、経験や管理部所がない。 ・ セプテージ管理ユニットを設立し、セプティックタンク情報を管理するための台帳やスケジュール・配車計画管理の技術が必要である。	【活動】 ・ 定期引抜用引抜管理台帳の作成 ・ 非定期引抜用引抜管理台帳の作成 ・ セプテージ引抜スケジュールシートの作成 【研修項目】 ・ セプティックタンクの台帳管理対象項目（定期引抜と非定期引抜別）と台帳例 ・ 非定期引抜対象住民への課金方法代替案 ・ セプテージ引抜スケジュール案と優先順位付け方法	・ 教室講義及び討議 ・ 台帳作成（台帳作成パイロット区域）OJT ・ 試運転時の実践訓練（OJT）	・ 引抜管理技術専門家（1名 x 0.90ヶ月） ・ MCWD のセプテージ管理ユニット（リーダー、副リーダー、収集・台帳管理担当4名） ・ MCWD の法務、財務、渉外担当者	・ 定期引抜用管理台帳（パイロット区域） ・ 非定期引抜用管理台帳（パイロット区域） ・ セプテージ引抜スケジュールシート ・ 実践訓練（OJT）報告書
	成果2 セプテージ引抜・収集作業及びセプテージ処理プラント運転に係る民間委託業務を管理できるようになる。	民間委託する作業の管理技術	・ MCWD は Mactan 島のセプテージ処理を PPP で実施しているが、施設・機材を所有していないため、施設・機材の効率や維持管理面での仕様書やモニタリング実務がない。そのため、委託先管理技術が不十分である。 ・ MCWD 直営の汚水処理施設がなく、汚水やセプテージ処理技術がない。そのため、水質等に応じて委託先指導ができない。 ・ セプテージ管理ユニットを設立し、適切な仕様の下で適切な会社を選定するとともに、委託作業の確実な履行とセプテー	【活動】 ・ 民間委託の仕様書/契約書案の作成（民間会社による台帳作成業務を含む） ・ セプテージ引抜作業モニタリング計画の策定 ・ STP 運転作業モニタリング計画の策定 【研修項目】 ・ 民間委託仕様/契約の事例 ・ 委託業者選定方法の事例 ・ 引抜作業モニタリング方法（マニフェスト/実績記録/引抜作業及び機材状況のチェックリスト等） ・ STP 運転作業モニタリング方法（脱水及び水処理原理、運転管理及び点検記録、水質記録、脱水汚泥ケーキ管理記録等） ・ 作業モニタリング結果からの課題抽出と解決案	・ 教室講義及び討議 ・ 台帳作成（台帳作成パイロット区域）OJT ・ 試運転時の実践訓練（OJT）	・ 民間委託契約・評価専門家（1名 x0.43ヶ月） ・ 引抜管理技術専門家（1名 x0.58ヶ月） ・ STP 管理技術（運転）専門家（1名 x1.75ヶ月） ・ STP 管理技術（水質）専門家（1名 x0.48ヶ月） ・ MCWD のセプテージ管理ユニット	・ 民間委託仕様書/契約書案 ・ セプテージ引抜作業モニタリング計画書 ・ STP 運転作業モニタリング計画書 ・ 実践訓練（OJT）報告書

分野	成果	必要とされる技術	現在及び必要とされる技術レベル	活動内容及び研修項目	活動方法	必要な投入	成果品
			ジ処理のパフォーマンスを監視する技術が必要である。			（リーダー、副リーダー、収集・台帳管理担当 4 名、STP 管理担当 2 名） ・ MCWD の法務、財務、渉外担当者 ・ MCWD の水質管理部門	
セプテージ管理事業に係る住民啓発分野	成果 3 セプテージ管理事業導入に必要な住民啓発活動ができるようになる。	効果的な住民啓発技術	・ MCWD にはセプテージ処理事業に係る計画的な住民啓発活動がない。 ・ セプテージ処理に係る情報が整理されておらず、公開すべき情報の知見がない。また、広報資料の例や実績の積み重ねがない。 ・ 日本の下水道事業導入時の広報や事業実施中の広報内容を踏まえ、効果的な広報手法で住民啓発を開始するための初期技術が必要である。	【活動】 ・ リーフレットや映像等の広報資料の作成 ・ 事業開始時のキャンペーンの試行 【研修項目】 ・ 日本の広報事例（内容及びメディア） ・ キャンペーン事例とキャンペーン計画/実施管理	・ 教室講義及び討議 ・ 広報メディア作成 ・ キャンペーン実践訓練（OJT）	・ 住民啓発技術専門家（1 名 x 0.92 ヶ月） ・ MCWD の渉外部	・ 住民啓発活動計画書 ・ 広報メディア ・ 第一回キャンペーン実践訓練（OJT）報告書

出典： JICA 調査団

表-9　ソフトコンポーネントに必要な専門家日数

専門家担当名	引抜管理技術				民間委託契約・評価				STP管理技術（運転）				STP管理技術（水質）				住民啓発技術				合計			
成果と作業内容	日数		合計（人月）	渡航回数	日数		合計（人月）	渡航回数	日数		合計（人月）	渡航回数	日数		合計（人月）	渡航回数	日数		合計（人月）	渡航回数	日数		合計（人月）	渡航回数
	国内	現地			国内	現地			国内	現地			国内	現地			国内	現地			国内	現地		
1.セブテージ引抜管理技術	2	24	0.90	2	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	2	24	0.90	2
1-1　セブテージ引抜管理台帳の作成	2	12		1	0	0			0	0			0	0			0	0			2	12		1
(1)研修計画・管理台帳案作成	1																				1	0		
(2)台帳案に係る討議		2																			0	2		
(3)台帳案の最終化		2																			0	2		
1-2　セブテージ引抜スケジュールシートの作成																					0	0		
(1)研修計画・スケジュールシート案作成	0.5																				0.5	0		
(2)スケジュールシート案に係る討議		2																			0	2		
(3)スケジュールシート（配車管理シート）の最終化		2																			0	2		
1-3　水道非契約者のセブテージ引抜管理台帳の作成																					0	0		
(1)研修計画・管理台帳案作成	0.5																				0.5	0		
(2)台帳案に係る討議		1																			0	1		
(3)料金徴収方法・管理に係る討議		2																			0	2		
(4)台帳案の最終化		1																			0	1		
1-4　台帳管理の実施と課題抽出活動	0	12		1	0	0			0	0			0	0			0	0			0	12		1
(1)台帳・スケジュールシートの記録管理実践		6																			0	6		
(2)課題抽出と解決案討議		3																			0	3		
(3)セブテージ引抜管理技術活動の報告書作成		3																			0	3		
2.民間委託業務の管理技術	5	10	0.58	1	2	10	0.43	1	7	42	1.75	4	5	7	0.48	1	0	0	0.00	0	19	69	3.24	7
2-1　TOR案の作成	0	0			2	10		1	2	10		1	0	0			0	0			4	20		2
(1)研修計画・テキスト作成					2				2												4	0		
(2)日本の委託契約事例講習						4															0	4		
(3)プロジェクトの委託作業案講習										4											0	4		
(4)業者選定・評価方法講習						3				3											0	6		
(5)TOR案・契約書案の作成						3				3											0	6		
2-2　セブテージ収集モニタリング計画作成	5	10		1	0	0			0	0			0	0			0	0			5	10		1
(1)研修計画・モニタリング計画案作成	5																				5	0		
(2)委託先モニタリングの目的・項目講習		2																			0	2		
(3)マニュフェスト案と実績記録管理講習		2																			0	2		
(4)収集作業現場確認チェックリスト講習		2																			0	2		
(5)収集運搬機材の点検シートと記録管理講習		2																			0	2		
(6)セブテージ収集モニタリング計画書の作成		2																			0	2		
2-3　STP運転モニタリング計画作成	0	0			0	0			5	13		1	5	7		1	0	0			10	20		2
(1)研修計画・モニタリング計画案作成									5				5								10	0		
(2)脱水・水処理原理の講習										2				2							0	4		
(3)委託先モニタリングの目的・項目講習										1				1							0	2		
(4)水質記録管理講習										2				2							0	4		
(5)運転記録管理・日常点検記録管理講習										2											0	2		
(6)脱水汚泥ケーキの発生量・搬出量管理講習										2											0	2		
(7)脱水汚泥ケーキの適正処分とマニフェスト管理講習										2											0	2		
(8)STP運転モニタリング計画書の作成										2				2							0	4		
2-4　収集・STPの運転モニタリングの実施と課題抽出活動(1)	0	0			0	0			0	7		1	0	0			0	0			0	7		1
(1)計画に基づく委託先作業のモニタリング実践・課題抽出										7											0	7		
2-5　収集・STPの運転モニタリングの実施と課題抽出活動(2)	0	0			0	0			0	12		1	0	0			0	0			0	12		1
(1)計画に基づく委託先作業のモニタリング実践・課題抽出										6											0	6		
(2)問題解決案討議										3											0	3		
(3)アウトソーシング作業の管理技術活動の報告書作成										3											0	3		
3.住民啓発技術	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	5	20	0.92	2	5	20	0.92	2
3-1　リーフレット・映像類の作成	0	0			0	0			0	0			0	0			5	12		1	5	12		1
(1)研修計画・日本の事例収集・啓発活動案作成																	5				5	0		
(2)日本の事例講習																		2			0	2		
(3)住民啓発活動案討議																		3			0	3		
(4)リーフレット・映像等の骨子案作成																		2			0	2		
(5)セブテージ管理キャンペーンの計画																		5			0	5		
3-2　セブテージ管理キャンペーンの実施支援	0	0			0	0			0	0			0	0			0	8		1	0	8		1
(1)セブテージ管理キャンペーンの実施支援																		5			0	5		
(2)住民啓発技術活動の報告書作成																		3			0	3		
合計	7	34	1.48	3	2	10	0.43	1	7	42	1.75	4	5	7	0.48	1	5	20	0.92	2	26	113	5.06	11

出典：　JICA 調査団

2)　ソフトコンポーネントの指導員

ソフトコンポーネントの指導員として、専門技術ごとに合計 5 名の日本人コンサルタントを配置する。

3)　研修の対象者（ターゲットグループ）

各成果に対するターゲットグループを表-10 のように計画する。

表-10　ソフトコンポーネントのターゲットグループ

成果	活動	ターゲットグループ
成果 1 セプテージの引抜管理ができるようになる。	・ 定期引抜用引抜管理台帳の作成 ・ 非定期引抜用引抜管理台帳の作成 ・ セプテージ引抜スケジュールシートの作成	MCWD に新設されるセプテージ管理ユニット及び法務・財務・渉外に関する既存の管理部門
成果 2 セプテージ引抜・収集作業及びセプテージ処理プラント運転に係る民間委託業務を管理できるようになる。	・ 民間委託の仕様書/契約書案の作成 ・ セプテージ引抜作業モニタリング計画の策定 ・ STP 運転作業モニタリング計画の策定	MCWD に新設されるセプテージ管理ユニット、法務・財務・渉外に関する既存の管理部門及び既存の水質管理部門
成果 3 セプテージ管理事業導入に必要な住民啓発活動ができるようになる。	・ リーフレットや映像等の広報資料の作成 ・ 事業開始時のキャンペーンの試行	MCWD の渉外部とセプテージ管理ユニット

出典：　JICA 調査団

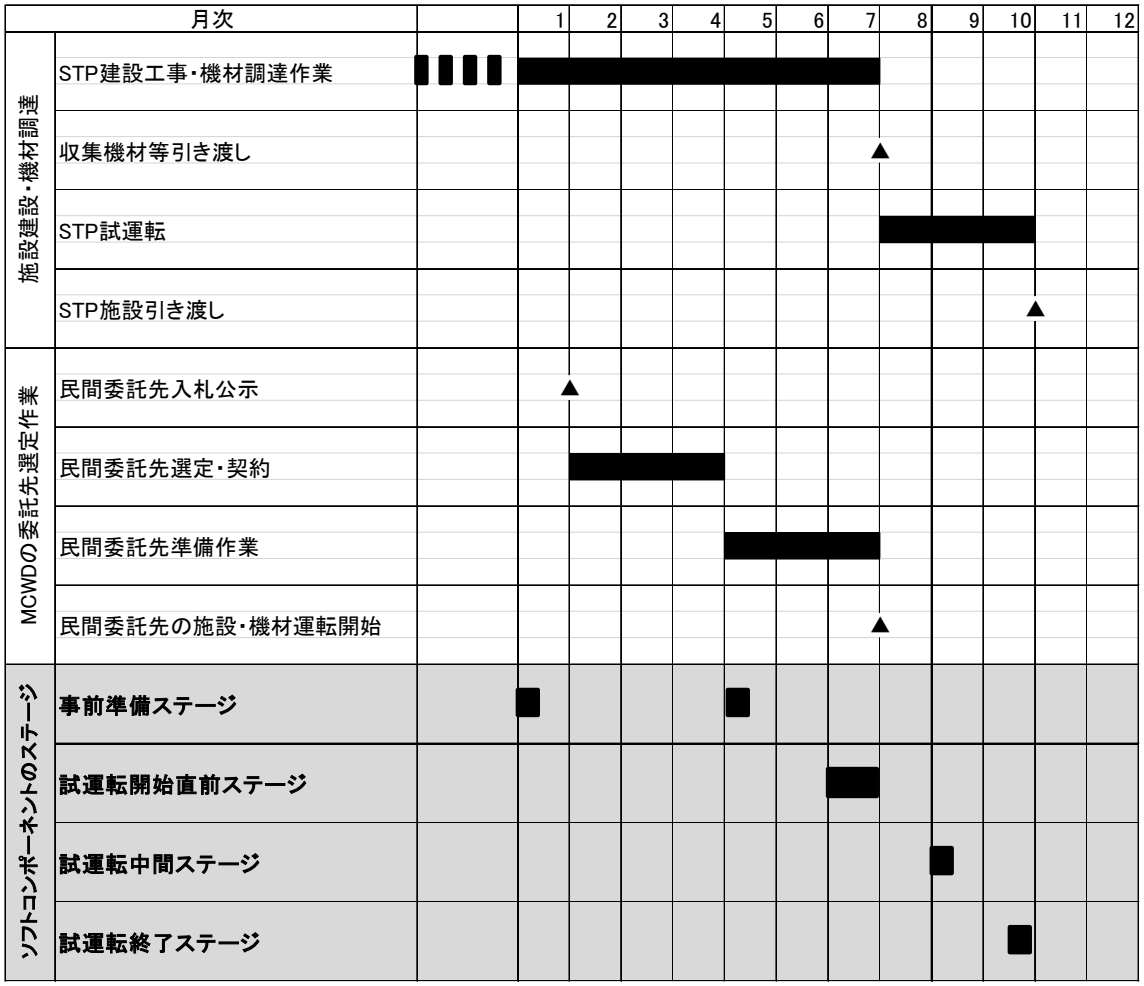
なお、MCWD は、当該活動の対象者について、活動開始の 1 ヶ月前までに JICA フィリピン事務所へ通知する。

(6)　ソフトコンポーネントの実施リソースの調達方法

本活動は、我が国の廃棄物管理や汚水処理事業の知見や技術を含む実施事例を MCWD へ移転することを中心にしたものである。本ソフトコンポーネントを担当する技術者は、我が国の事例に精通している必要があるため、本邦コンサルタントによる直接支援型を計画する。

(7)　ソフトコンポーネントの実施工程

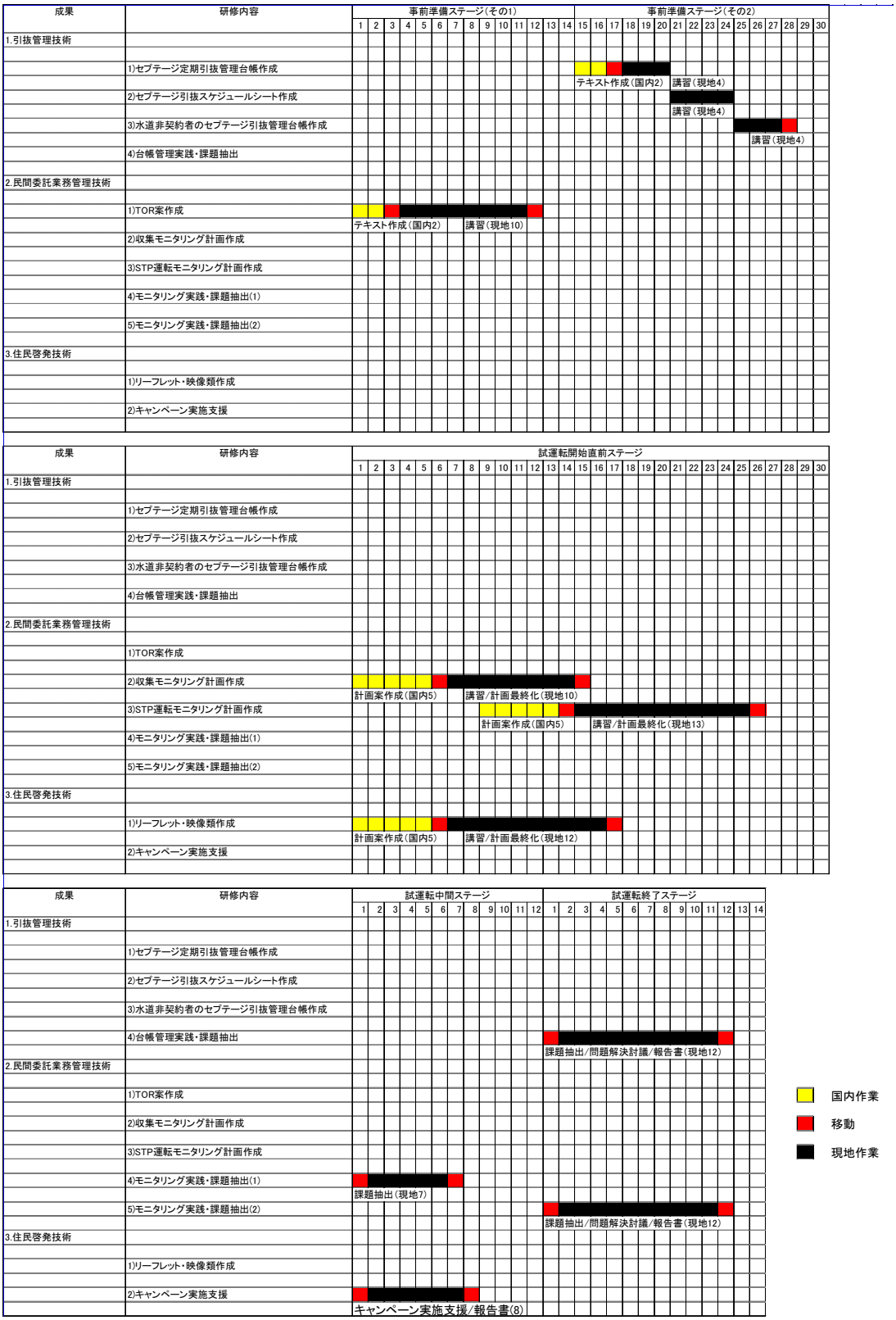
ソフトコンポーネントは、本プロジェクトによって建設される施設／機材を使って実施されることが必要であり、フィリピン国への施設の引き渡し時期及び試運転と並行して実施する。施設建設／機材調達のスケジュール及び MCWD による民間委託先選定機関を考慮すると、図-2 に示すように、施設建設工事終盤に、①事前準備ステージ、②試運転開始直前ステージ、③試運転中間ステージ、④試運転終了ステージの 4 段階で実施することが望ましい。



出典： JICA 調査団

図-2　ソフトコンポーネントの実施時期計画

上記の各ステージにおいては、図-3 に示す工程での活動が必要である。



出典：　JICA 調査団

図-3　ソフトコンポーネントの実施工程（案）

(8) ソフトコンポーネントの成果品

本ソフトコンポーネントにおける成果品は、表-11 に示す通りである。

表-11 本ソフトコンポーネントの成果品

成果	成果品	内容等
成果 1 セプテージの引抜管理ができるようになる。	・ 定期引抜用管理台帳 ・ 非定期引抜用管理台帳 ・ セプテージ引抜スケジュールシート ・ 実践訓練（0JT）報告書	各戸の住所等を含むセプティックタンク情報と引抜予定/記録を整理する台帳。非定期引抜用には料金徴収記録を含めることを検討。
成果 2 セプテージ引抜・収集作業及びセプテージ処理プラント運転に係る民間委託業務を管理できるようになる。	・ 民間委託仕様書/契約書案 ・ セプテージ引抜作業モニタリング計画書 ・ STP 運転作業モニタリング計画書 ・ 実践訓練（0JT）報告書	民間委託作業の仕様及び作業状況の日常管理に係る計画書/チェックシート（マニフェスト管理、脱水・水質管理、運転状況管理等）
成果 3 セプテージ管理事業導入に必要な住民啓発活動ができるようになる。	・ 住民啓発活動計画書 ・ 広報メディア ・ 第一回キャンペーン実践訓練（0JT）報告書	広報メディア例を含む広報計画（使用メディア、頻度、公開情報等）及び第一回キャンペーンの報告

出典： JICA 調査団

(9) 相手国実施機関の責務

1) 実施可能性

MCWD には、既存のセプテージ管理部門がない。本プロジェクトにおいて、MCWD は、同管理部門設立とともに、要員訓練と事業開始の必要性を認識しており、本ソフトコンポーネントの実施可能性（モチベーション）は高い。

ただし、本ソフトコンポーネントの目標を達成するためには、MCWD の組織整備と必要な財務的準備が実施される必要がある。

2) 阻害要因及び必要な措置

研修項目に関して阻害要因は特にないが、設立直後で事業開始準備中のセプテージ管理ユニットの要員を対象に実施することになる。MCWD 側の受講者の長時間拘束は難しいため、研修時間は、1 日に 3～4 時間程度で計画する。

なお、研修の受講者や MCWD 関係者には、以下の要件が求められ、MCWD は受講すべき職位の人員に対し、本要件を満たすよう習得させておくことが必要である。また、セプテージ管理ユニットのキーパーソンは、全ての研修内容を理解することが求められる。

- ✓ コンピューターの基本的な操作方法を身につけていること
- ✓ 基本ソフト（MS-Excel 及び MS-Word）の操作方法を身につけていること
- ✓ 講義・演習に十分な時間をさけること（1 日 3～4 時間程度）

✓ 研修場所（MCWD 内の講義室 1 部屋）

(10) ソフトコンポーネントの概略事業費

本ソフトコンポーネントの費用として、表-12 に示すように、約 17,759 千円を計画する。

表-12 本ソフトコンポーネントの費用

項目	金額（千円）
直接人件費	4,686
直接経費	3,217
間接費	9,746
合計	17,759

出典： JICA 調査団

注： 積算精査中のため、若干の金額変動があり得る。

資料－6 参考資料

資料－6-1 環境モニタリングフォーム

資料-6-1 モニタリングフォーム

MONITORING FORM (Construction Stage)

-If environmental reviews indicate the need of monitoring by JICA, JICA undertakes monitoring for necessary items that are decided by environmental reviews. JICA undertakes monitoring based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

-When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

1．Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during Report Period
Responses/Actions to Comments and Guidance from Government Authorities	

2．Mitigation Measures

－Water quality（Wastewater measured value）

Item（Unit）	Measured value (Mean)	Measured value (Max.)	Local standards	Reference: Japanese standard	Remarks
SS (mg/L)			150	200	1 time per week before discharge into river

3．Social Environment

－Impact to existing road

Monitoring item	Monitoring results during report periods
Conditions of construction vehicles operation and traffic jams	

－Labor environment

Monitoring item	Monitoring results during report periods
Labor accidents Safety Protector Safety Meeting	

MONITORING FORM (Operation Stage)

-If environmental reviews indicate the need of monitoring by JICA, JICA undertakes monitoring for necessary items that are decided by environmental reviews. JICA undertakes monitoring based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

-When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

1. Mitigation Measures

－Water quality（Effluent measured value）

Item（Unit）	Measured value (Mean)	Measured value (Max.)	Local standard	Reference: Japanese standard	Remarks
BOD(mg/L)			120	160	1 time per week before discharge into river
Fecal Coliform (MPN/100mL)			800	3000	
Ammonia as NH3-N (mg/L)			7.5	100	
Nitrate as NO3-N (mg/L)			30	100	
Phosphate (mg/L)			10	16	
Oil and Grease (mg/L)			15	30	
Surfactants (mg/L)			30	-	

－Waste

Monitoring items	Measured value
De-watered cake: generated volume	
De-watered cake: disposed volume in landfill	

２．Social Environment

－Impact to existing road

Monitoring items	Monitoring results during report periods
Conditions of vacuum trucks operation and traffic jams	
Conditions of dump trucks operation and traffic jams	

－Assignment of Private De-sludgers for Septage Collection

Monitoring items	Measured value
Monthly total volume collected by Private De-sludgers	

－Labor environment

Monitoring items	Monitoring results during report periods
Labor accidents Safety Protector Safety Meeting	

資料－6-2 環境チェックリスト

Appendix 6-2　Environmental check list

Category	Environmental items	Main check items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a)(b)(c) According to scale of the Project, approval procedures are taken by IEE checklist. (d) Environmental compliant certificate (ECC) is issued by DENR after examination of IEE checklist.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a)(b)Y	(a)(b) Several stakeholders meetings with local government unit, including leaders of Barangays, have been conducted.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Following 3 cases have been compared: 1.The case not to construct STP, and not to procure additional vacuum trucks 2.The case to construct STP and to procure additional vacuum trucks 3.The case not to construct STP, but to procure additional vacuum trucks
2 Pollution Control	(1) Water Quality	(a) Do pollutants, such as SS, BOD, COD, pH contained in treated effluent from a sewage treatment plant comply with the country's effluent standards? (b) Does untreated water contain heavy metals?	(a)Y (b) N	(a) Effluent of STP is discharged to a public river, after treatment satisfying the effluent standards for classification D of DENR（BOD, Fecal Coliform, Ammonia as NH3-N, Nitrate as NO3-N, Phosphate, and Sulfate）. (b) Heavy metals are not included, because only septage of septic tanks is the subject of treatment..
	(2) Wastes	(a) Are wastes, such as sludge generated by the facility operations properly treated and disposed of in accordance with the country's standards?	(a) Y	(a) De-watered cake is disposed in a landfill site.
	(3) Soil Contamination	(a) If wastes, such as sludge are suspected to contain heavy metals, are adequate measures taken to prevent contamination of soil and groundwater by leachates from the wastes?	(a) Y	(a) As mentioned in (1), heavy metals are not included.
	(4) Noise and Vibration	(a) Do noise and vibrations generated from the facilities, such as sludge treatment facilities and pumping stations comply with the country's standards?	(a) Y	(a) The standards on noise are respected during both construction and operation stages. The standards on vibrations is not available.
	(5) Odor	(a) Are adequate control measures taken for odor sources, such as sludge treatment facilities?	(a) Y	(a) Though no regulation is available for odor, the Project installs deodorization devices at STP.
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The construction site does not belong to national park and / or natural conservation area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?	(a)(b)(c)(d)N	(a)(b)(c)(d) The construction site does not belong to conservation areas such as primeval forests, tropical rain forests, ecologically valuable habitats.

Category	Environmental items	Main check items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a)(b)(c)(d)(e)(f)(g)(h)(i)(j)N	(a)(b)(c)(d)(e)(f)(g)(h)(i)(j) Involuntary resettlement is not anticipated.
	(2) Living and Livelihood	(a) Is there a possibility that changes in land uses and water uses due to the project will adversely affect the living conditions of inhabitants? (b) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	(a)N (b)N	(a)(b) No modification of land use and water basin is conducted.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a)N	(a) There is no cultural heritage in the construction site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a)N	(a) No impact to landscape is anticipated, because the Project is to rehabilitate the exiting septage de-watering plant.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to lands and resources respected?	(a)N (b)N	(a)(b) The construction site does not belong to areas for minority race and indigenous people.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a)(b)(c)(d)Y	(a)(b)(c)(d) Based on "occupational safety and health standards" by DOLE （Department of Labors and Environment), safe protectors such as gloves, helmet, safety belt are provided.
	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? (d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?	(a)Y (b)N (c)N (d)Y	(a) Water is discharged after catch basins of suspended solid not to pollute the river. If necessary, sprinkling water is provided to prevent dusts. Low noise / vibration models of construction machines are used for construction works. (b)(c) Since the Project is to rehabilitate the existing facility, no impacts to natural and social environment is anticipated. (d) Adequate time schedule is prepared for construction works not to concentrate construction vehicles in a particular time zone.

Category	Environmental items	Main check items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)Y (b)Y (c)Y (d)N	(a) Monitoring on effluent quality, harmful effects to the existing infrastructure, labor environment, and waste management are implemented. (b) During construction: Effluent quality is metered once per week. Impacts of construction vehicles to traffic conditions and labor environment are observed and reported according to monitoring sheet. During operation: Effluent quality is metered once per week. Impacts of construction vehicles to traffic conditions and labor environment are observed and reported according to monitoring sheet. Volume of de-watered cake is confirmed and reported once per month. (c) The Contactor monitors the above conditions during construction. Operation contractor and MCWD monitor the above conditions during operations. Such costs are included in construction and operation & maintenance costs respectively. (d) According to ECC, MCWD reports metered / observed conditions to DENR.
6 Note	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a)N	(a) No impact is anticipated to global environment.

資料－6-3 水質分析データ

既存Cebu市セプテージ脱水プラントの水質分析結果

	分析項目	単位	採集日			平均
			2018.2.6	2018.2.20	2018.2.27	
セプテージ	TSS	mg/L	28,900	2,840	1,450	11,063
	BOD	mg/L	19,809	980	591	7,127
	COD	mg/L	34,154	6,733	1,984	14,290
	T-N	mg/L	1,693	1,901	417	1,337
	T-P	mg/L	430	647	258	445
分離液	TSS	mg/L	193	192	89	158
	BOD	mg/L	691	175	255	374
	COD	mg/L	1,580	825	511	972
	T-N	mg/L	203	665	265	378
	T-P	mg/L	73	34	59	55
除去率	TSS	%				98.6
	BOD	%				94.8
	COD	%				93.2
	T-N	%				71.7
	T-P	%				87.6

既存Cebu市セプテージ脱水プラント水質分析結果(2014.4～2015.2)

	分析項目	単位	採集月							
			2014.3	2014.4	2014.5	2014.6	2014.7	2014.12	2015.1	2015.2
セプテージ	TSS	mg/L	21,000	210	170	450	300	450	450	850
	BOD	mg/L	3,560	1,000	5,440	3,240	1,440	8,620	6,300	3,520
	COD	mg/L	4,550	18,039	16,924	15,600	11,048	16,924	20,899	29,810
分離液	TSS	mg/L	30	<1	2	4	8	1	400	1
	BOD	mg/L	250	125	2,471	668	320	1,004	1,140	256
	COD	mg/L	200	248	4,118	850	715	3,654	2,432	385
除去率	TSS	%								
	BOD	%								
	COD	%								

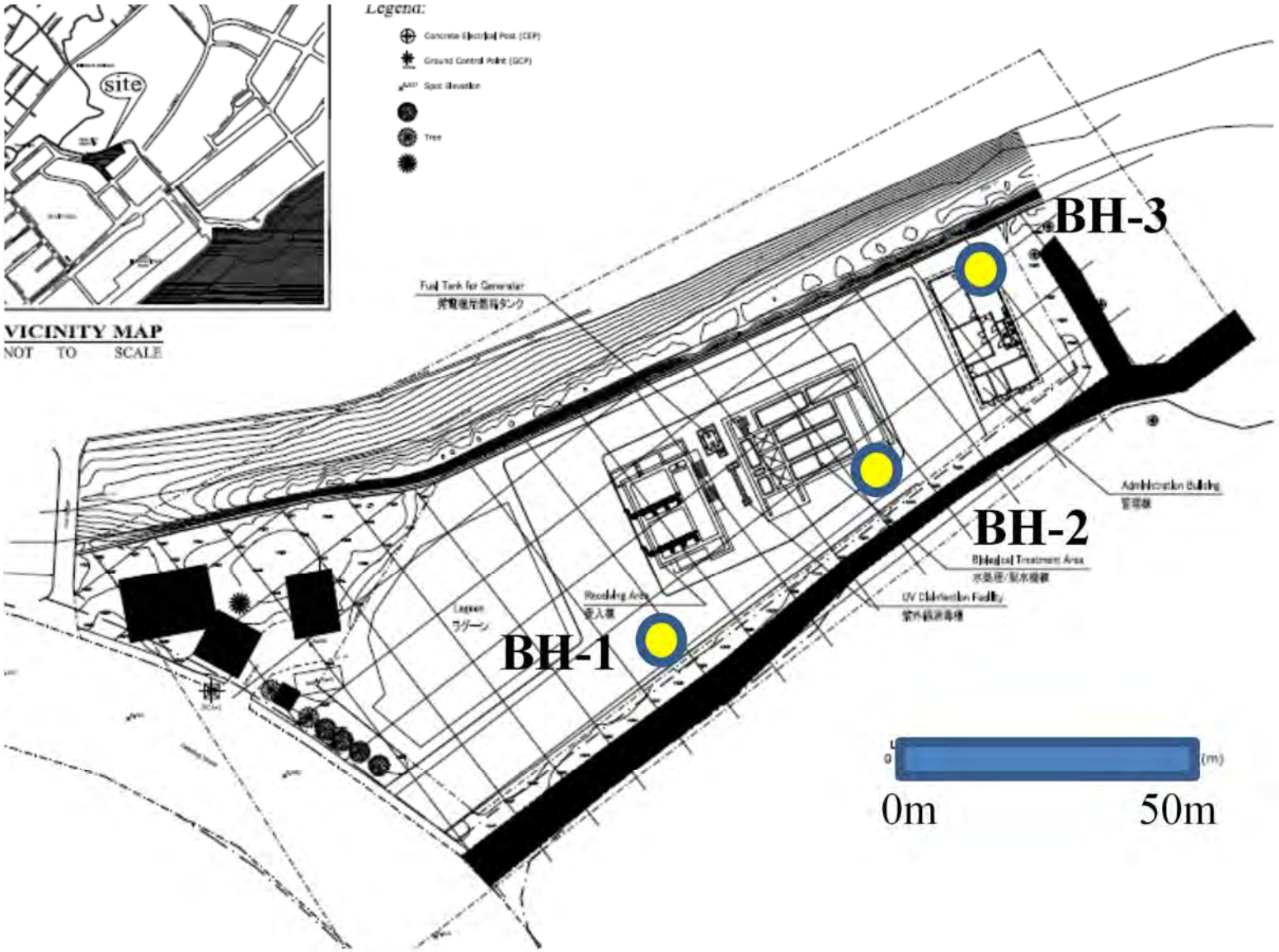
既存Cebu市セプテージ脱水プラント水質分析結果(2015.3～2015.9)

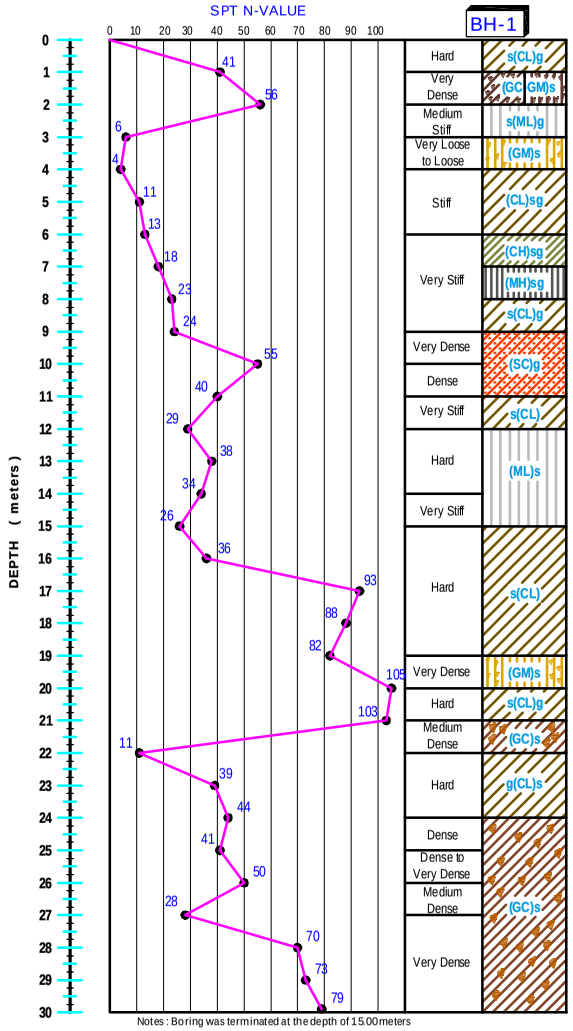
	分析項目	単位	採集月								全期間平均
			2015.3	2015.4	2015.4	2015.7	2015.7	2015.9	2015.9	2015.9	
セプテージ	TSS	mg/L	263	308	11,040	911	26,860	11,869	38,000	34,100	23,812
	BOD	mg/L	1,384	1,080	2,600	1,076	3,900	1,600	11,000	12,000	4,235
	COD	mg/L	10,598	11,435	4,000	19,261	6,400	4,700	9,400	10,000	13,099
分離液	TSS	mg/L	1	<1	40	2.7	320	620	80	120	202
	BOD	mg/L	86	119	240	119	280	210	180	230	481
	COD	mg/L	120	329	68	352	50	120	81	81	863
除去率	TSS	%									99.2
	BOD	%									88.6
	COD	%									93.4

※TSSの平均、除去率は1,000mg/L以下(黄色着色部)のデータを除いた6データの平均値

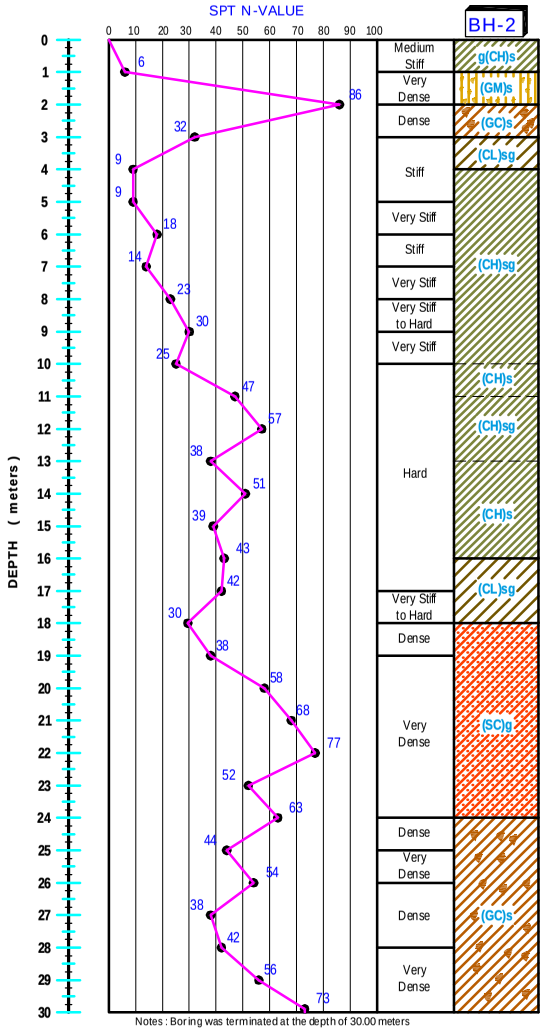
マニラ南部STP受入セプテージ性状			
受入セプテージ性状			
採集月	TSS	BOD	COD
年/月	mg/L	mg/L	mg/L
2016.10	18,400	2,292	16,277
2016.10	2,700	2,492	13,127
2016.10	4,500	928	5,113
2016.11	21,700	3,419	27,877
2016.11	15,900	3,465	18,748
2016.11	17,000	4,512	18,132
2016.12	24,800	1,596	14,865
2016.12	32,600	7,047	16,476
2017.1	18,000	3,914	23,709
2017.1	16,400	2,583	7,950
2017.1	18,000	2,712	14,556
2017.1	19,400	2,408	13,841
2017.2	5,600	1,402	7,964
2017.2	4,000	871	5,993
2017.2	2,000	2,060	3,653
2017.2	2,750	1,499	3,645
2017.3	17,900	6,964	14,638
2017.3	4,850	6,800	7,582
2017.3	18,100	3,763	17,527
2017.3	6,100	3,362	12,403
平均	13,535	3,204	13,204

資料－6-4 土質調査結果

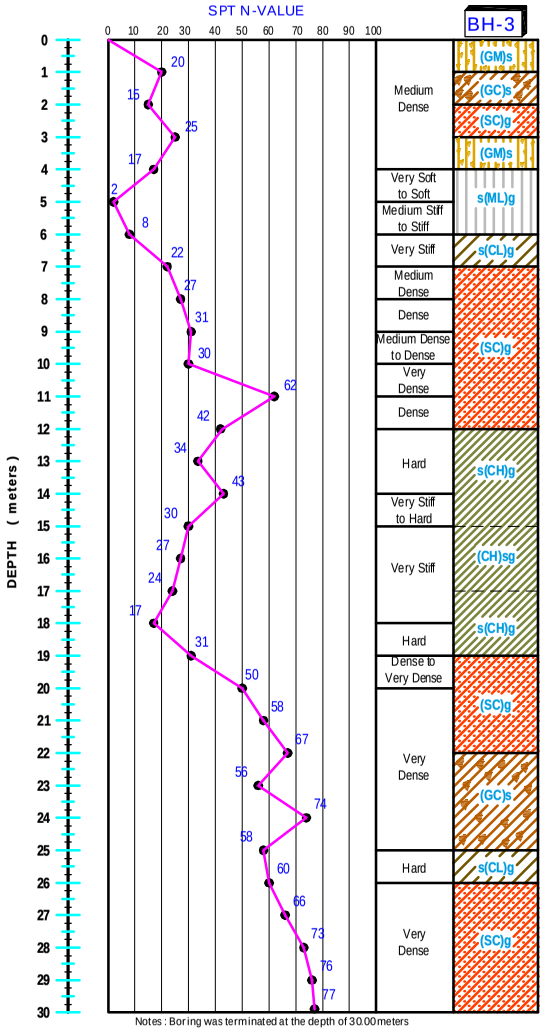

site
VICINITY MAP
NOT TO SCALE
Legend:
Tree
Fuel Tank for Generator
BH-3
BH-2
BH-1
Lagoon
Reedbed Area
UV Disinfection Facility
0m
50m



Notes : Boring was terminated at the depth of 15.00 meters



Notes : Boring was terminated at the depth of 30.00 meters



Notes : Boring was terminated at the depth of 30.00 meters

LEGEND:

s(CL)g	-	Sandy LEAN CLAY with gravel size coralline limestone fragments
(GC-GM)s	-	SILTY CLAYEY GRAVEL size coralline limestone fragments with sand
s(ML)g	-	Sandy SILT with gravel
(GM)s	-	SILTY GRAVEL size coralline limestone fragments with sand
(CL)sg	-	LEAN CLAY with sand and gravel
(CH)sg	-	FAT CLAY with sand and gravel
(MH)g	-	ELASTIC SILT with sand and gravel
(SC)g	-	CLAYEY SAND with gravel
s(CL)	-	Sandy LEAN CLAY
(ML)s	-	SILT with sand

LEGEND:

g(CH)s	-	Gravelly FAT CLAY with sand
(GM)s	-	SILTY GRAVEL size coralline limestone fragments with sand
(GC)s	-	CLAYEY GRAVEL size coralline limestone fragments with sand
(CL)sg	-	LEAN CLAY with sand and gravel
(CH)sg	-	FAT CLAY with sand and gravel
(CH)s	-	FAT CLAY with sand and gravel
(SC)g	-	CLAYEY SAND with gravel

LEGEND:

(GM)s	-	SILTY GRAVEL size coralline limestone fragments with sand
(GC)s	-	CLAYEY GRAVEL size coralline limestone fragments with sand
(SC)g	-	CLAYEY SAND with gravel size coralline limestone fragments
s(CH)g	-	Sandy FAT CLAY with gravel size coralline limestone fragments
(CH)sg	-	FAT CLAY with sand and gravel
s(CL)g	-	Sandy LEAN CLAY with gravel size coralline limestone fragments

A-6-4-2

DRAWN NTS

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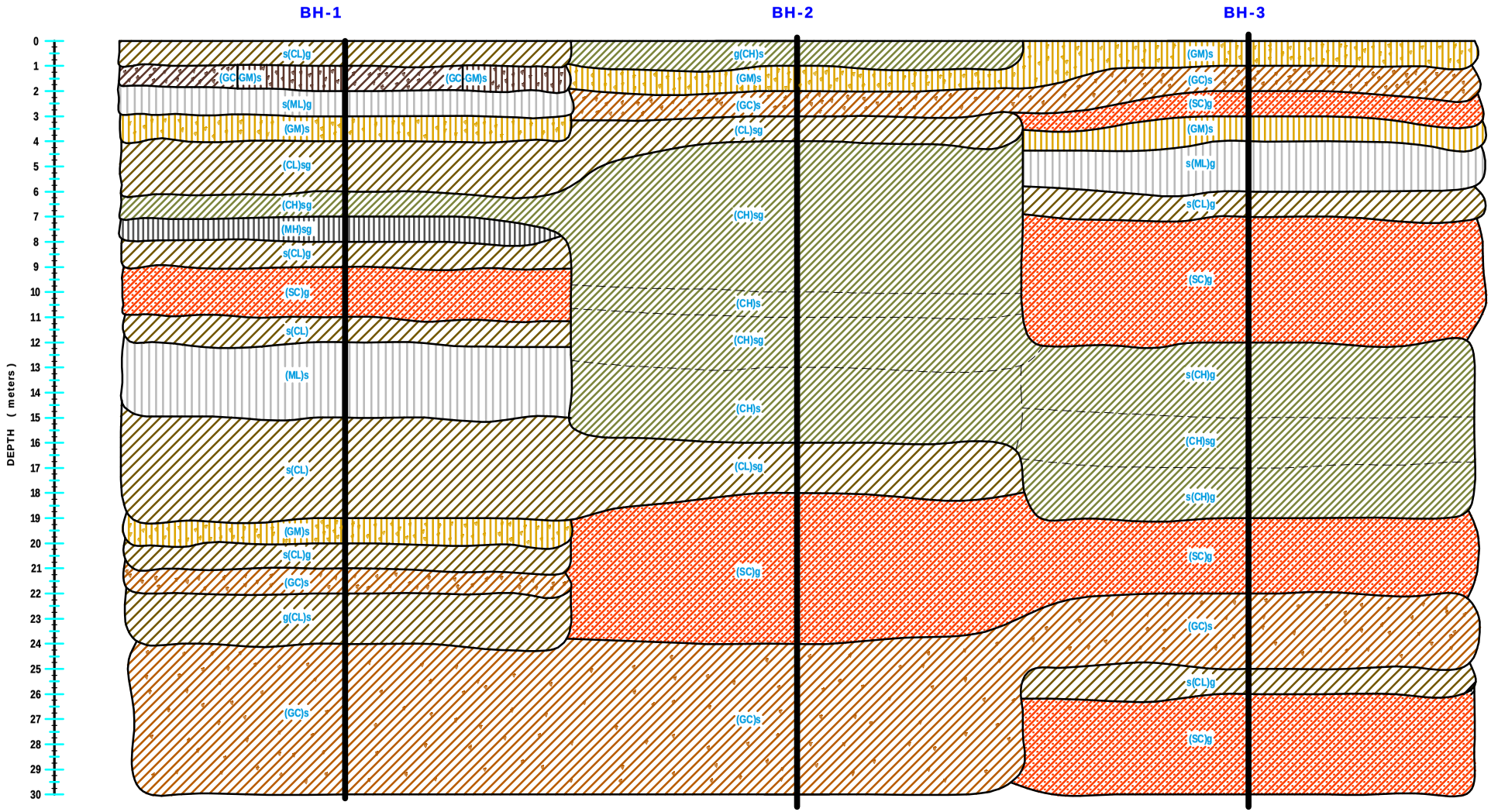
Project: PREPARTATION SURVEY FOR THE SEPTAGE MANAGEMENT PROJECT FOR MCWD SERVICE AREA
Location: F. CABAHOG ST., NRA, CEBU CITY
Site: SOUTH AMKON

Figure 3.0
DEPTH vs. SPT N-VALUE & SUBSOIL PROFILE (BH-1, BH-2 & BH-3)



A-6-4-3

LEGEND :

s(CL)g	-	Sandy LEAN CLAY with gravel size coralline limestone fragments
(GC-GM)s	-	SILTY CLAYEY GRAVEL size coralline limestone fragments with sand
s(ML)g	-	Sandy SILT with gravel
(GM)s	-	SILTY GRAVEL size coralline limestone fragments with sand
(CL)sg	-	LEAN CLAY with sand and gravel
(CH)sg	-	FAT CLAY with sand and gravel
(MH)sg	-	ELASTIC SILT with sand and gravel
(SC)g	-	CLAYEY SAND with gravel
s(CL)	-	Sandy LEAN CLAY
(ML)s	-	SILT with sand

LEGEND :

g(CH)s	-	Gravelly FAT CLAY with sand
(GM)s	-	SILTY GRAVEL size coralline limestone fragments with sand
(GC)s	-	CLAYEY GRAVEL size coralline limestone fragments with sand
(CL)sg	-	LEAN CLAY with sand and gravel
(CH)sg	-	FAT CLAY with sand and gravel
(CH)s	-	FAT CLAY with sand and gravel
(SC)g	-	CLAYEY SAND with gravel

LEGEND :

(GM)s	-	SILTY GRAVEL size coralline limestone fragments with sand
(GC)s	-	CLAYEY GRAVEL size coralline limestone fragments with sand
(SC)g	-	CLAYEY SAND with gravel size coralline limestone fragments
s(CH)g	-	Sandy FAT CLAY with gravel size coralline limestone fragments
(CH)sg	-	FAT CLAY with sand and gravel
s(CL)g	-	Sandy LEAN CLAY with gravel size coralline limestone fragments

DRAWN NTS

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Location:	F. CABAHOG ST., NRA, CEBU CITY
Site:	SOUTH AMKON

Figure 4.0

GENERALIZED SUBSOIL PROFILE (BH-1, BH-2 & BH-3)

資料－6-5 社会調査結果

April, 2018

Septage Management Practices of MCWD and non-MCWD Customers

University of San Jose-Recoletos

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1 Summary

The importance of proper waste disposal is a primordial concern of every household and individual. It should not be taken for granted because it can greatly affect the environment and the balance of nature. This household survey aims to determine the household practices of the selected municipalities and cities of Cebu when it comes to waste water disposal. Furthermore, this study further aims to ascertain on whether or not, waste water (sludge) withdrawn from different households will have a possible use to the farmers as fertilizer.

The following highlights are drawn from the results of the survey:

Household survey

- Most of the respondents were MCWD subscribers; few were customers of local service water provider, while others used deep wells.
- Most of the respondents have their own septic tank or cesspit/latrine as waste water storage facility that is equipped with opening with cover and a bottom slab.
- Respondents who own a waste water storage facility have never experienced withdrawing sludge for a long period of time
- Those who have experienced withdrawing sludge express that the quality of effluent they observed were good. Sludge withdrawal was done by private sector and the only reason that they avail of such service is because the tank became full.
- Respondents were open as to the possibility of sludge withdrawal within 3-5 years as long as it is affordable to them.
- Most of the respondents' waste water from the kitchen is drained to canals while waste water from toilet is going to the septic tank.
- The average size of septic tank is around 5.37 m^3

Farmer's Survey

- Most of the farmers are located in the mountain area of Cebu City.
- Most of the farmers owns at least a 1 hectare lot where different kinds of crops (eg. Flowers, vegetables, fruit bearing tress) are cultivated.
- Most of the farmers does not get agricultural water supply from a water service provider but rather sourced it from ground water such as ponds, rivers, and springs.
- Farmers used both commercial and organic fertilizers for their crops.
- Most of the farmers were willing to try the compost from sludge taken from septic tanks as fertilizer to their farm

2 Introduction

Environmental Programs and initiatives are enacted by national policy makers in order to protect the people from health hazards. These national policies are cascaded down to the local government units to formulate ordinances and implementing rules and regulations that suit its locality. In 2014, City Ordinance No. 2398, also known as septage management program ordinance, was enacted to protect the health of the people and the environment by controlling and managing the storage, collection, transport, treatment, and disposal of septage or sludge from various sources in the city of Cebu (Cabrera, 2014). This ordinance includes but not limited to: proper construction of septic tanks and frequent collection of sludge. However, this policy may be in place, but is this implemented or has this reached its implementation in the household level? It is therefore the aim of this study to describe the Septage management practices of the different households in the six (6) municipalities of Cebu.

Republic act 9275, otherwise known as the "Philippine Clean water act of 2004" mandates local government units to prepare a program on septage management and to share the responsibility in the management and improvement of water quality within their respective territorial jurisdictions. Furthermore, the same law mandates local government units to appropriate necessary land for the construction of a sewage and/or septage management facilities. These facilities shall be used in treating withdrawn sludge from different establishments and assures proper disposal of the same. Ingallinella, Sanguinetti, Koottatep, Montangero, Strauss (2002) averred that faecal sludge collected from different home-made sanitary facilities such as septic tanks are usually discharged not treated which poses a great risk to water resources and public health. That is why, it has been well documented that there is a direct relationship between different health diseases such as cholera, hepatitis, and dysentery and the unrestricted discharges of residential sewage system (Robbins, 2007). Until such time that these practices shall be properly managed, people continues to be at risk of these health hazards posed by indiscriminate disposal of household wastes.

With these considerations at hand, proper septage management is an indispensable practice. And this practice should start at home as it is considered as the basic unit of the society. These individual households may not be the major contributor to environmental pollutions, but taking them as a whole poses a big risk to the environment. Therefore, acting on the basic step of identifying the septage management practices of these households is the first priority, and from there, programs and interventions shall be implemented in order to prevent more risks to the environment and the people.

3 Survey

3-1 For Residents

3-1-1 Methodology

This study employed descriptive survey method using a custom-fit questionnaire designed appropriately for the purpose of the study and served as an Interview guide. The same questionnaire has undergone corrections and refinements before the actual survey implementation. These corrections include changing of numbering because of skipping questions and unlocking or changing of terms that can be clearly understood by the respondents. Though questions were in English, these were translated into the local dialect during the conduct of the survey. After the data were gathered, appropriate statistical treatment such as percentage and ranking were employed in order to obtain relevant information.

When it comes to statistical treatment used, a simple percentage and ranking were employed in this study. For questions that a certain range needs to be computed, the highest response of the respondents were deducted by the lowest response and divided by five (5) groups.

3-1-1-1 Questionnaire and contents of the interview

Please see Annex 5-1-1

3-1-1-2 Preparation/Mobilization

1) Resources

A total of 6 Field Interviewers (FI) were deployed in the 6 survey areas. Each FI is assigned to a specific Local Government Unit (LGU) and a number of household respondents that they are supposed to survey. In the conduct of the survey, each FI needs the following resources:

- Interviewer's Kit – containing the questionnaires need for the LGU
- Identification – Survey ID needed for them to be identified by the respondents
- Transportation Allowance and Honorarium

2) Mobilization

During the orientation, they were introduced to the questionnaire and did a simulation interview with one identified respondent in order to get a feel on the flow of questions and other possibilities that they may encounter during the actual survey. After the simulation interview, they were asked to share their experiences and even difficulties in conducting the interview.

During the survey proper, each field interviewer is already assigned to a specific Local Government Unit (LGU) and a barangay where they are supposed to conduct they survey. Upon reaching the barangay, they will proceed to a starting point (*any permanent landmark such as: church, school, medical facility and others*) which were already set and part of the interviewer's kit. From there, a random number is generated to serve as a guide to the first household respondent. After the first household, an interval of one (1) house is observed before the next household is chosen. During the entire conduct of the survey, field interviewers observed the right side rule, meaning, they are supposed to interview respondents from households located on the right side when walking along the road. This process ensures systematic selection and wide area coverage in the conduct of the survey.

3-1-2 Survey Area and Respondents

3-1-2-1 Survey area

Respondents of the survey were residents of the randomly selected households from the following six areas in Cebu: Compostela, Liloan, Consolacion, Mandaue, Cebu City, and Talisay City.

3-1-2-2 Survey Respondents

1) Number of respondents

Number of respondents in each municipality was identified accordingly in proportion to the total population of the municipalities and cities. In order to randomly select the respondents, list of customers from the Metropolitan Cebu Water District (MCWD) was used in the selection process. Using Minitab Statistical Software, random respondents were chosen among the list. Barangay location of these respondents served as a guide in the selection of the actual respondents in the survey. A total of 200 respondents were interviewed in the survey. However, around 20% of the total respondents were non-MCWD subscribers while and the remaining were customers of MCWD.

Table 3-1 Number of survey respondents

City\Sample type	MCWD customer	MCWD non-customer	Total	%
Compostela	8	2	10	5.0%
Liloan	11	3	14	7.0%
Consolacion	11	3	14	7.0%
Mandaue	41	9	50	25.0%
Cebu City	73	18	91	45.5%
Talisay City	18	3	21	10.5%
Total	162	38	200	100.0%

2) Average number of household member

Table 3-2 presents the average number of household members per survey area. Taking the total number of household members per locality, divided by the number of households surveyed in the area (ex. Liloan 63/14=4.50), it was found out that Talisay City had the highest average household members with 5.38 while Liloan got the lowest average household members with 4.50.

Table 3-2 Average number of household member

City	Number of household members	Number of household surveyed	Average number of household members
Compostela	52	10	5.20
Liloan	63	14	4.50
Consolacion	75	14	5.36
Mandaue	242	50	4.84
Cebu City	482	91	5.30
Talisay City	113	21	5.38
Total	1027	200	

Respondents were further asked on how many members of each family that belongs to the each group indicated below.

There were a total of 1,027 individuals listed as part of the members of the household. Of these, more females than males were observed, and more of them were coming from the

age group of 22-27 years old. There were 153 (sum of 0-5 and 6-11) members of the household who were children and 142 (sum of 58-63 and 64 above) who could possibly be senior citizens. With this, septage management is very important because these children and senior citizens could be the one who will be more affected if there is contamination in water system.

Table 3-3 Total Number of family members of the respondents

Age group (years)	Male	Female	Number of persons
0-5	35	35	70
6-11	49	34	83
12-17	46	39	85
18-21	45	61	106
22-27	70	77	147
28-33	48	48	96
34-39	49	35	84
40-45	24	42	66
46-51	36	27	63
52-57	33	52	85
58-63	25	28	53
64 and above	30	59	89
TOTAL	490	537	1,027

3) Religion

Data on the Religion of the Respondents are presented in figure 3-1. As revealed in the figure, one hundred eighty five (185) or 92.5% of the respondents were Roman Catholics. This is the dominant religion in the province of Cebu that is why most of the respondents belong to such religious affiliation.

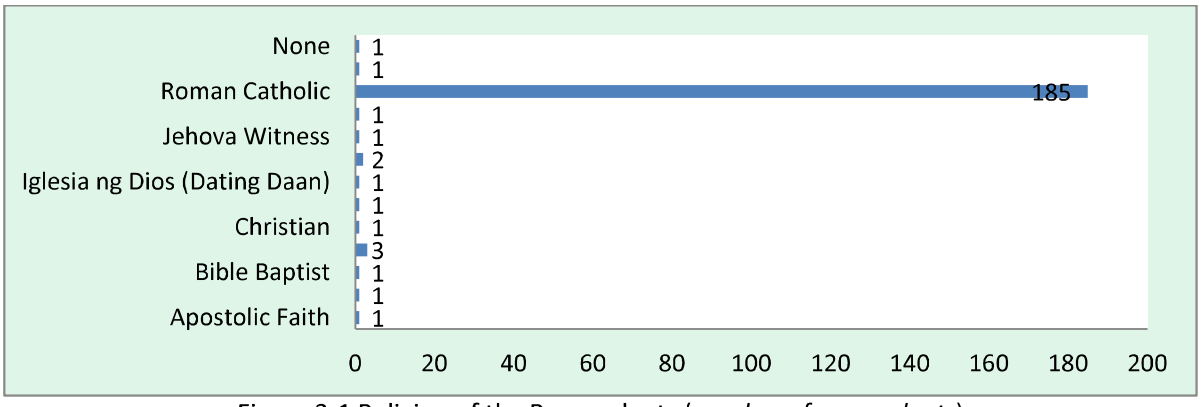

Figure 3-1 Religion of the Respondents (*number of respondents*)

Respondents were asked as to the main source of income of the household.
Figure 3-2 has the results. The figure revealed that majority of the respondent's household main source of income is from salaries and wages of an employed family member. Although, there were also others who got their main source of livelihood from a small business (eg. Sari-sari store (small business), internet café's, vulcanizing shop, some receives a monthly

pension from Social Security System (GSIS) and Government Services Insurance System (GSIS)

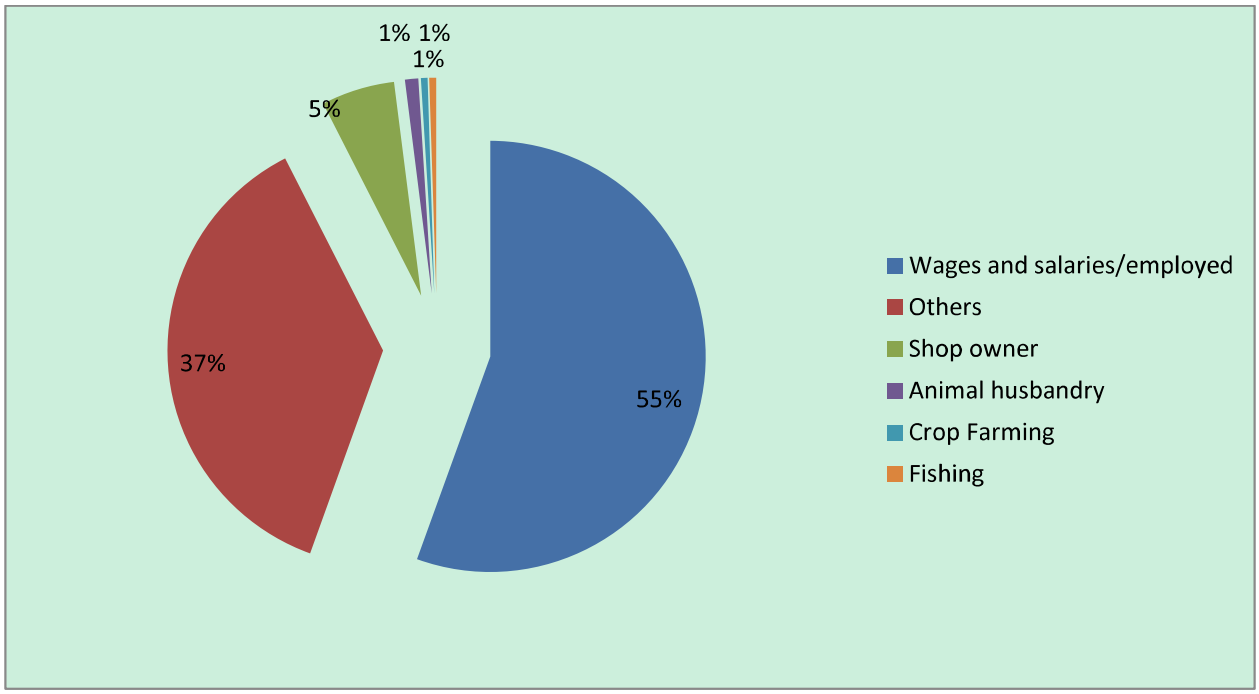

Figure 3-2 Main Source of Income

4) Preference on expense

The next table will reveal the top three expenses of the household. Meaning, after receiving their salaries, wages, and other incomes, where will it go? Respondents were asked to rank (with 1 as the first priority, 2 as second, and so on) the list based on the amount they usually spend for each category. Table 3-4 reveals the results. Taking the average response of the respondents (based on their rankings), table 3-4 revealed that the top 3 categories where household expenses will go were Food, Education, and Utilities. Utilities in this sense includes water, solid waste, energy source for lighting and cooking such as electricity, gas, kerosene, charcoal, and/or firewood. The result simply implies that food for the table will always be the first priority of every household.

Table 3-4 Household expenses

	Average of the rating	Categories
1	1.26	Food
2	2.22	Education
3	2.3	Utilities
4	2.5	Personal Care
5	2.5	Recreation
6	2.55	Health
7	2.76	Housing
8	2.8	Transportation
9	2.92	Clothing

Part of determining the socio-economic standing of a family is through the things that they possess. Some of these things could be very basic while others may also be a luxury. Figure 3-3 has the results. The top 3 common things that each household possess are Television with satellite dish (cable TV) with 187; followed by an electric fan with 180 respondents; and mobile phone with 169. The least commodity that each household possess are mosquito nets with 19; private car with 23; and private bicycle with 37 respondents.

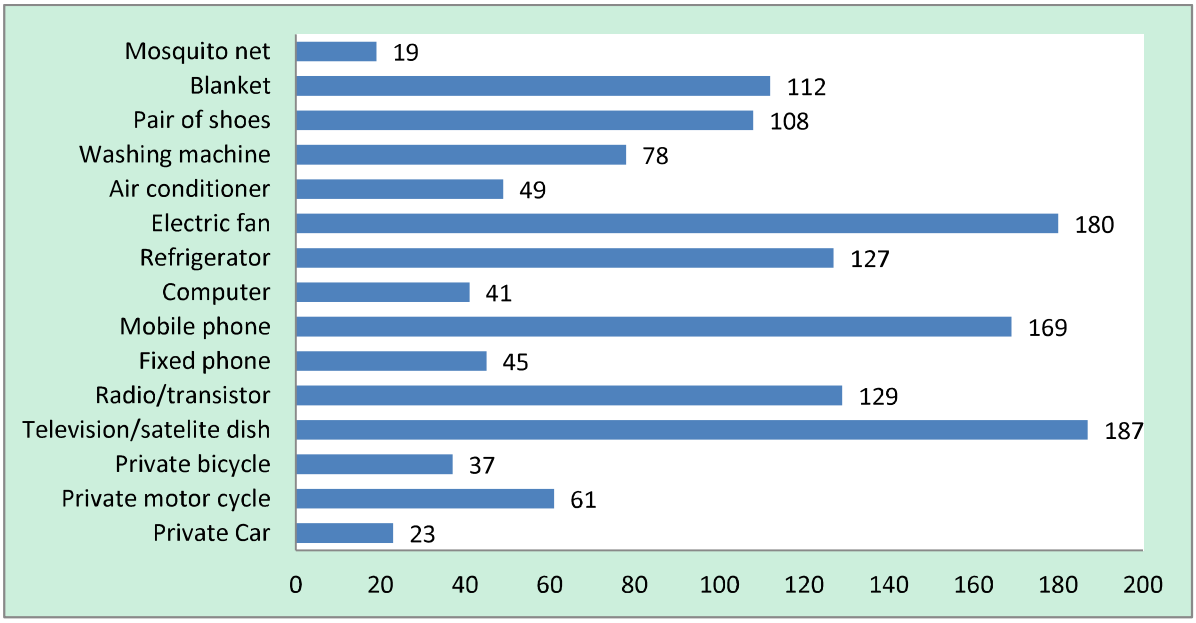

Figure 3-3 Things that respondents possess in the household *multiple response (*no. of respondents*)

5) Spread of diarrheal diseases

Respondents were asked on whether or not any members of the family have experienced hospitalization due to diarrheic diseases. Figure 3-4 shows the results. Most of the respondents could not anymore remember when was the last time a member of the family have experienced diarrheic diseases. Only few (17) have experienced diarrheic diseases once a year. This result may imply that as of the moment, there is not much contamination in the water supply yet. The availability of a purified drinking water now-a-days may have contributed to a more safe drinking water that is why diarrheic diseases are not anymore that prevalent.

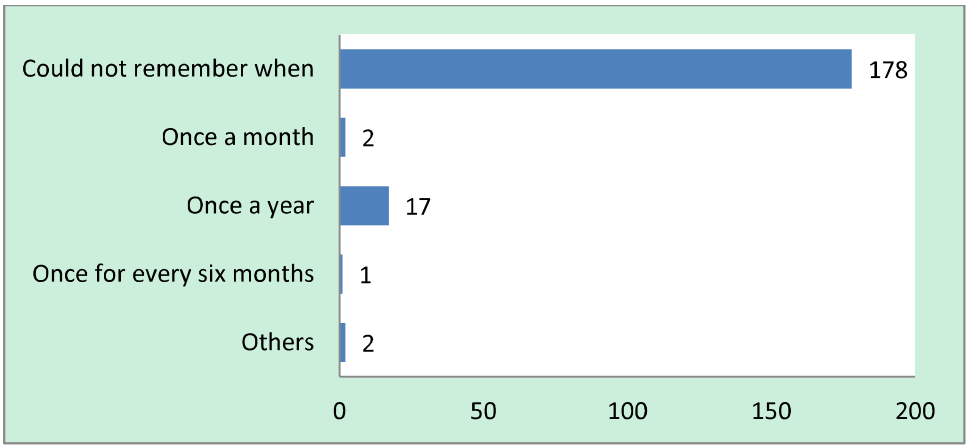

Figure 3-4 hospitalization due to diarrheic diseases (*number of respondents*)

The next figure shows the some social problem that is experienced by the household within the community. Figure 3-5 shows the results. It was revealed that the most prevalent social problem they have experienced in their community is the presence of solid waste that are scattered in public places or accumulated in drainage. This is the main cause of flooding (the second in rank) which is a frequent occurrence in the area whenever there is a strong pouring of rain. Furthermore, it also not surprising to observe that no job / source of income remains a social problem to most of the people. Although government have problems that would create more employment people, still only few got hired because of the needed skills for the job. While these top 3 social problems remain to be unsolved, others could not decide on which of these social problems they would consider as the biggest. Instead of choosing just one problem, they considered 2 or more problems as the issues they have experienced in their community.

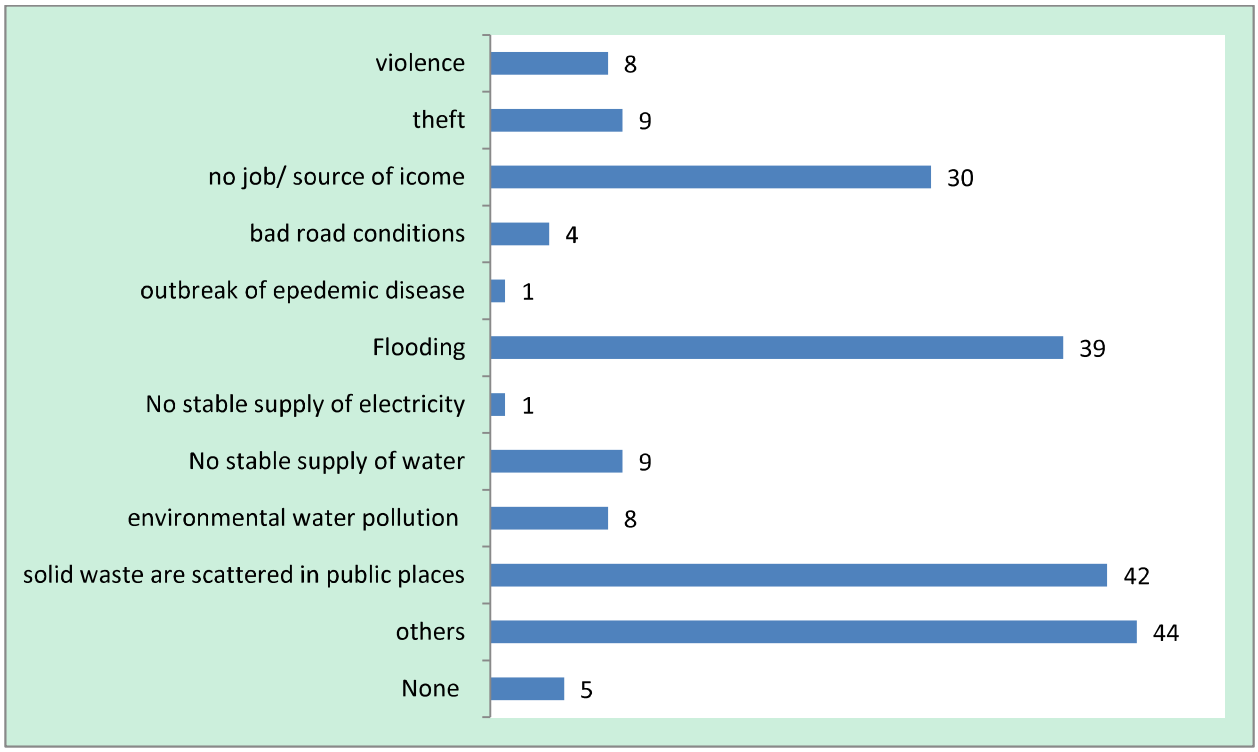

Figure 3-5 Social Problems encountered by the respondents (*number of respondents*)

Aside from being a residence, respondents were asked if there is any other purpose of the house they are living. Figure 3-6 shows the results. As revealed in the figure, most of the respondents used their house exclusively for residence only as indicated by 175 respondents. However, there were others who maximized their place and use a space for small eatery (carenderia), while others have small shops and others offer their residence for rental or boarding house.

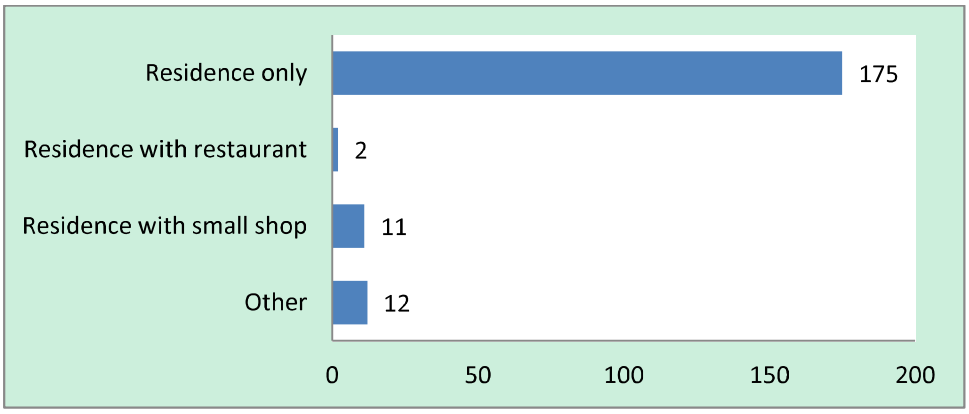

Figure 3-6 Purpose of house aside from residence (*number of household*)

In this question, respondents were asked at the same time observation was employed to determine the type of dwelling of the respondents. Type of dwelling refers to the floor area of the residence, whether it has one or multi-floor dwelling. Figure 3-7 shows the results. Majority of the residences surveyed have only one floor type of dwelling with 116 of the respondents. This was followed by residences that have more than one floor (2 or 3 floors) type of dwelling. In a place where space is so limited, like within the city setup, people are beginning to discover the importance of having a multi-story house in order to save and maximize the little space that they have.

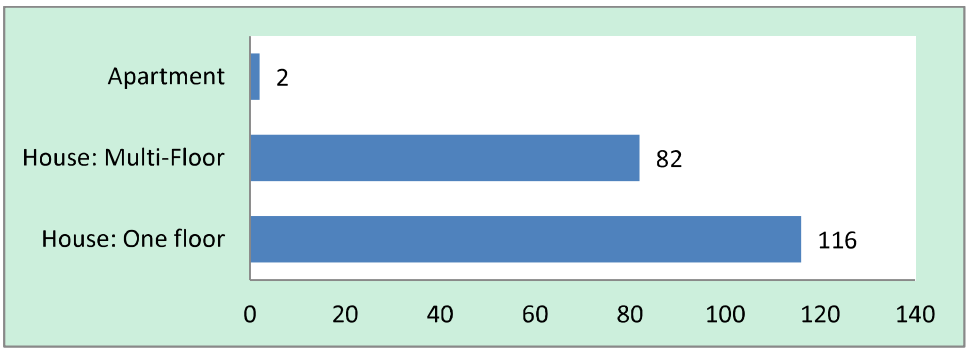

Figure 3-7 Type of dwelling (no. of household)

After determining the type of dwelling that respondents have, they are asked as to the number of rooms they have in their house. Figure 3-8 has the results. It was found out that about 64% of the respondents have three rooms or more in their dwellings. The others have two and one room with 42 and 31 respondents respectively.

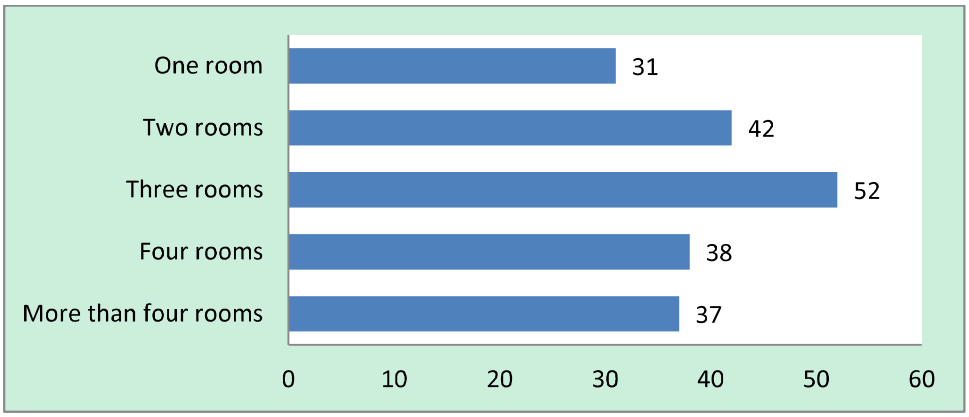

Figure 3-8 Number of rooms and other living service rooms (*no. of households*)

3-1-3 Results

3-1-4Water and Sanitation

1) Monthly fee for MCWD water provision

The next figure reveals the average monthly expenses of the respondents related to water consumption *(excluding mineral water used for drinking)*. The average figures indicated herein includes expenses for water used in kitchen, washing, and toilet. These expenses may be reflected in their bills if they are MCWD subscribers. Figure 3-9 reveals the results. As the figure revealed, more of the respondents paid around 250.00 pesos per month for water consumption which is more or less the minimum amount paid to MCWD. This was followed by those who paid around 500.00 pesos per month. Therefore, most of the respondents (sum of 250.00 and 500.00) paid around 500.00 pesos monthly for water consumption.

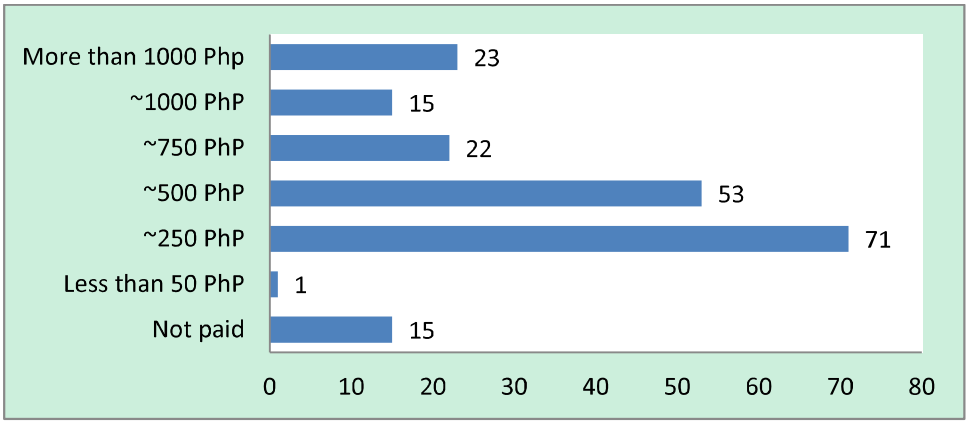

Figure 3-9 Average monthly expenses in water (*in Philippines peso*)

2) Cost for septage removal service

Currently, respondents are not paying a monthly fee for the cost of septage removal because such service will only be availed and paid during the actual removal of the sludge. However, this question asked the respondents to give estimated monthly expenses related to sanitary activities. Sanitary activities relates to disposing of sludge to the septic tank, maintenance of pipes, water used in the toilet, and water used in kitchen for cooking. Figure 3-10 shows the results. More than fifty percent (50%) or 108 out of 200 respondents did not spend any amount for sanitary activities every month. For those who have indicated their answers on the other hand, gave an estimated amount based on their monthly water consumption bill.

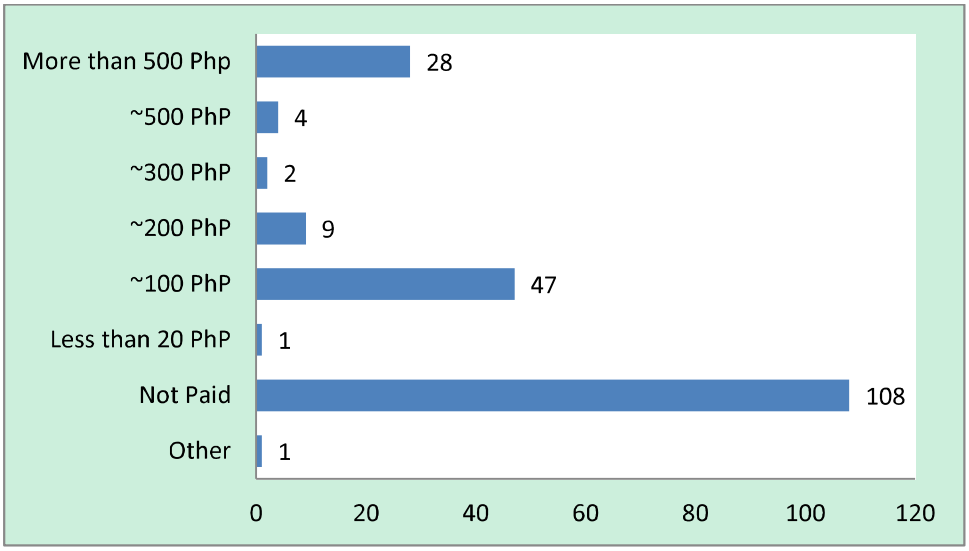

Figure 3-10 Average monthly expenses for sanitary activities (*in Philippine peso*)

3) Government Services and facilities

Government provides necessary drainage and canals in strategic places in order to prevent floods in the area. However, even with the presence of these infrastructures and facilities, respondents were asked on what are the improvements that they would want to expect more from the government in relation to sanitary fields. Figure 3-11 has the results. As revealed in figure 7, more than fifty percent (50%) of the respondents said that an improvement on the condition of the drainage is of primary importance. Considering that a lot of areas are flooded during rainy season, this is the area where government should improve their services. Although, looking at the situation, it is more on the residence call to make sure that their drainage are passable with water. Most of the time, because of the indiscriminate disposal of garbage by the people, most of the plastic thrown in the canals or drainage block the water that passes through it therefore causing flooding in the area.

Another area that public service should improve more is to lower the price of withdrawing sludge. Since this service (withdrawing of sludge) is currently done by private agencies, it is that not affordable for most of the people (*cost of sludge withdrawal by private sector shown in table 3-5*). The table shows that for every withdrawal of septic tank content, one has to pay around 2500 pesos per truck (with $6m^3$ capacity) within 20 meters from the location of the truck and additional fee of between 300-500 pesos for every 5 meters in excess of 20 meters. Furthermore, if the customer decides to have the septic tank cleaned by the provider, an additional cost of 4,500 pesos for cleaning the septic tank shall be paid.

Therefore, if the government can create programs and strategies that would lessen the cost of withdrawing sludge, more people would be encouraged to withdraw their sludge frequently and therefore minimizes soil and water contamination.

Table 3-5 Cost of withdrawing septic tank by private sectors (amount in Philippine peso)

Provider	Amount	Additional Cost	Cleaning
Septic Tank Services 1	3000/truck for 20 meters	500 / 5 meters of excess	
Septic Tank Services 2	2500 / truck for 50 meters	300 / 6.3 meters of excess	4,500
Septic Tank Services 2	2500 / truck for 50 meters	300 / 6 meters of excess	4,500

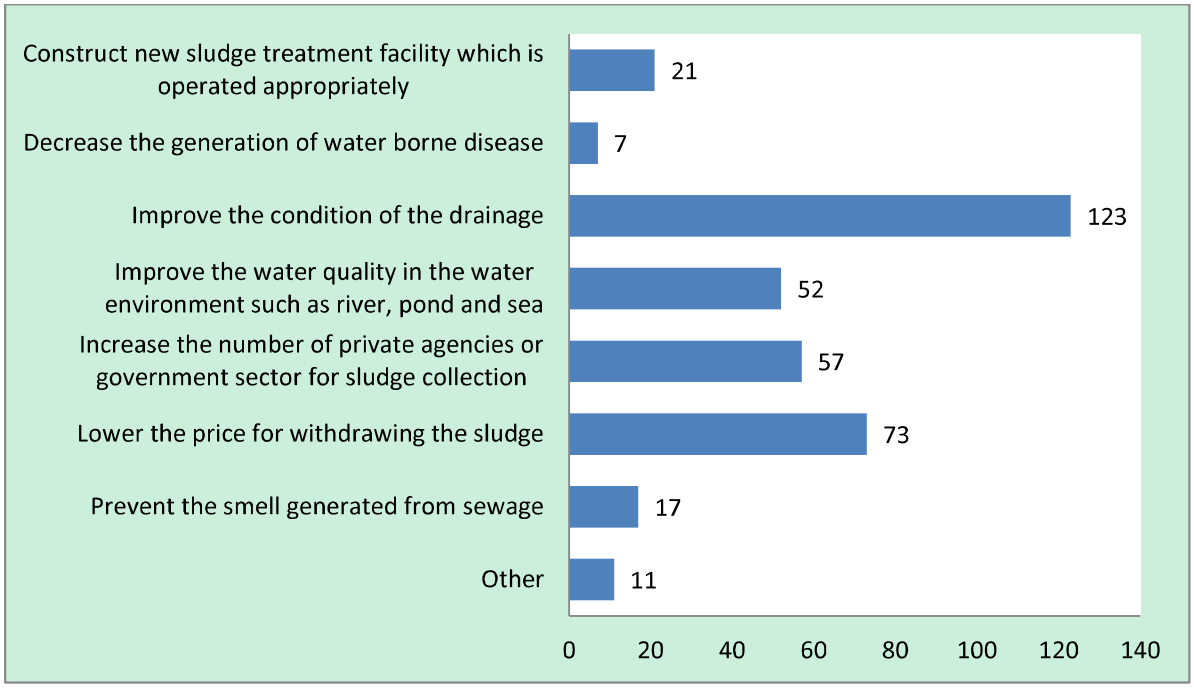

Figure 3-11 Improvements for Public Service regarding Sanitary Field

4) Payment for Additional Government Service

After choosing the kind of improvement that respondents expects from the government, they were asked if they are willing to pay an additional fee for such service/s and how much are they willing to pay. Figure 3-12 and table 3-6 reveals the results respectively.

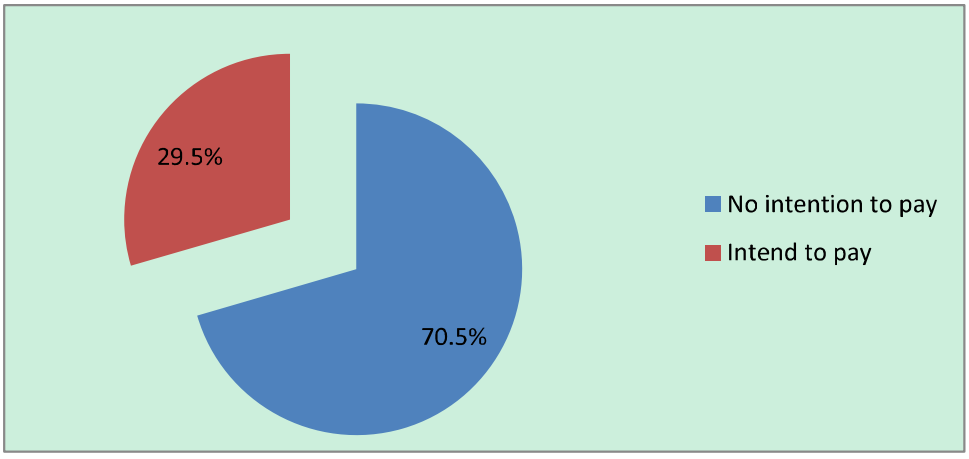

Figure 3-12 willingness to pay

This is the problem with the society, they would want to improve the public service, but do not want to pay additional fee for such service. It seems that they just want to have it for free. As revealed in figure 3-12, most of those who indicated an additional service improvement from public have no intention to pay more. So the next question would be, where should the government get the needed funding to provide these additional services to the people?

On the other hand, for those who indicated that they are willing to pay additional fee for the service/s, can only afford to pay not more than 180.00 pesos for such service as indicated by the sum of 16 and 24 which is around 68%. Others though could not estimate the amount but nevertheless willing to pay for the additional services and probably wait for the appropriate computation.

Table 3-6 additional fees for the service

Additional Fees for Service (in pesos)	Frequency
90 and below	16
91 to 180	24
181 to 270	1
271 to 360	
361 and above	1
Could not estimate	17
TOTAL	59

5) Water Equipment source

Respondents were asked as to the kinds of water equipment that they own in their residence. Figure 3-13 reveals the results. As revealed in the figure, most of the respondents have their own water meter connected to a service provider whether MCWD or their own local water provider. But even though they have their own water meter, others still prefer to have their own storage tank most especially for elevated areas where a schedule water interruption is more frequent. Others have their own deep well as a main source of water.

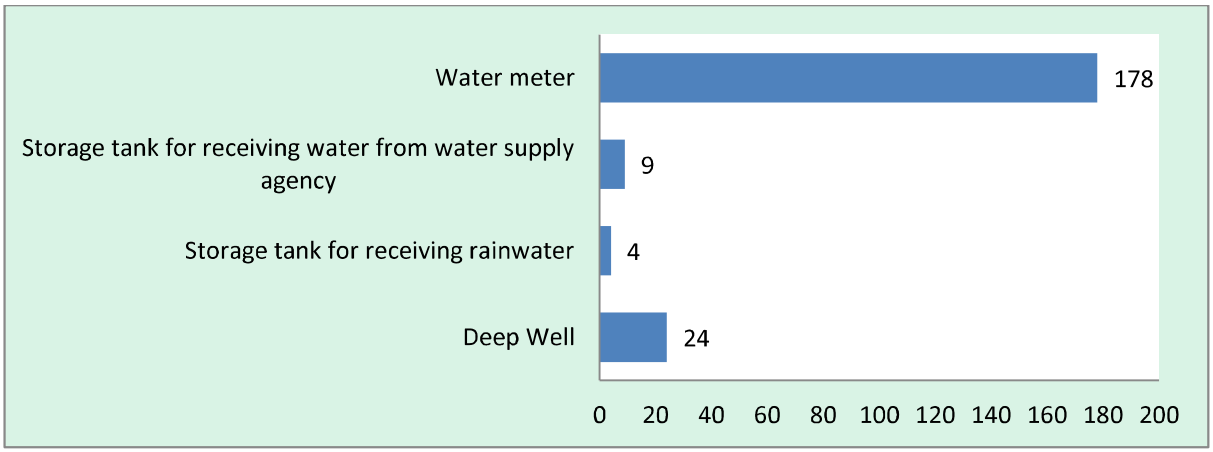

Figure 3-13 Kinds of water equipment *multiple response

6) Toilet type

Respondents of the survey were asked as to the kind of toilet that they have. Whether it is flushed toilet or not. Figure 3-14 has the results. Almost all of the respondents said that they are using flushed toilet in their residence with 99% of the respondents. With this 99% flush kind of toilet, around 82% or 163 of them used water tank / jar and dipper, or water pots for cleaning defecation and bowl.

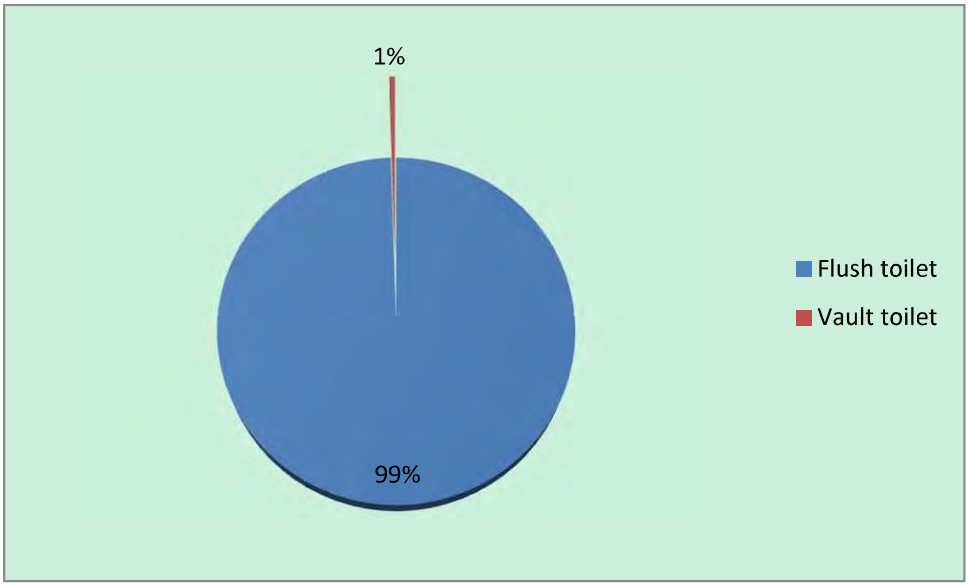

Figure 3-14 Kind of toilet

7) Water used in cleaning the toilet

In cleaning the toilet, respondents were asked on the kind of water do they use. Figure 3-15 reveals the results. Most of the respondents used water from MCWD in cleaning the toilet while others used water from deep wells and other local water service provider.

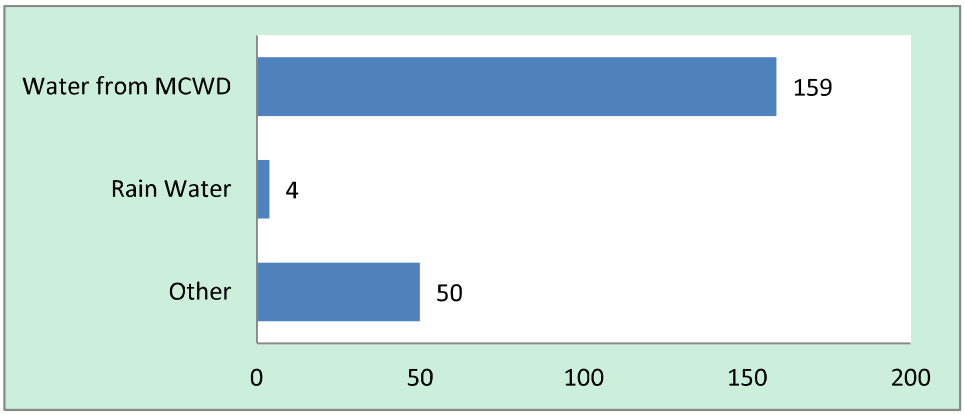

Figure 3-15 Kind of water used in the toilet *(*multiple response)*

3-1-5 Wastewater discharge and septic tank

In this question, respondents were asked as to the kind of sanitary equipment that the house have. Sanitary equipment in this context refers to the availability of septic tanks or latrine or cesspit, and drain pipes. Figure 3-16 shows the results. Most of the respondents have both drain pipe and septic tanks or latrine or cesspit but waste waters from kitchen are discharged into canal or drainage while only waste from toilet bowls are discharged into the

septic tank or cesspit. On the other hand, some of the respondents have septic /latrine/cesspit only therefore all household drain pipe are connected to the tank that could probably make the tank full faster.

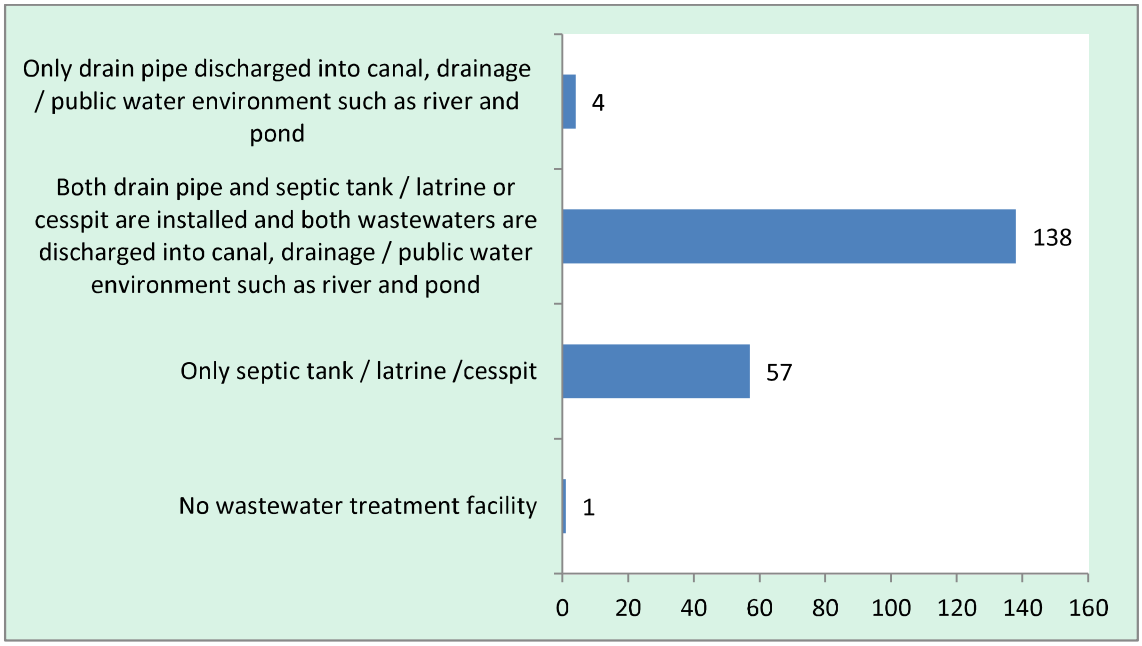

Figure 3-16 kind of sanitary equipment owned by the household

Respondents were asked on the outlet of their waste water at home. Table 3-7 has the results.

As revealed in the table, most of the waste water from the kitchen was discharged to a canal, drain, or even rivers. But for toilet wastewater, more particularly those coming from the toilet bowl; these were disposed into the septic tank /cesspit/latrine.

Table 3-7 Waste water discharged

Water Source	Kitchen	Washing Clothes	Body Washing	Toilet	Other
Public Sewer Pipe	0	0	0	0	0
Septic Tank/Cesspit/Latrine	6	5	13	195	0
Canal, Drain, River, etc.	192	191	184	5	0
Directly soaked into ground	2	4	3	0	6
Other	0	0	0	0	0

Respondents were asked whether they own a septic tank or cesspit/latrine as a wastewater storage facility. This question was explained to them especially the difference between a septic tank and a cesspit/latrine. Figure 3-17 reveals the results. Out of 200 respondents, a total of 195 respondents own an enclosed waste water storage facility. Of these, 130 or 65% own a septic tank while 65 or 32.5% owns a cesspit/latrine.

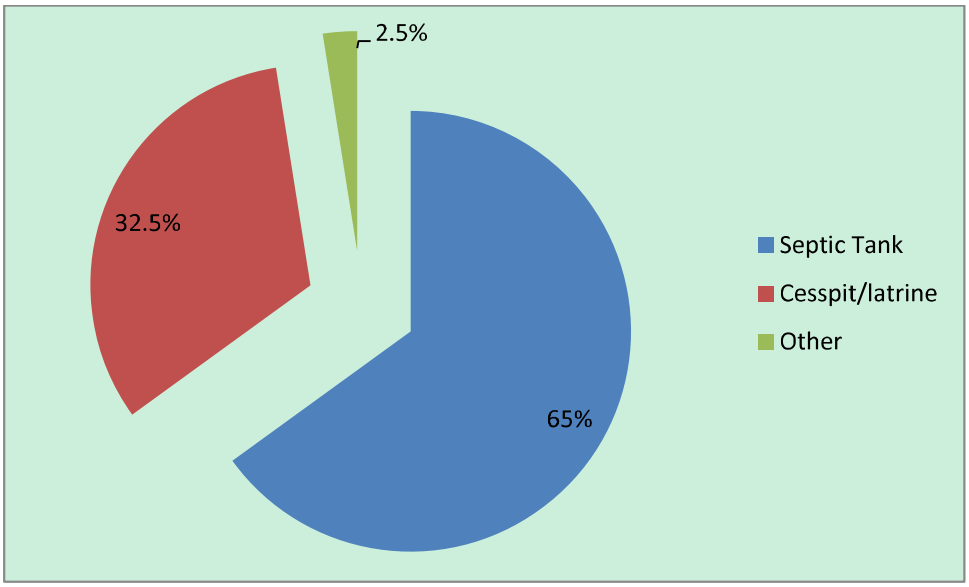

Figure 3-17 Kind of waste water storage facility

Those who indicated that they have septic tank, cesspit or latrine, were asked for an estimate of the volume of the tank. To get an estimate, actual survey of the area where the tank is located is done. This is also to determine the area or location of the septic tank, then estimated length, width, and depth were asked from the respondents. Table 3-8 shows the results. As revealed in table 3-8, the average size of the household's septic tanks or cesspits was about 5.37 cubic meter. Although, it is surprising to see a very small septic tank with only 0.11m^3, but looking at the data, it was very deep. It was just that it has a very small length and width that made the volume as such. On the other hand, the maximum size of the septic tank surveyed was 18.16 cubic meter. This septic tank is owned by a respondent who has a business or apartment for rent where at least 20 people are using it.

Table 3-8 Volume of the septic tank

Range (in $m^{3)}$	**Frequency**
1 and below	6
1.1 to 2	9
2.1 to 3	49
3.1 to 4	37
4.1 and above	89
cannot estimate	5
TOTAL	195

Mean	5.37 m^3
Maximum	18.16 m^3
Minimum	0.11 m^3

Putting disinfectant to the sanitary equipment is very important because it can prevent water borne diseases that causes diarrhea and even stomach infection. In this question, respondents were asked on how often they disinfect their sanitary equipment. Figure 3-18

has the results. Most of the respondents continuously disinfect their sanitary equipment with 117 of the respondents. While it is surprising to see group of respondents who never put disinfectant into their sanitary equipment, others put disinfectant more frequently like once a week or twice a week, while others could not anymore remember when the last time they put one.

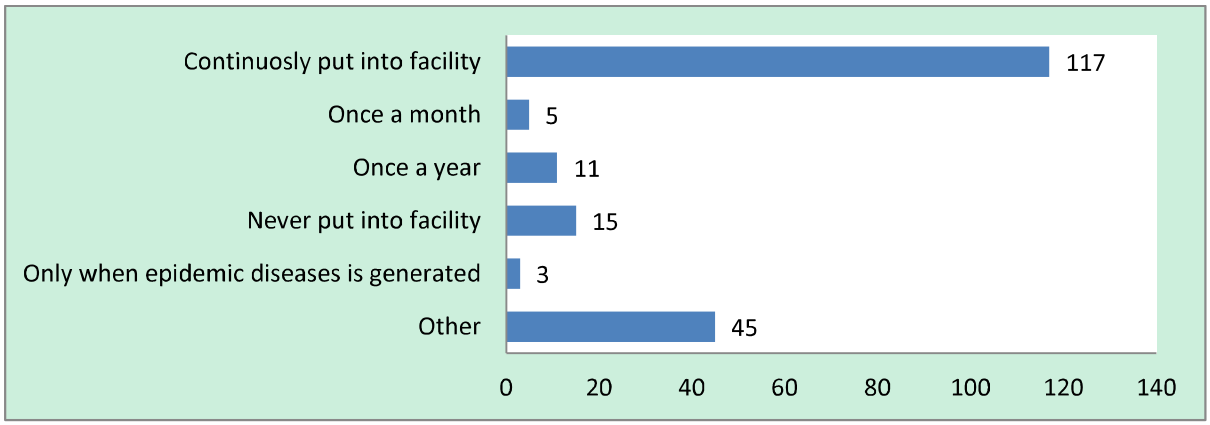

Figure 3-18 Frequency of disinfecting the sanitary equipment

This question reveals on whether or not respondents have experienced withdrawing sludge from their septic tank. Let us see the result on figure 3-19. Considering that some of the septic tanks are bottomless, meaning do not have flooring or bottom slab, it is not surprising to see that most of the respondents have never experienced withdrawing a sludge from their septic tanks. Although, they would say that they are using a closed-type septic tank, the fact that they have never experienced withdrawing sludge for a long period of time, simply means that water from the tank are absorbed by the soil which could pose a great risk to the environment. The absorption of these wastes to the soil could contaminate water supply pumped by a deep well.

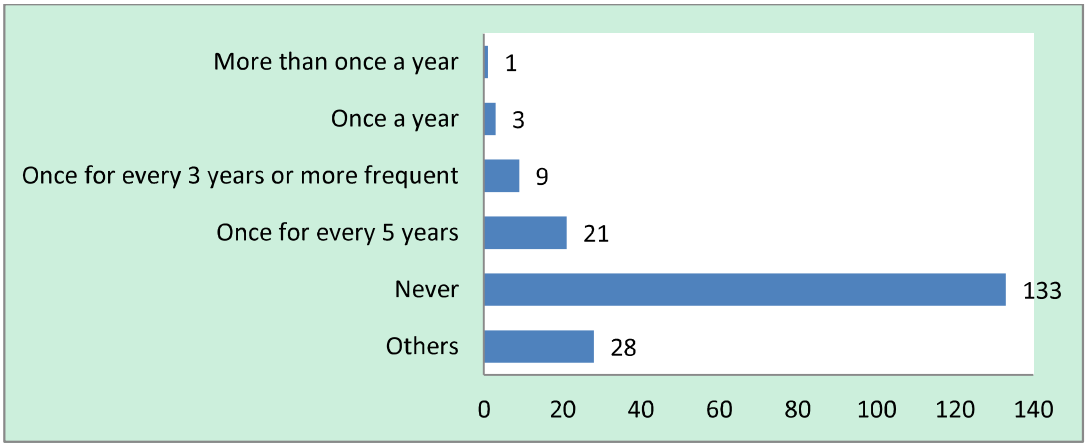

Figure 3-19 Frequency of withdrawing sludge

Those who have experienced withdrawing the content of their septic tank were asked on the agency that did the withdrawal of sludge. Figure 3-20 has the results. Most of the respondents who have experienced withdrawal of sludge from septic tanks availed the service from a private sector. Since this service is not yet offered by the government, the private sector has the monopoly of offering sludge withdrawal services to the household.

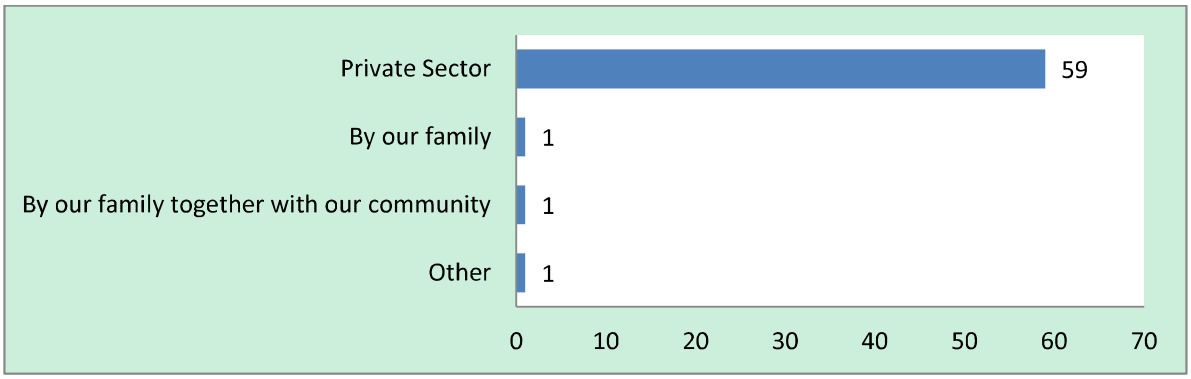

Figure 3-20 Agency requested to withdraw

Withdrawing sludge from a septic tank is not that affordable for many (*actual amount were presented in the table above, Government Services and Facilities*). But how much does it cost for respondents to empty a septic tank by a private sector? Table 3-9 has the range of costs involved. Most of those who experienced withdrawal of sludge from septic tank paid around 2,000.00 to 5,000.00 pesos. This is the average amount charged by private sectors engaged in sludge withdrawal service. Though the amount would also matter depending on the distance of the septic tank from the road where the truck is located. The farther the house from the truck, the more expensive is the charged as it is computed based on distance.

Table 3-9 Cost paid to withdraw sludge

Price Range (in pesos)	Frequency
2800 and below	27
2801 to 5600	23
5601 to 8400	5
8401 to 11200	3
11201 and above	1
Could not determine	3
TOTAL	62

There are certain rules and ordinances that require households to frequently withdraw sludge from septic tanks. But was these followed by the households? Let us see the results in figure 3-21 when respondents were asked on the reason/s for withdrawing the sludge. The most obvious reason why a household need to withdraw sludge from the septic tank is because the tank became full. Since sludge withdrawal is an expensive service, therefore households find no reason for withdrawing sludge more frequently as long as it is not yet full.

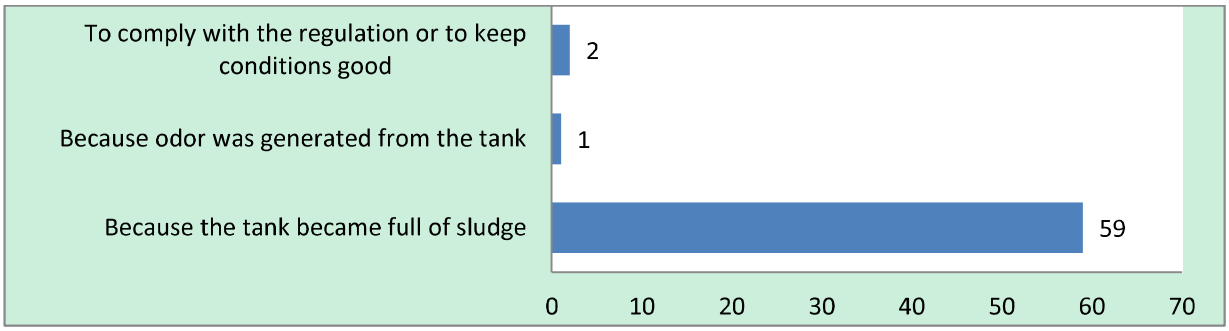

Figure 3-21 Reasons for withdrawing sludge

In order for easy withdrawal of sludge, septic tanks must have a hole or opening with a cover that is big enough for a hose to be inserted when withdrawing sludge. Figure 3-22 shows the statistics of the survey. More than majority of the respondent's septic tanks are equipped with an opening with a cover with 89% or around 178 of them. Without the opening with cover, it would be very hard to withdraw the sludge from the septic tank. If this is the case, then, a hole must be made where the hose will be inserted.
For Cebu City alone, out of 91 respondents 82 or 90.1% has an opening with cover in their septic tanks as revealed in table 3-10.

Table 3- 10 Cebu City Area

	Frequency	
Yes. Opening with cover is installed on the septic tank etc.	82	90.1%

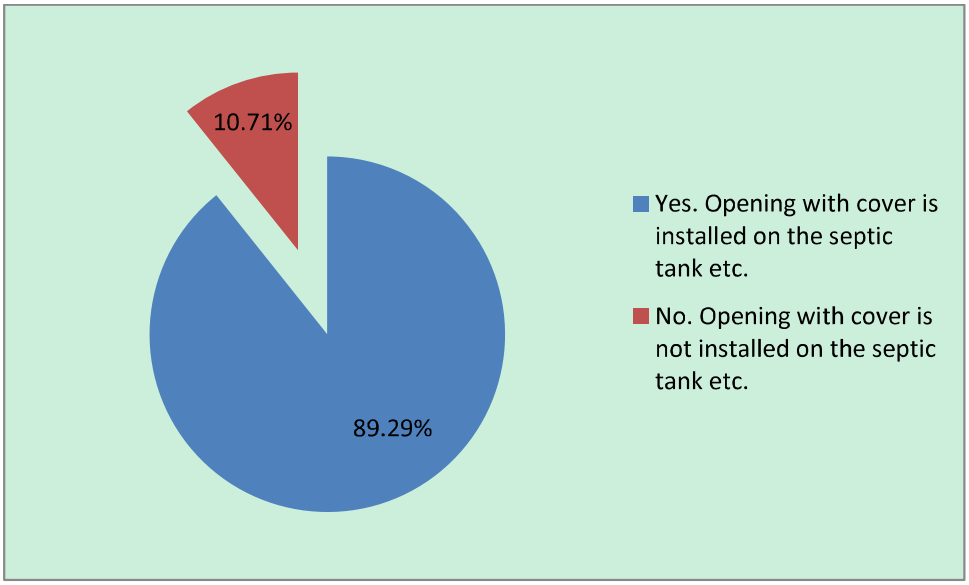

Figure 3-22 Whether or not septic tanks have opening with cover

Figure 3-23 reveals the location of the septic tank / cesspit of the household. Most of the septic tanks of the respondents were located outside the building or house with 114. There were some of them have their septic tank directly under the toilet, while others have them under the floor under than toilet or kitchen. When septic tanks are not located outside the house, it can cause so much inconvenience on the household members because of the dirt and smell that it can emit. Furthermore, when time of sludge withdrawal comes, the process can further because more inconvenience to the household.

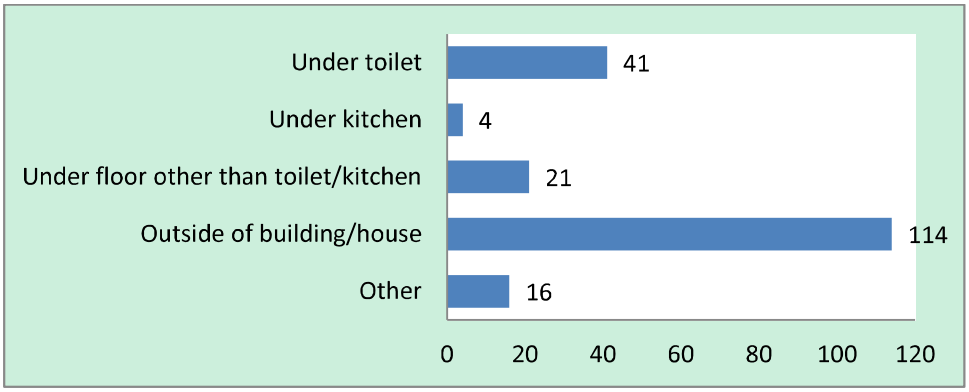

Figure 3-23 Location of Septic Tank

Upon learning that respondents own a septic tank, they were then asked on whether or not the septic tank has a bottom slab (concrete flooring) or not. Figure 3-24 has the results. Most of the respondents said that their septic tank is equipped with bottom slab with 150 answers. However, the result may be somewhat contrary on the previous answers of the respondents considering that most of them have not experienced withdrawing sludge from the septic tank. Now, if the average size of the septic tank is around $5m^3$, then it should not take long enough for the septic tank to become full which therefore need a withdrawal of sludge. With this, one factor that made the septic tank not being full even in a long period of time is because the septic tank is divided into two compartments. One compartment stores the solid waste while the other one contains the liquid with which has no bottom slab. Therefore, only one compartment (where the solid are stored) may have a bottom slab while the other one has none which may directly soak to the ground.
On the other hand, respondents may have mentioned that there is a bottom slab of their septic tank but probably, they were not so sure if it is indeed concrete or just soil.

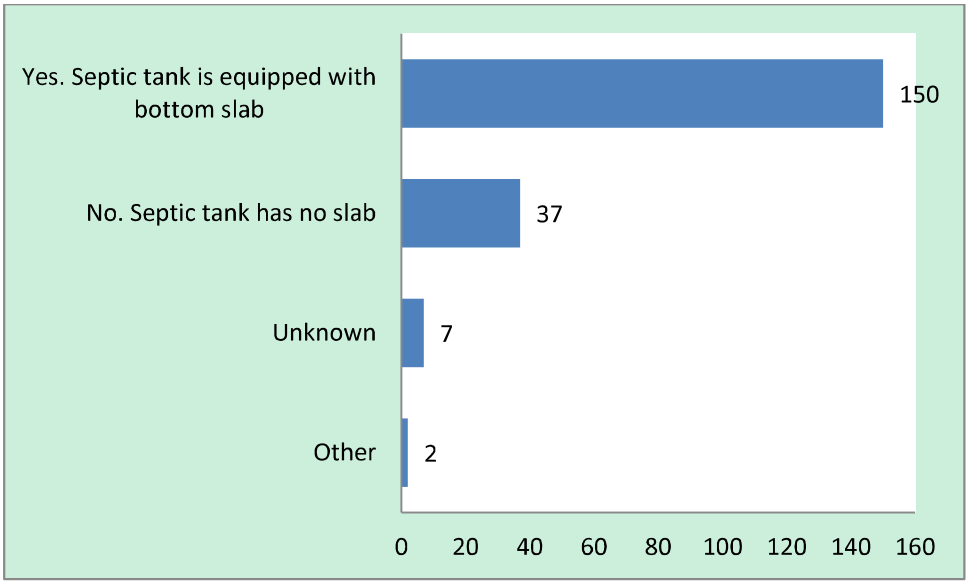

Figure 3-24. Whether or not septic tank has bottom slab

For those who have experienced withdrawing a sludge, they were asked if they have experienced observing effluent from septic tank and what is there impression of the effluent. Figure 3-25 shows the results. Most of the respondents have never experienced or

observed an effluent from a septic tank and therefore could not say anything on the quality of such. Nevertheless, those who have observed have a good feedback on the effluent and said that the effluent's quality is relatively good and acceptable.

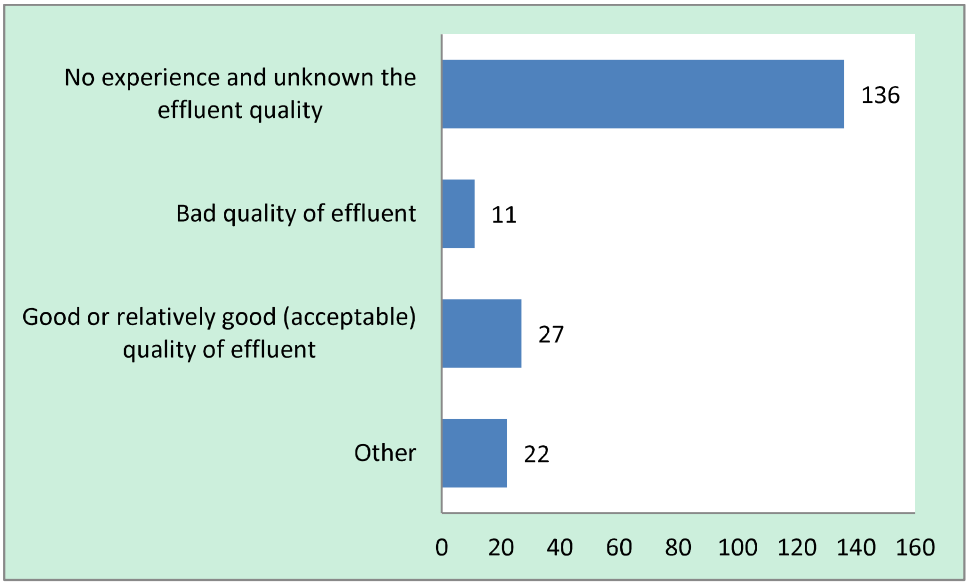

Figure 3-25. Experience of observing effluent from septic tank

Considering that most of the respondents have not experienced withdrawing their sludge for a long period of time, this question would somehow open their minds on the possibility of frequently emptying their septic tank than what they usually do. What is their take about this? Figure 3-26 has the results.

The plan of more frequent de-sludging of septic tanks got a positive feedback from the respondents. Most of them, around 175 (sum of 119 and 56) were in favor of the desludging of septic tanks every 3 to 5 years, however, few considers the price to be paid for them to make a concrete decision. With this, proper strategy on pricing must be carefully considered in order not to burden the consumers for such service.

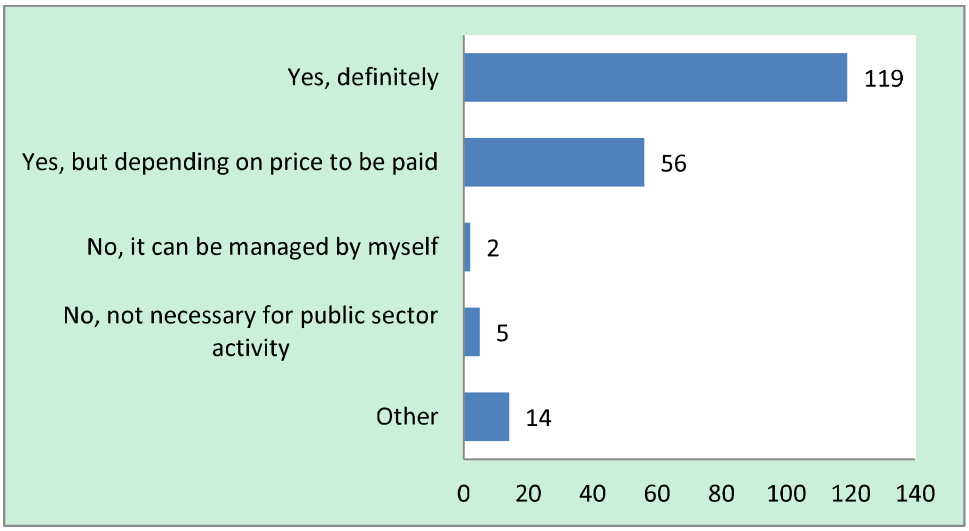

Figure 3-26. Possible de-sludge within 3-5 years

This question asked the respondents if they would allow workers who will de-sludge their septic tanks to enter the house during desludging. Figure 3-27 reveals their answer. Although more than half the respondents would allow entry of workers to de-sludge inside the house, a schedule must be set before the actual desludging. This is to ensure proper coordination and monitoring of the whole process to prevent any untoward incidents to happen.

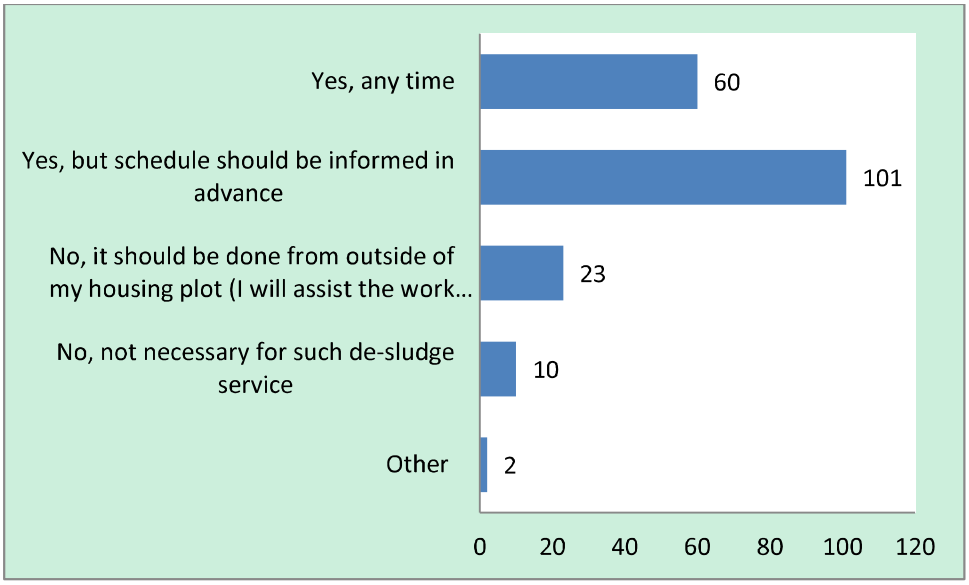

Figure 3-27. Entry of workers for de-sludge

3-1-6 Conclusion

Proper septage management is not the sole responsibility of the local government unit but a concern for the basic unit of the society, the family. Whether how big or small the waste is, when not properly disposed, treated, and withdrawn, it will contaminate the ground leading to a bigger concern, health problems.

This study revealed that, though most of the households in the area have their own waste water treatment facility (septic tank or cesspit); this was not properly managed and maintained. The fact that most of them have never experienced withdrawing sludge from their septic tank would imply that they are more reactive than proactive. Meaning, they will only withdraw their septic tanks when it becomes full when in fact, it should be withdrawn regularly and cleaned. On the other hand, while others would want a regular withdrawal of sludge from their septic tank (like: within 3-5 years), the cost of such service is of important consideration. This is where the intervention of the government should come in. Considering most, if not all services related to withdrawal of sludge is monopolized by the private sector, the services tends to be expensive and unaffordable to most residents in the area.

3-2 For Farmers

After determining the septage management practices of the different households in the selected cities and municipalities of Cebu, this study aims to determine on whether the treated sludge-turned fertilizer from different households will have a potential market for farmers. More particularly, this study aims to determine the interest of farmers in using compost coming from treated sludge taken from household septic tanks.

Farmers play an important role in our daily life. The vegetables that we eat, the meat that we savour, and the rice that will make us full, we owe it to them. But what does a farmer have to do in order to bring all these food to our table? Does all the risk of using pesticides and chemical fertilizers give them enough benefits? These and some other activities that a farmer needs to do in order to provide food to the table is described in this study.

Fertilizers, both chemical and organic, are important source of nutrients for plants and vegetations. When applied moderately, this can further enhance the growth of plants; make the soil more fertile, and therefore increase harvests and productivity. Farmers turn to these fertilizers because these substances contain plant nutrients such us nitrogen, phosphorus, and potassium.

Chemical Fertilizers act fast in providing nutrients needed by plants. They can be absorbed by plants more quickly than organic fertilizers; thus making the plants becomes lush and green faster. Therefore, if there is a need for quick and faster way for plant nourishment, chemical fertilizer may be the best option as this provides nutrients to plant immediately.

Organic fertilizers on the other hand release nutrients more slowly than chemical fertilizers. The benefit of such process is that it provides a steady and continuous flow of nutrients; thus make the plants grow bigger and stronger. This allows plants to hold nutrients and water with ease, which would encourage plant growth (www.ehlingerlawn.com)

While both organic and chemical fertilizers have its share of advantages and disadvantages, these two are indispensable to a farmer's life. Farmers cannot simply rely on the natural nutrients present in soil because there is no assurance of a better harvest. Therefore, with the introduction of this new form of organic fertilizer in Cebu, compost from treated household sludge, it is hoped that farmers will have better access to this kind of fertilizer at price that is affordable.

3-2-1 Methodology

This study made use of descriptive survey method. The design is deemed appropriate for the survey since this study describes the farmer's activity when it comes to maintaining their farmland. In order to gather relevant data, a self-made instrument that served as an interview guide was used and administered to the respondents. Before the actual implementation of the survey, a dry-run of the instrument was done in order to determine whether it captures the data needed in the survey. Part of the dry-run was also to determine the length of time to finish the survey of one respondent.

3-2-2 Questionnaire and interview contents

Please see Annex 5-1-2

3-2-3 Survey area

The survey was conducted in three (3) municipalities and three (3) cities of Cebu. The municipalities includes: Consolacion, Liloan, and Compostela; while the cities were Talisay, Cebu, and Mandaue. However, due to non-available farmers in some survey areas and others have a very small farm, only Cebu city, Talisay City, and Compostela farmers were surveyed and interviewed. These farmers are located in the mountain areas. Although these areas are accessible enough, field interviewers have to go to the place using a motorcycle for more mobility and convenience. In the conduct of the interview, most of the time, farmers are interviewed in their farmlands. Field interviewers introduced themselves to the respondent and asked a little time to conduct the interview. Once consent is given, the interview commences. Respondents were very cooperative in the conduct of the survey and share their experiences as a famer.

3-2-4 Respondents of the Study

The respondents of this study were the selected farmers of the municipalities and cities of Cebu. There were six (6) areas where the survey was supposed to be conducted. List of farmers from these areas were gathered from the Agricultural office of the Local Government Unit. But for those who were not able to provide the researchers with the list, the researchers proceeded to the area where farmers would normally cultivate their farms. Respondent farmers were chosen based on a single criterion, that is: they should have at least a one (1) hectare farm land. This is to ensure a bigger amount of fertilizers used in the farm. After a successful interview with a respondent farmer, the field interviewer would ask the same farmer for a referral to other farmers who at least own a 1 hectare farm. During the entire conduct of the survey, field interviewers made sure that there are variations of the crops cultivated by the farmers. As much as possible, there must be a representative farmer who is cultivating flowers, vegetables, and fruit trees. This is to determine the different types of fertilizers used in the farm.

3-2-5 Result

This section presents the results of the survey conducted in the three municipalities. Although, six (6) municipalities were identified as survey environment, factors like: limited farmland and conversion of agricultural to industrial or residential land reduced the environment to three (3). Of the six survey areas (Talisay city, Cebu City, Mandaue, Consolacion, Liloan and Compostela), only in Compostela, Talisay, and Cebu City where the survey was conducted. Results are presented in charts and tables depending on the nature of data. Simple percentage analyses are employed to give more meaning on the results.

Location of Farmers

Farmers located in six Local government Units were the identified respondents of this survey. However, due to reasons like: limited farmland (*since one criterion for a respondent to qualify is having at least 1 hectare of farm land*) and no available farmers in the area, limited the survey to two cities and a municipality. These two cities were Cebu and Talisay City, while the lone municipality is Compostela located in the northern part of Cebu. Figure 3-28 reveals the proportion of the respondents taken from each area. A total of 30 farmers were interviewed in the study. As the figure revealed, most of the farmers were coming from Cebu city, followed by Compostela, and Talisay City. Cebu city is composed of 80% mountain (cebucity.gov.ph), which made a haven for more farmers in the province. Most of these farm lands are located in the mountain area where farmers cultivate at least 1 hectare lot.

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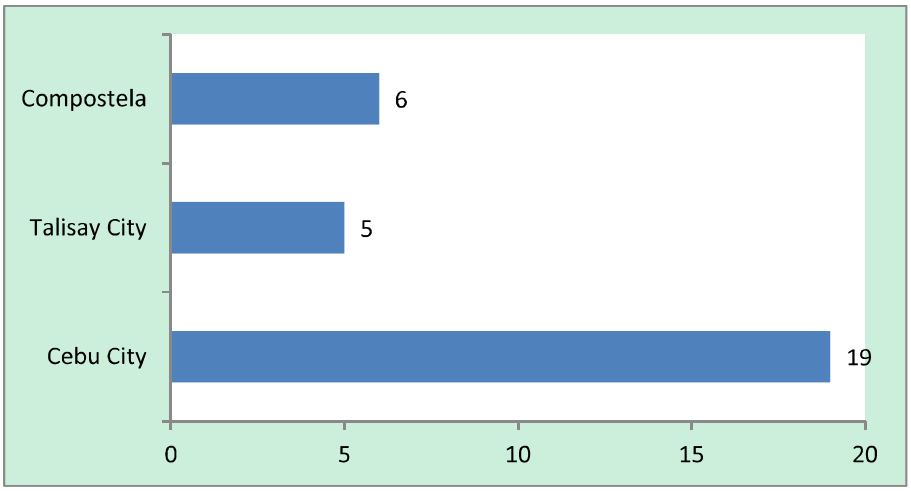

Figure 3-28 Location of Farmers

Respondents of the survey were farmers who own or cultivate at least 1 hectare lot. This criterion is set as these farmers utilized more fertilizers than those with small area. Table 3-11 shows the descriptive results of the lot area of the farmers. A total of 52.3 hectares of agricultural lot were cultivated by the respondent farmers in the study. Of these, most of them own a 1 hectare area where they plant different varieties of flowers and vegetables. There was

one (farmer) who owns an area of 7 hectares with which at least three types of vegetables were planted, while few on the other hand have more than 1.5 hectares of land. On the average, farmers surveyed have an area of 1.45 hectares where they cultivate their crops.

Table 3-11. Lot Area of the Farmers (in hectares)

Indicators	Area (hectares)	Frequency
Minimum	1	24
Maximum	7	1
Average	1.45	
Total	52.3	

Respondents were asked on the type of crops they cultivate in their farm. Table 3-12 reveals the results. It was found out that the top 5 crops cultivated by farmers in the three municipalities were mostly vegetables. Second in the rank is a mango tree plantation which would normally occupy a large area. Mango fruit is a major product in Cebu which comes in different packaging and therefore it is no surprise that it comes second in the rank. Nevertheless, there were variations of crops from cut flowers, vegetables and others that were planted in their farms.

Table 3-12. Types of Crops (sorted from highest to lowest)

Type of Crop	Frequency
Eggplant	7
Mango	6
Sili Espada	6
Banana	5
Corn	5
Tomato	5
Asther	4
Cabbage	4
Cucumber	4
Pechay	4
Rose	4
Alugbate	3
Coconut	3
Wonder White	3
Ampalaya	2
Beans	2
Lettuce	2
Letuce	2
Okra	2
Rice Field	2

Baguio Beans	1
Cacao	1
Cauliflower	1
Chinese Cabbage	1
Chinese Kangkong	1
Daisy	1
Dragon Fruit	1
Eugenia	1
Foxtail Palm	1
French Beans	1
Malunggay	1
Monggo	1
Orchid	1
Parsely	1
Picarra	1
Porea	1
Rambotan	1
SibuyasDahonan	1
Spring Onion	1
Squash	1
String Beans	1
Sweet Potatoes	1
Virginia	1
Yellow Boss	1

When farmers were asked as to the weight of their harvests per year, some if not most of them do not anymore weigh their harvest. Cut Flowers for examples are not weighed when harvested but rather tied in bundles while others have it in per piece basis. However, to get a glimpse of their harvest, they were asked for an estimated weight for each bundle or piece of harvest. Table 3 has the results of the annual yield of the different crops. Table 3-13 revealed that most of the harvests of the farmers weigh less than 1400 kilograms per annum. These harvests were coming from cut flowers, vegetables and fruits which are planted into a 1 hectare area.

Table 3-13. Annual yield of crops

Range Yield per year (kg)	Frequency
1397 and below	72
1398 to 2794	15
2795 to 4191	2
4192 to 5588	4
5589 and above	6

** frequency refers to the different kinds of harvest crops.*

Maintaining different kinds of crops and squeezing them into a 1 hectare area is not an easy job for a farmer. Personnel are needed to monitor, water, and harvest the crops. Let us take a look on how many staff does a farmer has in his farmland. Table 3-14 has the results. Most of the farmers employed eight (8) staff or less in their farm. An average farm area of 1.5 hectare would normally need this number of people to manage the farm and at least lessen the overhead cost. In as much as they would want to employ more people for their farm, as a way of giving back to the community, farmers are also concerned of the costs that will be involved in hiring more personnel.

Table 3-14. Number of Staff employed in the farm

Number of Staff	Frequency	Percentage
8 and below	22	73.33
9 to 17	2	6.67
18 to 26	1	3.33
27 to 35	4	13.33
36 and above	1	3.33
TOTAL	30	100.00

Annual Sales is an indicator that the farm is doing well and may get the return of its investment. After all, the sweat and effort exerted by the farmers will only be put to waste if this is not monitored and properly accounted. Table 3-15 reveals the results. Considering that most of the farmers own an average of 1.45 hectare lot, more of them only get an annual gross sale of 118,000 pesos and below. There were few with a very high annual gross sales that can even reach up to 2 million pesos per annum. Farmers who earns this much are owners of a bigger farm.

On the average, farmers' income per annum is around 250,000.00 pesos. Though only few (3) belong to the average income level, this is due to the fact that data is distorted by two farmers who have an income of 2million pesos per annum.

Table 3-15. Average Annual Gross Sales

Annual Gross Sales (in pesos)	**Frequency**	**percentage**
118,000 and below	14	46.67
118,001 to 236,000	8	26.67
236,001 to 354,000	3	10.00
354,001 to 472,000	2	6.67
472,001 and above	3	10.00
TOTAL	30	100.00

Water is Life. The same is true in maintaining a farm. Water is even more important than any other fertilizer. Now, considering that most of these farms are located in the mountain areas, how do farmers get water for their farm? Let us look at the results on table 3-16. The number one source of agricultural water by farmers is from the ground or spring followed by water from a river or pond. Ground water may be in form of a deep well or spring. This is the blessing of being in the mountain area because springs and groundwater sources is so abundant, thanks to the trees. However, for those who are not fortunate enough to find a groundwater or spring in their area, they have to depend on water from rivers and ponds. The challenge though is how to bring this water to their farm. For others, whose farms are located below these rivers or ponds, they can just maximize the law of gravity and divert these waters to their farms when needed. But for those whose farms are located above the water level, they need machines or pumps in order to bring this water to their farm.

Table 3-16. Farmer's source of water

Source of Agricultural Water	Frequency	rank
Water from groundwater	15	1
Water from River or pond	13	2
Water supply from water supply agency	4	3

*multiple response (some famers may have more than one source of agricultural water)

This question may be a little odd to the respondents considering that most of them sourced their water from deep well or springs, however, there are cases that they need to spend some amount just to bring the water into their farm lands. Let us take a look on how much do they spend for agricultural water on the average, every month. Figure 3-29 has the results. Considering that most of the farmers used ground and river or pond water, they do not have to spend anything for such. The challenged though for some is how to bring water to their farm because there are cases wherein their farm is situated on a higher ground than the water source. When such is the case, they need to use pumps and other machine to bring up the needed water. This is where the expense of the water comes in, but only few of them were in this situation.

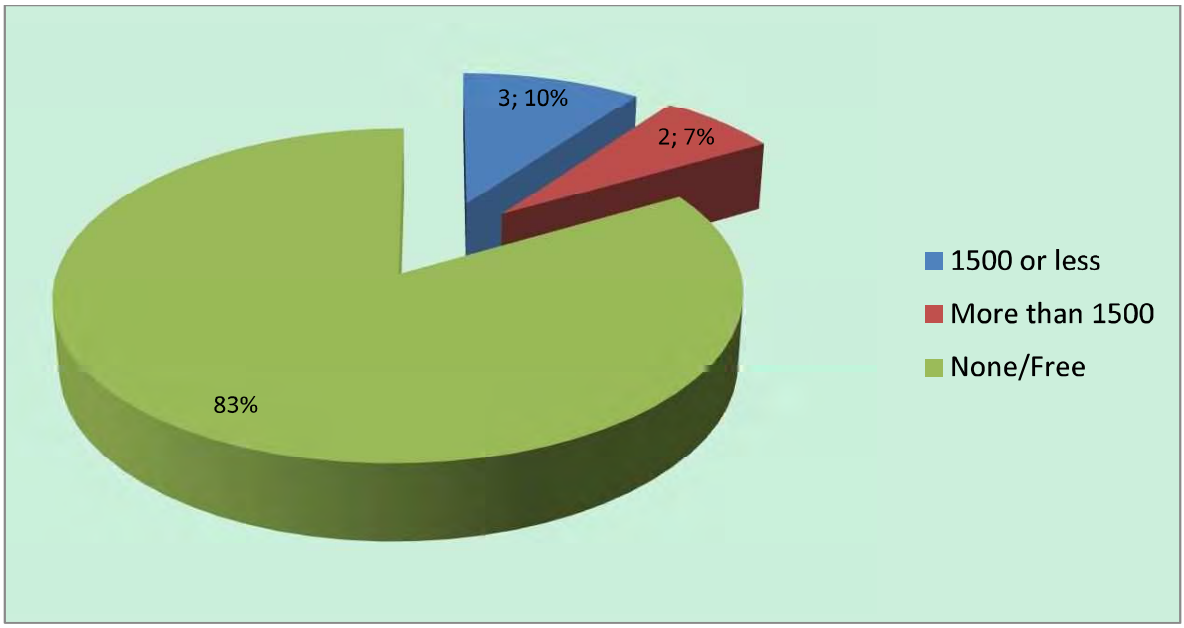

Figure 3-29. Monthly expenses on agricultural water

Though farmers may find it hard to quantify which one goes to the farm and which one goes to the household, they were asked to give an estimate as to their monthly expenses for fuels and electricity in relation to the use of machines and other equipment for their farm. Table 3-17 presents the results. More of the farmers spent an amount of 1,350 pesos and below per month for their electricity, fuels and others. Considering that most of them do not need to use electricity to water their farm, these expenses were primarily for lights and machineries (water pumps) placed on their farm. When it comes to rowing, manual labor is applied therefore not much were spent on fuel and electricity. But there were farmers with big areas that need to use special equipment that would require electricity and fuel to operate, and they are spending a little higher amount for that. On the average, farmers spend around 3500.00 pesos monthly for utilities and fuels used in the farm.

Table 3-17.Average monthly Expenses on Electricity, fuel and others

Monthly expenses (in pesos)	Frequency	Percentage
1350 and below	11	36.67
1351 to 2700	5	16.67
2701 to 4050	3	10.00
4051 to 5400	0	0.00
5401 and above	4	13.33
None	7	23.33
TOTAL	30	100.00

Agricultural equipment is necessary to at least ease the burden of the farmers. But will the farmers trade cost for convenience? Let us see the result in table 3-18. As revealed in the table most of the farmers incur an average annual expense of 14,800.00 pesos and below with 76.67% of the total respondents of the survey for maintenance of agricultural equipment. This is because most of them own a 1.5 hectare farm on the average and apply manual labor than machines. On the other hand, farmers that own a big farm land spend more than 50,000.00 pesos for the maintenance of Agricultural equipment.

Annual Expenses for Pesticides

Table 3-18. Average Annual Expenses for maintenance of Agricultural Equipment

Annual expenses	Frequency	Percentage
14800 and below	23	76.67
14801 to 29600	1	3.33
29601 to 44400	0	0.00
44401 to 59200	0	0.00
59201 and above	3	10.00
Could not estimate	3	10.00
TOTAL	30	100.00

Farmers usually use different types of pesticides for different kinds of crops. These pesticides are used to protect the crops from pests. However, regardless of the kinds of crops they have, how much is their average expenses annually on the use of these pesticides? The next table shows the results. Most of the spent below 20,000.00 pesos annually for pesticides. These pesticides when applied moderately may kill insects and weeds but the disadvantage is that, it may also contaminate the soil and could pose harmful effects to human beings. The table further reveal that farmers used pesticides in their farms in varying degree and amount. Taking on the individual response of the farmers, on average, they spent around 23,000.00 pesos per annum for pesticides.

Table 3-19. Average Annual Expense for the use of Pesticide

Range	frequency	Percentage
19600 and below	19	63.33
19601 to 39200	4	13.33
39201 to 58800	2	6.67
58801 to 78400	1	3.33
78401 and above	3	10.00
could not estimate	1	3.33
TOTAL	30	100.00

Fertilizers are necessary in order to maximize the growth of crops. Farmers have the choice of using organic or chemical fertilizer or may even use both at the same time. Organic fertilizers such as manure and compost are considered to be as old as the time agriculture started. But with the introduction of more advance and sophisticated equipment, chemical fertilizers have been developed and believed to be effective. Most chemical fertilizers composed of nitrogen, phosphorus, and potassium. These three elements are considered to be important for plant nutrition. Now, let us look at the kinds of fertilizers used by farmers in Cebu. Table 3-20 shows the results. As shown in the table, of the two kinds of fertilizers (organic and chemical), it is the chemical fertilizer that is widely used by farmers. The use of chemical fertilizer is inevitable to farmers because of the scarcity and limited supply of organic fertilizers. The abundance of chemical fertilizers which are readily available in the market will give more convenience to the farmers.

But these farmers do not discount the effect of organic fertilizers as well. The use of chicken manure and rice husks were the most widely used organic fertilizers in the farm. This is because, these kinds of organic fertilizers are readily available from poultry and rice farms respectively. Other poultry houses even offer their chicken manure for free because they also have hard time disposing the waste of their chicken. So just to dispose their chicken waste, they will contact a farmer and arrange with them schedule of pick-up for the manure, for free, and it is up to the farmer to make arrangement for transportation. But the same set-up may not be applicable for rice husks because these are sold to the farmers for a certain amount.

Table 3-20. Fertilizers used for crops

ORGANIC		CHEMICAL	
Name	Annual Consumption (kg)	Name	Annual Consumption (kg)
Chicken Manure	6450	18-46-0 (Diammonium phosphate)	6000
Rice Husks	5000	Urea	4600
Black Soil	3600	14-14-14 (NPK)	3050
Pig Manure	300	Perfect	1950
Urea	50	Yara	1570
CltcAgritech	8	Pulyar	600
		Potassium	550
		Winner	300
		Plant Vitamin	250
		21Sulpag	200
		Activa	150
		Asin	150
		Amonium	50
		Philphos	50
		Buswak	30

Whether it is organic or chemical, there will always be cost involved in using fertilizers. From the price per kilogram, to transportation and application, farmers have to spend in one way or another. But what will be presented in table 3-21 are estimated expenses of the farmers with regards to the purchase price or amount of fertilizers. Looking at the table, majority of the farmers spend 15,000.00 pesos and below in the use of fertilizers with seventeen (17) or 56.67% of the respondents. This is because most of them own a small area of farmland between 1 to 1.5 hectares only on average. There were others though who spend more than 60,000.00 pesos for fertilizer. On the average, farmers spend around 30,000.00 pesos for fertilizers used in the farm.

Table 3-21. Average Annual Expenses for the use of Fertilizer

Range (in pesos)	Frequency	Percentage
15000 and below	17	56.67
15001 to 30000	7	23.33
30001 to 45000	0	0.00
45001 to 60000	2	6.67
60001 and above	4	13.33
TOTAL	30	100.00

Even though respondents have been using organic and chemical fertilizers for their farm, they were still asked if they would be interested of using treated compost as fertilizer. Figure 3-30 reveals their answer. Almost all of the respondent farmers (29 out of 30 or 97%) said that they are interested in the compost that is produced by sludge from domestic waste water treatment. However, a single farmer who opted not to try it for now had a bad impression about using compost made from human excreta and he will only be persuaded to use it once it is proven safe already.

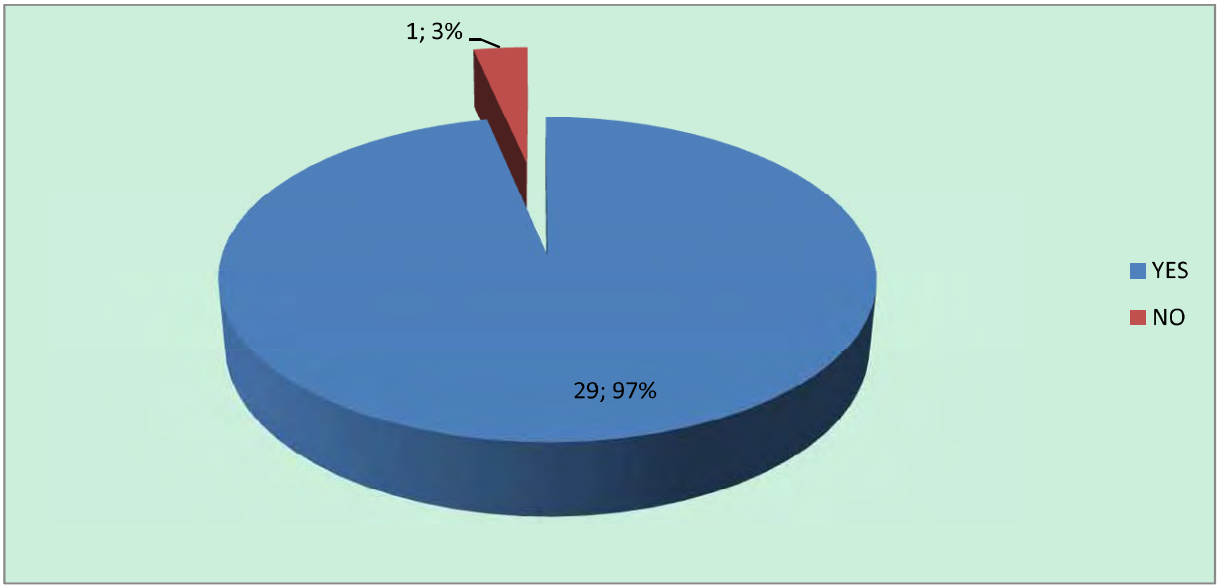

Figure 3-30. Whether or not respondents are interested to use compost as fertilizer

Those who indicated that they are interested to try the compost produced by sludge from domestic waste were asked on the amount per kilogram they are willing to pay for the compost. The next table presents the results. More of the farmers were willing to pay between 20-33 pesos per kilogram of compost to be used as fertilizer in their crops. However, it also noteworthy to look into a much higher price since more than 50% of them were willing to pay an amount of more than 34 pesos per kilogram. But on the average, farmers are willing to pay around 58 pesos per kilogram of the compost.

Table 3-22.Farmers capacity to pay per kilogram of compost

Range	Frequency	Percentage
Below 20 pesos	2	6.90
20 pesos – 33 pesos	10	34.48
34 pesos – 47 pesos	8	27.59
48 pesos – 61 pesos	0	0.00
61 pesos – 75 pesos	7	24.14
Above 75 pesos	2	6.90
TOTAL	29	100.00

*in computing for range, two (2) values were not part of the computation as they are considered an outlier of the values. These values fall under above 75 pesos range.

3-2-6Conclusion

Using fertilizers has been part of the farmer's life since time agriculture has begun. These fertilizers do not only give farmers monetary benefits but also a sense of security that they can always harvest more from what they have planted. Even with the existence of these chemical fertilizers in the market, farmers are still interested to use the organic one, which is abundant from treated sludge of the different households. Once all these domestic wastes are treated and properly handled, there is a bigger market out there that are willing to make it a try and hope that it will further enhance their yield and productivity.

4 References

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- Robbins, D.M. (2007). Septage management guide for Local Governments.

5 Annex – QUESTIONNAIRES

Annex 5-1-1

(Household Survey Questionnaire)

Survey on the Septage Management Project for Metro Cebu Water District's Service Area

SECTION A1-2: RESPONDENT'S PROFILE

Name of LGU	
Name of Barangay	
Name of Community / Household Head	
Name of Enumerator	
Date of Interview	
Time Interview Started	
Time Interview Ended	

Respondent's Name & Contact Number_____

Enumerator's Name & Signature_____

Supervisor's Name & Signature _____

The questions in this survey are to be administered to the randomly selected households in each of the objective area

SECTION A1-2: SOCIAL SURVEY REGARDING HOUSEHOLD

General Items;

200. How many people from each age range are there in your household? Please indicate below

Age group (Years)	Male	Female	Number of persons
0 – 5			
6 – 11			
12 –17			
18 – 21			
22 – 27			
28 – 33			
34 – 39			
40 – 45			
46 – 51			
52 -57			
58 – 63			
64 and above			

201. What kind of religion does your family believe? Please indicate below.

_____

Economic Condition

202. What is the main source income of your household? You can choose **one.**

1. Crop farming
2. Animal husbandry (livestock sales, milk sale)
3. Fishing
4. Manufacture of Industrious Product Name of Product:
5. Shop owner
6. Wages and salaries / employed
7. Other: Please indicate

203. Where do you spend your household income most? You can choose three (rank 1-most to 3-least).

1. Food
2. Education
3. Health
4. Clothing
5. Utilities※1
6. Transportation
7. Personal care
8. Housing※2
9. Recreation
10. Other

※1 Utilities include water, solid waste, and energy source for lighting and cooking, such as electricity, gas, kerosene, charcoal and firewood.

※2 Includes materials for maintenance of dwelling, repair of household appliances, household utensils and cleaning articles

204. What items does your household own? Please choose **one or more.**

1.	Private car
2.	Private motor cycle
3.	Private bicycle
4.	Television/satellite dish
5.	Radio/transistor
6.	Fixed phone
7.	Mobile phone
8.	Computer
9.	Refrigerator
10.	Electric Fan
11.	Air conditioner
12.	Washing machine
13.	Pair of shoes
14.	Blanket
15.	Mosquito net

Sanitary Condition;

205. How often do members of your family go to the hospital due to diarrheic diseases? Please choose **one.**

1.	Once a month
2.	Once for every six months
3.	Once a year
4.	Once for every two years
5.	Could not remember when

206. How much is paid monthly for water used in kitchen※1, washing (clothes, dishes, body) and toilet on the average? Please choose **one.**

	1	2	3	4	5	6
Not Paid	Less than 50 PhP	～ 250 PhP	～ 500 PhP	～ 750 PhP	～ 1000 PhP	More than 1000 PhP

※1 "Kitchen" means water use for drinking, washing dishes and vegetables etc.

207. How much is paid monthly for sanitary activity※1 on the average (estimated)? Please choose **one.**

	1	2	3	4	5	6
Not Paid	Less than 20 PhP	～ 100 PhP	～ 200PhP	～ 300 PhP	～500 PhP	More than 500 PhP

※1 "Sanitary activity" means disposing sludge of sewer pipe and septic tank etc.

208. What kind of improvements do you expect for public service regarding sanitary field. Please choose **one or more.**

1. Lower the price for withdrawing the sludge
2. Increase the number of private agencies or government sector for sludge collection
3. Construct new sludge treatment facility which is operated appropriately.
4. Prevent the smell generated from sewage
5. Decrease the generation of water borne disease
6. Improve the condition of the drainage
7. Improve the water quality in the water environment such as river, pond and sea.
8. Other ( )

209. How much are you willing to pay more for the additional service described in **208**? Please choose **one.**

1. No intension to pay more for the additional service
2. Intend to pay additionally for the additional service;

Intend to pay additionally **for one month** (PhP)

Social Problems;

210 What is the biggest social problem for your family? Please choose one.

1. Violence
2. A large number of theft
3. No job / source of income
4. No primary school
5. Bad road condition
6. Outbreak of epidemic diseases
7. Flooding
8. No Stable supply of electricity to no supply at al
9. No stable supply of water to no supply at al
10. Environmental water pollution by domestic or industrial wastewater
11. Solid wastes are scattered in public place or accumulated in the drainage
12. Other ( )

SECTION A2: SURVEY FOR WASTEWATER CONDITION ON EACH HOUSEHOLD

General Items;

300. How many people are living in your residence? Please indicate below.

_____ People.

301. Does your house have another purpose aside from a residence? Please choose one.

1. No. Only for residence
2. Yes. Residence with small shop
3. Yes. Residence with restaurant
4. Other ( )

Type of dwelling

302. What is the type of your dwelling? Please choose one.

1. House: One Floor
2. House: Multi – Floor
3. Apartment
4. Other(Please specify:_____)

303. How many rooms (bed rooms and other living and service rooms) are there in your dwelling? Please choose one.

1. One room
2. Two rooms
3. Three rooms
4. Four rooms
5. More than four rooms

Water Condition;

304. Are you receiving the water supply service from Metro Cebu Water District (MCWD)?

1. Yes
2. No

305. What kind of water equipment does your house own? Please choose **one or more.**

1. Water meter (for measuring water volume received from water supply agency)
2. Storage tank for receiving water from water supply agency
3. Storage tank for receiving water from water truck
4. Storage tank for receiving rainwater
5. Other

( )

Wastewater Condition

306. What kind of toilet does your house have? Please choose one.

1. Flush toilet
   1-a Water pipe is connected to the tank with ball tap in the toilet. By raising the lever or pulling the wire connected with the tank, cleaning water is gone out and excrement is washed out.
   1-b Water tank / jar and dipper, or water pots etc. for cleaning after defecation are put inside the toilet.
2. Vault toilet (Water is not used after defecation. Water is use only for cleaning toilet pan.)
3. Do not have own toilet
4. Other ( )

307. What kind of water do you use in your toilet? Please choose one or more.

1. Water from MCWD
2. Rain Water
3. Water from Pond/River
4. Other ( )

308. What kind of sanitary equipment does your house have? Please choose one or more.

1. Only sewer pipe connected with public sewer pipe (excluding canal and city drainage)
2. Only sewer pipe discharged into canal, drainage / public water environment such as river and pond etc.
3. Both Sewer pipe and septic tank※1 / latrine or cesspit※2 are installed and both wastewaters are discharged into canal, drainage / public water environment such as river and pond etc.
4. Only septic tank / latrine /cesspit
5. No wastewater treatment facility
6. Other ( )

※1 "Septic tank" means aerobic / anaerobic wastewater treatment facility with the wall made of reinforced concrete etc. so that the wastewater inside the facility cannot be leaked and soaked into the ground. Treated water is finally discharged into sewer pipe. Accumulated sludge is regularly withdrawn by vacuum truck.

※2 "Latrine or cesspit" means only pit for discharging wastewater. Wastewater is finally soaked into the ground. Accumulated sludge is regularly withdrawn by vacuum truck.

309. Where do you discharge wastewater of the following sanitary equipment?

Water Source	Kitchen	Washing Clothes	Washing Body	Toilet	Other
Public Sewer Pipe	Yes No	Yes No	Yes No	Yes No	Yes No
Septic Tank/Cesspit/Latrine	Yes No	Yes No	Yes No	Yes No	Yes No
Canal, Drain, River, etc.					
Directly soaked into ground	Yes No	Yes No	Yes No	Yes No	Yes No
Other	Please specify (_____)	Please specify (	Please specify (___)	Please specify (___)	Please specify (___)

		)			

QUESTIONS 310-322 CAN ONLY BE ANSWERED BY RESPONDENTS WHO OWNS A SPECTIC TANK, CESSPIT OR LATRINE, ETC. IF FAMILY DOES NOT HAVE THEM, SKIP THESE ITEMS.

310. What kind of wastewater treatment facility dose your house own? Please choose **one.**

1. Septic Tank
2. Cesspit/latrine
3. Other ( )

311. Please show us the approximate dimension and volume of septic tank, cesspit or latrine etc..

Dimension	
Volume	m3
Number of person connected with the tank	People

312. How often is the disinfectant put into the sanitary equipment? Please choose one.

1. Continuously put into the facility
2. Once a month
3. Once a year
4. Never put into the facility
5. Only when epidemic diseases is generated
6. Other ( )

313. How often do you withdraw sludge or clean inside the tank with vacuum truck. ? Please choose **one.**

1	2	3	4	5	6
More than once a year	Once a year	Once for every 3 years or more frequent	Once for every 5 years	Others: (Once for _____ years)	Never

314. Which agency does your family request to withdraw sludge / to clean inside the tank? Please choose **one.**

1. Public sector
2. Private sector
3. By our family
4. By our family together with our community
5. Have never withdrawn sludge
6. Other ( )

QUESTIONS 315-317 CAN ONLY BE ANSWERED BY RESPONDENTS WHO OWNS A SPECTIC TANK, CESSPIT OR LATRINE, ETC, AND HAVE EVER WITHDRAWN A SLUDGE. IF FAMILY HAVE NOT DONE THEM, SKIP THESE ITEMS.

315. How much is paid to withdraw sludge or clean inside the tank with vacuum truck **for one time**? Please show us the cost and the approximate volume discharged.

Cost: _____ (PhP)

Volume withdrawn: _____ (m3)

316. What is the reason you withdrew the sludge? Please choose **one.**

1. Because the tank became full of sludge
2. Because odor was generated from the tank
3. To comply with the regulation or to keep conditions good
4. Other ( )

317. Is there an opening with cover on the septic tank, cesspit or latrine, for inserting the hose into the tank and taking the sludge out of the tank? Please choose **one.**

1. Yes. Opening with cover is installed on the septic tank etc.
2. No. Opening with cover is not installed on the septic tank etc. So when we clean the inside of septic tank, we need to make the opening at first
3. Other ( )

318. Where is your septic tank / cesspit is located? Please choose **one.**

1. Under Toilet.
2. Under kitchen.
3. Under floor other than Toilet / Kitchen
4. Outside of building / house
5. Other ( )

319. Is your septic tank equipped with **bottom slab*** to protect the wastewater infiltration into ground? Or, is your septic tank not equipped with bottom slab and wastewater / sludge is soaked out? Please choose **one.**

1. Yes. Septic tank is equipped with bottom slab.
2. No. Septic tank has no slab.
3. Unknown

4.	Other ( )

** referring to a concrete flooring of a septic tank*

320. Do you have any experience to observe the effluent from septic tank / cesspit? How did you find the its quality? Please choose **one.**

1.	No experience and unknown the effluent quality.
2.	Bad quality of effluent.
3.	Good or relatively good (acceptable) quality of effluent
4.	Other ( )

321. Do you feel the need to schedule a de-sludge from your septic tank / cesspit every 3 -5 years? Please choose **one.**

1.	Yes, definitely.
2.	Yes, but depending on price to be paid.
3.	No, it can be managed by myself.
4.	No, not necessary for public sector activity
5.	Other ( )

322. Do you allow de-sludge workers to enter your housing area for de-sludge work? Please choose **one.**

1.	Yes, any time.
2.	Yes, but schedule should be informed in advance.
3.	No, it should be done from outside of my housing plot (I will assist the work in my plot).
4.	No, not necessary for such de-sludge service
5.	Other ( )

ANNEX 5-1-2

Survey on Farmers Utilization of Compost

SECTION A3 RESPONDENT'S PROFILE

Name of LGU	
Name of Barangay	
Name of Household Head	
Name of Enumerator	
Date of Interview	
Time Interview Started	
Time Interview Ended	

Respondent's Name & Contact Number_____

Enumerator's Name & Signature_____

Supervisor's Name & Signature _____

The questions in this survey are to be administered to the randomly selected households (Farmer) in each of the objective area

SECTION A3: SURVEY FOR UTILIZATION OF COMPOST

General Items;

400. How many area and annual production volume do you cultivate for each crop in your farm? Please indicate below.

Name of crop; _____ (ha) _____ (kg/**year**)_____
Name of crop; _____ (ha) _____ (kg/**year**)_____
Name of crop; _____ (ha) _____ (kg/**year**)_____
Name of crop; _____ (ha) _____ (kg/**year**)_____
Name of crop; _____ (ha) _____ (kg/**year**)_____
Name of crop; _____ (ha) _____ (kg/**year**)_____

401. How many staff do you have in your farm? _____

402. What is your average Annual Gross Sales? _____

403. What is the source of water that you use for agriculture? Please choose **one or more.**

1. Water from river or pond
2. Water from groundwater
3. Rainwater
4. Water supply from water supply agency
5. Others ( )

404. How much is paid **monthly** for agricultural water on the average? Please indicate below.
_____ (PhP)

405. How much is paid **monthly** for electricity and fuel etc. on the average? Please indicate below.
_____ (PhP)

406. How much is paid **annually** for maintenance cost for agricultural equipment and machine etc. including replacement of spare parts on the average? Please indicate below.
_____ (PhP)

407. How much is paid **annually** for pesticide on the average? Please indicate below.
_____ (PhP)

408. What kind of fertilizer is **annually** used for each crop? Please indicate below.

Name of Crop	Organic fertilizer Name (kg)	Chemical fertilizer Name (kg)	Other
	Name: (kg) Name: (kg) Name: (kg)	Name: (kg) Name: (kg) Name: (kg)	Name: (kg) Name: (kg) Name: (kg)
	Name: (kg) Name: (kg) Name: (kg)	Name: (kg) Name: (kg) Name: (kg)	Name: (kg) Name: (kg) Name: (kg)
	Name: (kg) Name: (kg) Name: (kg)	Name: (kg) Name: (kg) Name: (kg)	Name: (kg) Name: (kg) Name: (kg)

409. How much is paid **annually** for fertilizer on the average? Please indicate below.
_____ (PhP)

4010. We are planning to produce the compost using the sludge generated from domestic wastewater treatment plant through this project, would you be interested intend to use the compost for your farm? Please choose **one.**

1.	No. I am not interested
2.	Yes. I am interested in the compost and would like to study the introduction of the compost.

If you will use the compost, how much are you willing to pay (per kilogram) at a maximum? Please indicate below.
_____ (PhP / kg)

QUESTIONS 409-411 ARE ONLY FOR THOSE WHO ANSWERED "NO" IN QUESTION NO. 408. IF THE ANSWER IS YES, SKIP THESE QUESTIONS.

4011. Why are you not interested? Please choose **one or more.**

1.	I have bad impression on using the compost made from human excreta
2.	Due to religion
3.	I do not use fertilizer in my farm
4.	I am concerned about the quality of the compost and there might be that toxic substances contained in the compost.
5.	Other ( )

410 What are the conditions that would make persuade you to use the compost? Please choose **one or more.**

1.	If it is proven that the compost has good effect on the growth of the crop
2.	If it is proven safe
3.	If it is cheaper than the fertilizer I currently use.
4.	Other ( )

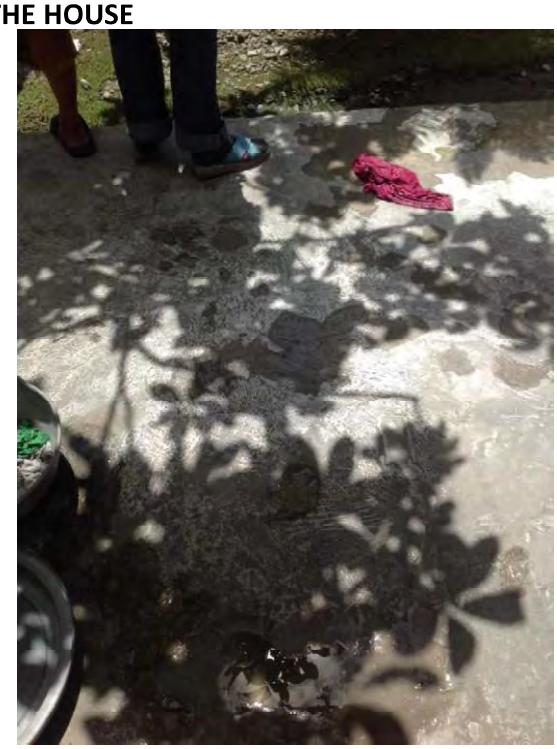
411 If you are NOT interested with the compost, would you be interested with a **de-watered sludge** and produce the compost yourself to fertilize your farm land?

1.	Yes, I am interested.
2.	Yes, if you pay a certain amount of money
3.	Yes, if the price is affordable
4.	No, I am not interested.
5.	Other ( )

5-1 Sheet

5-2 Pictures (More pictures are accessible through google drive)

SEPTIC TANKS LOCATED OUTSIDE THE HOUSE



TOILET FACILITY

AT-50

A-6-5-53

WITH THE RESPONDENTS

AT-51

A-6-5-54