パプアニューギニア国
気候変動開発公社

パプアニューギニア国
PNGにおける持続可能な
GHGインベントリシステム構築のための
の能力強化プロジェクト

事業完了報告書

2022年2月

独立行政法人
国際協力機構（JICA）
三菱UFJリサーチ＆コンサルティング株式会社

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略語

AFOLU	Agriculture, Forestry and. Other Land Use	農業、林業及びその他の土地利用
BTR	Biennial Transparency Report	隔年透明性報告書
BUR	Biennial Update Report	隔年更新報告書
CBIT	Capacity Building Initiative for Transparency	透明性のための能力開発イニシアティブ
CCDA	Climate Change and Development Authority	気候変動開発公社
CEPA	Conservation and Environmental Protection Authority	環境保護・保全公社
DAC	Development Assistance Committee	開発援助委員会
DNPM	Department of National Planning and Monitoring	国家計画モニタリング省
DPE	Department of Petroleum and Energy	石油・エネルギー省
ETF	Enhanced transparency framework	強化された透明性フレームワーク
FAO	Food, Agriculture Organization	食糧農業機関
FAQ	Frequently asked questions	よくあるご質問
FSV	Facilitative Sharing of Views	見方を共有することを促進するためのワークショップ、促進的な意見共有
GEF	Global Environment Facility	地球環境基金
GHG	Greenhouse gas	温室効果ガス
HFC	Hydrofluorocarbon	ハイドロフルオロカーボン
ICA	International Consultation and Analysis	国際協議・分析プロセス
IPCC	Intergovernmental Panel on Climate Change	気候変動に関する政府間パネル
IPPU	Industrial Processes and Product Use	工業プロセスおよび製品使用分野
JCC	Joint Coordination Committee	合同調整委員会
JICA	Japan International Cooperation Agency	独立行政法人　国際協力機構
LULUCF	Land Use, Land-Use Change and Forestry	土地利用、土地利用変化及び林業
MM	mon-months	人月
MoU	Memorandum of Understanding	覚書
MRV	Measurable, Reportable, Verifiable	測定、報告及び検証
MURC	Mitsubishi UFJ Research and Consulting Co., Ltd.	三菱 UFJ ﾘｻｰﾁ＆ｺﾝｻﾙﾃｨﾝｸﾞ株式会社
NAMA	Nationally Appropriate Mitigate Action	（途上国による）国内の適切な緩和行動
NC	National Communication	国別報告書
NCDC	National Capital District Commission	首都圏庁
NDAL	National Department of Agriculture and Livestock	農業畜産省
NDC	National Determined Contribution	自国が決定する貢献
NIR	National Inventory Report	国家温室効果ガスインベントリ報告書
NSO	Natioal Statistics Office	国家統計局
PDM	Project Design Matrix	プロジェクト・デザイン・マトリックス
PNG	Papua New Guinea	パプアニューギニア
PO	Plan of Operation	活動計画
PNGFA	PNG Forest Authority	PNG 森林公社
QA/QC	Quality Assurance / Quality Control	品質保証/品質管理
RAC	Refrigeration and air conditioning	冷凍空調機器
R/D	Record of Discussion	実施協議
TACCC	Transparency, Accuracy, Completeness, Comparability, Consistency	透明性、正確性、一貫性、比較可能性、完全性
ToR	Terms of Reference	付託条項
TTE	Team of technical experts	技術専門家チーム
UNEP	United Nations Environment Programme	国連環境計画
UNFCCC	United Nations Framework Convention on Climate Change	国連気候変動枠組条約

1章 プロジェクト概要

1. 対象国名

パプアニューギニア（PNG）

2. プロジェクト名：

PNG における持続可能な GHG インベントリシステム構築のための能力強化プロジェクト

3. プロジェクト期間

プロジェクト期間は、当初 2017 年 9 月 1 日から 2021 年 8 月 1 日までの 4 年間の予定であったが、国際協力機構（JICA）プロジェクト専門家チームの第 1 回 PNG 派遣が 2017 年 10 月 4 日であったことを受け、2017 年 10 月 4 日から 2021 年 10 月 4 日までの 4 年間となった。

4. プロジェクト背景

パプアニューギニア独立国（Papua New Guinea、以下「PNG」）は、長期国家戦略 Vision 2050 の中で環境持続性と気候変動を重点戦略分野のひとつに掲げ、2050 年までのカーボンニュートラルな社会の実現を目指し、気候変動対策の主流化に取り組んでいる。「途上国における森林減少・劣化に由来する温室効果ガス排出削減（Reducing Emissions from Deforestation and Forest Degradation in Developing Countries、以下「REDD」）」の提唱国、また UN-REDD のパイロット国として、森林分野の温室効果ガス（Greenhouse Gases、以下「GHG」）排出削減に積極的である。また、近年の経済成長に伴う化石燃料の利用量増加を受けて、2016 年 3 月に提出した自国が決定する貢献（Nationally Determined Contributions、以下「NDC」）では、2030 年までの再生可能エネルギーへの完全移行、分野横断的なエネルギー効率の改善、交通分野の排出量削減等を目標に掲げている。

これまで PNG は、国連気候変動枠組条約（United Nations Framework Convention on Climate Change、以下「UNFCCC」）の下で、第一回／第二回国別報告書（National Communication、以下「NC」）にかかる GHG インベントリ作成を 2 度経験している。

この経験から明らかにされた課題を踏まえ、2015 年には気候変動管理法（Climate Change（Management） Act）が成立し、気候変動開発公社（Climate Change and Development Authority、以下 CCDA という）が気候変動関連政策の統括機関に指定されるなど、国レベルでの体制整備が進められている。2016 年にはパリ協定を批准し、UNFCCC Paris Agreement （Implementation） Bill 2016 が成立したことにより、NDC に示した GHG 排出量削減の目標が国内で法的拘束力を持つこととなった。他方、GHG データベースの設計・整備、データ収集・管理、運営体制構築等の専門性を有する人材不足の問題が存在していた。本プロジェクトの要請機関である CCDA では、過去数年にわたり人員の増強が図られていたものの、増強された人員の実施能力強化が課題であることから、2014 年 7 月に、PNG 政府より、同機関の人材育成を含む能力強化に向けて本プロジェクトの要請がなされた。

JICA は 2016 年 9 月に第 1 次詳細計画策定調査、2017 年 2 月に第 2 次詳細計画策定調査を実施し、PNG における GHG インベントリ作成上の課題を、1）定期的な国家 GHG インベントリの作成に必要な基礎的な能力の不足、2）関係機関による GHG インベントリの理解を促進する能力の不足、3）GHG インベントリを技術的に評価し、各分野のインベントリを改善する能力の不足、と分析した。

本プロジェクトは、これらの課題を解決し、GHG インベントリを定期的に作成するための基礎能力強化に取り組むものであり、JICA、CCDA 及び国家計画モニタリング省（Department of National Planning and Monitoring、以下「DNPM」）の三者間の合意に基づき、2017 年 4 月 24 日に本プロジェクトの討議議事録（Record of Discussion：R/D）署名が行われた。

5. 上位目標、及びプロジェクト目的

5.1 上位目標

TACCC（透明性、正確性、一貫性、比較可能性、完全性）を満たす GHG インベントリが定期的に作成される。

5.2 プロジェクト目的

TACCC（透明性、正確性、一貫性、比較可能性、完全性）を満たす GHG インベントリ定期的作成のための CCDA の基礎的な能力が強化される。

5.3 成果及び活動

表 1 プロジェクト成果及び活動

成果 1： 国家 GHG インベントリに必要なデータを定期的及び体系的に収集し編纂する能力及び QA/QC 手順の実施能力が向上する。	1.1: PNG の国家 GHG インベントリ作成に関する既存の体制を調査し、インベントリ作成にかかる CCDA 及び関連機関の現在の能力について評価する。 1.2: 国家 GHG インベントリに関する取り決めの改善方法を検討・提言する。 1.3: （国家インベントリ報告書［NIR］の一部となる）分野横断的 QA/QC 活動を含む国家 GHG インベントリ作成に関する作業計画／ガイドブック／チェックリストを作成／更新する。 1.4: データの提供の全体的なスケジュールに加えて、役割や責任を明確にするため CCDA とデータ提供者の間で覚書を作成／更新する。 1.5: 関連機関から国家 GHG インベントリに必要なデータを収集する。 1.6: GHG 排出量／吸収量予測に使用される係数から成るデータベース／データプラットフォームを構築／更新する。 1.7: 各分野からの GHG 排出量／吸収量の作成に 2006 年 IPCC ガイドラインソフトウェア及び／または表計算ソフトを使用する。 1.8:時系列に整合性のある国家 GHG インベントリを編纂する。 1.9:（NIR の一部となる）インベントリ編纂の手順及び各分野の QA/QC 活動に関する技術文書を作成／更新する。
成果 2： 国家 GHG インベントリの理解を促進する能力が向上する。	2.1: 国家 GHG インベントリ作成にかかる一般的知識を習得するためのワークショップを開催する。 2.2: 関係ステークホルダーを対象に、インベントリ作成の進捗及びインベントリ作成方法、改善に関するワークショップを開催する。

成果 3: GHG インベントリを技術的に評価し、各分野（エネルギー、工業プロセス、農業、土地利用、土地利用変化及び林業、廃棄物）を改善する能力が向上する。	3.1: 活動量及び排出係数の準備、並びにデータ編纂及び国家 GHG インベントリの分野別の QA/QC の実施のための IPCC 方法について検討する。 3.2: 主要排出・吸収源にかかる分析及び不確実性評価を実施し、インベントリを優先的に改善すべき排出・吸収源を特定する。 3.3: 関連情報を収集のうえ、優先すべき主要排出・吸収源において国または地方の事情をよりよく反映する排出係数及び他の係数を特定する。 3.4: NDC 目標達成及び PNG の目標達成の進捗状況をモニタリングするために、GHG インベントリに NAMA を含む緩和行動を反映させることができるか／どのように反映させることができるか検討する。 3.5: 国際協議・分析プロセスに関するガイドブック／FAQ を作成、UNFCCC の下での促進的な意見の共有に関する文書を作成する。 3.6:（NIR に含まれる）国家 GHG インベントリ改善計画を作成・改善する。 3.7: CCDA により作成され、BUR/NC に含まれる GHG インベントリの内容を審査する。

6. プロジェクト実施体制

6.1 プロジェクト実施体制

プロジェクト実施体制は図 1 の通りである。CCDA は当プロジェクトのカウンターパート（以下、C/P という）であり、GHG インベントリ作成、及び関連報告書の UNFCCC 提出に関し、責任を有する機関である。GHG インベントリ作成に関して、CCDA は、PNG 国家統計局、PNG 税関、国家エネルギー公社（前石油・エネルギー省）、PNG 水道公社、首都圏庁（NCDC）、環境保護・保全公社（CEPA）、PNG 森林公社（PNGFA）、農業畜産省（NDAL）、その他の関連ステークホルダーからの支援、及びデータの提供を必要としており、これらの機関を合同調整委員会（Joint Coordinating Committee、以下、JCC という）の構成メンバーとした。

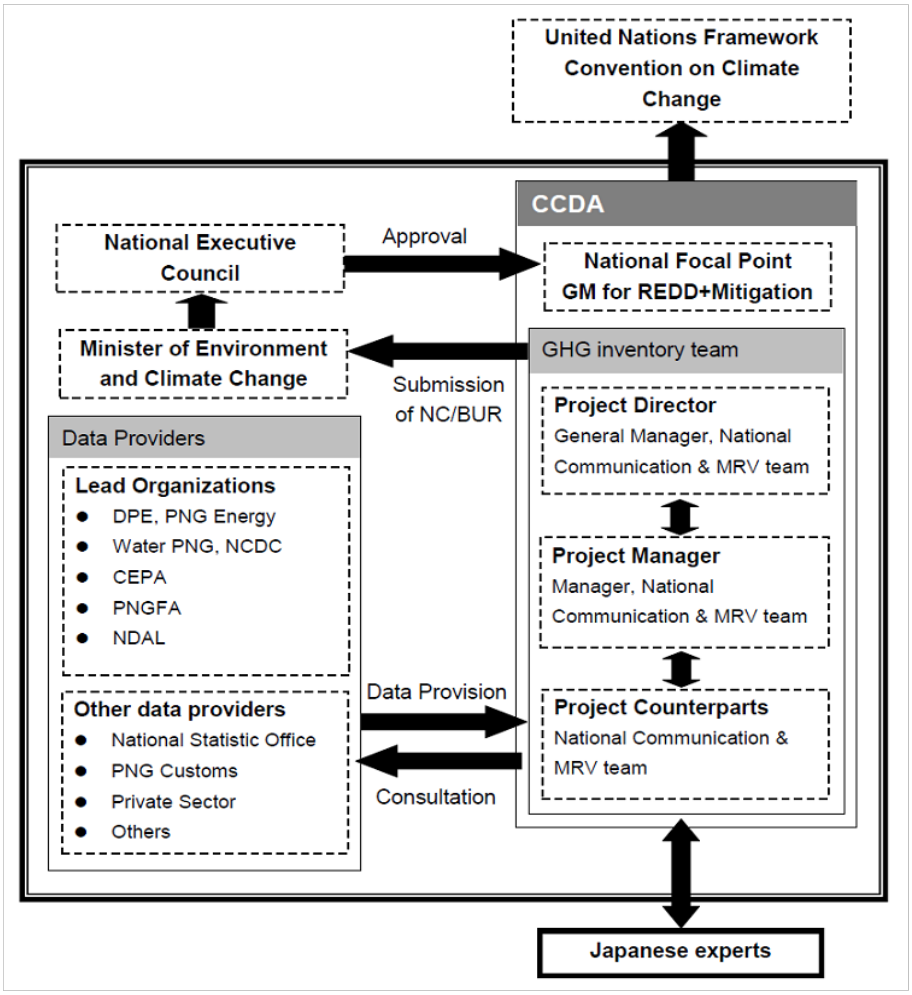

図 1 プロジェクト実施体制

出所：2017 年プロジェクト R/D

6.2 プロジェクト・カウンターパートメンバー

主要カウンターパートメンバーを表 2 に示す。

表 2 カウンターパートメンバー

#	Name	Position	Organization
1	William Lakain	Acting Managing Director	CCDA
2	Gwen Sissiou	General Manager – REDD+ & Mitigation Division	CCDA
3	Alfred Rungol	General Manager Manager – MRV	CCDA
4	Erick Sarut	National Communication Officer	CCDA
5	Larsen Daboyan	National Communication Officer	CCDA
6	Debra Sungi	MRV Officer	CCDA
7	Jason Paniu	Acting MRV Officer	CCDA
8	Morgan Kai	Trainee Officer – National Communication	CCDA
9	Jacinta Kull	Trainee Officer – National Communication	CCDA
10	Priscilla Pep※	Trainee Officer – MRV	CCDA
11	Nathan Sapala※	Trainee Officer – MRV	CCDA

※当メンバーは、2018 年 CCDA を離任

プロジェクト内でのメンバーの役割分担は、図 2 の通りである。

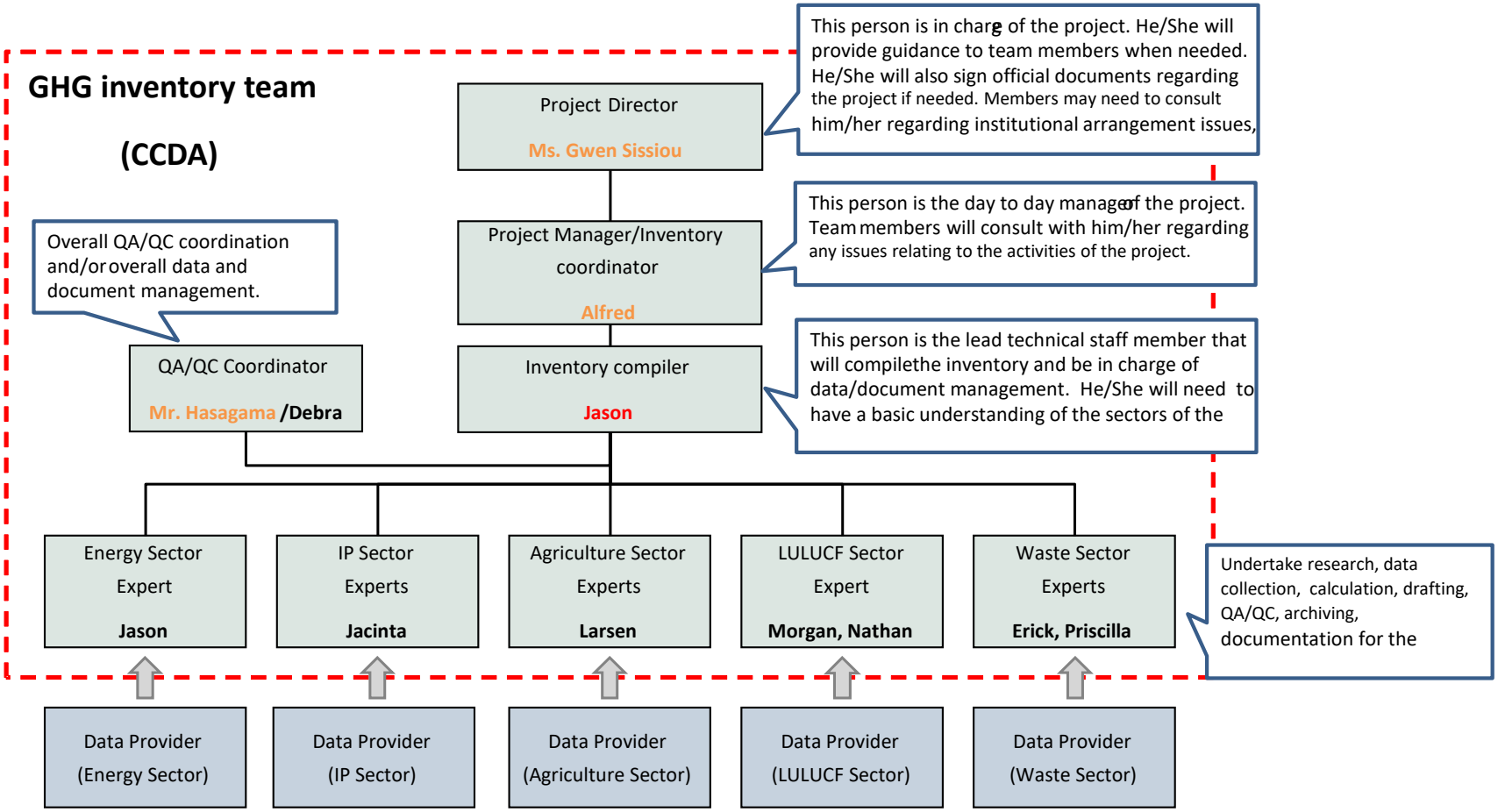

図 2 GHG インベントリ作成における CCDA の役割分担

出所：JICA プロジェクト専門家により作成

6.3 JICA プロジェクト専門家

JICA プロジェクト専門家を表 3 に示す。

表 3 JICA プロジェクト専門家

#	Name	Position	Organization
1	Takeshi Enoki	Project leader/ generalist	MURC
2	Tomoki Takahashi Takuji Terakawa	Energy sector	MURC
3	Matthew Dudley	Industrial Processes and Product Use sector	Independent consultant
4	Atsushi Sato	AFOLU sector	MURC
5	Hiroyuki Ueda	Waste sector	MURC
6	Masaaki Nakamura	Mitigation actions	MURC
7	Yui Ogawa	Training Coordination	MURC

6.4 合同調整委員会（JCC）メンバー機関

JCC メンバー機関は、下記の通りである。

- 気候変動開発公社（JCC 議長機関）
- PNG 税関
- PNG 電力公社
- 環境保護・保全公社
- 国家エネルギー公社
- 農業畜産省
- PNG 水道公社
- PNG 森林公社

7. 実施方針及び留意事項

7.1 プロジェクト・デザイン・マトリックス（PDM）及び活動計画（PO）に基づくプロジェクト運営

プロジェクトの運営に際しては、PDM 及び PO に沿った C/P との共同作業を基本とした。プロジェクト期間中に PDM を変更することはなかったが、PO は 2018 年 2 月に修正され、第一回 JCC で承認された。

7.2 プロジェクトの柔軟性の確保

本プロジェクトでは、GHG インベントリの作成に関する技術移転を目的としていたが、C/P から隔年更新報告書（Biennial Update Report、以下 BUR という）全体の作成・編集支援の要請を受け、結果的にインベントリのみならず BUR 全体（国内情勢、GHG インベントリ、緩和行動、ニーズに関する章）の作成支援を行った。また、新型コロナウイルスの感染拡大及び、それに伴う海外渡航制限のため、JICA プロジェクト専門家チームは、2020 年 3 月以降、当該協力期間終了に至るまで、PNG へ渡航することが出来なかった。そのため、当初 PNG 国内で実行される予定だった活動は、約 1 年

半もの間、PNG 国外よりリモートで行われ、C/P に対するトレーニングや打合せは、オンライン会議ツールを使った形態に切り替えられた。

7.3 C/P のオーナーシップの確保

C/P のプロジェクトに対するオーナーシップを醸成するため、会議やワークショップの際には、彼らが会議の前面に立ち、プレゼンテーションや質疑応答を行うスタイルを継続した。イベントやヒアリングの前には、必ず発表及び質疑応答のシミュレーションを行い、自信をもって当日に臨めるように努めた。この結果、C/P のプロジェクトに対するオーナーシップは向上し、会議の場でも C/P が意思表示し、議論に参加できるようになった。

また、C/P スタッフ全員とのスケジュール調整は時間をかけて、メンバー間で何度も協議を行った。その結果、C/P スタッフによる当事者意識は高まり、C/P はプロジェクト内容に精通している。

7.4 他ドナー支援との協調

CCDA は、国際連合食糧農業機関（FAO）の支援を受け、GEF による透明性のための能力開発イニシアティブ（Capacity Building Initiative for Transparency 、以下 CBIT という）の下で申請した、AFOLU（Agriculture, Forestry, and Other Land Use）分野の包括的な支援を目的とする総額 200 万ドル規模のプロジェクト（以下、GEF/CBIT プロジェクトという）を 2017 年から 2022 年まで実施した。本プロジェクトでは、GHG インベントリの AFOLU 分野に関するデータ収集からインベントリ報告書の作成までの一貫した支援が活動内容に含まれており、本プロジェクトとの重複が見られたため、AFOLU 分野のインベントリは GEF/CBIT プロジェクトが担当し、非 AFOLU 分野（エネルギー、工業プロセス及び製品の使用（IPPU）、廃棄物）は本プロジェクトの支援対象としてデマケーションを行った。

7.5 広報活動

業務実施にあたっては、本協力の意義、活動内容とその成果を我が国・PNG 両国の国民各層に正しく理解してもらえるよう、プロジェクトホームページ[1]の原稿作成、C/P による COP 等の国際会議でのプレゼンテーションの作成支援、PNG 国内のメディア対応、国際ワークショップでのレクチャー・プレゼンテーション等に努めた。

[1] https://www.jica.go.jp/project/png/006/index.html（和文）、https://www.jica.go.jp/project/english/png/006/index.html（英文）

２章 プロジェクトの成果

1. プロジェクト結果

1.1 日本側投入

A.　日本側の投入金額

プロジェクトの年別事業費は下記の通りである。

表 4 年別事業費

年	現地事業費 (国際コンサルタント費込み)
2017	¥599,055
2018	¥2,850,152
2019	¥1,112,241
2020	¥120,068
2021	¥6,380,000

B.　専門家チーム

8 人の専門家（短期）で構成された JICA プロジェクト専門家チームが、プロジェクト活動実施のため、1 年に約 4 回ポートモレスビーに派遣された。しかしながら、新型コロナウイルスの感染拡大及び、それに伴う海外渡航制限のため、JICA プロジェクト専門家チームは、2020 年 3 月以降、当該協力期間終了に至るまで、PNG へ渡航することが出来なかった。そのため、当初 PNG 国内で実行される予定だった業務が、約 1 年半もの間、PNG 国外よりリモートで行われた。2021 年 9 月末までに、JICA プロジェクト専門家チームはポートモレスビーにて 12.43 人月及び PNG 国外リモートにて 22.45 人月の労力を投入した。ポートモレスビーにおいて実際に投入された人月は、当初の計画よりも低い数値となった。

表 5 に、JICA プロジェクト専門家の投入人月を示す。JICA プロジェクト協力期間は 2021 年 10 月に終了したが、JICA プロジェクト専門家は 2022 年 2 月まで大洋州地域の国々の GHG インベントリ、緩和行動等に係る調査研究を継続した。2021 年 10 月から 2022 年 2 月までの人月は合計 3.20 であった。

表 5 JICA プロジェクト専門家による投入人月

業務従事者	担当	計画	実績※
榎剛史	GHG インベントリ　（総括/一般）	12.78	12.88（1.50）
高橋智輝／寺川卓志	GHG インベントリ（エネルギー）	7.52	7.12（0.50）
中村仁明	GHG インベントリ（エネルギー2）	1.70	1.55（0.20）
Matthew Dudley	GHG インベントリ（IPPU）	7.97	6.97（0.30）
佐藤淳	GHG インベントリ（AFOLU)	6.48	4.83（0.70）
植田洋行	GHG インベントリ（廃棄物)	4.88	2.73（0.00）
小川結	業務調整/研修	1.00	0.35（0.00）

※（）の値は大洋州地域の調査の人月分

表 6 JICA プロジェクト専門家の渡航実績

氏名	担当業務	格付	現地滞在期間		業務概要
			出発日	帰国日	
榎　剛史	統括/GHGインベントリ（一般）	2	2017/10/4	2017/10/18	キックオフ
高橋　智輝	GHGインベントリ（エネルギー）	5	2017/10/4	2017/10/18	キックオフ
榎　剛史	統括/GHGインベントリ（一般）	2	2017/12/3	2017/12/16	インセプションワークショップ
高橋　智輝	GHGインベントリ（エネルギー）	5	2017/12/3	2017/12/16	インセプションワークショップ
Matthew Dudley	GHGインベントリ（IPPU）	3	2017/12/9	2017/12/15	インセプションワークショップ
佐藤　淳	GHGインベントリ（AFOLU）	3	2017/12/9	2017/12/16	BUR1インベントリ作成支援
植田　洋行	GHGインベントリ（廃棄物）	3	2017/12/11	2017/12/16	BUR1インベントリ作成支援
榎　剛史	統括/GHGインベントリ（一般）	2	2018/2/4	2018/2/17	BUR1インベントリ作成支援
高橋　智輝	GHGインベントリ（エネルギー）	5	2018/2/4	2018/2/15	BUR1インベントリ作成支援
佐藤　淳	GHGインベントリ（AFOLU）	3	2018/2/11	2018/2/17	BUR1インベントリ作成支援
高橋　智輝	GHGインベントリ（エネルギー）	5	2018/4/15	2018/4/21	BUR1インベントリ作成支援
佐藤　淳	GHGインベントリ（AFOLU）	3	2018/4/14	2018/4/18	BUR1インベントリ作成支援
榎　剛史	統括/GHGインベントリ（一般）	2	2018/5/20	2018/5/26	第1回JCC
Matthew Dudley	GHGインベントリ（IPPU）	3	2018/5/19	2018/5/25	BUR1インベントリ作成支援
榎　剛史	統括/GHGインベントリ（一般）	2	2018/7/29	2018/8/9	BUR1インベントリ作成支援
高橋　智輝	GHGインベントリ（エネルギー）	5	2018/8/9	2018/8/15	BUR1インベントリ作成支援
Matthew Dudley	GHGインベントリ（IPPU）	3	2018/8/8	2018/8/15	BUR1インベントリ作成支援
植田　洋行	GHGインベントリ（廃棄物）	3	2018/7/29	2018/8/4	BUR2インベントリ計画策定
佐藤　淳	GHGインベントリ（AFOLU）	3	2018/8/15	2018/8/22	BUR2インベントリ計画策定
榎　剛史	統括/GHGインベントリ（一般）	2	2018/9/26	2018/10/6	コンサルテーションワークショップ
Matthew Dudley	GHGインベントリ（IPPU）	3	2018/10/1	2018/10/6	コンサルテーションワークショップ
榎　剛史	統括/GHGインベントリ（一般）	2	2018/11/27	2018/12/5	BUR2インベントリ計画策定
榎　剛史	統括/GHGインベントリ（一般）	2	2019/2/16	2019/2/26	BUR2インベントリ計画策定
Matthew Dudley	GHGインベントリ（IPPU）	3	2019/2/18	2019/2/24	BUR2インベントリ計画策定
高橋　智輝	GHGインベントリ（エネルギー）	5	2019/3/10	2019/3/16	BUR2インベントリ作成支援
榎　剛史	統括/GHGインベントリ（一般）	2	2019/5/7	2019/5/23	BUR2インベントリ作成支援
Matthew Dudley	GHGインベントリ（IPPU）	3	2019/5/9	2019/5/17	BUR2インベントリ作成支援
榎　剛史	統括/GHGインベントリ（一般）	2	2019/7/17	2019/7/30	BUR2インベントリ作成支援
Matthew Dudley	GHGインベントリ（IPPU）	3	2019/7/21	2019/7/30	第2回JCC
高橋　智輝	GHGインベントリ（エネルギー）	5	2019/7/24	2019/8/3	第2回JCC
佐藤　淳	GHGインベントリ（AFOLU）	3	2019/7/27	2019/8/3	BUR2インベントリ作成支援
佐藤　淳	GHGインベントリ（AFOLU）	3	2019/9/21	2019/9/28	BUR2インベントリ作成支援
榎　剛史	統括/GHGインベントリ（一般）	2	2019/10/9	2019/10/23	BUR2インベントリ作成支援
Matthew Dudley	GHGインベントリ（IPPU）	3	2019/10/9	2019/10/18	BUR2インベントリ作成支援
高橋　智輝	GHGインベントリ（エネルギー）	5	2019/10/13	2019/10/19	BUR2インベントリ作成支援
佐藤　淳	GHGインベントリ（AFOLU）	3	2019/10/22	2019/10/30	BUR2インベントリ作成支援
榎　剛史	統括/GHGインベントリ（一般）	2	2019/11/27	2019/12/11	BUR2インベントリ作成支援
Matthew Dudley	GHGインベントリ（IPPU）	3	2020/3/2	2020/3/11	Fガスワークショップ

C.　供与機材

下記の機材は、プロジェクト活動実施のため、当初計画通り、購入及び使用された。これらは、プロジ

ェクト完了後、相手国カウンターパートに供与された。

表 7 購入及び使用された機材

購入・使用機材	数量
デスクトップパソコン	1
ノートパソコン	1
プリンター	1
Windows ソフトウェア	2

1.2 PNG 側投入

A. 専門家

第 1 章第 6 節 2 項にて言及されている通り、当プロジェクトの C/P メンバーとして、11 名が任命された。

B. 執務環境

相手国 C/P により、JICA プロジェクト専門家は執務スペース、及び必要機材配備の会議室が利用可能となった。

C. プロジェクト費用

相手国 C/P によって、C/P メンバーの人件費が提供された。

1.3 プロジェクト活動

A. 運用計画に基づくプロジェクト活動

下記は、プロジェクト活動概要、及びその達成度に関する表である。

「成果 1 : 国家 GHG インベントリに必要なデータを定期的及び体系的に収集し編纂する能力及び QA/QC 手順の実施能力が向上する」に関して、表 8 の通り、JICA プロジェクトを通じて編纂された 2 つの GHG インベントリに関する全ての活動が予定通り実施された。

表 8 成果 1 の活動に関する達成度

1.1: PNG の国家 GHG インベントリ作成に関する既存の体制を調査し、インベントリ作成にかかる CCDA 及び関連機関の現在の能力について評価する。	達成済。 CCDA 及び関連機関の能力に関する評価が、国内制度を通じて行われた。
1.2: 国家 GHG インベントリに関する取り決めの改善方法を検討・提言する。	達成済。 国内制度による評価結果に基づき、GHG 改善計画が策定された。
1.3:（国家インベントリ報告書［NIR］の一部となる）分野横断的 QA/QC 活動を含む国家 GHG インベントリ作成に関する作業計画／ガイドブック／チェックリストを作成／更新する。	達成済。 GHG インベントリの関連ステークホルダー、インベントリ作成プロセス、CCDA による実施のための QC チェック、及び、QA の今後の見込みに言及した QA/QC 計画が策定された。

1.4: データの提供の全体的なスケジュールに加えて、役割や責任を明確にするため CCDA とデータ提供者の間で覚書を作成／更新する。	達成済。 GHG インベントリ作成に関する覚書文書が作成され、関連ステークホルダーと共有された。更に、エネルギーサブ技術ワーキング委員会に対しても、付託条項文書が作成された。
1.5: 関連機関から国家 GHG インベントリに必要なデータを収集する。	達成済。 2000-2015 GHG インベントリ、及び、2000-2017 GHG インベントリに関するデータが収集された。
1.6: GHG 排出量／吸収量予測に使用される係数から成るデータベース／データプラットフォームを構築／更新する。	達成済。 GHG 排出量の算定ファイルシステムが 2000-2015 GHG インベントリ、及び、2000-2017 GHG インベントリ向けに構築された。
1.7: 各分野からの GHG 排出量／吸収量の作成に 2006 年 IPCC ガイドラインソフトウェア及び／または表計算ソフトを使用する。	達成済。 2000-2015 GHG インベントリに関して、国家 GHG インベントリの構築が行われ、2000-2017 GHG インベントリに関しては、AFOLU 分野以外からの排出量の作成が行われた。これらは IPCC ガイドラインソフトウェアではなく表計算ソフトを用いて作成されたが、データベースは、IPCC ソフトウェアのようなインベントリソフトウエアへのデータ入力が可能となるよう設計された。
1.8: 時系列に整合性のある国家 GHG インベントリを編纂する。	達成済。 上記に同じ。
1.9:（NIR の一部となる）インベントリ編纂の手順及び各分野の QA/QC 活動に関する技術文書を作成／更新する。	達成済。 2000-2015 GHG インベントリ概要が作成され、これは PNG の BUR1 にて確認することができる。2000-2017 国家 GHG インベントリ報告書は詳細化・更新された。

「成果 2：国家 GHG インベントリの理解を促進する能力が向上する」に関しては、表 9 の通り、当該活動が実施、及び達成された。

表 9 成果 2 の活動に関する達成度

2.1: 国家GHGインベントリ作成にかかる一般的知識を習得するためのワークショップを開催する。	達成済。 JICA プロジェクト開始時に、UNFCCC の下での報告要件について、及び、GHG インベントリ概要を説明するために、ワークショップが開催された。
2.2: 関係ステークホルダーを対象に、インベントリ作成の進捗及びインベントリ作成方法、改善に関するワークショップを開催する。	達成済。 BUR1 結果を提示するためにコンサルテーションワークショップが、又、インベントリ作成方法やデータの必要性に関する議論を開始するために F ガスワークショップが開催された。更に、当プロジェクトは、エネルギー分野のサブ技術ワーキング委員会向けに、排出量作成の方法論の提示に関する支援も行った。

「成果 3：GHG インベントリを技術的に評価し、各分野（エネルギー、工業プロセス、農業、土

地利用、土地利用変化及び林業、廃棄物）を改善する能力が向上する」に関しては、表 10 の通り、全ての活動において実施及び達成が図られた。

表 10 成果 3 の活動に関する達成度

3.1: 活動量及び排出係数の準備、並びにデータ編纂及び国家 GHG インベントリの分野別の QA/QC の実施のための IPCC 方法について検討する。	達成済。 プロジェクト専門家は、CCDA に対して、GHG インベントリ作成準備に関する技術的要素に加え、GHG インベントリの基本に関する研修も行った。
3.2: 主要排出・吸収源にかかる分析及び不確実性評価を実施し、インベントリを優先的に改善すべき排出・吸収源を特定する。	達成済。 2000-2015 GHG インベントリに関し、主要排出・吸収源にかかる分析が、定性的な不確実性評価と共に、実施された。2000-2017 GHG インベントリに関しては、AFOLU 分野以外の排出・吸収源の分析、及び定量的な不確実性評価が実施された。
3.3: 関連情報を収集のうえ、優先すべき主要排出・吸収源において国または地方の事情をよりよく反映する排出係数及び他の係数を特定する。	達成済。 国特有の排出係数及び他の係数に対して、検討が行われた。廃棄物分野においては、IPCC ガイドラインのデフォルト係数の代わりに、国特有のデータが使用された。
3.4: NDC 目標達成及び PNG の目標達成の進捗状況をモニタリングするために、GHG インベントリに NAMA を含む緩和行動を反映させることができるか／どのように反映させることができるか検討する。	達成済。 GHG インベントリ改善と緩和行動、もしくは NDC とのリンク（関連付け）について説明・協議した。更に、JICA プロジェクト専門家は、BUR の緩和行動に関する報告書の作成も支援した。
3.5: 国際協議・分析プロセスに関するガイドブック／FAQ を作成、UNFCCC の下での促進的な意見の共有に関する文書を作成する。	達成済。 JICA プロジェクト専門家は、国際協議・分析プロセスに関するプレゼンテーション（ガイドブック）の作成、及び国際協議・分析プロセスの対応支援を行った。
3.6: NIR に含まれる）国家 GHG インベントリ改善計画を作成・改善する。	達成済。 BUR1、BUR2 では、国内制度面全般、及び技術的観点より、インベントリの改善が必要な点について言及されている。
3.7: CCDA により作成され、BUR/NC に含まれる GHG インベントリの内容を審査する。	達成済。 JICA プロジェクト専門家は、BUR1 及び BUR2 作成の支援を行った。

B. 合同調整委員会会議

本プロジェクトの協力期間中、JCC は、下記表の通り開催された。

表 11 JCC 会議概要

会議	日程	参加機関	主要議題
第 1 回 JCC 会議	2018 年 5 月 23 日	CCDA、PNG 森林公社、PNG 電力公社、PNG 水道公社、石油・エネルギー省、 JICA	● JCC メンバーに対し、GHG インベントリ、UNFCCC 報告要件、及びガイドラインに関する周知 ● JICA プロジェクトの目的、活動、スケジュール、及び成果に関する合意
第 2 回 JCC 会議	2019 年 7 月 26 日	CCDA、国家計画モニタリング省、PNG 水道公社、日本大使館、JICA	● プロジェクト活動、特に BUR2 の GHG インベントリに関する活動の進捗について、JCC メンバーに報告 ● PNG において GHG インベントリ作成を行うための制度的取り決めを強化する計画の提示
第 3 回 JCC 会議	2021 年 3 月 10 日	CCDA、 JICA	● プロジェクト活動、特に BUR2 の GHG インベントリに関する活動の進捗について、JCC メンバーに報告 ● 残りのプロジェクト期間中の計画の提示
第 4 回 JCC 会議	2021 年 10 月 4 日	CCDA、環境保護・保全公社	● JCC メンバーに対し、BUR2 の特に GHG インベントリ及び緩和に関する章について包括的な概要を説明 ● プロジェクトの成果と課題の反映 ● 将来的に PNG の GHG インベントリ作成能力を更に強化する方法の推奨

C. ステークホルダー及びカウンターパートとの会議

JICA プロジェクトメンバーの PNG 派遣期間中に行われたステークホルダー及びカウンターパートとの会議リストを以下に示す。

表 12 カウンターパート及びステークホルダーとの会議

年	日程	スケジュール
2017	10 月 6 日	エネルギー、廃棄物部門に関する会議
	10 月 9 日	CCDA とのキックオフミーティング、及び以下について議論 ・作業計画 ・JCC/ワークショップ開催 ・機材購入、及びエクセル・トレーニングの時期
	10 月 10 日	IPPU、農業及び土地利用、LULUCF 部門に関する会議
	10 月 11 日	以下について議論 ・作業計画 ・機材購入
	10 月 12 日	プロジェクト説明のため、石油・エネルギー省を表敬訪問
		プロジェクト説明のため、CEPA を表敬訪問
	10 月 13 日	プロジェクト説明のため、農業畜産省を表敬訪問
		プロジェクト説明のため、PNG 水道公社を表敬訪問
	10 月 16 日	プロジェクト説明のため、NCDC を表敬訪問
		AFOLU 部門対応に関し、PNGFA 及び FAO について議論

年	日程	スケジュール
	10 月 17 日	CCDA ラップアップ
		ポートモレスビー、PNG における固形廃棄物に関して JPRISM 専門家と会議
	12 月 4 日	進捗について議論するため、JICA 事務所訪問
	12 月 6 日	キックオフワークショップ
2018	2 月 6 日	BUR 及び NC スケジュール議論のためのグループ会議
		Alfred と会議
	2 月 12 日	Jacinta、廃棄物レク
		Jason、エネルギー・燃料の燃焼に関する準備
	2 月 13 日	固形廃棄物に関して J Prism Project と会議
	2 月 15 日	Jason、IPCC ガイドライン
		CCDA ラップアップ
	2 月 16 日	IPCC ガイドラインレクチャー、及びデータ収集のための AFOLU 会議
	4 月 16 日	IPCC ガイドラインレクチャー、及びデータ収集のため、CCDA と会議
		CCDA、IPCC ガイドラインレクチャー、及びデータ収集
		CCDA と会議 AFOLU 部門、排出・除去見積りの進捗に関する FAO 会議
	4 月 17 日	IPCC ガイドラインレクチャー、及びデータ収集のためのグループ会議
		Alfred と会議
	4 月 18 日	CCDA にて IPCC ガイドラインレクチャー、及びデータ収集のための会議
		CCDA にて IPCC ガイドラインレクチャー、及びデータ収集のための会議
	4 月 19 日	CCDA にて IPCC ガイドラインレクチャー、及びデータ収集のための会議
		CCDA にて IPCC ガイドラインレクチャー、及びデータ収集のための会議
	4 月 20 日	CCDA にて IPCC ガイドラインレクチャー、及びデータ収集のための会議
		CCDA にて IPCC ガイドラインレクチャー、及びデータ収集のための会議
	5 月 21 日	BUR 最終化のためのグループワーク実施のため、Stanley にて CCDA 会議
		BUR 最終化のためのグループワーク実施のため、Stanley にて CCDA 会議
	5 月 22 日	BUR 最終化のためのグループワーク実施のため、Stanley にて CCDA 会議
		BUR 最終化のためのグループワーク実施のため、Stanley にて CCDA 会議
	5 月 23 日	プロジェクト概要、活動、期待される成果を提示するための第 1 回 JCC
	5 月 24 日	BUR 最終化のためのグループワーク実施のため、Stanley にて CCDA 会議
		BUR 最終化のためのグループワーク実施のため、Stanley にて CCDA 会議
	7 月 30 日	CCDA キックオフ
	7 月 31 日	CCDA キックオフ/Alfred
	8 月 1 日	第 1 次 GHG インベントリ最終化のためのグループ会議

年	日程	スケジュール
	8 月 2 日	第 1 次 GHG インベントリ最終化のためのグループ会議
	8 月 3 日	第 1 次 GHG インベントリ最終化のためのグループ会議
	8 月 6 日	Jacinta Prescilla 会議 (ロジ関連)
		進捗議論のための PNG JICA 会議 Erick、固形廃棄物に関する FOD 方法論の議論
	8 月 7 日	ジェネラリスト、レビュー
		CCDA MD 会議
	8 月 17 日	進捗議論のため JICA 事務所訪問
	8 月 21 日	進捗議論のため JICA 事務所訪問
	9 月 27 日	BUR2 報告書最終化のためのグループ会議
	9 月 28 日	BUR2 報告書最終化のためのグループ会議
	10 月 1 日	Erick、固形廃棄物に関する会議
		Jacinta、IPPU に関する会議
	10 月 2 日	BUR1 インベントリのジェネラリストレビュー
		CCDA MD 会議
	10 月 4 日	BUR1 承認のためのコンサルテーションワークショップ
	10 月 5 日	BUR1 承認のためのコンサルテーションワークショップ
	11 月 28 日	CCDA コンサルテーションワークショップ準備
	11 月 29 日	CCDA コンサルテーションワークショップ準備
		Grand Papua Hotel コンサルテーションワークショップ
	11 月 30 日	CCDA 準備
		Grand Papua Hotel コンサルテーションワークショップ
	12 月 3 日	CCDA 準備
		Grand Papua Hotel コンサルテーションワークショップ
	12 月 4 日	CCDA ラップアップ
2019	2 月 18 日	CCDA、BUR2 GHG インベントリ計画会議
		Matthew
	2 月 19 日	CCDA、BUR2 GHG インベントリ計画会議
	2 月 20 日	CCDA、BUR2 GHG インベントリ計画会議
		Alfred 進捗議論のため会議
	2 月 21 日	CCDA、BUR2 GHG インベントリ計画会議
		HFC（ハイドロフルオロカーボン）コンサルト会議
		JICA 進捗議論のため会議
	2 月 22 日	Alfred 進捗議論のため会議
		CEPA、HFC に関する会議
	2 月 25 日	CCDA ラップアップ
	3 月 12 日	燃料統計に関する関係省庁（DPE）と会議
	3 月 13 日	燃料統計に関する関係省庁（NMSA）と会議
	3 月 14 日	燃料統計に関する関係省庁（CASA）と会議
	5 月 9 日	CCDA キックオフ
	5 月 10 日	CCDA キックオフ
		Erick、廃棄物、医療廃棄物焼却関連
		Jacinta、IPPU キックオフ
	5 月 12 日	Erick、廃棄物、医療廃棄物焼却関連
	5 月 13 日	保健省、医療廃棄物焼却関連
		進捗議論のため、Alfred と会議
	5 月 14 日	Jason エネルギー・ワーキンググループ ToR Jason Energy Working Group ToR
		Jason、民間企業と漏出量に関する議論

年	日程	スケジュール
	5 月 15 日	CEPA、産業許可関連
		NSO、産業統計、人口統計関連
	5 月 16 日	Jacinta ラップアップ
		Jacinta 準備
	5 月 17 日	PNG 税関、IPPU 分野における商品の輸出入量
		Erick 工場排水に関する会議
	5 月 21 日	QA/QC 計画、アーカイブ・ドキュメンテーション、データストレージ
		民間企業と漏出量に関する議論 JICA
	5 月 22 日	ラップアップ
	7 月 22 日	Alfred、JCC
		JICA 清水氏と会議
	7 月 24 日	CCDA
	7 月 26 日	UNFCCC への BUR1 の進捗及び報告を議論するための第 2 回 JCC
	7 月 29 日	CCDA、スプレッドシート・データ管理を議論
		CCDA、スプレッドシート・データ管理を議論
		Alfred ラップアップ (JCC フォローアップ)
	7 月 30 日	PNG Power on Power、産業燃料消費統計
		CCDA、スプレッドシート・データ管理を議論
		CCDA、スプレッドシート・データ管理を議論
	7 月 31 日	PNG 水道公社、廃水に関するデータ提供
		ICCC エネルギー部門、燃料消費統計
		DoT エネルギー部門、燃料消費統計
		REDD+ TA 議論
	9 月 26 日	廃水に関して Eda Ranu と会議
	10 月 10 日	キックオフ
	10 月 11 日	キックオフ
	10 月 15 日	エネルギー統計に関する DPE 会議
		Econoler、F ガス調査書フォローアップのため会議
	10 月 16 日	エネルギー及び IPPU 部門会議
		エネルギー及び IPPU 部門会議
		F ガスに関する CEPA 会議
	10 月 17 日	エネルギー及び IPPU 部門会議
		エネルギー及び IPPU 部門会議
		Jacinta ラップアップ
	10 月 18 日	Jason ラップアップ
	10 月 21 日	DPE 会議
	10 月 24 日	IPPU 部門会議、Alfred 会議
		IPPU 部門会議
	10 月 25 日	IPPU 部門会議
		IPPU 部門会議
	10 月 29 日	JICA 事務所訪問
2020	3 月 3 日	CCDA 事務所。ワークショップに関する準備会議。Jason のプレゼンテーションに関する協力。
	3 月 4 日	CCDA 事務所。ワークショップ・プレゼンテーションの見直し。2006 IPCC ガイドラインに関して Jacinta と会議。Alfred (GM)と会議。
	3 月 10 日	CCDA 事務所。ワークショップ報告書の最終化、及び見直しのため、ワークショップ参加者に送付。Jacinta と課題に関する会議

年	日程	スケジュール
		PNG RAC と午後会議
2020 ～ 2021	3 月～ 9 月	CCDA とオンライン会議プラットフォーム経由で、BUR2 GHG インベントリ進捗、緩和に関する章、進捗等に関して、毎週、隔週会議開催

D. 国内での研修

当初は、CCDA 及び関係ステークホルダーが GHG インベントリ作成プロセスと制度整備について学ぶために、日本の関係省庁を訪問し、日本国内での研修が行われることが予定されていた。しかし、JICA プロジェクト立ち上げ前に BUR1 準備が元々計画されており、その遅延に直面していたため、CCDA と JICA プロジェクト専門家は、BUR1 GHG インベントリに優先的に取り組むことに合意した。

E. 第三国研修

途上国が UNFCCC に提出する BUR は、国際的協議・分析（International Consultation and Analysis, 以下「ICA」）というプロセスに供され、同プロセスの一環で促進的意見共有（Facilitative Sharing of Views, 以下「FSV」）という公開のプレゼンテーション・質疑応答セッションが開催される。FSV への対応は、GHG インベントリの質の改善にも関係し、本プロジェクトの成果達成に資するものである。そこで、当初、JICA が GHG インベントリ能力強化プロジェクトを実施した国（ベトナム、インドネシア、モンゴル）の中の一国にて第三国研修を行う予定だったが、その代わりに、CCDA のインベントリスタッフを FSV に派遣し、BUR1 に示された GHG インベントリ・排出削減行動・支援ニーズ等についてプレゼンテーションを行うことになった。第三国研修の変更については、本プロジェクトマネージャーと合意し、ミニッツで確認した。

なお、2019 年 4 月に提出された PNG の BUR は、2019 年 12 月チリにおける締約国会合（Conference of the Parties, 以下「COP」）で FSV が予定されていたが、コロナウイルスの影響により、2020 年 11 月 24 日にリモート会議によって開催され、海外へのスタッフ派遣は行わなかった。JICA プロジェクト専門家は CCDA の FSV プレゼンテーションの作成支援をするとともに想定問答を作成し、スタッフと質疑応答シミュレーションを行った。

2. プロジェクト達成度

2.1 成果及び指標

A. 成果 1

成果 1 に対して、客観的に検証可能な 3 つの指標が設定された : 1-1) 一般的なインベントリ編纂手順（作業計画）が作成される; 1-2) 国家 GHG インベントリ作成のためのデータが収集、保存及び維持される; 1-3) インベントリ編纂に関する技術的なドラフト文書が作成される。検証方法は、1-1) 作業計画; 1-2) 国家 GHG インベントリに関するデータベース・スプレッドシートファイルの設定; 1-3) 国家 GHG インベントリ報告書である。

当該 3 指標の到達度レベルは高く、特に、第 2 次 GHG インベントリに関して高かった。下記のように、プロジェクトで編纂された 2 つの GHG インベントリに関して、指標を 2 度達成した。

<u>作業計画</u>

プロジェクトの期間中、各 GHG インベントリに対し 1 つずつ、即ち 2 つの作業計画が策定され

た。最初の作業計画は、第 1 回 BUR が、プロジェクトが開始する前、2017 年に完成することを前提に策定されていた（図 3 参照）。しかしながら、第 1 回 BUR 作成プロセスが、プロジェクト開始時にまだ継続中であったため、JICA 専門家及び CCDA は、進行中だったインベントリの完成を優先させることにした。

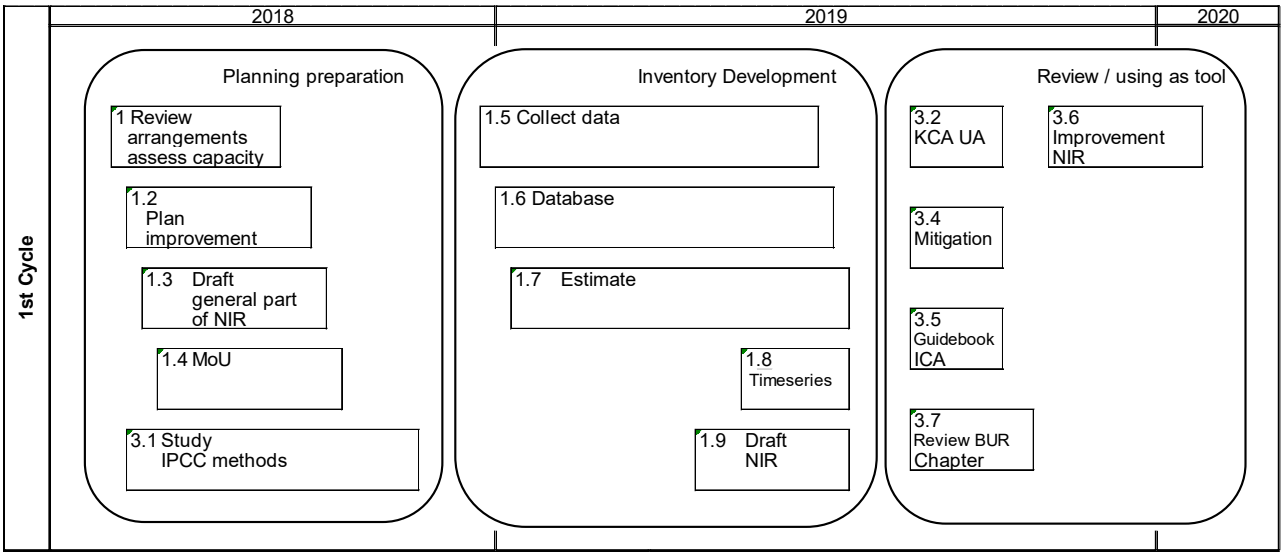

図 3 第 1 次 GHG インベントリサイクルの当初作業計画

第 2 次作業計画は、JICA プロジェクト専門家の支援の下、CCDA の各部門担当者によって作成された。部門作業計画は、2018 年夏に完了した BUR1 GHG インベントリの見直し結果に基づいている。以下の表は、当計画の抜粋である。

表 13 第 2 次 GHG インベントリ作業計画（エネルギー分野）

Data provider	Request data	Category	TACCC	Priority	Purpose	Schedule
PNG Power	Energy consumption data in energy industries. In addition, Country specific Calorific Values and carbon content	1A1 Energy Industries category.	Completeness and Accuracy	medium	Activity Data for Energy Industry and Emission Factor for fuel combustion.	OCTOBER/November, 2018
Independent Consumer and Competition Commission	Energy consumption data in energy industries especially for IPPs.	1A1 Energy Industries category.	Completeness and Accuracy	medium	Activity Data for Energy Industry .	OCTOBER/November, 2018
Chamber of Mines and Petroleum (Check for list of companies operating in PNG)	Energy consumtion data in Mining and Petoleum category and by fuel type. Check for country specific EF for fugitives. In addtion Calorific Values and carbon content for Oil and Gas produced in the country	1A1b Petroleum Refining. 1A1cii Other Energy Industries, 1A2i Mining and Quarrying, 1B2 Oil and Natural Gas	Completeness and Accuracy	High	Activity data for Petroleum Refining, Other Energy Industries, Mining and Quarrying and fugitive emissions from Oil and Natural Gas. Emission Factors from fugitive emission from Oil and Natural Gas and fuel combustion	OCTOBER/November, 2018
Industry and Construction Associations (check if there is)	Energy consumption data in Industry and Construction caterogy and by fuel type	1A2 Manufacturing Industry and Construction category	Completeness and Accuracy	medium	Activity data for Manufacturing Industry and Construction	February/March, 2019
Conservation and Environment Protection Authority (CEPA)	Energy consumption data in Industry and Construction caterogy and by fuel type	1A2 Manufacturing Industry and Construction category	Completeness and Accuracy	High	Activity data for Manufacturing Industry and Construction	OCTOBER/November, 2018
Department of Transport (Check what data they have)	Energy consumption data by the transport category	1A3 Transport Category	Completeness and Accuracy	High	Activity data for the Transport (Land, Aviation, Marine) Category	OCTOBER/November, 2018
Airline Companies (still need clarification of which companies/association)	Total Fuel consumption from civil aviation. Then the fuel consumtion by aircraft type number of LTOs by aircraft type	1A3a Civil Aviation category	Completeness and Accuracy	medium	Activity data for Aviation category	February/March, 2019

表 14 第 2 次 GHG インベントリ作業計画（IPPU 分野）

ID	Data provider	Request data	Category	TACCC	Priority	Purpose	Schedule
2A Mineral Industry	1) Customs; 2) National Statistics Office; 3) Industry associations.	Quantity of carbonates (by type) used in domestic lime production process by type (high calcium, dolomite, hydraulic)	2A2 Lime production	Completeness	High	The purpose is to confirm the occurrence of the activity, and then to obtain activity data.	Oct-18
	1) Customs; 2) National Statistics Office; 3) Industry associations.	Quantity of glass as feedstock (by type of glass) used in PNG to manufacture glass	2A3 Glass production	Completeness	High	The purpose is to confirm the occurrence of the activity, and then to obtain activity data (ie.e quantity of glass as feedstock).	Oct-18
	1) Customs; 2) National Statistics Office; 3) Industry associations.	Quantity of soda ash used in other process uses of carbonates	2A4 Other process uses of carbonates	Completeness	High	Need to confirm if soda ash is imported in PNG and w here it is being used (i.e. glass production; paper and pulp; soap and detergents; solvents; etc).	Oct-18
	1) Customs; 2) National Statistics Office; 3) Industry associations.	Quantity of magnesia produced	2A4c Non Metallurgical Magnesia Production	Completeness	High	Need to confirm if there is production domestically to determine for emission reporting	Oct-18

表 15 第 2 次 GHG インベントリ作業計画（廃棄物分野）

Data provider	Request data	Category	TACCC	Priority	Purpose	Schedule
NCDC	Amount of waste goes to SWDS in POM from 1950 to 2017	Solid waste disposal	Accuracy	Medium	Activity data for Solid Waste Disposal Site (to update current estimation method)	October/ November, 2018
	Waste composition data in POM from 1950 to 2017	Solid waste disposal	Accuracy	Medium	Activity data for Solid Waste Disposal Site (to update current estimation method)	
	Waste generation ratio in POM from 1950 to 2017	Solid waste disposal	Accuracy	Medium	To estimate amount of generated waste by using population data in POM and waste generation ratio	
	Waste generation ratio in provinces from 1950 to 2017	Solid waste disposal	Accuracy	Medium	To estimate amount of generated waste by using population data in provinces and waste generation ratio	
	Waste treatment method in POM from 1950 to 2017	Solid waste disposal Biological treatment	Accuracy	Medium	To estimate amount of waste which goes to SWDS or other methods	
	Type of SWDS in POM from 1950 to 2017	Solid waste disposal	Accuracy	Medium	To apply appropriate MCF value	
	amount of industrial solid waste goes to SWDS	Solid waste disposal	Completeness	High	Activity data for Solid Waste Disposal Site	
	amount of industrial waste water	Wastewater treatment and discharge	Completeness	High	Activity data for industrial wastewater treatment and discharge	
	Inlet industrial wastewater concentration	Wastewater treatment and discharge	Completeness	High	Activity data for industrial wastewater treatment and discharge	
Town Authorities (22 provinces)	Amount of waste goes to SWDS in provinces from 1950 to 2017	Solid waste disposal	Accuracy	Medium	Activity data for Solid Waste Disposal Site (to update current estimation method)	November & December, 2018
	Waste composition data in provinces from 1950 to 2017	Solid waste disposal	Accuracy	Medium	Activity data for Solid Waste Disposal Site (to update current estimation method)	
	Waste generation ratio in provinces from 1950 to 2017	Solid waste disposal	Accuracy	Medium	To estimate amount of generated waste by using population data in provinces and waste generation ratio	
	Waste treatment method in provinces from 1950 to 2017	Solid waste disposal Biological treatment	Accuracy	Medium	To estimate amount of waste which goes to SWDS or other methods	
	Type of SWDS in provinces from 1950 to 2017	Solid waste disposal	Accuracy	Medium	To apply appropriate MCF value	
National Statistical Office	Population data by region from 1950 to 2017	Solid waste disposal	Accuracy	High	To estimate amount of generated waste by using population data in POM and provinces and waste generation ratio	October/ November, 2018
Water PNG	amount of industrial waste water	Wastewater treatment and discharge	Completeness	High	Activity data for industrial wastewater treatment and discharge	October, 2018
	Inlet industrial wastewater concentration	Wastewater treatment and discharge	Completeness	High	Activity data for industrial wastewater treatment and discharge	
	ratio for wastewater treatment system in Port Moresby	Wastewater treatment and discharge	Accuracy	High	To apply appropriate important parameter of "Wastewater treatment system"	
	ratio for wastewater treatment system in provinces	Wastewater treatment and discharge	Accuracy	High		

国家 GHG インベントリに関するデータベース・スプレッドシートファイル

各 GHG インベントリについて、一連のスプレッドシートファイルが開発された。第 1 次算定ファイルセットは、CCDA によって作成された既存ファイルに基づいている。第 1 次算定ファイルセットは、各部門担当者によって作成され、ファイルへのアプローチの一貫性や品質管理チェックに欠けている。

第 2 次セットは、JICA 専門家及び CCDA によって開発され、スタッフの交代等で新規にプロジェクトに参画するスタッフがある場合も、最小限の支援でファイル更新が可能となるよう、分野間の一貫性の強化、ファイルの階層の導入、操作性の強化を行った。

なお、算定ファイルはすべて CCDA の GHG インベントリスタッフの共有ドライブに保管、維持されている。

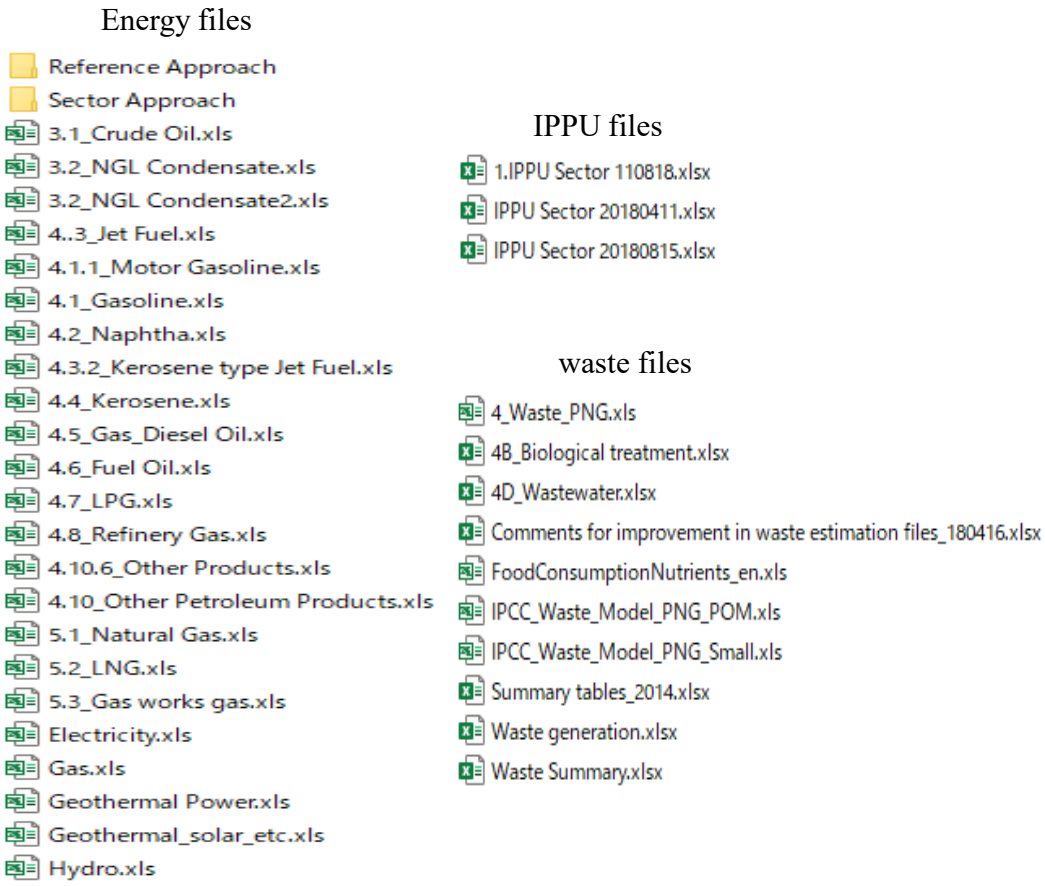

図 4 第 1 次 GHG インベントリの算定ファイルリスト

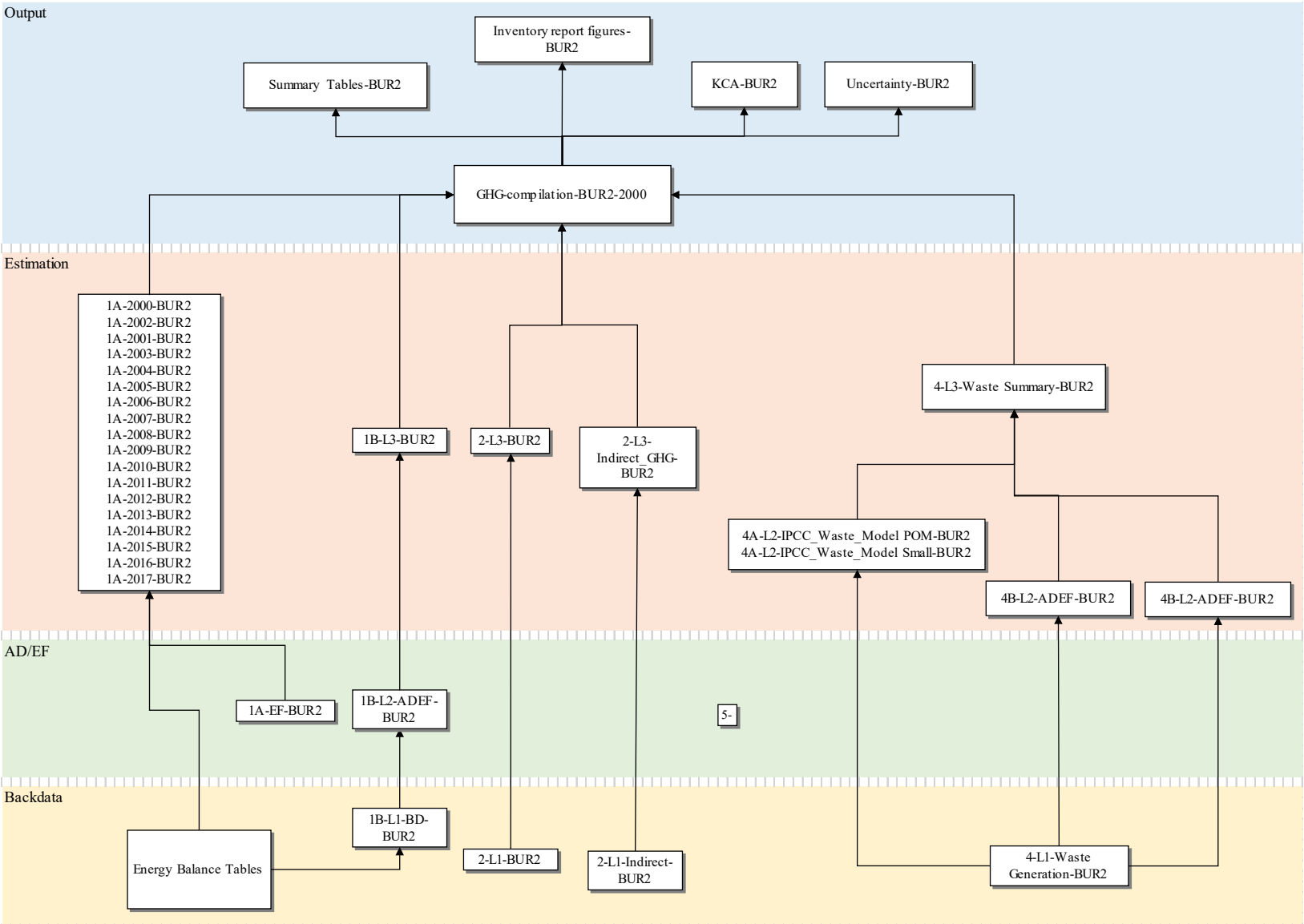

図 5 第 2 次 GHG インベントリの算定ファイルシステム

国家 GHG インベントリ報告

GHG インベントリに関する２つの報告書が CCDA 及び JICA プロジェクト専門家によって共同で作成された。第 1 次 GHG インベントリ報告書は、時間的な制約から大略的なものとなったが、排出量・吸収量の全体的傾向、一般的な方法論に加え、分野に特化した手法に関する情報、データソース、排出量・吸収量結果や必要な改善点についても言及されている。本文書は、のちに BUR1 の一部にもなった。なお、PNG の BUR1 は 2019 年 4 月に UNFCCC に提出されている（https://unfccc.int/documents/209907）。

第 2 次 GHG インベントリ報告書では、排出・吸収源、手法、使用データ、結果、実際に講じられた改善策、及び将来に向けて必要な改善点について、より詳細に述べられている。当インベントリ報告書は、報告書としてだけではなく、PNG が今後インベントリを編纂する際のマニュアルとしても活用されることを想定している。第 2 次インベントリ報告書の概要が、BUR2 の GHG インベントリに関する章に該当する。BUR2 は 2022 年 3 月に提出予定である。

国家インベントリ報告書に加え、CCDA 及び JICA プロジェクト専門家は、PNG のための QA/QC 計画を策定した。当該文書では、主要排出源・吸収源にかかる評価(key category assessment)や不確実性分析の実施方法に関する技術情報に加え、インベントリ作成プロセス、ステークホルダーに期待されるべき役割と責任について述べられている。この文書については、現行の測定、報告及び検証（Measurable, Reportable, Verifiable, 以下「MRV」）に関する枠組みの下では必須ではないが、パリ協定下の強化された透明性フレームワーク（Enhanced Transparency Framework, 以下「ETF」）においては要件とされている。

B. 成果 2

成果 2 に対して、客観的に検証可能な 1 指標が設定された：2-1) ワークショップの平均理解度：70%以上。検証方法は以下の通りである： 2-1) アンケート調査結果。指標の達成度が高いこと。

JICA プロジェクト専門家チームは、参加者に 3 つのワークショップ（開始時のインセプションワークショップ、コンサルテーションワークショップ、オゾン層破壊物質のフッ素系代替物質(fluorinated substitutes for ozone depleting substances）に関するワークショップについて評価してもらうため、オンラインでアンケート調査を行った。参加者によるワークショップへの全体的な評価は、UNFCCC、GHG インベントリや GHG インベントリ作成要件に関する背景情報を提供した開始時インセプションワークショップに対するものが、最も高かった。 コンサルテーションワークショップは、BUR1 のドラフトを提示したものであるが、全参加者が期待に合致したものだったと回答し、個々のセッションの満足度は 75%と、指標値を大幅に上回った。F ガスに関するワークショップでは、全体的な満足度は 67%だったが、各セッションに対する満足度は 80%を超えた。

開始時インセプションワークショップ

2017 年 12 月、当プロジェクトの開始時インセプションワークショップが半日開催された。ワークショップ終了時に、参加者に対し、以下の質問についてアンケート用紙が配布された：

- 当トレーニングワークショップについて、どのように評価しますか？
- これらのセッションに対し、どの程度満足していますか？
- 個々のセッションはあなたの業務に対し、どの程度役に立ち、或いは、どの程度関係していますか？

各セッションに対する満足度は、以下の図の通りである。

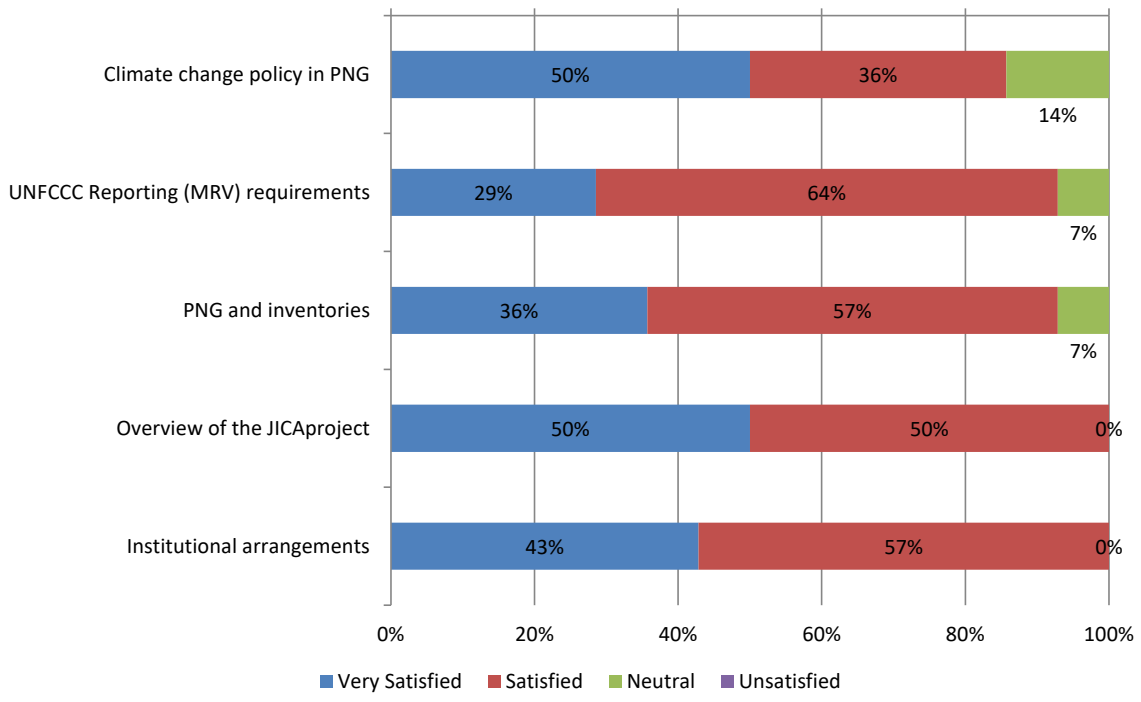

図 6 各セッション満足度

ワークショップの満足度がその理解度を反映していると仮定すると、ほとんどの参加者が、ワークショップへの高い理解度を示したことがわかる。特に、「PNG における気候変動政策」セッションについて、86% の参加者が「大変満足、もしくは満足」と回答し、「UNFCCC 報告 (MRV) 要件」及び「PNG とインベントリ」に関するセッションに対しては、 93%の参加者が「大変満足、もしくは満足」と回答し、更に「JICA プロジェクト概要」及び「制度整備」セッションに関しては、100% が「大変満足、もしくは満足」という回答が得られた。

<u>コンサルテーションワークショップ</u>

BUR1 のドラフトを検証するため、2018 年 10 月に、コンサルテーションワークショップが開催された。JICA プロジェクト専門家チームは、参加者に対し、特に以下の質問について、コンサルテーションワークショップの評価をしてもらうため、オンラインアンケート調査を行った：

- 当ワークショップについて、どのように評価しますか？
- 5 セッション各々に、どの程度満足していますか？

最初の質問に関しては、全参加者が当ワークショップは期待に合致していると回答した。

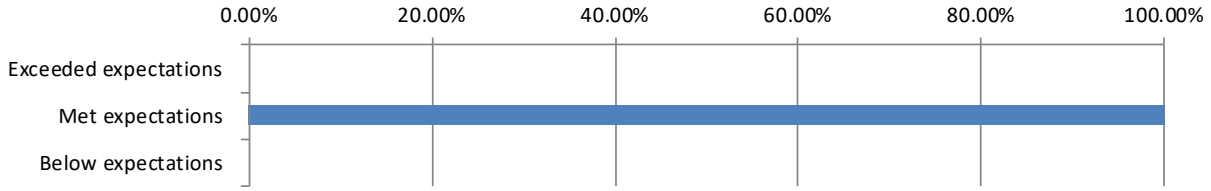

図 7 コンサルテーションワークショップに対する全体的な満足度

ワークショップの満足度がその理解度を反映していると仮定すると、ほとんどの参加者が、ワーク

ショップに対して高い理解度を示したことが分かる。特に、「PNG の自然環境」セッションについて、92%の参加者が「大変満足、もしくは満足」と回答し、「GHG インベントリ」セッションに対しては、100%の参加者が「大変満足、もしくは満足」と回答し、「緩和行動」セッションについては、83%が「大変満足、もしくは満足」と回答。更には、「支援」セッションに関しては、100%「大変満足、もしくは満足」の回答を得ることができた。各セッションの理解度・満足度については、以下の図の通りである。

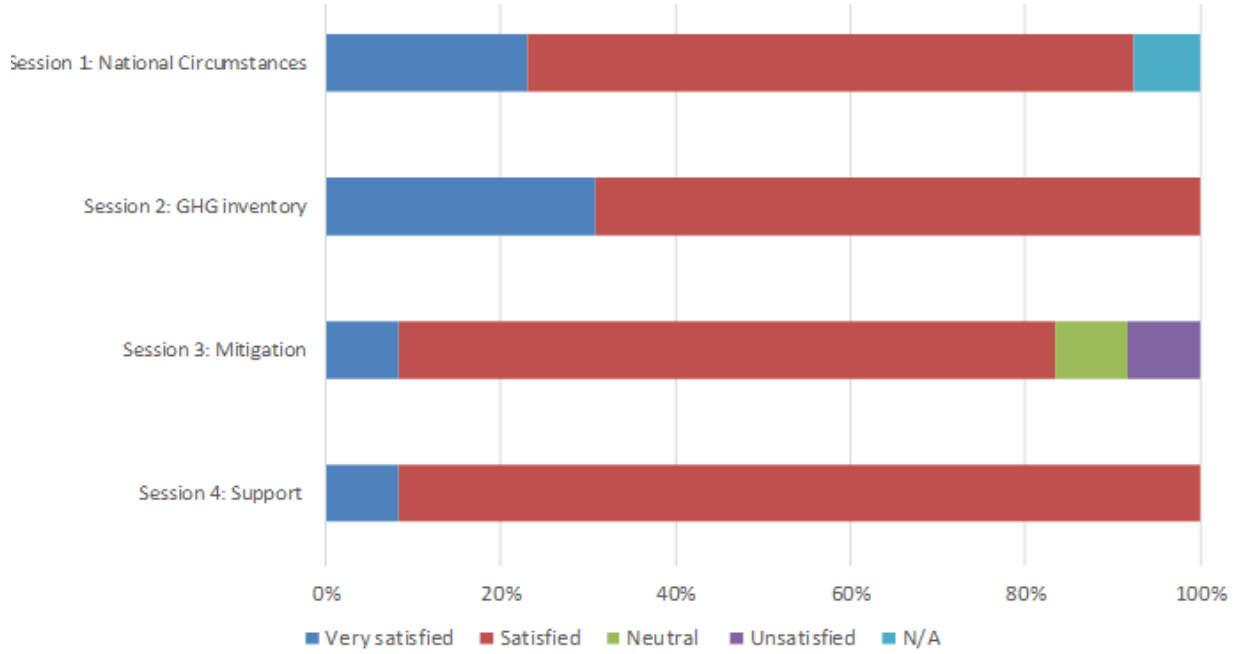

図 8 各セッションの満足度

F ガスに関するワークショップ

JICA プロジェクトは、2020 年 3 月に F ガスに関するワークショップを開催した。 JICA プロジェクト専門家チームは、参加者に対し、特に以下の質問について、オゾン層破壊物質のフッ素系代替物質に関するワークショップの評価をしてもらうため、オンラインアンケート調査を行った：

- 当ワークショップについて、どのように評価しますか？
- 5 セッション各々に、どの程度満足していますか？

参加者 13 名中 6 名がアンケートに回答した。ワークショップの満足度がその理解度を反映していると仮定すると、高い理解度を示した参加者は 67%に留まった。

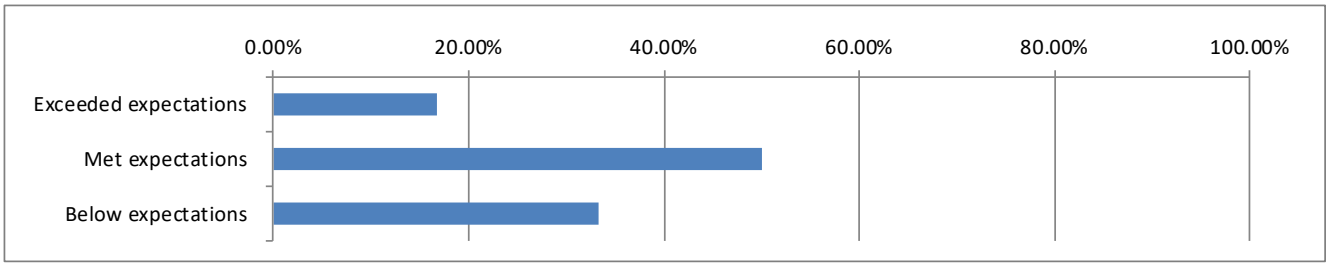

図 9 ワークショップに対する満足度

しかしながら、個別のセッションに関する理解度は高く、特に、「UNFCCC 報告義務」 については、100%が「大変満足、もしくは満足」と回答し、その他の 3 セッションに対しても、83% が「大

変満足、もしくは満足」と回答した。各セッションの理解度・満足度については、以下の図の通りである。

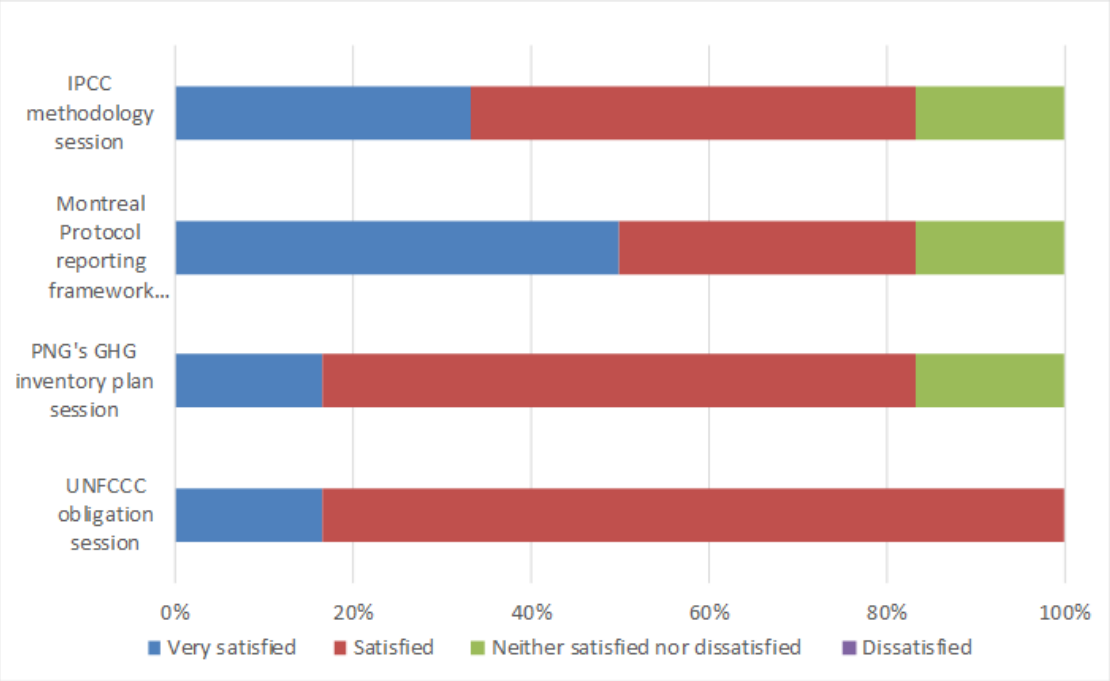

図 10　ワークショップの各セッション満足度

C.　成果 3

成果 3 に対して、客観的に検証可能な指標が以下の通り設定された：3-1)主要排出・吸収源にかかる分析及び不確実性評価結果の文書化; 3-2) 実際に講じられた改善策、及び将来に向けて必要な改善点の文書化。国家 GHG インベントリ報告書は、検証手段の 1 つとして確認された。指標達成度は高い。

上記 A 節で述べた通り、双方の GHG インベントリに関して国家インベントリ報告書が作成された。

<u>主要排出・吸収源にかかる分析及び不確実性分析</u>

第 1 次 GHG インベントリに対し、主要排出・吸収源にかかる分析が実施された。2006 年 IPCC ガイドラインに則り、LULUCF 分野を含めた評価、及び LULUCF 分野を含めない評価が実施された。2015 年の主要排出・吸収源にかかる第 1 回分析結果は、下記表 16 及び表 17 の通りである。

表 16 主要排出・吸収源にかかる評価結果（LULUCF 分野を含めない）

crf code	category name	gas	2015 emissions	absolute value of 2015 emissions	Level assessment	cumulative total
1.A.1:	1A1 Energy Industries	CO2	4,119.87	4,119.87	30.57%	30.57%
1.B.2.b.iii.2	Gas Production	CH4	2,394.52	2,394.52	17.77%	48.34%
1.A.3	1A3 Transport	CO2	1,937.59	1,937.59	14.38%	62.71%
1.A.2:	1A2 Manufacturing Industries and Construction	CO2	1,444.99	1,444.99	10.72%	73.44%
1.B.2.a.iii2	Production and Upgrading	CH4	555.61	555.61	4.12%	77.56%
4D	Wastewater Treatment and Discharge	CH4	487.68	487.68	3.62%	81.18%
1.A.4:	1A4 Other Sectors	CO2	456.73	456.73	3.39%	84.57%
3C4	Direct N2O Emissions from Managed Soils	N2O	411.00	411.00	3.05%	87.62%
1.B.2.b.iii.5	Gas Distribution	CH4	353.58	353.58	2.62%	90.24%
4A	Solid Waste Disposal	CH4	250.26	250.26	1.86%	92.10%
3A1	Enteric Fermentation	CH_4	168.30	168.30	1.25%	93.35%
1.B.2.b.iii.3	Gas Processing	CH4	155.18	155.18	1.15%	94.50%
3A2	Manure Management	CH_4	144.83	144.83	1.07%	95.57%
1.B.2.b.iii.4	Total Gas Transmission and Storage	CH4	131.06	131.06	0.97%	96.54%
4D	Wastewater Treatment and Discharge	N2O	128.21	128.21	0.95%	97.50%
1.B.2.b.i	Gas Venting	CH4	77.00	77.00	0.57%	98.07%
1.B.2.a.ii	Oil Flaring	CO2	42.77	42.77	0.32%	98.38%
3C5	Indirect N2O Emissions from Managed Soils	N2O	41.96	41.96	0.31%	98.70%
1.B.2.b.ii	Gas Flaring	CO2	33.21	33.21	0.25%	98.94%
1.A.3	1A3 Transport	N2O	27.61	27.61	0.20%	99.15%
1.B.2.b.iii.3	Gas Processing	CO2	20.11	20.11	0.15%	99.30%
3A2	Manure Management	N2O	18.99	18.99	0.14%	99.44%
1.A.2	1A2 Manufacturing Industries and Construction	N2O	17.85	17.85	0.13%	99.57%
1.B.2.a.i	Oil Venting	CH4	15.83	15.83	0.12%	99.69%
3C6	Indirect N2O Emissions from Manure Management	N2O	8.69	8.69	0.06%	99.75%
1.A.1	1A1 Energy Industries	N2O	6.09	6.09	0.05%	99.80%
1.A.3	1A3 Transport	CH4	5.06	5.06	0.04%	99.83%
4B	Biological Treatment of Solid Waste	N2O	3.31	3.31	0.02%	99.86%
4B	Biological Treatment of Solid Waste	CH4	2.99	2.99	0.02%	99.88%
1.A.1:	1A1 Energy Industries	CH4	2.45	2.45	0.02%	99.90%
1.B.2.a.iii2	Production and Upgrading	CO2	1.90	1.90	0.01%	99.91%
3C1	Biomass Burning	CH_4	1.46	1.46	0.01%	99.92%
2D1	Lubricants Use	CO2	1.40	1.40	0.01%	99.94%
1.A.4:	1A4 Other Sectors	CH4	1.30	1.30	0.01%	99.94%
1.A.2:	1A2 Manufacturing Industries and Construction	CH4	1.21	1.21	0.01%	99.95%
1.A.4	1A4 Other Sectors	N2O	1.14	1.14	0.01%	99.96%
1.B.2.b.iii.2	Gas Production	CO2	0.91	0.91	0.01%	99.97%
1.B.2.b.iii.5	Gas Distribution	CO2	0.89	0.89	0.01%	99.98%
2G3	N20 From Medical Use	N2O	0.80	0.80	0.01%	99.98%
3C1	Biomass Burning	N2O	0.71	0.71	0.01%	99.99%
1.B.2.a.ii	Oil Flaring	CH4	0.55	0.55	0.00%	99.99%
1.B.2.b.ii	Gas Flaring	CH4	0.45	0.45	0.00%	99.99%
1.B.2.a.ii	Oil Flaring	N2O	0.21	0.21	0.00%	100.00%
1.B.2.a.iii.3	Oil Transport	CH4	0.18	0.18	0.00%	100.00%
1.B.2.b.ii	Gas Flaring	N2O	0.16	0.16	0.00%	100.00%
1.B.2.a.i	Oil Venting	CO2	0.10	0.10	0.00%	100.00%
1.B.2.a.iii.3	Oil Transport	CO2	0.09	0.09	0.00%	100.00%
1.B.2.b.i	Gas Venting	CO2	0.05	0.05	0.00%	100.00%
1.B.2.b.iii.4	Total Gas Transmission and Storage	CO2	0.01	0.01	0.00%	100.00%
1.B.2.a.i	Oil Venting	N2O	0.00	0.00	0.00%	100.00%
1.B.2.a.iii2	Production and Upgrading	N2O	0.00	0.00	0.00%	100.00%
1.B.2.a.iii.3	Oil Transport	N2O	0.00	0.00	0.00%	100.00%
1.B.2.b.i	Gas Venting	N2O	0.00	0.00	0.00%	100.00%
1.B.2.b.iii.2	Gas Production	N2O	0.00	0.00	0.00%	100.00%
1.B.2.b.iii.3	Gas Processing	N2O	0.00	0.00	0.00%	100.00%
1.B.2.b.iii.4	Total Gas Transmission and Storage	N2O	0.00	0.00	0.00%	100.00%
1.B.2.b.iii.5	Gas Distribution	N2O	0.00	0.00	0.00%	100.00%

表 17 主要排出・吸収源にかかる評価結果（LULUCF 分野を含む）

crf code	category name	gas	2015 emissions	absolute value of 2015 emissions	Level assessment	cumulative total
3B2	Cropland	CO2	12,648	12,647.58	32.510%	32.510%
3B1	Forest land	CO2	-11,855	11,855.41	30.473%	62.983%
1.A.1:	1A1 Energy Industries	CO2	4,120	4,119.9	10.590%	73.573%
1.B.2.b.iii.2	Gas Production	CH4	2,395	2,394.5	6.155%	79.728%
1.A.3	1A3 Transport	CO2	1,938	1,937.6	4.980%	84.708%
1.A.2:	1A2 Manufacturing Industries and Construction	CO2	1,445	1,445.0	3.714%	88.422%
1.B.2.a.iii2	Production and Upgrading	CH4	556	555.6	1.428%	89.851%
4D	Wastewater Treatment and Discharge	CH4	488	487.68	1.254%	91.104%
1.A.4:	1A4 Other Sectors	CO2	457	456.7	1.174%	92.278%
3C4	Direct N2O Emissions from Managed Soils	N2O	411	411.0	1.056%	93.335%
3C1	Biomass burning - FL	CH4	395	394.89	1.015%	94.350%
1.B.2.b.iii.5	Gas Distribution	CH4	354	353.6	0.909%	95.258%
3B3	Grassland	CO2	323	323.36	0.831%	96.090%
4A	Solid Waste Disposal	CH4	250	250.26	0.643%	96.733%
3C1	Biomass burning - FL	N2O	171	171.45	0.441%	97.174%
3A1	Enteric Fermentation	CH_4	168	168.3	0.433%	97.606%
1.B.2.b.iii.3	Gas Processing	CH4	155	155.2	0.399%	98.005%
3A2	Manure Management	CH_4	145	144.8	0.372%	98.377%
1.B.2.b.iii.4	Total Gas Transmission and Storage	CH4	131	131.1	0.337%	98.714%
4D	Wastewater Treatment and Discharge	N2O	128	128.21	0.330%	99.044%
1.B.2.b.i	Gas Venting	CH4	77	77.0	0.198%	99.242%
1.B.2.a.ii	Oil Flaring	CO2	43	42.8	0.110%	99.352%
3C5	Indirect N2O Emissions from Managed Soils	N2O	42	41.96	0.108%	99.459%
3B5	Settlements	CO2	35	34.59	0.089%	99.548%
1.B.2.b.ii	Gas Flaring	CO2	33	33.2	0.085%	99.634%
1.A.3	1A3 Transport	N2O	28	27.6	0.071%	99.705%
1.B.2.b.iii.3	Gas Processing	CO2	20	20.1	0.052%	99.756%
3A2	Manure Management	N2O	19	19.0	0.049%	99.805%
1.A.2	1A2 Manufacturing Industries and Construction	N2O	18	17.8	0.046%	99.851%
1.B.2.a.i	Oil Venting	CH4	16	15.8	0.041%	99.892%
3C6	Indirect N2O Emissions from Manure Management	N2O	9	8.69	0.022%	99.914%
1.A.1	1A1 Energy Industries	N2O	6	6.1	0.016%	99.930%
1.A.3	1A3 Transport	CH4	5	5.1	0.013%	99.943%
4B	Biological Treatment of Solid Waste	N2O	3	3.31	0.008%	99.951%
4B	Biological Treatment of Solid Waste	CH4	3	2.99	0.008%	99.959%
1.A.1:	1A1 Energy Industries	CH4	2	2.5	0.006%	99.965%
1.B.2.a.iii2	Production and Upgrading	CO2	2	1.9	0.005%	99.970%
3C1	Biomass Burning	CH_4	1	1.5	0.004%	99.974%
2D1	Lubricants Use	CO2	1	1.4	0.004%	99.978%
1.A.4:	1A4 Other Sectors	CH4	1	1.3	0.003%	99.981%
1.A.2:	1A2 Manufacturing Industries and Construction	CH4	1	1.2	0.003%	99.984%
1.A.4	1A4 Other Sectors	N2O	1	1.1	0.003%	99.987%
1.B.2.b.iii.2	Gas Production	CO2	1	0.9	0.002%	99.989%
1.B.2.b.iii.5	Gas Distribution	CO2	1	0.9	0.002%	99.992%
2G3	N20 From Medical Use	N2O	1	0.8	0.002%	99.994%
3C1	Biomass Burning	N2O	1	0.7	0.002%	99.995%
1.B.2.a.ii	Oil Flaring	CH4	1	0.5	0.001%	99.997%
1.B.2.b.ii	Gas Flaring	CH4	0	0.4	0.001%	99.998%
1.B.2.a.ii	Oil Flaring	N2O	0	0.2	0.001%	99.998%
1.B.2.a.iii.3	Oil Transport	CH4	0	0.2	0.000%	99.999%
1.B.2.b.ii	Gas Flaring	N2O	0	0.2	0.000%	99.999%
1.B.2.a.i	Oil Venting	CO2	0	0.1	0.000%	100.000%
1.B.2.a.iii.3	Oil Transport	CO2	0	0.1	0.000%	100.000%
1.B.2.b.i	Gas Venting	CO2	0	0.0	0.000%	100.000%
1.B.2.b.iii.4	Total Gas Transmission and Storage	CO2	0	0.0	0.000%	100.000%
1.B.2.a.i	Oil Venting	N2O	0	0.0	0.000%	100.000%
1.B.2.a.iii2	Production and Upgrading	N2O	0	0.0	0.000%	100.000%
1.B.2.a.iii.3	Oil Transport	N2O	0	0.0	0.000%	100.000%
1.B.2.b.i	Gas Venting	N2O	0	0.0	0.000%	100.000%
1.B.2.b.iii.2	Gas Production	N2O	0	0.0	0.000%	100.000%
1.B.2.b.iii.3	Gas Processing	N2O	0	0.0	0.000%	100.000%
1.B.2.b.iii.4	Total Gas Transmission and Storage	N2O	0	0.0	0.000%	100.000%
1.B.2.b.iii.5	Gas Distribution	N2O	0	0.0	0.000%	100.000%
3B4	Wetlands	CO2	0	0.00	0.000%	100.000%
3B6	Other land	CO2	0	0.00	0.000%	100.000%
3D1	HWP	CO2	0	0.00	0.000%	100.000%
3C1	Biomass burning - GL	CH4	0	0.00	0.000%	100.000%
3C1	Biomass burning - crop residue	CH4	0	0.00	0.000%	100.000%
3C1	Biomass burning - GL	N2O	0	0.00	0.000%	100.000%

不確実性にかかる分析については、BUR1 GHG インベントリプロセスにおいて、定性的な議論のみ行われた。PNG のインベントリにおける不確実性の主要因は、データの欠如、特に全分野の活動データが欠如している点である。例えば、PNG には公式なエネルギー統計がないため、CCDA 及び JICA 専門家は、エネルギー分野の排出における活動データとして、APEC によって編纂されたエネルギーバランス表を使用した。

BUR2 GHG インベントリのエネルギー分野、IPPU 分野、廃棄物分野については、各排出源別の不確実性を定量的に算定した。AFOLU 分野が完成した際には、CCDA によって、主要排出・吸収源にかかる評価、及び GHG インベントリ全体の不確実性分析の完全実施が行われる予定である。2021 年 10 月 4 日時点では、AFOLU 分野の算定は、まだ他のステークホルダーの支援の下、CCDA、PNG FA によって行われている。

実際に講じられた改善策、及び将来に向けて必要な改善点

２つの GHG インベントリに関して、実際に講じられた改善策、及び将来に向けて必要な改善点が報告書にまとめられた。第 1 次 GHG インベントリに関しては、分野別に情報がまとめられ、第 2 次 GHG インベントリに関しては、排出・吸収源別に情報が提示された。

表 18 BUR2 で講じられた改善策、及び将来に向けて必要な改善点に関する概要

エネルギー	第二回国別報告書(OCCD, 2015) は、燃料輸入統計に基づいた、エネルギー分野の排出量推定値を集計したものであるが、カテゴリー/ 排出・吸収源別に分類はしていない。更に、NC2 では 2000 年の排出量のみの算定だった。BUR1 はエネルギー分野の排出量算定において、カテゴリー及び年を網羅した点で、大幅に改善された。これは、2000 年から 2015 年の全ての年を含んだ、APEC のエネルギー消費データが改良された数値を基に作成されている。 しかしながら、国内のエネルギーバランス表が欠如していることや、一部データをカテゴリー/ 排出・吸収源別に分類できないことは、国特有の排出係数の欠如ともなり、これは今後の全般的な課題でもある。
IPPU	SNC では、IPPU 分野の最重要排出・吸収源はセメント製造によって発生する CO_2 であると報告されている。しかし、CCDA の、BUR1 のデータ収集作業により、PNG では、クリンカーは製造されておらず、輸入されていることが発覚した。そのため、2006 IPCC ガイドラインに従って、セメント製造による排出量に関しては作成されていない。当排出源は現在、「NO」として報告されている。BUR1 で予測されている２つのカテゴリー/ 排出・吸収源（潤滑油使用、及び N_2O 医療使用）については、SNC では含まれていない。 データに制約があるため、PNG で発生していない排出源を除き、全ての排出源に対し、全ての排出量が予測されている訳ではない。
農業	以前報告されていなかった排出源が算定対象に含まれ、その他の排出源(管理土壌、作物残渣の燃焼、及び稲作)も改善され、2000 年から 2015 年までの全時系列に関して算出が行われている。 FAOSTAT より当インベントリに関して入手した、合成もしくは有機肥料といった管理土壌関連の全てのデータ収集に関しては、多大な努力が求められる。

LULUCF	SNC では修正版 1996 IPCC GL が使用されているが、当インベントリでは IPCC 2006 GL が使用されている。SNC では、LUCF 分野の排出量／吸収量算定結果の合計が計上されている。本報告書では、GHG 予測において、活動データや、排出・吸収源及び年の網羅に関し、SNC と比較して、より細分化された情報が提供されている。 しかし、現在使用されているデータに関しては、活動データを更に改善するためには、UPNGRSC、OPRA、CCRI といった機関からのグラウンドデータによる確認が必要である。当 GHG インベントリには、高炭素有機質土壌、及び無機質土壌の炭素ストック量変化による GHG 排出量予測が含まれていない。泥炭地を含めた有機質土壌からの GHG 排出量を正確に算定するためには、排水が行われ、再湿潤された土壌の領域に関する予測も求められる。こうした情報を取得するために当国は、土壌のある場所について、又これらの土壌の歴史的及び現在の土地利用に関する情報を更に収集する必要がある。無機質土壌について算定するためには、当国は歴史的な土地利用に関する情報が更に必要となる。PNG が現在のデータセットを更に持続・構築し、特に、変換及び管理された土地を経時的に追跡するために（デフォルト 20 年、もしくはそれ以下）、アプローチ 1 からアプローチ 2 への移行を可能にするためには、継続的な能力開発が必要である。
廃棄物	SNC では、SWDS 及び、国内廃水（2008 年のみ）からの CH_4 排出量についてのみ取り込まれているが、当インベントリでは、廃棄物分野からの GHG 排出量算定は、SWDS からの CH_4 排出量、又、固形廃棄物の生物学的処理（堆肥化）、及び生活排水の処理・排出に伴う CH_4 と N_2O 双方の排出量から構成されている。また、2000 年から 2015 年までの時系列により GHG 排出量が算定されている。 当インベントリ実施において直面した主な制約は、PNG における生活排水処理方法、工業排水データ、国特有の排出係数の不足、廃棄物管理システムに関する限られた情報による、活動データの不足、特に、埋め立て廃棄物、堆肥化廃棄物、焼却・野焼き廃棄物、廃棄物組成、埋立地のメタン予測に必要な係数、産業廃棄物データ、人口データの不足である。

BUR2 GHG インベントリに関しては、AFOLU 分野以外の各分野の排出・吸収源別に、実際に講じられた改善策、及び将来に向けて必要な改善点について確認されている。BUR1 で言及された、将来に向けて必要な改善点の多くは残っているが、下記は BUR2 GHG インベントリに関して、実際に講じられた改善策である。詳細については、国家インベントリ報告書 2000-2017 を参照されたい。

表 19 BUR2 で講じられた改善策及び将来に向けて必要な改善点（BUR2）

エネルギー	（全排出源）APEC による 2000 年～2017 年のエネルギーベースデータの更新(主に製造業及び建築業排出源) 非エネルギー用途の燃料消費量を反映; (製造業及び建築業排出源) 自家発電からの排出量を製造業に割り当て, (燃料からの漏出排出源) NMVOC 排出量の算定
IPPU	冷凍空調機器排出源において、オゾン層破壊物質の代わりとして使用される代替フロン（HFC 類）を新規算定
廃棄物	野焼きからの CH_4 排出量の新規算定、排水処理の種類を反映し CH_4 排出量算定の精緻化、排水処理施設の利用人口の改善による N_2O 排出量の算定精緻化、工業用排水においてタンパク質量を考慮した N_2O 排出量算定を改善

2.2 プロジェクト目的及び指標

プロジェクト目標について、客観的に検証可能な指標は、2015 年、2017 年の国家 GHG インベントリ報告書、及び TACCC チェックリスト項目の 2 点が設定されていた。これは、国家 GHG インベントリ（2015 年、2017 年）に関する報告書、及び TACCC チェックリスト評価結果に相当する。

国家 GHG インベントリ報告書（2000-2015 年、及び 2000-2017 年）については、上記 A 節にて言及しており、又、本報告書付録としても添付している。TACCC 評価は、上記 A 節にて既述の通り、第 1 次 GHG インベントリ結果を見直すため 2018 年に実施され、改善計画の一部となっている。

成果 3 つを達成し、CCDA にインベントリ作成に必要な文書（GHG インベントリ報告書、作業計画、QA/QC 計画、等）や GHG 排出・吸収量の算定ファイルが作成され、ステークホルダーのインベントリに対する理解も深まり連携体制が強化されたことから、本プロジェクトの目標は達成されたと考える。

3. PDM 及び PO 修正の履歴

2016 年 9 月から 2017 年 2 月に実施された、当プロジェクトの技術協力に関する調査の期間中、PNG は 2017 年 12 月に BUR1 を提出することを目標としている旨、CCDA より JICA は報告を受けていた。当プロジェクトのスケジュール及び計画は、こうした期限・前提条件を基に、多少の遅延にも対応できるよう柔軟性を持たせながら、設計されていた。

しかし、JICA プロジェクト開始の際に、JICA プロジェクト専門家は、BUR 1 インベントリプロセスにおいて深刻な遅れが生じていることを知らされた。BUR 1 インベントリ作成の遅延を受け、活動計画（PO）は、BUR1 提出のための修正計画を反映すべく、2018 年 2 月に修正された。これは 2018 年 5 月の第 1 回 JCC 会議にて承認された。第 1 回 JCC 会議以降は、PO に変更は加えられていない。

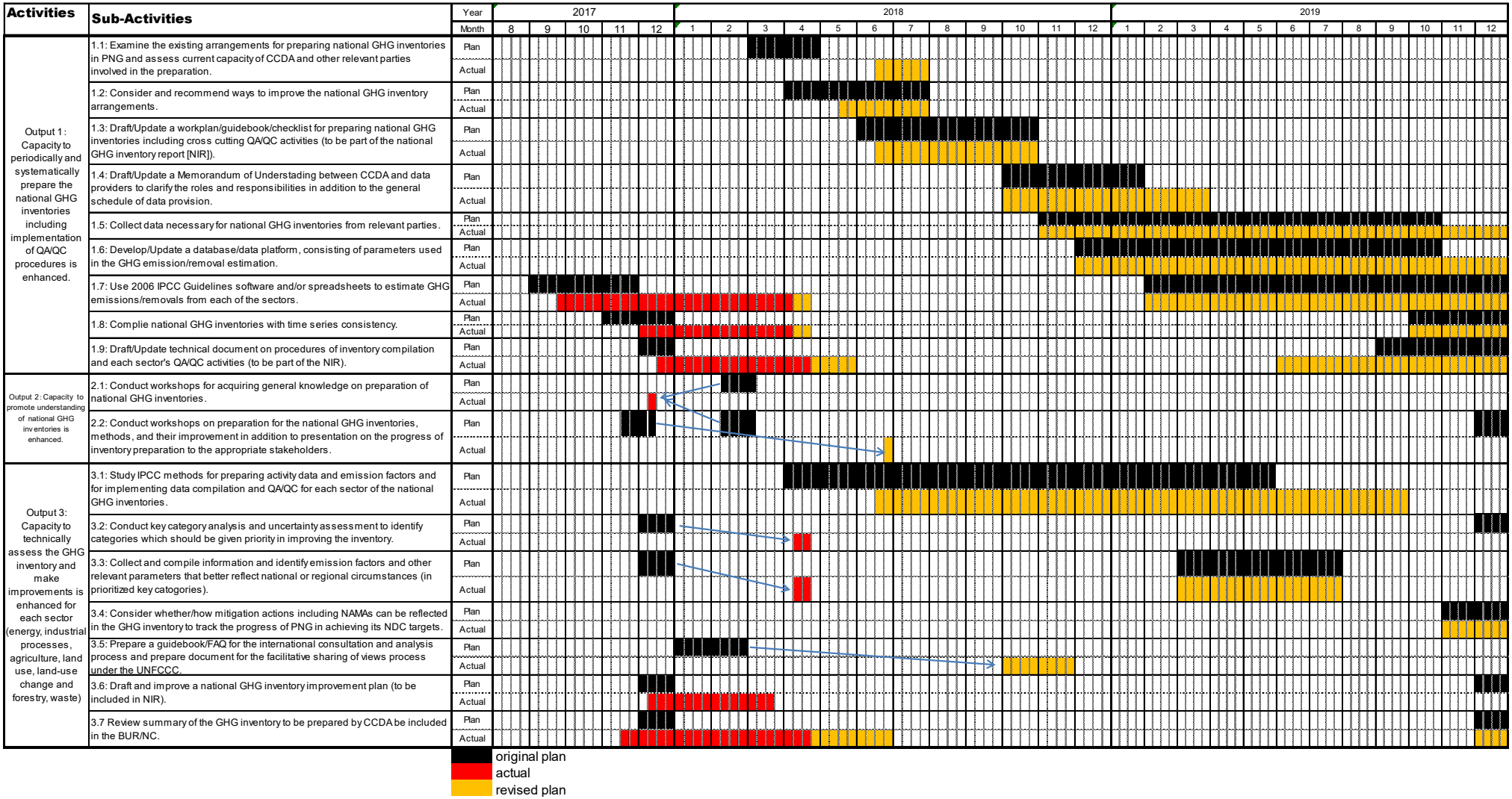

図 11　修正版 PO（2017-2019 年）

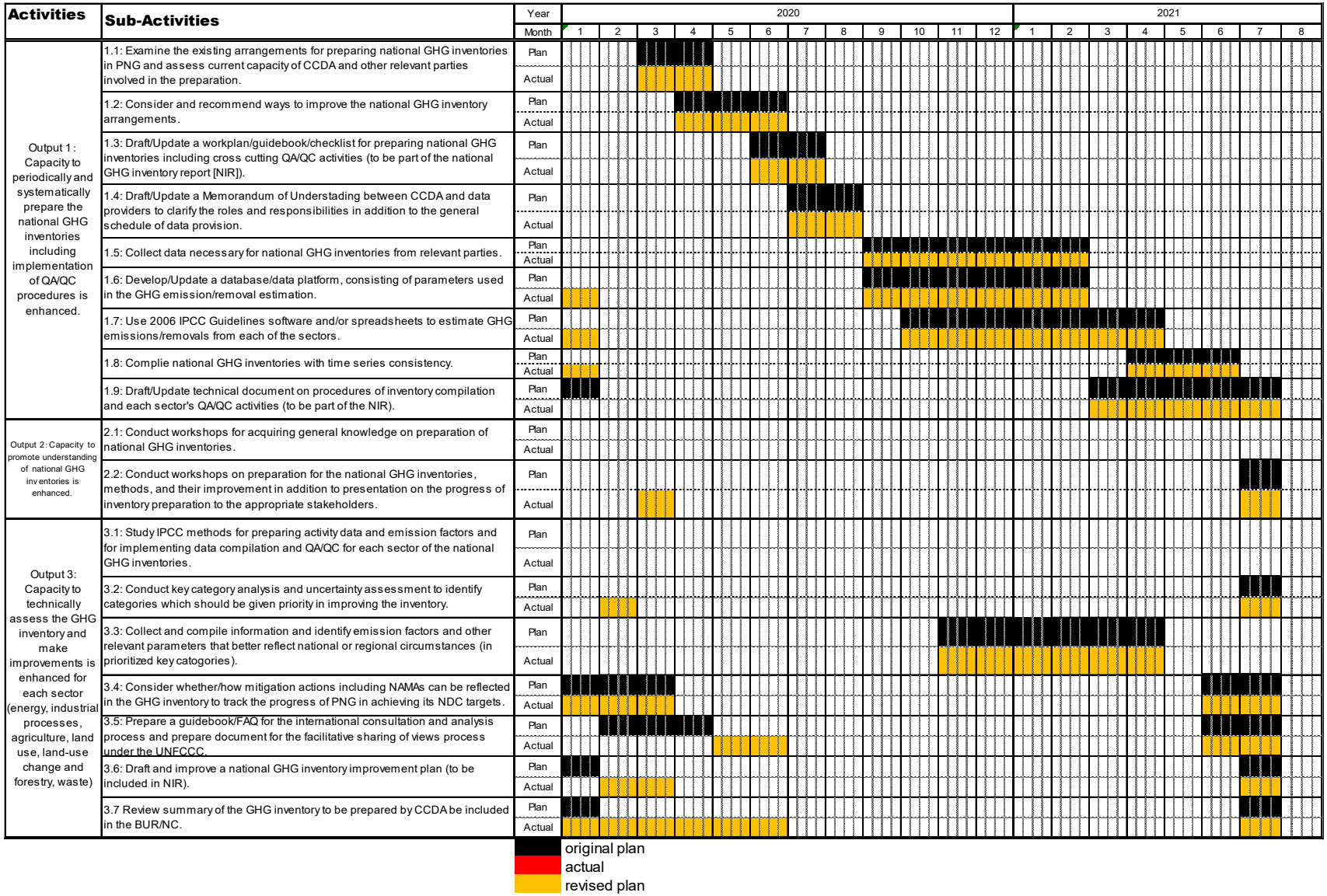

図 12　修正版 PO（2020-2021 年）

３章 共同レビュー結果

1. 開発援助委員会（DAC）評価基準に基づいたレビュー結果

JICA プロジェクト専門家と CCDA は、経済協力開発機構（OECD）の開発援助委員会（DAC）によって作成された DAC 評価基準を適用しながら、当プロジェクト結果の共同レビューを実施した。

当基準は、表 20 の通り、妥当性、有効性、効率性、インパクト、持続性といった５つの視点からなる。各基準においては、当プロジェクトは、「とても高い」「高い」「やや低い」「低い」というスケールに基づき、評価された。

表 20 DAC 評価基準

妥当性	妥当性については、パプアニューギニアの政府開発政策、及びターゲットグループと／或いは最終的な受益者のニーズと関連付けて、プロジェクト目的及び上位目標がどの程度妥当かによって評価される
有効性	有効性については、プロジェクトがどの程度プロジェクト目的を達成したか、プロジェクト目的と成果の関係性を明確にしながら、評価される。
効率性	プロジェクト実施の効率性については、成果と投入の関係性に重点を置き、タイミング、質、量の観点から分析される。
インパクト	プロジェクトのインパクトについては、それがもたらした影響が正／負（肯定的／否定的）なのか、又、意図的／意図せずに生じたのかといった観点から評価される。
持続性	プロジェクトの持続性については、プロジェクト完了後、プロジェクト実績がどの程度持続性があるか、(1)政策及び制度、(2)組織、(3) 財政、(4) 技術的観点から評価される。

1.1 妥当性

JICA プロジェクト専門家と CCDA は、妥当性に関して、「とても高い」と合意した。

当プロジェクトの目的は「TACCC を満たす GHG インベントリを、CCDA が定期的に作成する基礎的な能力を強化すること」である。

GHG インベントリは、気候変動政策、及び UNFCCC において使用される政策ツールであり、国別報告書及び BUR の中核的な構成要素である。これによって政策立案者は、国の GHG 排出・吸収量の推移を評価し、緩和行動を計画し、これらの行動をモニタリングすることができる。それゆえ、2024 年より、全てのパリ協定締約国によって提出される予定となっている隔年透明性報告書（Biennial Transparency Report, 以下「BTR」）においても、GHG インベントリは報告要素の中核を成している。ETF の下では、提出された GHG インベントリに対して、国際専門家による TACCC を評価するレビューが行われることになる。これを踏まえ、当プロジェクトの目的は、UNFCCC 下の現在の報告要件のみならず、今後求められる ETF 下の報告要件にも則した形となるよう、GHG インベントリが「TACCC を満たす」ことを条件とした。

PNG にとって、気候変動問題、及び京都議定書やパリ協定などの UNFCCC の下での合意事項への対応は、重要課題である。PNG ビジョン 2050 においては、2050 年までに PNG が達成すべき目標が掲げられており、その中には、GHG 排出量を 90%削減し 1990 年レベルにまですることや、電力を 100%再生可能エネルギーによって供給することが含まれている。中期開発計画（2010、2015、2018）、及び責任ある持続可能なパプアニューギニア国家開発戦略（2014）では、グリーン成長と持続可能な開発の原則に基づいた経済成長戦略が規定され、ロードマップが構築された。そして、国家気候

適合開発管理政策（2014）では、PNG の持続可能な開発アプローチについて定義し、気候変動の緩和と適応のための主要な政策分野を特定及び説明し、気候変動に対する活動を実施するための制度、手段、役割、責任について概説している。次いで、気候変動管理法（2015）において、京都議定書及びその他の国際協定やプログラムに従って、PNG における気候変動対策の開発及び実施の枠組みが示された。直近では、国連パリ協定実施法（2016）により、PNG の気候変動問題への対処や、パリ協定下での国家義務の履行が定められている。

GHG インベントリの政策ツールとしての利用価値と有用性は前述のとおりであり、それゆえ、本プロジェクトの上位目標、及びプロジェクト目標に定義される「GHG インベントリの定期的な作成」は、PNG の国策に資すると言える。

以上のことから、PNG への当プロジェクトの妥当性はとても高い。

1.2 有効性

JICA プロジェクト専門家と CCDA は、有効性に関して、「とても高い」と合意した。

当プロジェクトの目標は、TACCC を満たす GHG インベントリを、CCDA が定期的に作成する基礎的な能力を強化することである。検証手段としては、2 セットの作業計画、データベース、国家 GHG インベントリ報告書、及びアンケート結果が用意された。本報告書で既述の通り、これらの文書は、CCDA 及び JICA プロジェクト専門家によって作成された。

GHG インベントリを定期的に作成する能力を評価する際に考慮すべき重要な点は、CCDA が都度、新規プロジェクトとして、次期の GHG インベントリサイクルにアプローチするのではなく、日常的に活動を実施できるように、インベントリに関連する作業ツールが改善されているかどうか、ということである。特にユーザビリティの高さは、CCDA にとって極めて重要である。というのは、CCDA 内部では、人員の移動や組織内部の役職変更のリスクがあり、新規スタッフが、次期 GHG インベントリ更新の業務を担う可能性があるためである。作業計画に関しては、CCDA は、JICA プロジェクト専門家によって策定された一般的な作業計画を使用した。また、JICA プロジェクト専門家と CCDA が共同で行った TACCC 審査結果に基づき、分野ごとの作業計画が策定された。データベースについても、ファイル相互の整合性や、ユーザビリティの向上を図るため、更新が行われた。第 2 次インベントリ報告書には、第 1 次インベントリよりも詳細に、算定方法や使用データに関するカテゴリー特有の情報や、講じられた改善策、及び将来に向けて必要な改善点が含まれている。このように、成果物に改善が加えられたことによって、今後のサイクルではインベントリ編纂が容易となるだろう。新規スタッフが次期サイクルを引き継ぐことになった場合、担当者があまり専門性を持たずしても、それを更新できるようにするために、ユーザビリティは、作業計画、データベース、インベントリ報告書の開発の際に考慮すべき重要な点である。

1.3 効率性

JICA プロジェクト専門家と CCDA は、効率性に関して、「やや低い」と合意した。

本プロジェクトは効率性のあるプロジェクトとして計画されていたが、想定外の状況や、その他の問題により、当プロジェクトの実施は、当初計画されていたように効率的なものとはならなかった。

本プロジェクトでは、2 度の GHG インベントリサイクルを含むように設計された。その中で、第 1 次サイクルは、JICA プロジェクト専門家が、CCDA のスタッフの側で、各ステップにおける作業

を誘導しながら行うことが想定されており、第 2 次サイクルにおいては、JICA プロジェクト専門家は一歩退き、CCDA のスタッフが自らの能力を最大限に発揮し、自分たちで活動を実施できるようにすることが想定されていた。しかしながら、当プロジェクトが開始されるまでに完成／提出されている予定であった BUR1 の作業に遅延が生じており、JICA プロジェクト専門家は BUR1 プロセスの最中に、プロジェクトの始動を余儀なくされ、そのために、GHG インベントリ開始から完了までの各ステップにおいて、CCDA を誘導することは困難となった。

更に、新型コロナウイルス感染拡大に伴うロックダウンや、JICA プロジェクト専門家の PNG 渡航が不可能となったことから、第 2 次サイクルの完全実施は果たされなかった。そのため、第 2 次サイクルへのアプローチについては、JICA プロジェクト専門家が GHG インベントリの更新をリードし、CCDA は JICA プロジェクト専門家の作業の見直しから学習するといった形となり、修正が行われた。インベントリ報告書やデータベースの作成という点で、JICA プロジェクト専門家が採った現場主義は、GHG インベントリ編纂の側面からは効率的と考えられていたが、能力開発プロジェクトという観点からは効率的とはならなかった。

本プロジェクトの対象分野は、全ての分野であったが、AFOLU 分野に対し CCDA を支援している機関が他に存在していたため、JICA プロジェクトは AFOLU 以外の分野に注力することとした。CCDA はプロセスの管理やドナーとの調整をリードすることが十分にできなかったため、AFOLU チームと JICA プロジェクト専門家チームの作業を調整することが課題となった。第 1 次サイクルでは、JICA プロジェクトチームは、国家 GHG インベントリ全体を網羅して編纂するために、AFOLU 分野含む全ての分野のインベントリプロセスを積極的に管理していたが、第 2 次サイクルでは、JICA プロジェクト専門家は、AFOLU 以外の分野に注力し、AFOLU インベントリは、CCDA が支援機関と調整しながら作業を進めた。CCDA がこうした調整を、更に改善させることで、本プロジェクト期間内に GHG インベントリ全体が完成していたかもしれない。

プロジェクトの開始時に、JICA プロジェクトは、CCDA スタッフに対し、エクセル・スプレッドシート使用の基礎、及び基本的なエクセル機能についてトレーニングを行うため、エクセル専門家を起用した。これが GHG インベントリの技術的な能力開発には効果的なアプローチだった一方で、CCDA スタッフの中には、当訓練に苦闘し、基本的な方程式や GHG 排出量予測方法を理解することに苦労し続ける者も見受けられた。この点については、プロジェクトが開始される前に、分野担当者の要件を高く設定しておく必要性があったのかもしれない。

1.4 インパクト

JICA プロジェクト専門家と CCDA は、インパクトに関しては、「高い」と合意した。

CCDA スタッフは GHG インベントリ作成の 2 サイクルを経験し、各ステップ、及びインベントリ作成と編纂に必要な作業への理解度が高まった。こうした作業を学習することは、スタッフの自信と、各々のインベントリ分野へのオーナーシップの高まりに繋がった。CCDA スタッフの成長は顕著で、特にコンサルテーションミーティングにおいて、BUR1 の成果に関する全てのプレゼンテーションを CCDA スタッフが行ったことなどに見受けられた。また、CCDA スタッフはプロジェクトを通じて、GHG インベントリプロセスにおいてのみならず、どのプロジェクト環境においても、プロフェッショナリズム、計画性及びコミュニケーションは重要であることも学んだ。当プロジェクトは、「TACCC を満たす GHG インベントリを定期的に作成する」という、やりがいのある作業継続に対する CCDA 若手スタッフの自信を高めることとなり、殆どの点において、肯定的な「正」の成長経験となっている。

当プロジェクトは、その他の関係ステークホルダーに対しても、肯定的な「正」のインパクトがあった。前述した通り、関係機関による GHG インベントリや UNFCCC への理解度が高まったが、当プロジェクトが指定していなかったアクターからも、CCDA は、GHG インベントリに関する質問を受けるようになった。これにより CCDA のプレゼンスが高まり、GHG インベントリ作業は、PNG に肯定的な「正」のインパクトをもたらすこととなった。

GHG インベントリは時系列で一貫した算定方法・データを用いて排出・吸収量を算定することが求められる。したがって、インベントリの改善を行う場合は、過去に遡って排出・吸収量を再計算する必要がある。PNG の BUR2 インベントリではエネルギー分野、IPPU 分野、廃棄物分野において再計算を施しており、その結果、エネルギー分野において 2015 年の排出量が大幅に減少（約 11,800 kt CO_2 eq から約 8,500 kt CO_2 eq）、IPPU 分野において 2015 年の排出量が増加（約 0 kt CO_2 eq から約 140 kt CO_2 eq）、廃棄物分野において 2015 年の排出量が増加（870 kt CO_2 eq から 950 kt CO_2 eq）した。こうした排出量の再計算により、PNG の GHG 排出量のトレンドが変化し、新たな排出源が追加されており、これらは PNG における気候変動政策の評価・立案に影響があることから、緩和行動・NDC の更新を検討する際に考慮すべき点であると JICA プロジェクト専門家から重要メッセージとして最終 JCC で説明を行った。これに対し、JCC 議長は、PNG の BUR1 の GHG インベントリデータは NDC 更新作業の基礎データとして活用されており、今後もインベントリデータを踏まえて NDC を更新すると回答し、JICA に対して政策インプリケーションのある GHG インベントリの作成支援に感謝の意を表した。

1.5 持続性

JICA プロジェクト専門家と CCDA は、持続性に関して、「高い」と合意した。

CCDA と JICA プロジェクト専門家は、政策・制度面、実施機関の体制、財政、及び技術面より、プロジェクト完了後もプロジェクト実績が持続されるかどうか、プロジェクト成果の持続性について評価した。

<u>政策及び制度面</u>

本章第 1 節第 1 項で既述の通り、GHG インベントリと BTR は、パリ協定の下、UNFCCC に対し、継続的に編纂し提出することが求められている。この国際的な合意は継続され、今後も UNFCCC 要件への PNG のコミットメントが継続することが期待されている。PNG がパリ協定実施法及び NDC 規定（NDC Regulation）を更に発展させ、具体化させるにあたり、PNG の制度・機関には、CCDA が GHG インベントリと BTR 作成の際に、定期的に支援を行うことが求められるだろう。

パリ協定 ETF の下では、更新された NDC の提出、BTR の進捗状況のモニタリング、及びグローバルストックテーク（Global stocktake）のサイクルが継続される限り、PNG の国内体制は持続することが期待されている（NDC のサイクルについては下記図を参照）。

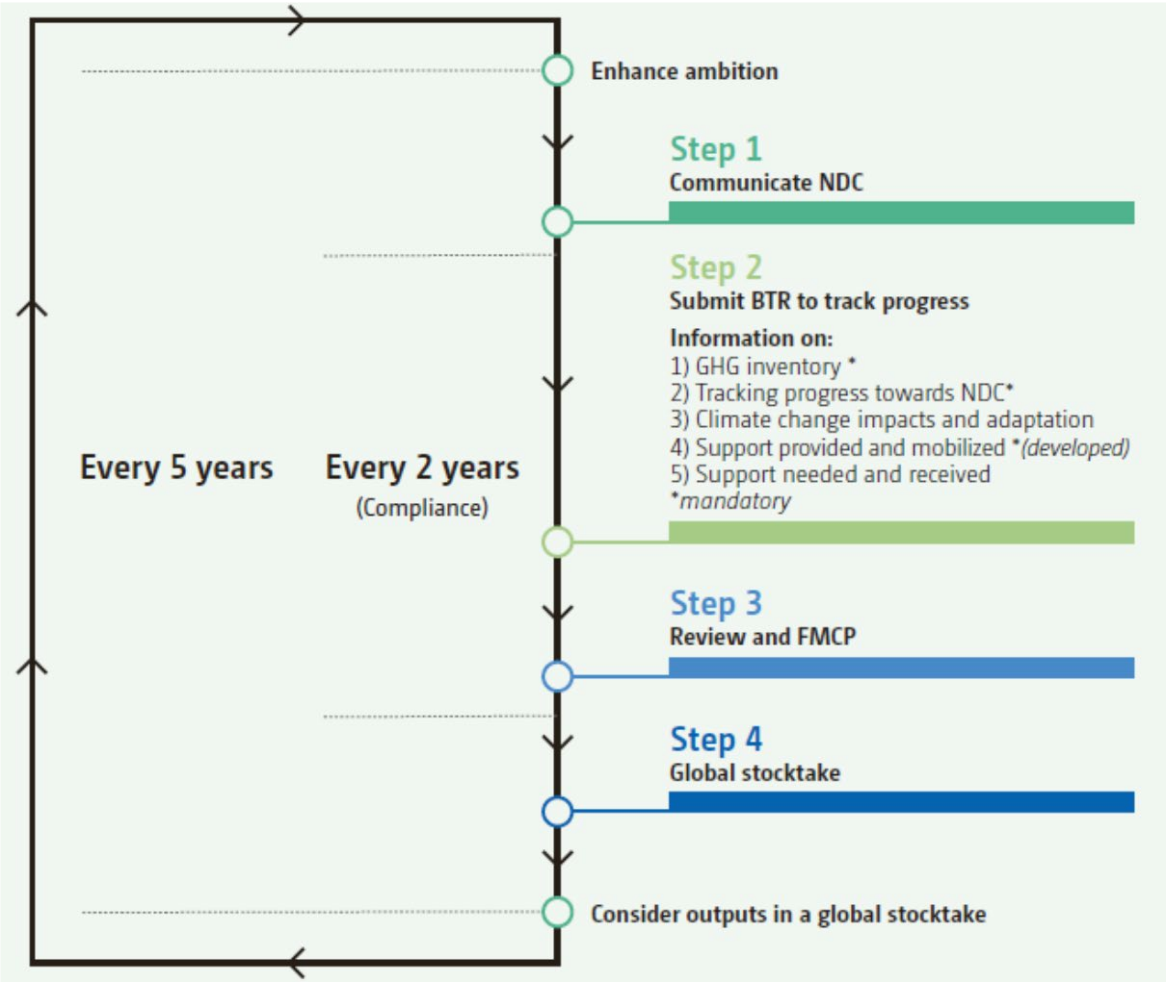

図 13　NDC サイクル

出典：Reference Manual for the Enhanced Transparency Framework under the Paris Agreement, UNFCCC, 2020

PNG には、サブ技術ワーキング委員会や NDC 規定の一部として策定された新規制度のような、NDC の実施や GHG インベントリ作成を考慮した制度面の整備が適所に行われている。CCDA には又、GGGI や GIZ といった、これらの取り組みを支援する機関もある。そのため、政策及び制度面からの持続性は、「とても高い」とされる。

実施機関の体制

CCDA の体制は、プロジェクト開始時より弱体化している。NC 及び MRV Division のマネージャー職は、プロジェクト開始時より不在で、2018 年には CCDA スタッフ 2 名が離職したが、後任の採用は行われていない。CCDA のジェネラルマネージャーは、一時、各 GHG インベントリ分野の業務を担う 5 人のスタッフを抱え、プロジェクトの監督を行うと同時に、日々の管理を担うマネージャーも任されていた。この体制は、2020 年に、CCDA スタッフの一人が、GHG インベントリのリーダーとして昇格し、ジェネラリスト／コンパイラー／エネルギー専門家を兼任したことによって、変化した。

こうした CCDA の体制は、「組織内の 1 人か 2 人のスタッフが GHG インベントリプロセスの管理を任されている」といった途上国でよく見られる状況に比べると、それ以上のものではあるが、

CCDA のスタッフは若年層が多く、また中間管理職による厳密な指揮監督を受けているわけではない。一部スタッフが積極的にプロセスを管理し、作業計画及び進捗のモニタリングにかかわったものの、当プロジェクトなくしては、計画・作業進捗確認は懸念事項として考えられる。そのため、組織的観点からの持続性については、「やや低い」状況である。

財政面

上述した通り、PNG には NC 及び BUR 作成専用のスタッフチームがあり、その点、他の多くの途上国よりも有利である。本プロジェクト開始以降、スタッフ数は減少したが、気候変動問題の重要性や PNG のパリ協定締結を考慮すると、今後当 Division の予算がなくなることはないと考えられる。と同時に、CCDA は GEF やその他の支援機関による援助に予算面で依存してきたが、こうした関係は今後も変わることはないだろう。そのため、予算面における持続性については、「高い」とされた。

技術面

CCDA スタッフの職業訓練を通じて、彼らは GHG インベントリ作成プロセスを理解し、各分野をリードするまでに成長することができた。JICA プロジェクト専門家が現場に不在の間の、プロジェクトへの関与の度合いがスタッフ間で異なり、成長の度合いは、スタッフメンバーにより異なる。更に、新型コロナウイルス感染拡大による制約のため、GHG インベントリプロジェクトの第 2 次サイクルでは、訓練のレベルに制限が生じた。

しかしながら、第 2 章第 2 節第 1 項 A で既述の通り、GHG インベントリ TACCC チェックリスト、データベース、国家インベントリ報告書といったインベントリ作成ツールが、プロジェクトを通じて開発された。これらの基礎ツールは CCDA スタッフ向けのマニュアルにもなっているが、GHG インベントリ・コンパイラーに対しては、最低限に必要な技術的コンピテンスを持続させるための支援を行うべきである。そのため、技術面における持続性については、「やや低い」状況である。

2. 実施及び成果に影響を与えている主な要因

プロジェクト実施に影響を与えた要因は以下の通り。

2.1 作業の遅延

2016 年 9 月から 2017 年 2 月に実施された、当プロジェクトの技術協力に関する詳細計画策定調査の期間中、PNG は 2017 年 12 月に BUR1 を提出することを目標としている旨、CCDA より JICA は報告を受けていた。当プロジェクトの活動は、こうした前提条件を基に、多少の遅延にも対応できるよう柔軟性を持たせながら、設計されていた。しかし、2017 年 10 月、当プロジェクト開始の際に、JICA プロジェクト専門家は、CCDA がもはや 2017 年末をその期限として考えておらず、遅延がどの程度になるか査定もしておらず、又、BUR1 提出計画も策定されていないことを知らされた。この不確実性と迅速性の欠如が、プロジェクト活動に影響を及ぼした。

2.2 プロジェクトマネージメント

2017 年 4 月 R/D 署名の際は、プロジェクト責任者及び、プロジェクトマネージャー職は不在だった。これらの役職は、各々、REDD+・Mitigation ジェネラルマネージャーと NC・MRV マネージャーが兼任することで、一時的に補充された。しかし、プロジェクト責任者は、JICA 及びその他の支援

機関、また、GHG インベントリ作成に関連する他のステークホルダーとの調整を適宜行うために、フルタイムのコミットメントを必要としていたため、これは NC 作成の責任を有しない両マネージャーにとって、負担が大きすぎるものだった。

CCDA の NC・MRV Division のジェネラルマネージャーは GHG インベントリチームのマネージャーを兼務していたため、CCDA のマネージャーが GHG インベントリの技術的作業に関与することには限界があった。

2.3 他の支援機関との調整

FAO は、CCDA の UN-REDD（途上国における森林減少・劣化 による二酸化炭素排出の削減に関する取り組み）支援の一部として、AFOLU インベントリに関して、CCDA を支援していた。これに加えて、CCDA は、透明性のための能力開発イニシアティブ(CBIT)・地球環境基金（GEF）、及び、熱帯雨林諸国連合(CfRN)より、AFOLU 分野の GHG 排出・吸収量予測に関し、更なる支援を要請した。多くの支援機関が、CCDA の GHG インベントリ AFOLU 分野を支援しているため、プロジェクト間での調整は、時宜を得て、効率的な GHG インベントリプロセスにするためには、極めて重要であった。

2.4 新型コロナウイルス

新型コロナウイルスの世界的な大流行により、2020 年 3 月以降は、日本の専門家がポートモレスビーで業務を行うことができなくなり、プロジェクト実施に深刻な影響を与えた。

3. プロジェクト・リスク管理結果に関する評価

3.1 作業の遅延

JICA 本部は、BUR1 スケジュール問題に対処すべく、2018 年 1 月、CCDA に対し、懸念を表明する書簡を送付した。それに対し、CCDA は、BUR1 を 2018 年 6 月に最終化し、提出するよう努めており、National Communication、MRV Division の全ての支援機関との調整を行えるよう善処する、との返信を受けた。BUR1 の期限が修正されたことを受け、プロジェクト活動計画は、2018 年 2 月に修正が行われた。これは、2018 年 5 月の第 1 回 JCC にて承認された。

2020 年にはコロナウイルスの影響による作業の遅れに加え、C/P が NDC の更新作業に注力したため、プロジェクト活動が一時停滞した。

3.2 プロジェクトマネージメント

上述した懸念表明の書簡で、JICA 本部は CCDA に、関連マネージャーを、プロジェクト責任者、及びプロジェクトマネージャー職に任命するよう、要請した。それに対し、CCDA は、REDD+・Mitigation ジェネラルマネージャーと NC・MRV マネージャー（後に、NC・MRV ジェネラルマネージャーに昇進）を、各々プロジェクト責任者、及びプロジェクトマネージャー職に任命し、補充を行った。

2020 年には、NC・MRV ジェネラルマネージャーが、部門オフィサーの一人（当時の、ジェネラリスト／コンパイラー／エネルギー専門家）を JICA プロジェクトの管理者に任命する旨が、CCDA より JICA プロジェクト専門家チームに伝えられた。

本プロジェクト期間中に C/P のスタッフが 2018 年に 2 名（1 名は LULUCF 分野担当、1 名は廃棄物分野担当）退職し、2020 年には 1 名（廃棄物分野担当）が NDC プロジェクトに配置され、JICA

プロジェクト専門家と CCDA スタッフとのマンツーマンのトレーニングが困難な状況が続いた。2018 年以降、CCDA で採用活動を継続していたが、プロジェクト終了時までインベントリスタッフの補充は行われなかったため、数少ないメンバーでプロジェクト活動を実施することになった。

本プロジェクトでは、PNG 国内でデータ収集の知見のある専門家が特定できた場合は、その専門家を短期間傭人雇用することによって業務の効率化を図る予定だったが、PNG の NC2 を作成したコンサルタントや本プロジェクトのプロジェクトマネージャーにコンサルタントやアカデミア等の協力者について相談したが、知見・経験のある専門家は特定できなかった。

3.3 他の支援機関との調整

上述した懸念表明の書簡で、JICA 本部は CCDA に対し、プロジェクト専門家と CCDA スタッフ間での混乱を回避するため、他の支援機関との調整を行うよう要請した。AFOLU 分野には既に FAO が支援に入っており、また土地利用関係の算定に必要な土地利用マトリクスの作成は REDD＋の技術的支援の側面から同じく FAO により実施されていた。この状況を受け、JICA プロジェクト専門家と CCDA は、当プロジェクトでは JICA プロジェクト専門家はエネルギー、IPPU 及び、廃棄物分野を優先的に担当し、CCDA は BUR1 及び BUR2 提出に間に合うよう、AFOLU 分野インベントリの完了を確実に行うため、林業関連の支援機関との調整を行うことで合意した。JICA プロジェクト専門家は CCDA を通して、AFOLU インベントリの進捗確認を定期的に行った。BUR1 の AFOLU 分野については、GHG インベントリ作成を完遂するためには大きく、(1) IPCC ガイドラインの方法論に関する理解、(2)土地利用マトリクスの作成、(3)GHG インベントリとしての推計の実施、という 3 つの要素が必要となるが、支援開始時に確認を行ったところ、(1)については FAO 本部と CCDA 担当者が週一度にリモート会議で作業をしており、(2)については FAO コンサルタントが直接 PNG FA 及び CCDA に出向いて作業をしてほぼ完成版が出来上がっており、(3)については農業分野はある程度進んでいたが LULUCF ほぼ手つかずの状況であった。CCDA の LULUCF 分野担当者については、土地マトリクスの作成及びその内容についてはほぼ理解しているものの、IPCC ガイドラインの方法論の理解は基礎的な段階にとどまっており、自力で算定ファイルを組み立てたりソフトウエアで推計を実施するまでの習熟度はない状況であった。従って、JICA プロジェクト遂行の前提となる BUR1 を提出し終わった段階から支援の開始を行うという状況に成り行きで到達することは困難と判断し、それまでに作成された土地利用マトリクスを元に、JICA プロジェクト専門家が LULUCF 分野の算定ファイルを組み立て排出・吸収量の推計方法を確立し、直接 CCDA 担当者にレクを行う事で、GHG インベントリの最終化を行うために、JICA プロジェクト専門家側で、全面的に CCDA をサポートした。これには、農業分野の算定について CCDA の農業担当者から直接質問を受けたときの対応や、また、当時 REDD＋の参照レベル提出を控えていたことから、GHG インベントリと REDD+参照レベルの一貫性の確認や、REDD＋に関する technical annex の内容等についても、適宜 CCDA の依頼に応じてクロスチェックを行ったことも含まれる。

なお、BUR1 の AFOLU 分野については、JICA プロジェクト専門家で作り上げたファイルを元に、FAO 専門家がごく一部に修正を行った上で、FAO 側でインベントリ報告書ドラフトを作成して、CCDA に提供した。BUR2 作成については、BUR1 作成時に作り上げた蓄積があることから、JICA プロジェクト側では直接的に作業は行わなかった。

3.4 新型コロナウイルス

2020 年 3 月以降、JICA 専門家は PNG への渡航が不可能となり、プロジェクト活動を確実に継続させるため、予定されていたトレーニングは、オンライン会議ツールを使った形態に切り替えられた。

オンライン会議では、意思決定が円滑に行われることもあったが、全般的には、オンライン会議ツールを通じたトレーニングでは、現場で行われる対面式のトレーニングを代替することはできなかった。

4. プロジェクト実施上の工夫・教訓

4.1 持続性に考慮した汎用性の高いファイル

インベントリファイルは可能な限りシンプル、わかりやすい、フレキシブルなどの条件を満たす必要がある。本プロジェクトで開発した GHG 排出・吸収量算定ファイルシステムは、エクセルのファイル群によって構成されており、データベースの更新により排出・吸収量が自動的に算出されるデザインになっている。プロジェクト終了後も、C/P が継続的に算定のベースとして活用することを想定し、上記の必要要件を満たす汎用性の高いデザインを心掛けた。

4.2 オーナーシップの醸成

C/P のプロジェクトに対するオーナーシップを醸成するため、会議やワークショップの際には、彼らが会議の前面に立ち、プレゼンテーションや質疑応答を行うスタイルを継続した。イベントやヒアリングの前には、必ず発表及び質疑応答のシミュレーションを行い、自信をもって当日に臨めるように努めた。この結果、C/P のプロジェクトに対するオーナーシップは向上し、会議の場でも C/P が意思表示し、議論に参加できるようになった。

また、C/P スタッフ全員とのスケジュール調整は時間をかけて、メンバー間で何度も協議を行った。その結果、C/P スタッフによる当事者意識は高まり、C/P は、プロジェクト内容に精通している。

4.3 直接的な技術移転形式の重要性

本プロジェクトのアウトプットは GHG インベントリの完成だが、その作成過程における C/P の意識の変化が、より重要であったと考える。

例えば、本プロジェクトでは OJT 形式を取り、データの収集にあたっては、C/P 自らがヒアリングのための資料案を作成し、アポイントを取り、面談内容の要点をまとめ、JICA 専門家に添削をしてもらい、何をどのように質問し、どのようにフォローアップするか、をシミュレーションするという一連の流れを経験した。これにより、C/P の中に収集したデータに対するオーナーシップが生まれ、データの活用段階にも積極的に取り組む、といった好循環が生まれた。こうした過程を繰り返し行うことで、プロジェクト全体の進行に対する C/P の意識が改善するとともに、業務遂行能力の向上につながったと考えられる。

4.4 定期的モニタリングのフォーマットの開発

GHG インベントリ作成作業の管理状況のモニタリング、記録、保管の一連の作業を標準化するため、C/P と協議の上、作業モニタリングテンプレートを開発した。各分野の担当者の作業進捗が他分野の担当者にも一目で分かり、お互いの進捗状況を確認・モニタリングすることでチーム内の競争心・焦りを促すことができた。

4.5 広報機会の活用

プロジェクト開始当時から、様々な広報機会の活用を促している。イベントへの参加、COP 等の国際会議への参加、国内メディア対応等、可能な限り多くの機会を活用し、PNG プロジェクトの取り組みを発表し、情報提供を行った。

4.6 新型コロナウイルス対応

本プロジェクトは新型コロナウイルス感染拡大の影響を受け、プロジェクト期間の後半、１年８か月の間、現地への渡航ができなくなった他、ステークホルダーとの会議や、ワークショップ、本邦研修などの予定が大幅に変更となった。OJT の実施期間は予定の半分に留まり、予定していたマンツーマンのトレーニングも限定的なものとなってしまった。

こうした状況下においてプロジェクトを継続するために、CCDA と JICA 専門家チームはリモート会議ツールや SNS でのやり取りを駆使し、オンラインでの能力開発活動を行うことを余儀なくされたが、これは、スプレッドシートの構築、会議の準備、及びステークホルダーとの会議やインタビューを行う際に、大きな課題となった。一方で、急遽意思決定が必要となった場合や、インベントリファイルに関する技術的な質疑応答が必要となった場合等、ある側面においては、タイムリーな対応や意思決定ができるオンライン形式の優位性は有効的であった。その際、良好なインターネット接続環境が双方に求められるが、この点に関しては必ずしもそうとは限らなかった。

今後のプロジェクトにおいては、今回のような事態に備え、相手国側の C/P 機関が、プロジェクト期間中を通して安定したインターネット接続環境を保持すること、又、活動を円滑に進めるために、リモート会議ツールを積極的に利用することが事前に確認されるべきである。

4.7 将来的な変化を考慮した設計

UNFCCC との関連においては、パリ協定が 2015 年に採択され、2016 年に発効しており、プロジェクト期間中も UNFCCC よる交渉は進み、GHG インベントリの報告要件についても議論が継続していた。そして、ETF におけるモダリティ、手順、ガイドラインに関する合意が、2018 年 12 月に行われた。

JICA プロジェクト専門家は、プロジェクト開始前より、ETF の全般的な概念を把握しており、プロジェクトで作成される予定の GHG インベントリに必要とされる見込みの報告要件についても、特に第 2 次サイクルに関しては、計画段階から考慮することが出来た。GHG インベントリ排出／吸収予測データテーブル、及び NDC 報告テーブルの形式に関しては、2021 年時点では、未だ交渉中ではあるが、プロジェクト専門家は、必要とされる見込みの報告要件に準拠して、予測ファイルを設計するよう、尽力した。JICA プロジェクトは時宜にかなったもので、UNFCCC の下、報告に関する規則に将来変化が生じても対応できる柔軟性を持って設計されている。これは、当プロジェクトがもたらした成果の持続性を高めるべく、特筆すべき点である。

5. その他、プロジェクトに関連・影響した、注目・考慮すべき問題点／プロジェクトへの影響

なし

４章 プロジェクト完了後の上位目標達成に向けて

1. 上位目標達成の見込み

当プロジェクトの上位目標は、TACCC（透明性、正確性、一貫性、比較可能性、完全性）を満たすGHG インベントリが定期的に作成されることで、これは、「国家 GHG インベントリ報告書の作成」及び「TACCC チェックリスト」の指標によって評価されている。これら 2 つの指標は又、プロジェクト目的の指標でもあり、「国家 GHG インベントリ報告書の作成」に関しては、成果 1 及び成果 3 の指標の一部でもある。第 2 章第 2 節第 1 項で言及した通り、これらの指標は既に、CCDA 及び JICA プロジェクト専門家の共同作業によって、2 度達成されている。いずれの指標も、各 GHG インベントリサイクルで作成する必要のある、リビングドキュメントとして作成されており、GHG インベントリは、パリ協定下の ETF の中核を成すため、CCDA はまた、近い将来、定期的にこれら 2 つの指標を更新し、GHG インベントリを編纂することが期待される。しかし同時に、第 3 章第 1 節第 5 項で言及した通り、プロジェクト成果の持続性について、組織的観点からは懸念事項が存在する。従って、上位目標達成の見込みについては、やや高いと考えられる。

2. 上位目標達成のための、PNG 側の運用計画、及び実施体制

第 3 章 1.1.5 で既述の通り、PNG では、パリ協定実施法、サブ技術ワーキング委員会、及び NDC 規定（NDC Regulation）といった、GHG インベントリを定期的に作成するための政策及び制度整備が適所に行われている。こうした制度整備は、プロジェクト完了後も継続され、CCDA が GHG インベントリの担当機関として、関連ステークホルダーに情報及びデータ提供を行い、制度の構築を行うことで持続するであろう。

第 4 回 JCC において、CCDA は、2021 年に、第 2 次且つ最終化された BUR を提出し、その後、2024 年に提出されるべき第 1 次 BTR の作成を開始すると述べている。もし CCDA が、既存の政策及び制度的取り決めを活用し、関連ステークホルダーとの協調を強化して、GHG インベントリプロセスの進捗を計画、管理、監督するために必要なリーダーシップを取ることができれば、PNG はパリ協定下の報告要件に完全に準拠し、TACCC を満たす GHG インベントリを定期的に作成するという上位目標を達成することが可能な状態となる。

3. PNG 側への推奨

下記は、プロジェクト上位目標達成を確実に実行するため、PNG 側に対して行う勧告である：

<u>サブ技術ワーキング委員会から得た便益の最大化</u>

CCDA は、ステークホルダーとの一連の議論、又、JICA プロジェクト専門家の支援の下、付託条項及び、覚書を起草した後、エネルギーサブ技術ワーキング委員会を設立した。これは制度的整備面において、主要な成果であるが、当委員会が、データ共有と GHG インベントリの改善を効果的に促進するためには、CCDA によって誘導、及びリードされることが求められるだろう。これを実行するためには、CCDA は GHG インベントリ改善のための長期ビジョンを構築し、新型コロナウイルスによるロックダウン及び制限によって失われた勢いを取り戻すために、委員会メンバーから賛同を

得ることが必要となるだろう。これに加えて、CCDA は対応分野について、IPPU や廃棄物、或いは、これらのサブ分野にまで拡げるため、サブ技術ワーキング委員会設立のための詳細計画を作成すべきである。

効果的な協調を確実に実行するための現存の制度的整備の強化

CCDA はプロジェクトを通じて、ステークホルダーと非公式なネットワークを構築したが、これは主にスタッフ間で行われているものである。GHG インベントリ作成のためには、組織的な協力が確実に行われるようにすることが求められる。その達成のためには、更なる覚書及び／或いは契約を通じた方法、もしくは規則やサブ技術ワーキング委員会を通じたトップダウン型のアプローチといった、異なる対処法がある。そのプロセスの多くは、時間を要すものであるが、その中で重点を置くべきことは教育であり、協力者への対処の仕方にこだわるべきではない。

長期的ビジョン・計画

既に述べた通り、CCDA は NC、BUR、そして将来的には BTR 作成の担当機関であり、これは、GHG インベントリ作成のためにプロジェクトベースでアプローチを行うよりも、むしろ長期的なビジョン、及び計画の作成をマネージャーが行うことを可能にし、パリ協定における合意の遵守を可能にしているように思われる。CCDA には、独自の長期体制計画を構築することで、GHG インベントリの作成計画を管理し、より短周期の年次・隔年事業計画を通じて、インベントリの作成計画の実施をサポートしていくことが求められる。

4. プロジェクト完了時から事後評価に及ぶモニタリング計画

国際的な基準である、DAC 評価基準に基づき、JICA は各プロジェクトを、妥当性、有効性、効率性、インパクト、持続性の観点から評価を行っている。当報告書・第 3 章において、評価結果については概説されているが、当プロジェクトは事後評価として、再度評価が行われる予定である。一般的には、事後評価は、プロジェクト完了の 3 年後に実施される予定となっている。

５章 大洋州調査

本プロジェクトでは、PNG と似た国情の大洋州地域における GHG インベントリや NDC を整理・分析し、共有課題や今後必要とされる技術ニーズ等の検討を行った。

1. 大洋州の GHG 排出量算定

1.1 背景

各国が UNFCCC の第 4 条 1 及び第 12 条 1 に基づき作成する GHG インベントリは、各国の GHG 排出・吸収量の実態を把握するとともに、どの排出・吸収源に対策を実施することが排出削減を進める上で効果的か等について検討する上で、きわめて重要な基礎資料となる。したがって、UNFCCC によって定められたガイドライン（国別報告書作成ガイドライン、IPCC の算定方法ガイドライン等）に従い、正確かつ網羅的に算定することが求められる。

しかしながら、多くの途上国にとって、関連ガイドラインを理解し、自国に適した算定方法を選択し、さらには活動量データやパラメータデータを収集して算定を行うことは決して容易ではない。実際、データの不足やインベントリ作成に係るキャパシティの不足等により、幅広い排出・吸収源を対象に毎年排出・吸収量を算定している国はわずかである。

一方で、一部の国際機関は各国の排出・吸収量を独自に算定し、結果を公表している。例えば、欧州委員会の共同研究センター（JRC）では、世界全体の人為起源の大気汚染物質・温室効果ガス排出量を独自に推計し、時系列のグリッド別・国別データを EDGAR（Emissions Database for Global Atmospheric Research）と称して、ウェブサイトにおいて公表している。EDGAR では 2006 年 IPCC ガイドラインに準拠したカテゴリーに基づいて温室効果ガス排出量が算定されており、あらゆる国で全カテゴリーが対象となっているわけではないものの、大洋州の島嶼国なども算定対象となっている。

また、国連食糧農業機関（FAO）は、農業分野、LULUCF 分野を対象に、IPCC ガイドラインの Tier 1 の算定方法（最も簡便な方法）に基づき、各国から FAO に提出されたデータを用いて、排出・吸収量を算定している。

これらのデータの算定には、各国の個別事情が十分に加味されておらず、したがって算定精度は必ずしも高くない。しかしながら、インベントリ作成が一時的なものではなく、継続的な改善プロセスであることを勘案すれば、そのプロセスの出発点となり得る重要なデータである。また、これらのデータを分析することによって、総排出量に対してどの排出・吸収源が大きく寄与しているのか、過去から現在に至るまで排出・吸収量がどのように推移しているのか等を把握することも可能であり、今後重点的に検討すべき排出・吸収源を特定する上でも有益な情報となる。

以上の背景を踏まえ、国際機関の排出・吸収量データを活用しつつ、大洋州の島嶼国のインベントリの算定精度を高めるアプローチについて検討を行った。

1.2 手法

各種国際機関・研究機関などの外部機関が公表している、大洋州各国を対象とした温室効果ガス排出量の独自推計事例や排出量算定に使用可能な各種活動量データや排出係数などを調査し、大洋州各国が自国のインベントリを構築するうえでの最初のステップとして活用可能な情報源となるよう、掲載データの内容や対象国等を整理した。また、それらの資料のうちいくつかから、今回調査対象としている大洋州各国のインベントリカテゴリー別の温室効果ガス排出量を可能な限り時系列のデ

ータとして、抽出、あるいは掲載データを使用した推計を行い、独自のインベントリデータとして構築した。

さらに、各国が UNFCCC に提出している最新のインベントリ（NC、BUR）と本業務で収集した排出・吸収量データ等を比較し、各国のインベントリが抱える課題について整理した。その上で、排出・吸収量に大きな差異が認められる排出・吸収源、外部機関では算定あるいは活動量・排出量が掲載されているにもかかわらず各国インベントリでは未推計の排出・吸収源を主な対象として、収集したデータにおける算定方法の改善余地について検討しつつ、算定対象の拡大や精度向上に向けたガイダンスを取りまとめた。

A. 対象国

本検討の対象国は以下の 14 ヵ国とした（すべて UNFCCC の非附属書 I 国）。

- クック諸島
- フィジー
- キリバス
- マーシャル諸島
- ミクロネシア
- ナウル
- ニウエ
- パラオ
- パプアニューギニア
- サモア
- ソロモン諸島
- トンガ
- ツバル
- バヌアツ

B. 比較対象とした各国の報告書

UNFCCC の非附属書 I 締約国は、NC を 4 年毎に、また、各国の能力や提供される支援のレベルに従って BUR を 2 年ごとに提出することとされている（ただし、島嶼国は BUR を独自の裁量で提出することが認められている）。

本検討のすべての対象国は、既に NC を複数回提出しており、その中でインベントリ報告を行っている。また、パプアニューギニアは NC に加えて BUR も提出し、インベントリを報告している。

本検討では、各国の最新の報告書に記載されているインベントリを用いた。

	1回目	2回目	3回目
クック諸島	NC1 30/10/1999	NC2 12/04/2012	**NC3 07/08/2020**
フィジー	NC1 18/05/2006	NC2 31/07/2014	**NC3 28/04/2020**
キリバス	NC1 30/10/1999	**NC2 27/06/2013**	–
マーシャル諸島	NC1 24/11/2000	**NC2 11/12/2015**	–
ミクロネシア	NC1 04/12/1997	**NC2 12/11/2015**	–
ナウル	NC1 30/10/1999	**NC2 01/04/2015**	–
ニウエ	NC1 02/10/2001	**NC2 17/09/2016**	–
パラオ	NC1 18/06/2003	**NC2 26/08/2019**	–
パプアニューギニア	NC1 27/02/2002	NC2 15/12/2015	**BUR1 17/04/2019**
サモア	NC1 30/10/1999	**NC2 14/06/2010**	–
ソロモン諸島	NC1 29/09/2004	**NC2 14/09/2017**	–
トンガ	NC1 21/07/2005	NC2 02/05/2012	**NC3 12/02/2020**
ツバル	NC1 30/10/1999	**NC2 19/03/2018**	–
バヌアツ	NC1 30/10/1999	NC2 30/08/2016	**NC3 22/03/2021**

資料）UNFCCC の HP に基づき MURC 作成。

C.　比較分析の視点

<u>算定対象の比較</u>

- 各国インベントリにおいて、排出・吸収量が網羅的に算定されているか。
- 各国インベントリにおいて、排出・吸収量が経年的に算定されているか。
- 外部機関におけるデータベースによって特定された主要な排出・吸収源が各国インベントリの算定対象に含まれているか。

<u>算定値の比較</u>

- 比較可能な排出・吸収区分について、各国インベントリと外部機関におけるデータベースの算定値に相違はないか。
- 大きな相違がある場合、その理由は何か。

1.3 結果概要

A.　データの有無

下表に今回調査した各種国際機関・研究機関などの外部機関における大洋州地域を対象としたインベントリに使用可能なデータの有無の確認結果を示す。なお、排出量・カテゴリーはあくまでも資料の掲載対象となっているかを示すものであり、ガスやカテゴリーが対象とはなっていても、国に

よってはデータが存在しない場合もあることに留意が必要である。

表 21 国際機関・研究機関等による GHG インベントリデータ

作成期間			European Commission	US EIA	UN
資料名			EDGAR	the International Energy Statistics	UN Comtrade Database
URL			https://edgar.jrc.ec.europa.eu/report_2021#data_download	https://www.eia.gov/beta/international/	https://comtrade.un.org/data/
活動量			×	○	○
排出係数			×	○	×
排出量	CO2		○	×	×
	CH4		○	×	×
	N2O		○	×	×
	Fgas		×	×	×
カテゴリー	1. Energy	A. Fuel combustion	○	○	×
		B. Fugitive	○	○	×
	2. Industrial processes	A. Mineral industry	○	×	×
		B. Chemical industry	○	×	×
		C. Metal industry	○	×	×
		D. Non-energy products from fuels and solvent use	○	×	×
		E. Electronics industry	○	×	×
		F. Product uses as substitutes for ODS	○	×	○
		G. Other product manufacture and use	○	×	×
		H. Other (as specified in tables 2(I).A-H and 2(II))(3)	○	×	×
	3.Agriculture		○	×	×
	4.Total LULUCF		×	×	×
	5. waste		○	×	×
対象国	クック諸島		○	○	
	ミクロネシア連邦		○	○	
	フィジー		○	○	
	キリバス		○	○	
	マーシャル諸島		×	×	
	ナウル		○	○	
	ニウエ		×	○	
	パラオ		○	×	
	パプアニューギニア		○	○	
	サモア		○	○	
	ソロモン諸島		○	○	
	トンガ		○	○	
	ツバル		○	○	
	バヌアツ		○	○	
備考			排出量データ有。	燃料消費量データ有。	HFC等の輸出入量データ有。

作成期間			BP	UN	UN
資料名			bp's Statistical Review of World Energy	Industrial Commodity Statistics Database	Environment Statistics Database
URL			https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html	http://data.un.org/Explorer.aspx?d=ICS	http://data.un.org/Explorer.aspx?d=ESD
活動量			○	○	○
排出係数			×	×	×
排出量	CO2		×	×	×
	CH4		×	×	×
	N2O		×	×	×
	Fgas		×	×	×
カテゴリー	1. Energy	A. Fuel combustion	○	×	×
		B. Fugitive	○	×	×
	2. Industrial processes	A. Mineral industry	×	○	×
		B. Chemical industry	×	×	×
		C. Metal industry	×	×	×
		D. Non-energy products from fuels and solvent use	×	×	×
		E. Electronics industry	×	×	×
		F. Product uses as substitutes for ODS	×	×	×
		G. Other product manufacture and use	×	×	×
		H. Other	×	×	×
	3.Agriculture		×	×	×
	4.Total LULUCF		×	×	×
	5. waste		×	×	○
対象国	クック諸島		×	×	×
	ミクロネシア連邦		×	×	×
	フィジー		×	○	×
	キリバス		×	×	×
	マーシャル諸島		×	×	○
	ナウル		×	×	×
	ニウエ		×	×	×
	パラオ		×	×	×
	パプアニューギニア		×	×	×
	サモア		×	×	○
	ソロモン諸島		×	×	×
	トンガ		×	×	×
	ツバル		×	×	×
	バヌアツ		×	×	×
備考			大洋州は対象外。	フィジーのセメント生産量のみ有。	サモアとマーシャル諸島の一廃収集量のみ有。

作成期間			UNEP	IEA	The Global Carbon Project	FAO
資料名			Data Centre	Greenhouse Gas Emissions from Energy	Global Carbon Budget	FAOSTAT
URL			https://ozone.unep.org/countries/data-table	https://www.iea.org/reports/greenhouse-gas-emissions-from-energy-overview	Data supplement to the Global Carbon Budget 2021 | ICOS (icos-cp.eu)	https://www.fao.org/faostat/en/#data/GT
活動量			○	×	×	×
排出係数			×	×	×	×
排出量	CO2		×	○	○	○
	CH4		×	○	×	○
	N2O		×	○	×	○
	Fgas		△	○	×	×
カテゴリー	1. Energy	A. Fuel combustion	×	○	○	×
		B. Fugitive	×	○	○	×
	2. Industrial processes	A. Mineral industry	×	○	○	×
		B. Chemical industry	×	○	×	×
		C. Metal industry	×	○	×	×
		D. Non-energy products from fuels and solvent use	×	○	×	×
		E. Electronics industry	×	○	×	×
		F. Product uses as substitutes for ODS	○	○	×	×
		G. Other product manufacture and use	×	○	×	×
		H. Other	×	○	×	×
	3.Agriculture		×	×	○	○
	4.Total LULUCF		×	×	○	○
	5. waste		×	×	×	×
対象国	クック諸島		○	×	○	○
	ミクロネシア連邦		○	×	○	○
	フィジー		○	×	○	○
	キリバス		○	×	○	○
	マーシャル諸島		○	×	○	○
	ナウル		×	×	○	○
	ニウエ		×	×	○	○
	パラオ		○	×	○	○
	パプアニューギニア		×	×	○	○
	サモア		○	×	○	○
	ソロモン諸島		×	×	○	○
	トンガ		○	×	○	○
	ツバル		○	×	○	○
	バヌアツ		○	×	○	○
備考			HFC消費量データ有。	"Oceania (UN)"としてデータが集約されている。エネ起CO2以外のガスはカテゴリーが集約されている。	カテゴリー別の排出量はなし。	

※各ソースのリンク

EDGAR: https://edgar.jrc.ec.europa.eu/report_2021#data_download

the International Energy Statistics: https://www.eia.gov/beta/international/

UN Comtrade Database: https://comtrade.un.org/data/

bp's Statistical Review of World Energy: https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

Industrial Commodity Statistics Database: http://data.un.org/Explorer.aspx?d=ICS

Environment Statistics Database: http://data.un.org/Explorer.aspx?d=ESD

Data Centre: https://ozone.unep.org/countries/data-table

Greenhouse Gas Emissions from Energy: https://www.iea.org/reports/greenhouse-gas-emissions-from-energy-overview

Global Carbon Budget: Data supplement to the Global Carbon Budget 2021 | ICOS (icos-cp.eu)

FAOSTAT: https://www.fao.org/faostat/en/#data/GT

B.　今回使用したデータ

今回、大洋州各国が NC 等で報告しているインベントリデータと比較検証を行うために本業務において収集、整理対象とした資料は以下のとおりである。

EDGAR

欧州委員会の共同研究センター（JRC）が独自に推計、公表している世界全体における人為起源の大気汚染物質・温室効果ガス排出量のデータベースであり、推計結果について毎年報告書を公表すると共に、学術研究などにも使用可能となるよう、時系列のグリッド別・国別データを CSV ファイルとして公表している。最新版の EDGAR では 2006 年 IPCC ガイドラインに準拠したカテゴリーに基づいて温室効果ガス排出量が算定されており、UNFCCC のインベントリと整合したものとなっている。なお、本調査時点（2022 年 1 月 24 日）では、CO_2、CH_4、N_2O の排出量データのみが公開されており、HFCs 等のフッ素系ガスについては近日公開予定とされている。

FAOSTAT

各国インベントリの比較対象として、FAO が提供している FAOSTAT の排出量データベースを使用した（https://www.fao.org/faostat/en/#data/GT）。

同データベースから農業分野と LULUCF 分野における国別の排出・吸収量（作物や家畜の生産に伴う CH_4/N_2O 排出量、土地利用と土地利用変化に伴う CO_2 排出・吸収量、燃料消費に伴う CO_2 排出量等）を入手することが可能である。

UNFCCC の附属書 I 国のインベントリ首席審査官会合では、インベントリレビューを支援するためのデータソースとして FAOSTAT データベースの有用性が強調され、UNFCCC 事務局に対して同データベースをレビューのサポートデータとして組み込む方法について検討するよう要請された。このように、UNFCCC でも FAOSTAT データベースの活用が模索されている。

C.　GHG 排出・吸収量

本業務で収集した大洋州各国のカテゴリー別の排出・吸収量データを図 14 から図 27 に示す。なお、これらの排出量データはデータベースから把握できたもののみを掲載しており、各国の排出源をすべて網羅しているとは限らないため注意が必要である。

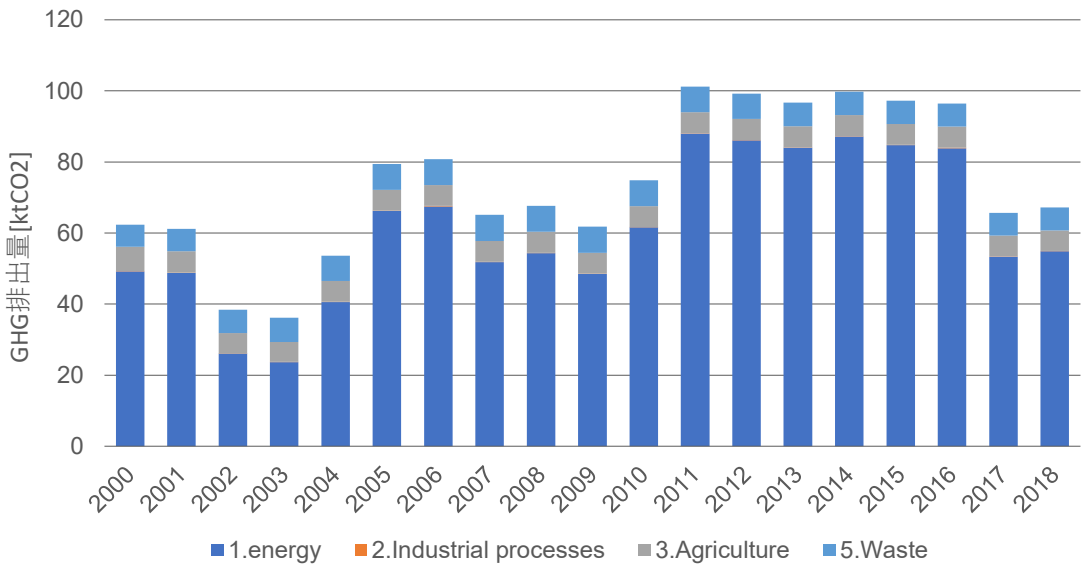

図 14　温室効果ガスの排出量の推移（クック諸島）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

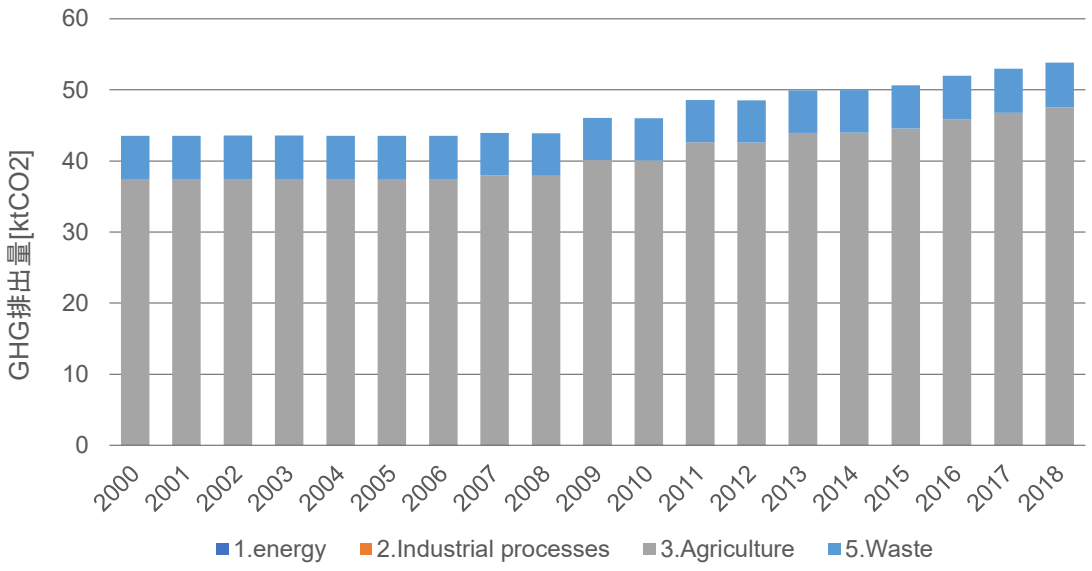

図 15　温室効果ガスの排出量の推移（ミクロネシア連邦）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

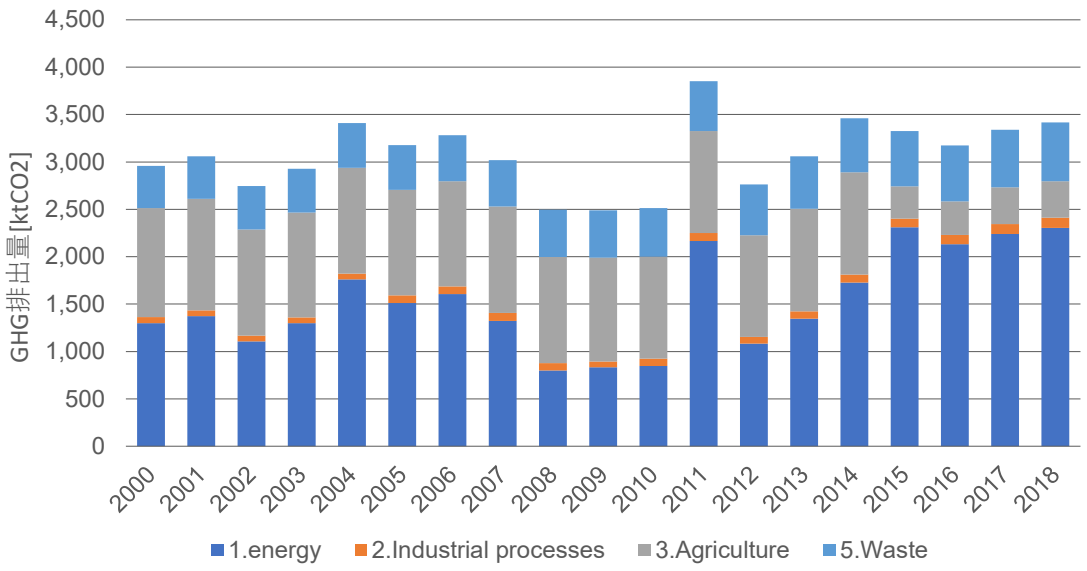

図 16　温室効果ガスの排出量の推移（フィジー）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

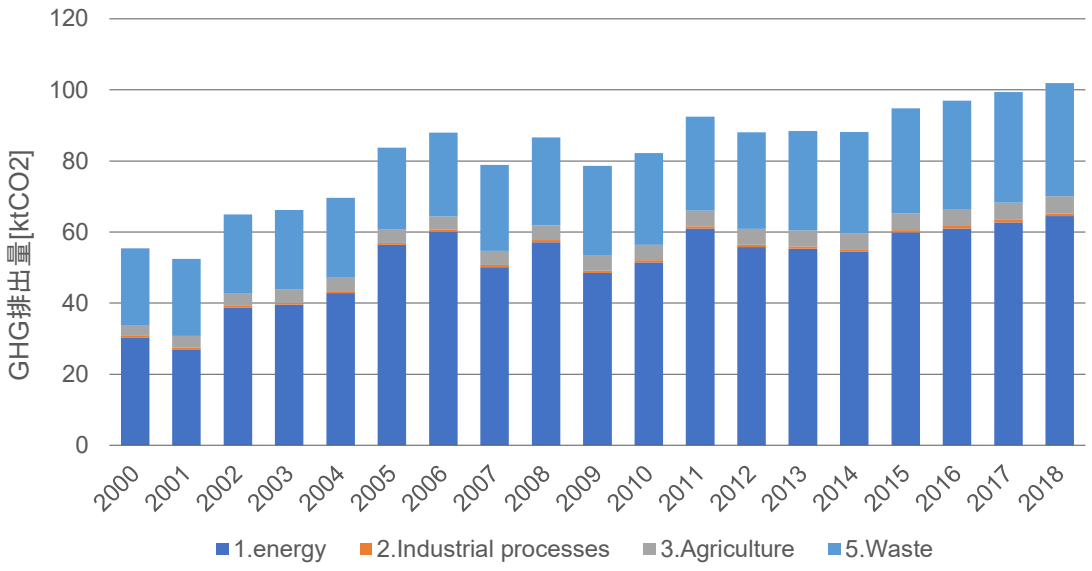

図 17　温室効果ガスの排出量の推移（キリバス）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

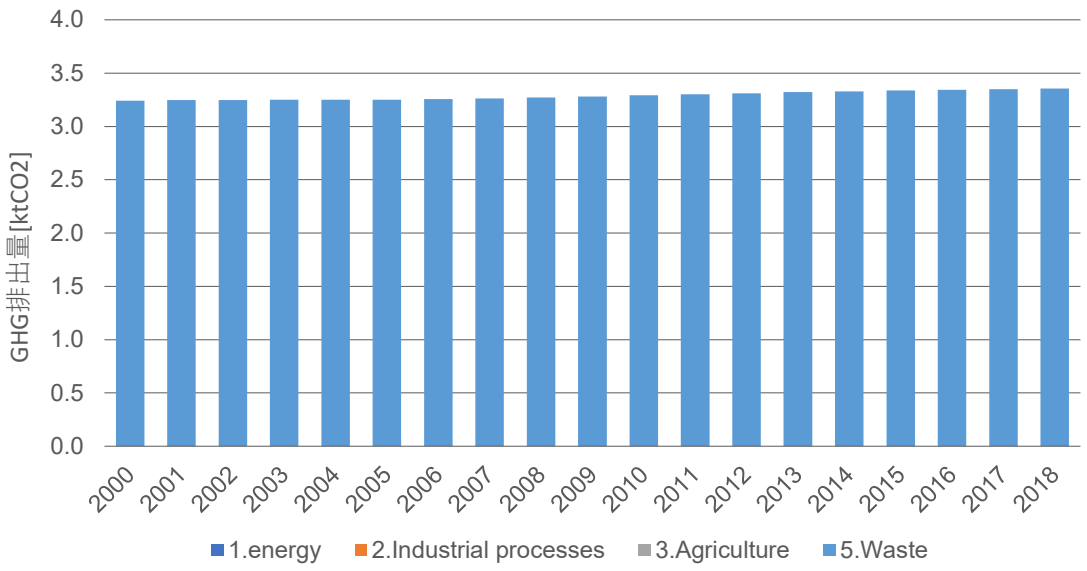

図 18　温室効果ガスの排出量の推移（マーシャル諸島）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

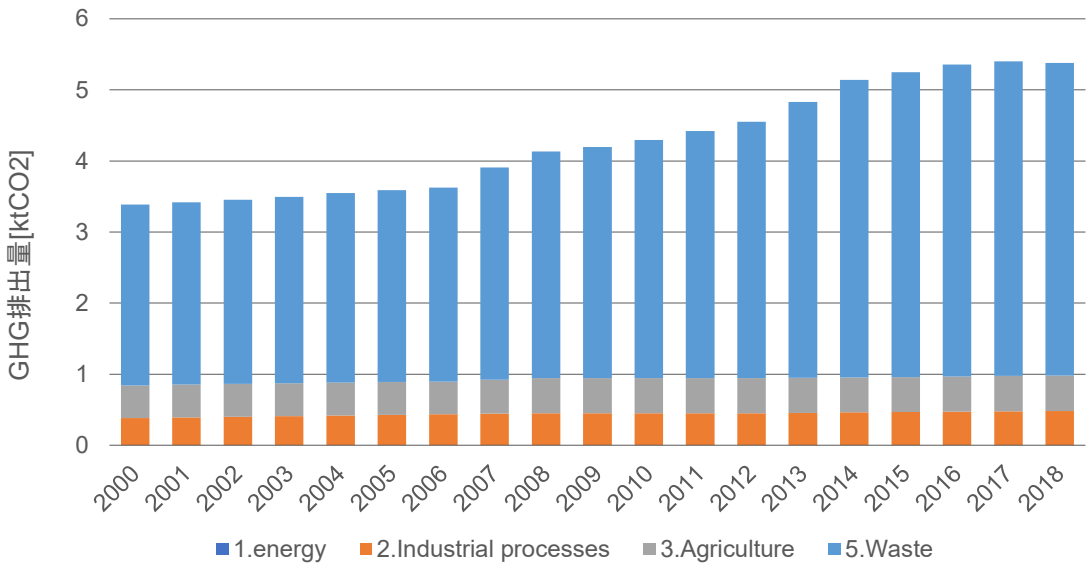

図 19　温室効果ガスの排出量の推移（ナウル）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

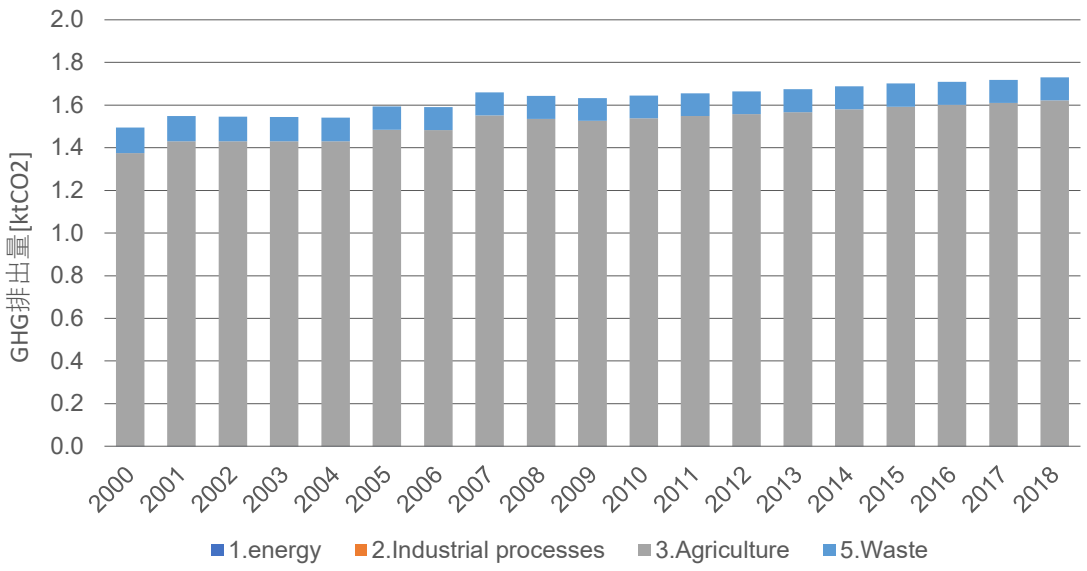

図 20　温室効果ガスの排出量の推移（ニウエ）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

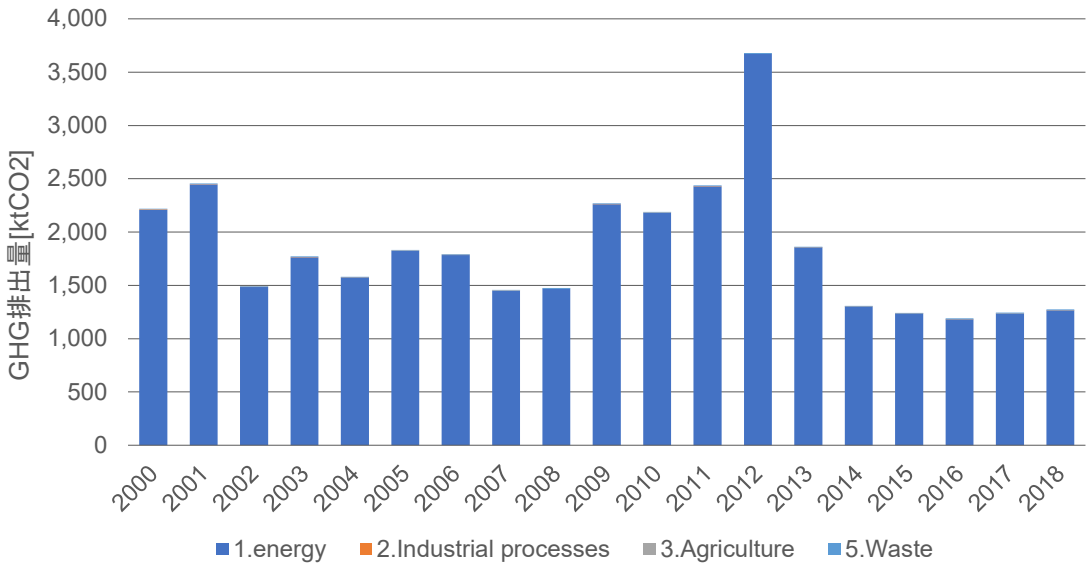

図 21　温室効果ガスの排出量の推移（パラオ）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

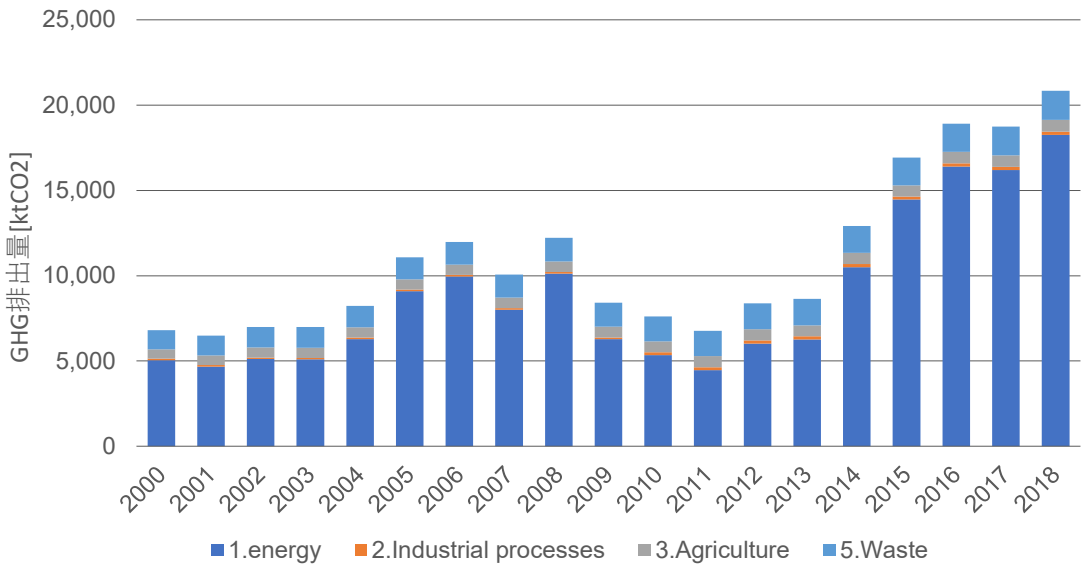

図 22　温室効果ガスの排出量の推移（パプアニューギニア）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

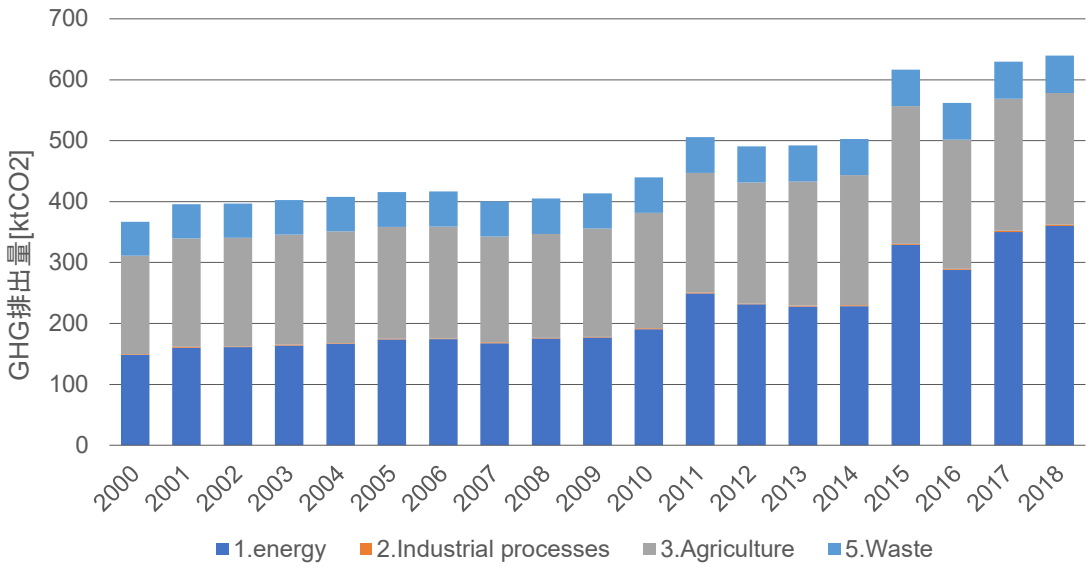

図 23　温室効果ガスの排出量の推移（サモア）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

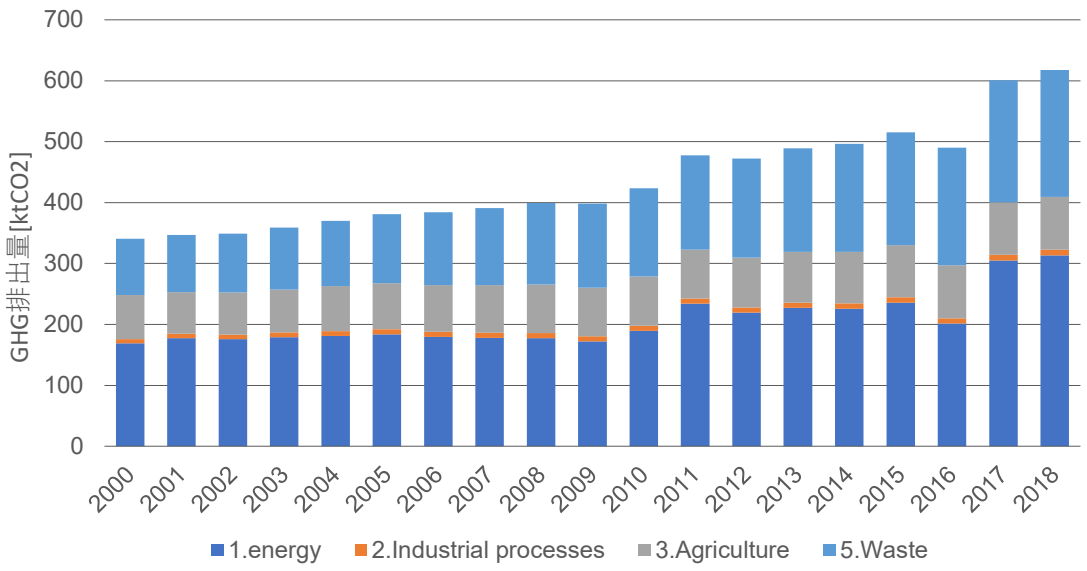

図 24　温室効果ガスの排出量の推移（ソロモン諸島）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

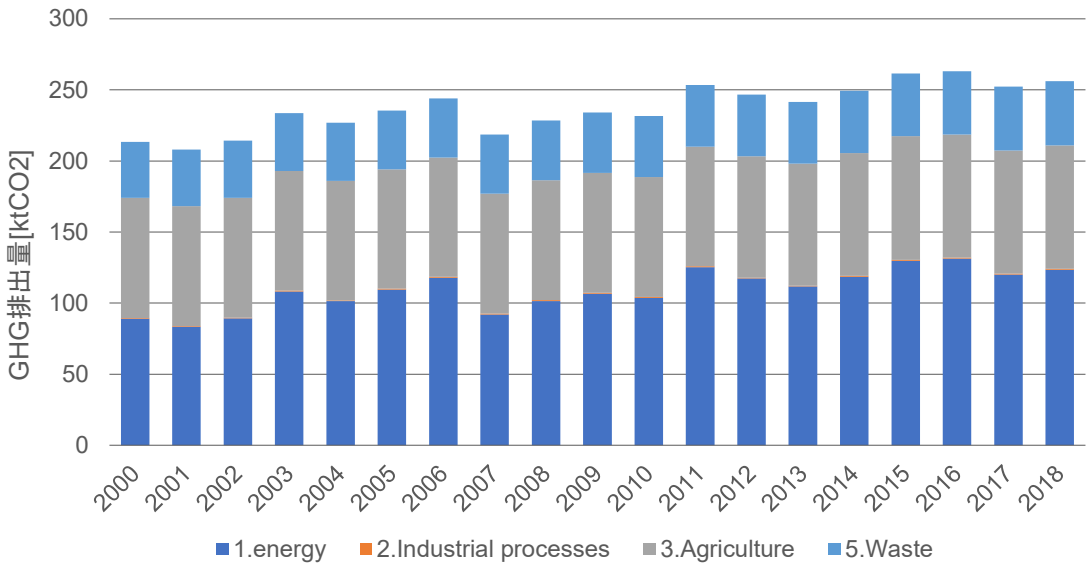

図 25　温室効果ガスの排出量の推移（トンガ）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

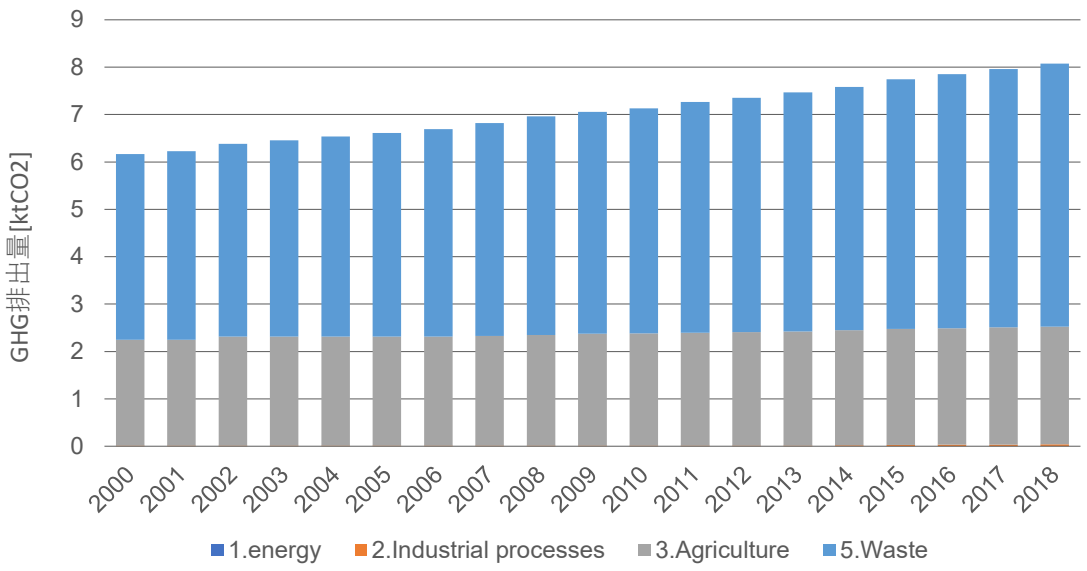

図 26　温室効果ガスの排出量の推移（ツバル）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

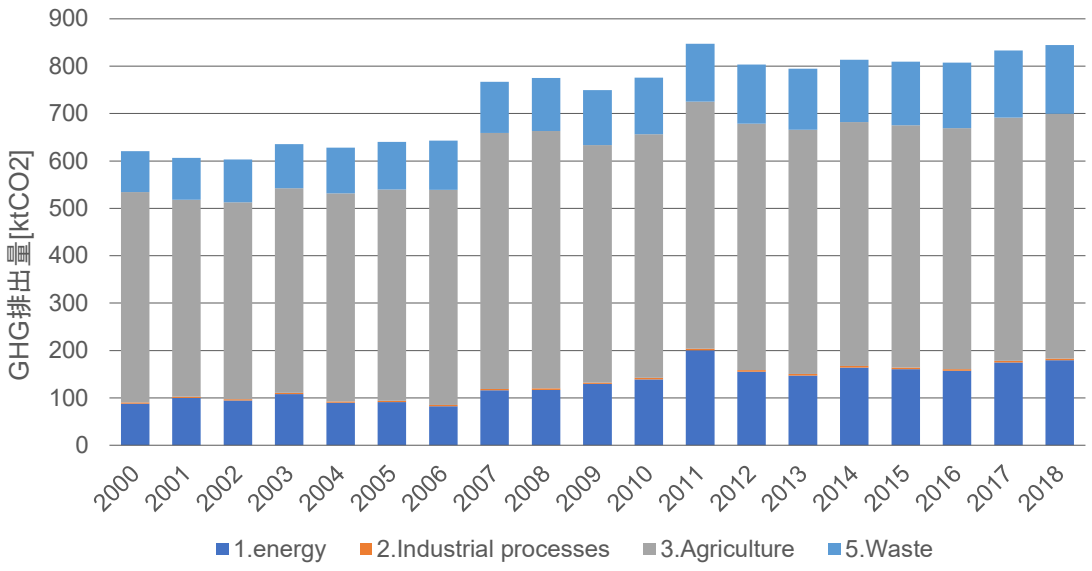

図 27　温室効果ガスの排出量の推移（バヌアツ）

出所：EC-JRC / PBL., EDGAR v6.0_GHG (1970 - 2018) of May 2021.

D.　比較結果

収集した排出・吸収量データと各国が UNFCCC に提出している最新のインベントリ（NC、BUR）との比較結果を以下に示す。

クック諸島

■ 算定対象の比較

- インベントリでは、エネルギー分野は業務部門以外からのCO_2・CH_4・N_2O、IPPU分野では冷媒からのFガスのみ、廃棄物分野では固形廃棄物の処分、排水の処理と放出および廃棄物の焼却と野焼きからのCH_4が算定対象となっている。
- EDGARではIPPU分野ではガラス製造、潤滑油の使用の算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

分野	算定対象	
エネルギー	年	2006年～2014年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	2006年～2014年
	排出源／ガス	Fgas
廃棄物	年	2006年～2014年
	排出源／ガス	CH_4

■ 算定値の比較

- 比較可能な排出区分ではIPPU分野の合計排出量の差異が大きく、インベントリではFガスのみが計上されている一方、EDGARではFガスが計上されていないことによる。
- エネルギー分野も差異が大きく、インベントリのの方が各ガスとも排出量が小さい。これは、排出係数などの違い以外にも、燃料種や対象部門の差異が影響している可能性がある。

Cook Islands 2014 [ktCO_2eq.]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	66	87	-24.1%
	CH_4	0.01	0.09	-93.2%
	N_2O	0.16	0.72	-78.6%
	Total	**66.16**	**87.81**	**-24.7%**
2.Industrial processes	CO_2	-	0.09	-
	CH_4	-	-	-
	N_2O	-	0.11	-
	Fgas	2.5	-	-
	Total	**2.50**	**0.20**	**1151.4%**
5.Waste	CO_2	-	-	-
	CH_4	-	3.27	-
	N_2O	-	-	-
	Total	**3.70**	**3.27**	**13.1%**

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■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵と家畜排せつ物管理のみ。LULUCF分野は算定されていない。
- FAOSTATでは無機質肥料からの排出（農業分野）と森林吸収（LULUCF分野）の算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分のうち、家畜排せつ物管理の差が大きく、インベントリの排出量はFAOSTATの10%以下の値となっている。
- 大きな相違が生じている理由は不明であるが、活動量データの範囲が異なっている（FAOSTATの方が対象が広範である）可能性が高い。

分野	算定対象	
農業	年	2006年～2014年
	排出源／ガス	CH_4/N_2O
LULUCF	年	算定していない
	排出・吸収源／ガス	算定していない

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	4,642	Total	16,710	-72.2%
	Enteric fermentation	1,030	Enteric fermentation	1,436	-28.3%
	Manure management	1,348	Manure management	13,789	-90.2%
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	2,264	Synthetic fertilizers	41	-59.2%
			Manure applied to soils	1,228	
			Manure left on pasture	216	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	-	Total	-2,757	-
	Changes in forest and other woody biomass stocks	-	Forestland	-2,757	-
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-	Net forest conversion	0	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

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フィジー

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O 、廃棄物分野では固形廃棄物の処分、汚泥処理および生活排水の処理と放出からのCH_4が算定対象となっており、 IPPU分野は未推計となっている。
- EDGARでは、IPPU分野ではセメント製造、生石灰製造、ガラス製造からのCO_2、その他製品の製造および使用からのN_2O、廃棄物分野では排水の処理と放出からのN_2Oの算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分ではエネルギー分野のCH_4・N_2Oの差異が大きく、インベントリの方が各ガスとも排出量が小さい。また廃棄物分野のCH_4もインベントリの方が排出量が小さく、排出係数などの違い以外にも、燃料種や活動量の対象範囲の差異が影響している可能性がある。

分野	算定対象	
エネルギー	年	2006年～2011年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	2006年～2011年
	排出源／ガス	CH_4

Fiji 2011 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	1474	2,147	-31.3%
	CH_4	1	10	-90.3%
	N_2O	3	26	-88.5%
	Total	**1,478**	**2,183**	**-32.3%**
2.Industrial processes	CO_2		83	-100.0%
	CH_4		-	-
	N_2O		5	-100.0%
	Fgas		-	-
	Total	**0.00**	**88**	**-100.0%**
5.Waste	CO_2		-	-
	CH_4	92	262	-64.9%
	N_2O		12	-100.0%
	Total	**92**	**275**	**-66.5%**

■ 算定対象の比較

- インベントリでは比較的広範な排出・吸収源を対象に算定が行われている。一方、FAOSTATではインベントリで算定済みの排出・吸収源に加え、作物残渣、作物残渣の焼却、有機質土壌の排水が算定されている。なかでも有機質土壌の排水は比較的排出量が大きいため、FAOSTATのデータを参考に算定に向けて検討することが求められる。

■ 算定値の比較

- 比較可能な排出源のうち、森林バイオマス（LULUCF分野）の差が大きい。FAOSTATでは吸収であるにもかかわらず、インベントリは森林転用等の要因により排出になるとされている。
- 差が生じる要因として、インベントリにおいて木材収穫に伴う排出が240万トンCO_2計上されていることが挙げられる。

分野	算定対象	
農業	年	2006年～2011年
	排出源／ガス	CH_4/N_2O
LULUCF	年	2006年～2011年
	排出・吸収源／ガス	CO_2

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	551,985	Total	999,768	-44.8%
	Enteric fermentation	314,440	Enteric fermentation	608,525	-48.3%
	Manure management	81,200	Manure management	128,809	-37.0%
	Rice cultivation	9,800	Rice cultivation	10,878	-9.9%
	Agricultural soils	146,545	Synthetic fertilizers	19,494	-41.0%
			Manure applied to soils	24,002	
			Manure left on pasture	204,487	
			Crop residues	605	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	2,968	-
LULUCF	Total	560,000	Total	-2,537,730	122.1%
	Changes in forest and other woody biomass stocks	-170,000	Forestland	-2,654,328	93.6%
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	730,000	Net forest conversion	0	-
	CO2 emissions and removals from soil	-	Drained organic soils	116,598	-

キリバス

■ 算定対象の比較

- インベントリでは、エネルギー分野は発電、運輸、家庭、農林水産業からのCO_2のみが算定対象となっており、エネルギー分野からのCH_4・N_2O、IPPU分野、廃棄物分野は未推計となっている。
- EDGARでは、エネルギー分野からのCH_4・N_2O、IPPU分野ではその他製品の製造および使用からのN_2O、廃棄物分野では固形廃棄物の処分、廃棄物の野焼きからのCH_4、および排水の処理と放出からのCH_4・N_2Oの算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分ではエネルギー分野のCO_2については、インベントリの方が排出量が大きい。時系列のデータによると、インベントリの排出量は2006年に急増しており、データ精度に疑義があるとのことで、時系列の一貫性も含めデータの精査が必要であると考えられる。

分野	算定対象	
エネルギー	年	2006年～2008年
	排出源／ガス	CO_2
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	算定していない
	排出源／ガス	算定していない

Kiribati 2008 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	63.8	55.7	14.6%
	CH_4		0.7	-100.0%
	N_2O		0.4	-100.0%
	Total	**63.8**	**57**	**12.3%**
2.Industrial processes	CO_2		0.6	-100.0%
	CH_4		-	-
	N_2O		0.6	-100.0%
	Fgas		-	-
	Total	**0.00**	**1.3**	**-100.0%**
5.Waste	CO_2		-	-
	CH_4		12.4	-100.0%
	N_2O		1.4	-100.0%
	Total	**0.00**	**14**	**-100.0%**

■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵と家畜排せつ物管理のみ。LULUCF分野は算定されていない。
- FAOSTATでは有機質肥料からの排出（農業分野）の算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 消化管内発酵と家畜排せつ物管理について、インベントリの方がそれぞれ約3倍、約16倍大きく見積もられている。大きな相違が生じている理由として、活動量データの把握方法が大きく異なる可能性が指摘される。インベントリでは豚と家禽が対象とされており、NC2にはそれぞれの飼養頭数も記載されていることから、これら活動量データが妥当かどうかを精査する必要がある。

分野	算定対象	
農業	年	2006年～2008年
	排出源／ガス	CH_4/N_2O
LULUCF	年	算定していない
	排出・吸収源／ガス	算定していない

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	102,897	Total	8,263	1145.2%
	Enteric fermentation	1,008	Enteric fermentation	353	185.7%
	Manure management	101,888	Manure management	6,117	1565.7%
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	-	Synthetic fertilizers	-	-
			Manure applied to soils	1,727	
			Manure left on pasture	67	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	0	Total	0	-
	Changes in forest and other woody biomass stocks	-	Forestland	-	-
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-	Net forest conversion	-	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

マーシャル諸島

■ 算定対象の比較

- インベントリでは、エネルギー分野は製造業以外からのCO_2・CH_4・N_2O 、廃棄物分野では固形廃棄物の処分および排水の処理と放出からのCH_4・N_2Oが算定対象となっており、エネルギー分野の製造業とIPPU分野は排出源が存在しないとされている。
- EDGARでは、廃棄物分野では廃棄物の野焼きからのCH_4の算定値も示されているため、Tier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分では廃棄物分野のCH_4の差異が大きく、インベントリの方が排出量が大きい。EDGARでは、廃棄物分野の排水の処理と放出および廃棄物の野焼きからのCH_4のみが算定対象となっており、固形廃棄物の処分からのCH_4が含まれていないことが影響している可能性がある。

分野	算定対象	
エネルギー	年	2000年～2010年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	2000年～2010年
	排出源／ガス	CO_2/CH_4/N_2O

Marshall Islands 2010 [ktCO_2eq.]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	124.9	-	-
	CH_4	6.9	-	-
	N_2O	1.6	-	-
	Total	**133.5**	-	-
2.Industrial processes	CO_2		-	-
	CH_4		-	-
	N_2O		-	-
	Fgas		-	-
	Total	**0.00**	-	-
5.Waste	CO_2	0	-	-
	CH_4	35.2	1.6	2036.0%
	N_2O	1.2	-	-
	Total	**36.3**	**1.6**	**2107.6%**

■ 算定対象・算定値の比較

- インベントリでは農業分野、LULUCF分野とも排出・吸収量の報告が行われていない。一部の排出区分（稲作、サバンナの計画的な燃焼）については同国内において活動が実施されておらず、したがって活動なし（NO：Not Occurring）であるが、それ以外の区分については未推計（NE）となっている。
- 一方、FAOSTATでもマーシャル諸島の農業分野、LULUCF分野における排出・吸収量は報告されていない。
- 同国では排出・吸収量を算定する上での基礎データである活動量データが整備されていない状況であり、当面の作業として活動量データの整備を進める必要がある。

分野	算定対象	
農業	年	算定していない
	排出源／ガス	算定していない
LULUCF	年	算定していない
	排出・吸収源／ガス	算定していない

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	0	Total	0	-
	Enteric fermentation	-	Enteric fermentation	-	-
	Manure management	-	Manure management	-	-
	Rice cultivation	0	Rice cultivation	-	-
	Agricultural soils	-	Synthetic fertilizers	-	-
			Manure applied to soils	-	
			Manure left on pasture	-	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	0	Savanna fires	-	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	0	Total	0	-
	Changes in forest and other woody biomass stocks	-	Forestland	-	-
			Forest fires	-	
			Fires in organic soils	-	
	Forest and grassland conversion	-	Net forest conversion	-	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

ミクロネシア

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O 、 IPPU分野では生石灰製造からのCO_2および冷凍空調機器・消火剤からのHFCs、廃棄物分野では固形廃棄物の処分からのCH_4、排水の処理と放出からのCH_4 ・N_2Oが算定対象となっている。
- EDGARでは、廃棄物分野では廃棄物の野焼きからのCH_4の算定値も示されているため、Tier 1での算定が可能であると考えられる。
- なお、インベントリでは2000年単年の排出量算定となっているが、 US EIAの「the International Energy Statistics」などでは2000年以降の時系列でのエネルギー消費量なども掲載されており、こうした外部のデータの活用も考えられる。

■ 算定値の比較

- 比較可能な排出区分では、廃棄物分野のCH_4は、インベントリの方が排出量が小さく、廃棄物の野焼きからのCH_4が計上されていないことが影響している可能性がある。

分野	算定対象	
エネルギー	年	2000年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	2000年
	排出源／ガス	CO_2/HFCs
廃棄物	年	2000年
	排出源／ガス	CH_4/N_2O

Micronesia, Federated States of　2000　[ktCO_2eq.]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	151.9	-	-
	CH_4	0.2	-	-
	N_2O	0.004	-	-
	Total	**152.1**	-	-
2.Industrial processes	CO_2	0.07	-	-
	CH_4		-	-
	N_2O		-	-
	Fgas	0.00051	-	-
	Total	**0.07**	-	-
5.Waste	CO_2		-	-
	CH_4	0.06	3.05	-98.0%
	N_2O	0.05	-	-
	Total	**0.11**	**3.05**	**-96.4%**

■ 算定対象の比較

- 算定対象年は2000年の1ヵ年に限られるものの、比較的幅広い排出・吸収区分を対象に算定が行われている。
- ただし、家畜排せつ物管理や農地土壌等については、排出・吸収量について十分に検討した上でゼロなのか、それとも未推計（NE）なのかの見分けがつかない。実際、FAOSTATではこれらの区分において排出量が報告されていることから、ゼロではなくNEの可能性が高い。

■ 算定値の比較

- 算定値の比較が可能な排出・吸収区分のうち、消化管内発酵と森林・草地の転用において大きな差異が認められた。
- 差異が生じている理由として、インベントリにおける単位表記ミスの可能性が指摘される。示された数値がガス別重量なのか、GWPを用いてCO_2換算された重量なのか等について精査する必要がある。

分野	算定対象	
農業	年	2000年
	排出源／ガス	CH_4/N_2O
LULUCF	年	2000年
	排出・吸収源／ガス	CO_2/CH_4

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	690	Total	54,486	-98.7%
	Enteric fermentation	671	Enteric fermentation	26,676	-97.5%
	Manure management	0	Manure management	16,984	-100.0%
	Rice cultivation	0	Rice cultivation	553	-100.0%
	Agricultural soils	0	Synthetic fertilizers	-	-100.0%
			Manure applied to soils	1,979	
			Manure left on pasture	8,270	
			Crop residues	16	
			Drained organic soils	-	
	Prescribed burning of savannahs	19	Savanna fires	0	-
	Field burning of agricultural residues	0	Burning-crop residues	8	-100.0%
LULUCF	Total	-481,999	Total	-29,122	-1555.1%
	Changes in forest and other woody biomass stocks	-506,950	Forestland	-381,110	-33.0%
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	831	Net forest conversion	351,988	-99.8%
	CO2 emissions and removals from soil	24,119	Drained organic soils	-	-

ナウル

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O 、廃棄物分野では固形廃棄物の処分からのCH_4および排水の処理と放出からのCH_4 ・N_2Oが算定対象となっており、 IPPU分野は未推計となっている。
- EDGARでは、 IPPU分野ではその他製品の製造および使用からのN_2O、廃棄物分野では廃棄物の野焼きからのCH_4の算定値も示されているため、Tier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分では、廃棄物分野のCH_4は、インベントリの方が排出量が大きくなっている。両者とも人口等により活動量を推計しているとみられるが、インベントリでは地域固有の原単位などを使用しており、より実態を反映している可能性がある（EDGARについては未確認であるが、より一般的なデータに基づいている可能性が高いとみられる）。

分野	算定対象	
エネルギー	年	1994年、2000年、2003年、2007年、2010年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	1994年、2000年、2003年、2007年、2010年
	排出源／ガス	CH_4/N_2O

Nauru 2000 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	13.29	-	-
	CH_4	0.021	-	-
	N_2O	0.03	-	-
	Total	**13.34**	-	-
2.Industrial processes	CO_2		0.38	-100.0%
	CH_4		-	-
	N_2O		0.06	-100.0%
	Fgas		-	-
	Total	**0.00**	**0.45**	**-100.0%**
5.Waste	CO_2		-	-
	CH_4	4.34	1.27	241.2%
	N_2O	0.21	-	-
	Total	**4.55**	**1.27**	**257.7%**

MUFG

■ 算定対象の比較

- 算定対象は2000年の1ヵ年に限られており、排出・吸収区分も農業分野のうち家畜飼養と農地土壌のみである。LULUCF分野については算定されていない。
- FAOSTATと比較すると、排出・吸収区分の名称が必ずしも一致していないものの、概ね同じ区分を対象に排出・吸収量の算定が行われている。
- 以上より、技術的に算定可能な区分についてはインベントリにおいて報告が行われており、今後は活動量データを整備しつつ、算定対象を拡大していくことが求められる。

■ 算定値の比較

- インベントリとFAOSTATの算定値（農業分野の合計排出量）の差異は15.2%と、他の国の差異と比べて小さく、概ね適切に算定が行われていると考えられる。

分野	算定対象	
農業	年	2000年
	排出源／ガス	CH_4/N_2O
LULUCF	年	算定していない
	排出・吸収源／ガス	算定していない

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	1,608	Total	1,396	15.2%
	Enteric fermentation	1,371	Enteric fermentation	78	1648.7%
	Manure management	-	Manure management	1,200	-
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	237	Synthetic fertilizers	-	101.5%
			Manure applied to soils	117	
			Manure left on pasture	1	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	0	Total	0	-
	Changes in forest and other woody biomass stocks	-	Forestland	0	-
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-	Net forest conversion	0	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

MUFG

ニウエ

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2Oが算定対象となっている。廃棄物分野では固形廃棄物の処分、排水の処理と放出および廃棄物の焼却が排出源として確認されているが、いずれも排出量はわずかであるとして、算定は行われていない。また、IPPU分野は未推計となっている。
- EDGARでは、廃棄物分野では排水の処理と放出および廃棄物の野焼きからのCH_4の算定値も示されており、排出量はわずかではあるものの、これらの排出源については、Tier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分ではエネルギー分野のCH_4・N_2Oの差異が大きく、インベントリの方が各ガスとも排出量が大きい。CH_4・N_2Oについては、使用施設や燃料種によって排出係数が大きく異なる可能性があり、両者で使用している排出係数の差異が影響している可能性がある。

分野	算定対象	
エネルギー	年	2000年、2005年～2009年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	算定していない
	排出源／ガス	算定していない

Niue 2009 [ktCO_2eq.]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	5.03	-	-
	CH_4	0.004	0.00037	976.1%
	N_2O	0.002	0.00003	7190.0%
	Total	**5.04**	**0.00040**	########
2.Industrial processes	CO_2		-	-
	CH_4		-	-
	N_2O		-	-
	Fgas		-	-
	Total	**0.00**	-	-
5.Waste	CO_2		-	-
	CH_4	0.00	0.053	-100.0%
	N_2O	0.00	-	-
	Total	**0.00**	**0.053**	**-100.0%**

6 Mitsubishi UFJ Research and Consulting

MUFG

■ 算定対象の比較

- インベントリで算定されているのは、LULUCF分野のうち森林・草地の転用のみ。農業分野は算定されていない。
- FAOSTATでは消化管内発酵、家畜排せつ物管理、農地土壌等の排出・吸収量が示されているため、これらの排出・吸収源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 算定値の比較が可能な森林・草地の転用において大きな差異が認められた。インベントリが吸収である一方、FAOSTATでは排出と算定されており、そもそも算定対象あるいは算定方法が大きく異なっている可能性が指摘される。
- インベントリにおいて具体的にどのような活動が含まれ、どのように算定されたのかを明らかにしつつ、必要に応じて改善を加えていくことが求められる。

分野	算定対象	
農業	年	算定していない
	排出源／ガス	算定していない
LULUCF	年	2000年
	排出・吸収源／ガス	CO_2

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	0	Total	1,315	-100.0%
	Enteric fermentation	-	Enteric fermentation	300	-
	Manure management	-	Manure management	849	-
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	-	Synthetic fertilizers	-	-
			Manure applied to soils	98	
			Manure left on pasture	69	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	-144,000	Total	2,248	-6504.8%
	Changes in forest and other woody biomass stocks	-	Forestland	-69	-
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-144,000	Net forest conversion	2,317	-6314.1%
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

21 Mitsubishi UFJ Research and Consulting

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パラオ

■ 算定対象の比較

- インベントリでは、エネルギー分野は業務部門以外の部門からのCO_2、IPPU分野では生石灰製造とソーダ灰製造からのCO_2、廃棄物分野では固形廃棄物の処分からのCH_4、排水の処理と放出からのCH_4・N_2O、および廃棄物の焼却からのCO_2が算定対象となっている。エネルギー分野のCH_4・N_2Oが算定対象となっているかは確認できない。
- EDGARでは、エネルギー分野からのCH_4・N_2O、IPPU分野ではガラス製造からのCO_2およびその他製品の製造および使用からのN_2O、廃棄物分野では廃棄物の焼却からのCH_4の算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分では、対象排出源が異なっているIPPU分野を除くと、エネルギー分野のCO_2の差異が大きく、インベントリの方が排出量が小さい。排出係数などの違い以外に、活動量の対象範囲の差異が影響している可能性が高いと思われる。

分野	算定対象	
エネルギー	年	1994年～2005年
	排出源／ガス	CO_2/(CH_4/N_2O)
IPPU	年	1994年～2005年
	排出源／ガス	CO_2
廃棄物	年	1994年～2005年
	排出源／ガス	CH_4/N_2O

Palau 2005 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	332	1,731	-80.8%
	CH_4		46	-100.0%
	N_2O		10	-100.0%
	Total	**332**	**1,787**	**-81.4%**
2.Industrial processes	CO_2	0.09	2.7	-96.6%
	CH_4		-	-
	N_2O		0.1	-100.0%
	Fgas		-	-
	Total	**0.09**	**2.8**	**-96.7%**
5.Waste	CO_2	0.007	-	-
	CH_4	3.99	3.2	25.4%
	N_2O	0.47	-	-
	Total	**4.46**	**3.2**	**40.2%**

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■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵、家畜排せつ物管理、農地土壌、LULUCF分野のうち森林吸収である。
- FAOSTATでは農業、LULUCF分野とも算定が行われておらず、したがってインベントリの方が算定・報告が進んでいる状況である。

■ 算定値の比較

- FAOSTATに算定値が示されていないため、これと比較することは困難である。
- ただし、国土面積や人口、土地利用、産業構造等が比較的近い国の算定値（インベントリ、FAOSTATデータベース）と比較し、差異を分析することで、今後のインベントリ改善に向けた検討の糸口を見つけることが可能かもしれない。

分野	算定対象	
農業	年	2000年～2005年
	排出源／ガス	CH_4/N_2O
LULUCF	年	2000年～2005年
	排出・吸収源／ガス	CO_2

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	9,918	Total	0	-
	Enteric fermentation	55	Enteric fermentation	-	-
	Manure management	625	Manure management	-	-
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	9,238	Synthetic fertilizers	-	-
			Manure applied to soils	-	
			Manure left on pasture	-	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	98,570	Total	0	-
	Changes in forest and other woody biomass stocks	98,570	Forestland	-	-
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-	Net forest conversion	-	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

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パプアニューギニア

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O、IPPU分野では潤滑油の使用からのCO_2、廃棄物分野では固形廃棄物の処分からのCH_4、固形廃棄物の生物処理、排水の処理と放出からのCH_4・N_2Oが算定対象となっている。
- EDGARでは、IPPU分野ではセメント製造、生石灰製造、ガラス製造、その他プロセスでの炭酸塩の使用からのCO_2、その他製品の製造および使用からのN_2O、廃棄物分野では廃棄物の焼却と野焼きからのCO_2・CH_4・N_2Oの算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。なお燃料からの漏出の固体燃料からのCH_4・N_2Oも算定されているが、インベントリでは当該排出源は国内に存在しないとされており、EDGAR側のデータについて確認が必要である。

■ 算定値の比較

- 比較可能な排出区分ではエネルギー分野の燃料の燃焼のエネルギー産業や製造業におけるCO_2の差異が大きく、インベントリの方が排出量が大きい。燃料種や活動量の対象範囲の差異が影響している可能性がある。

分野	算定対象	
エネルギー	年	2000年～2015年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	2000年～2015年
	排出源／ガス	CO_2
廃棄物	年	2000年～2015年
	排出源／ガス	CH_4/N_2O

Papua New Guinea 2015 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	8,059	6,184	30.3%
	CH_4	3,694	4,141	-10.8%
	N_2O	53	97	-45.4%
	Total	**11,806**	**10,421**	**13.3%**
2.Industrial processes	CO_2	1.4	182	-99.2%
	CH_4	0	-	-
	N_2O	0	0.004	-100.0%
	Fgas	0	-	-
	Total	**1.4**	**182**	**-99.2%**
5.Waste	CO_2	0	1	-100.0%
	CH_4	741	810	-8.5%
	N_2O	130	18	640.0%
	Total	**871**	**828**	**5.2%**

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■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵、家畜排せつ物管理、農地土壌、LULUCF分野のうち森林、農地、草地、開発地、バイオマスの燃焼である。
- FAOSTATにはサバンナの計画的な燃焼、稲作等の算定値も示されているため、これらの排出区分についてTier 1での算定が可能であると考えられる。また、FAOSTATでは、排水された有機質土壌において3,000万トンCO_2を超える排出量が示されている。同排出区分の算定は容易ではないものの、インベントリでも算定に向けて検討を進める必要がある。

■ 算定値の比較

- 算定値の比較が可能な排出・吸収区分ではいずれも大きな差異が認められた。特に森林吸収の差異が大きく、優先的に改善する必要がある。

分野	算定対象	
農業	年	2015年
	排出源／ガス	CH_4/N_2O
LULUCF	年	2015年
	排出・吸収源／ガス	CO_2/CH_4/N_2O

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	796,710	Total	1,698,065	-53.1%
	Enteric fermentation	168,210	Enteric fermentation	216,198	-22.2%
	Manure management	163,500	Manure management	871,811	-81.2%
	Rice cultivation	-	Rice cultivation	2,697	-
	Agricultural soils	465,000	Synthetic fertilizers	114,120	82.8%
			Manure applied to soils	86,250	
			Manure left on pasture	53,206	
			Crop residues	862	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	352,228	-
	Field burning of agricultural residues	-	Burning-crop residues	694	-
LULUCF	Total	1,721,460	Total	43,877,968	-96.1%
	Changes in forest and other woody biomass stocks	-11,284,070	Forestland	0	-1204.2%
			Forest fires	1,021,961	
			Fires in organic soils	0	
	Forest and grassland conversion	13,005,530	Net forest conversion	10,500,491	23.9%
	CO2 emissions and removals from soil	-	Drained organic soils	32,355,516	-

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サモア

■算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O、IPPU分野では潤滑油の使用からのCO_2、その他製品の製造および使用からのN_2O、および冷蔵庫及び空調機器からのHFCs・PFCs、廃棄物分野では固形廃棄物の処分からのCH_4、廃棄物の焼却と野焼きからのCO_2・CH_4・N_2O、排水の処理と放出からのCH_4が算定対象となっている。
- EDGARでは、IPPU分野ではガラス製造からのCO_2、廃棄物分野では排水の処理と放出からのN_2Oの算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■算定値の比較

- 比較可能な排出区分ではIPPU分野のその他製品の製造および使用からのN_2Oの差異が大きく、インベントリの方が排出量が小さい。当該排出源では活動量がそのまま排出量として計上されていると考えられ、データの桁間違い等が生じている可能性がある。

分野	算定対象	
エネルギー	年	1994年～2007年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	1994年～2007年
	排出源／ガス	CO_2/N_2O/HFCs/PFCs
廃棄物	年	1994年～2007年
	排出源／ガス	CO_2/CH_4/N_2O

Samoa 2007 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	171	158	8.0%
	CH_4	1.1	4.6	-77.0%
	N_2O	2.2	1.6	32.6%
	Total	**174**	**165**	**5.9%**
2.Industrial processes	CO_2	4	1.5	182.4%
	CH_4	0	-	-
	N_2O	0.11	1.2	-90.0%
	Fgas	5,253	-	-
	Total	**5,257**	**3**	**200901.2%**
5.Waste	CO_2	2.4	-	-
	CH_4	30	29	3.5%
	N_2O	0.6	2.7	-77.3%
	Total	**33**	**32**	**4.2%**

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■算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵、家畜排せつ物管理、農地土壌、LULUCF分野のうち森林吸収、森林・草地の転用である。
- FAOSTATと比較すると、インベントリと概ね同じ区分を対象に排出・吸収量の算定が行われている。
- 以上より、技術的に算定可能な区分についてはインベントリにおいて報告が行われており、今後は活動量データを整備しつつ、算定対象を拡大していくことが求められる。

■算定値の比較

- 特にLULUCF分野において大きな差異が認められた。具体的にどのような活動が含まれ、どのように算定されたのかを明らかにしつつ、必要に応じてインベントリに改善を加えていくことが求められる。

分野	算定対象	
農業	年	2000年～2007年
	排出源／ガス	CO_2/CH_4/N_2O
LULUCF	年	2000年～2007年
	排出・吸収源／ガス	CO_2

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	149,450	Total	169,039	-11.6%
	Enteric fermentation	90,500	Enteric fermentation	59,606	51.8%
	Manure management	14,250	Manure management	83,352	-82.9%
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	44,700	Synthetic fertilizers	88	71.4%
			Manure applied to soils	8,363	
			Manure left on pasture	17,630	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	0	-
LULUCF	Total	-785,070	Total	106,634	-836.2%
	Changes in forest and other woody biomass stocks	-777,470	Forestland	1,831	-42552.2%
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-7,600	Net forest conversion	104,803	-107.3%
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

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ソロモン諸島

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O、廃棄物分野では固形廃棄物の処分からのCH_4、排水の処理と放出からのCH_4・N_2Oが算定対象となっている。IPPU分野では食品飲料製造からのNMVOCは算定対象となっているが、その他のGHGは算定対象となっていない。また、エネルギー分野からのガス別排出量は確認できなかった。
- EDGARでは、IPPU分野ではガラス製造からのCO_2、その他製品の製造および使用からのN_2O、廃棄物分野では廃棄物の焼却と野焼きからのCH_4の算定値も示されているため、Tier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分では廃棄物分野の固形廃棄物の処分からのCH_4の差異が大きく、インベントリの方が排出量が3倍以上大きい。活動量の推計に用いている廃棄物の組成や発生率等の差異が影響している可能性がある。

分野	算定対象	
エネルギー	年	1994年、2000年、2005年、2010年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	1994年、2000年、2005年、2010年
	排出源／ガス	CH_4/N_2O

Solomon Islands 2010 [ktCO_2eq.]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	-	172	-
	CH_4	-	9	-
	N_2O	-	3	-
	Total	**351**	**183**	**91.2%**
2.Industrial processes	CO_2	-	9	-
	CH_4	-	-	-
	N_2O	-	3	-
	Fgas	-	-	-
	Total	**0.00**	**12**	**-100.0%**
5.Waste	CO_2	-	-	-
	CH_4	182.7	72	152.3%
	N_2O	9.9	6	76.9%
	Total	**192.6**	**78**	**146.9%**

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■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵、家畜排せつ物管理、農地土壌である。LULUCF分野は算定されていない。
- FAOSTATでは、稲作等のほか、LULUCF分野の排出・吸収量が示されているため、これらの排出・吸収源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 算定値の比較が可能な農業分野を見ると、合計排出量は概ね一致しているものの、個別の排出区分毎にみると差異が認められた。こうした差異は使用されているデータの相違に由来するほか、計上する排出区分が異なる可能性も指摘される。例えばFAOSTATにおいて農地土壌に分類されている土壌への家畜排せつ物の施用等は、インベントリにおいて家畜排せつ物の管理に含まれている可能性もある。

分野	算定対象	
農業	年	2000年、2005年、2010年
	排出源／ガス	CH_4/N_2O
LULUCF	年	算定していない
	排出・吸収源／ガス	算定していない

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	76,390	Total	74,175	3.0%
	Enteric fermentation	20,960	Enteric fermentation	27,796	-24.6%
	Manure management	35,360	Manure management	26,650	32.7%
	Rice cultivation	-	Rice cultivation	8,229	-
	Agricultural soils	20,070	Synthetic fertilizers	-	75.5%
			Manure applied to soils	2,989	
			Manure left on pasture	8,222	
			Crop residues	225	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	65	-
LULUCF	Total	0	Total	1,692,756	-100.0%
	Changes in forest and other woody biomass stocks	-	Forestland	1,502,986	-
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-	Net forest conversion	188,927	-
	CO2 emissions and removals from soil	-	Drained organic soils	843	-

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トンガ

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O、廃棄物分野では固形廃棄物の処分からのCH_4、廃棄物の焼却と野焼きからのCO_2・CH_4・N_2O、排水の処理と放出からのCH_4およびし尿処理施設からのN_2Oが算定対象となっている。また、IPPU分野は未推計となっている。
- EDGARでは、IPPU分野ではガラス製造および潤滑油の使用からのCO_2、廃棄物分野では排水の処理と放出からのN_2Oおよび廃棄物の焼却と野焼きからのCH_4の算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分ではエネルギー分野や廃棄物分野のCH_4の差異が大きい。同一の対象排出源ながら桁が異なるほどの差異が生じているため、データ精度に加え、CO_2換算の誤りや桁間違い等が生じている可能性がある。

分野	算定対象	
エネルギー	年	1994年、2000年、2006年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	1994年、2000年、2006年
	排出源／ガス	CH_4/N_2O

Tonga 2006 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	113.1	117	-2.9%
	CH_4	3.0	0.7	328.9%
	N_2O	0.9	0.7	36.0%
	Total	**117.1**	**118**	**-0.7%**
2.Industrial processes	CO_2	-	0.6	-
	CH_4	-	-	-
	N_2O	-	0.6	-
	Fgas	-	-	-
	Total	**0.00**	**1.3**	**-100.0%**
5.Waste	CO_2	-	-	-
	CH_4	0.795	21	-96.2%
	N_2O	0.095	-	-
	Total	**0.890**	**21**	**-95.7%**

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■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵、農地土壌、サバンナの計画的な焼却、LULUCF分野のうち森林吸収、森林・草地の転用である。
- FAOSTATでは家畜排せつ物の管理の排出・吸収量が示されていることから、この区分についてはTier 1での算定が可能であると考えられる。
- FAOSTATでは、LULUCF分野のほか、サバンナの計画的な焼却（農業分野）の算定が行われておらず、これらについてはインベントリの方が算定・報告が進んでいる状況である。

■ 算定値の比較

- 算定値の比較が可能な排出区分を見ると、消化管内発酵で比較的大きな差異が認められた。活動量データを精査した上で、必要に応じて改善を加える必要がある。

分野	算定対象	
農業	年	2006年
	排出源／ガス	CO_2/CH_4/N_2O
LULUCF	年	2006年
	排出・吸収源／ガス	CO_2

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	31,670	Total	78,756	-59.8%
	Enteric fermentation	19,000	Enteric fermentation	28,832	-34.1%
	Manure management	-	Manure management	36,848	-
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	11,920	Synthetic fertilizers	0	-8.8%
			Manure applied to soils	3,884	
			Manure left on pasture	9,192	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	750	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	-1,250,140	Total	0	-
	Changes in forest and other woody biomass stocks	-1,437,540	Forestland	0	-
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	187,400	Net forest conversion	0	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

MUFG

ツバル

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O、廃棄物分野では固形廃棄物の処分からのCH_4、排水の処理と放出からのCH_4・N_2Oが算定対象となっている。また、IPPU分野は未推計となっている。
- EDGARでは、IPPU分野では潤滑油の使用からのCO_2、その他製品の製造および使用からのN_2O、廃棄物分野では排水の処理と放出からのN_2Oおよび廃棄物の焼却と野焼きからのCH_4の算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。
- なお、インベントリではほとんどの算定結果が2002年値の据え置きとなっており、EDGARのデータのトレンドなども確認して必要に応じて何らか補正を加えることも考えられる。

■ 算定値の比較

- 比較可能な排出区分では廃棄物分野では固形廃棄物の処分からのCH_4において、インベントリの方が排出量が小さく、10分の1未満となっている。排出係数や活動量の対象範囲の差異に加え、データや算定過程での誤りなども生じている可能性がある。

分野	算定対象	
エネルギー	年	2014年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	2014年
	排出源／ガス	CH_4/N_2O

Tuvalu 2014 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	11.168	-	-
	CH_4	0.01	-	-
	N_2O	0.03	-	-
	Total	**11.21**	-	-
2.Industrial processes	CO_2	-	0.02	-
	CH_4	-	-	-
	N_2O	-	0.07	-
	Fgas	-	-	-
	Total	**0.00**	**0.09**	**-100.0%**
5.Waste	CO_2	-	-	-
	CH_4	1.70	2.6	-33.8%
	N_2O	0.43	-	-
	Total	**2.13**	**2.6**	**-16.9%**

■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵、家畜排せつ物の管理、農地土壌、LULUCF分野のうち森林吸収である。
- FAOSTATと比較すると、インベントリと概ね同じ区分を対象に排出・吸収量の算定が行われている。
- 以上より、技術的に算定可能な区分についてはインベントリにおいて報告が行われており、今後は活動量データを整備しつつ、算定対象を拡大していくことが求められる。

■ 算定値の比較

- 算定値の比較が可能な排出・吸収区分を見ると、家畜排せつ物の管理と農地土壌において大きな差異が認められた。活動量データを精査した上で、必要に応じて改善を加える必要がある。

分野	算定対象	
農業	年	2002年
	排出源／ガス	CH_4/N_2O
LULUCF	年	2002年
	排出・吸収源／ガス	CO_2

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	4,617	Total	6,794	-32.1%
	Enteric fermentation	246	Enteric fermentation	378	-34.8%
	Manure management	501	Manure management	5,810	-91.4%
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	3,869	Synthetic fertilizers	-	538.6%
			Manure applied to soils	600	
			Manure left on pasture	6	
			Crop residues	-	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	0	-
	Field burning of agricultural residues	-	Burning-crop residues	-	-
LULUCF	Total	-33	Total	-198	83.1%
	Changes in forest and other woody biomass stocks	-33	Forestland	-198	83.1%
			Forest fires	0	
			Fires in organic soils	0	
	Forest and grassland conversion	-	Net forest conversion	0	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

バヌアツ

■ 算定対象の比較

- インベントリでは、エネルギー分野は全部門からのCO_2・CH_4・N_2O、廃棄物分野では固形廃棄物の処分からのCH_4、排水の処理と放出からのCH_4・N_2Oが算定対象となっている。また、IPPU分野は未推計となっている。
- EDGARでは、IPPU分野ではガラス製造および潤滑油の使用からのCO_2、廃棄物分野では廃棄物の焼却と野焼きからのCH_4の算定値も示されているため、これらの排出源についてTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 比較可能な排出区分ではエネルギー分野のCH_4の差異が大きく、インベントリの方が排出量が小さい。EDGARでは、その他部門においてバイオマス由来のCH_4が計上されているのに対し、インベントリでは化石燃料のみとなっており、差異の原因の一つとなっている可能性がある。

分野	算定対象	
エネルギー	年	2007年～2015年
	排出源／ガス	CO_2/CH_4/N_2O
IPPU	年	算定していない
	排出源／ガス	算定していない
廃棄物	年	2007年～2015年
	排出源／ガス	CH_4/N_2O

Vanuatu 2015 [$ktCO_2eq.$]

sector	gas	Inventory	EDGAR	difference
1.Energy	CO_2	128	149	-14.2%
	CH_4	0.17	7.7	-97.8%
	N_2O	1.1	1.9	-44.0%
	Total	**129.43**	**157**	**-17.8%**
2.Industrial processes	CO_2	-	3	-
	CH_4	-	-	-
	N_2O	-	2	-
	Fgas	-	-	-
	Total	**0.00**	**5**	**-100.0%**
5.Waste	CO_2	-	-	-
	CH_4	34.02	89.73	-62.1%
	N_2O	3.18	2.97	7.2%
	Total	**37.20**	**70.77**	**-47.4%**

※バヌアツのインベントリでは、GWPとしてAR5の値（CH_4：28、N_2O：265）が使用されているため、EDGARも同様のGWPにてCO_2換算している。

■ 算定対象の比較

- インベントリで算定されているのは、農業分野のうち消化管内発酵、家畜排せつ物の管理、農地土壌、LULUCF分野のうち森林である。
- FAOSTATでは農業残渣の焼却、サバンナの計画的な焼却の算定値が示されていることから、これらの区分についてはTier 1での算定が可能であると考えられる。

■ 算定値の比較

- 算定値の比較が可能な排出・吸収区分を見ると、森林吸収においてきわめて大きな差異が認められた。活動量データを精査した上で、必要に応じて改善を加える必要がある。
- ソロモン諸島でも指摘したように、FAOSTATにおいて農地土壌に分類されている土壌への家畜排せつ物の施用等は、インベントリにおいて家畜排せつ物の管理に含まれている可能性もある。

分野	算定対象	
農業	年	2007年～2015年
	排出源／ガス	CH_4/N_2O
LULUCF	年	2007年～2015年
	排出・吸収源／ガス	CO_2

Category	Inventory	Emission (t-CO2)	FAOSTAT	Emission (t-CO2)	Difference
Agriculture	Total	443,400	Total	504,360	-12.1%
	Enteric fermentation	306,600	Enteric fermentation	319,786	-4.1%
	Manure management	121,500	Manure management	72,832	66.8%
	Rice cultivation	-	Rice cultivation	-	-
	Agricultural soils	15,300	Synthetic fertilizers	-	-86.3%
			Manure applied to soils	9,211	
			Manure left on pasture	102,314	
			Crop residues	65	
			Drained organic soils	-	
	Prescribed burning of savannahs	-	Savanna fires	15	-
	Field burning of agricultural residues	-	Burning-crop residues	137	-
LULUCF	Total	-6,973,700	Total	4,011	-173981.7%
	Changes in forest and other woody biomass stocks	-6,973,700	Forestland	-	-173981.7%
			Forest fires	4,011	
			Fires in organic soils	0	
	Forest and grassland conversion	-	Net forest conversion	-	-
	CO2 emissions and removals from soil	-	Drained organic soils	-	-

1.4 ガイダンス

未推計区分の解消

- 外部機関におけるデータベースでは排出・吸収量が示されており、したがって Tier 1 での算定は技術的に可能であるにもかかわらず、インベントリでは未推計となっている区分がある。

経年的な排出・吸収量の把握

- インベントリでは、排出・吸収量をある一時点だけではなく、経年的に把握する必要がある。しかしながら、多くの国のインベントリでは算定対象年が限られており、トレンドの把握が困難である。

算定方法等に関する説明の拡充

- 多くの国は排出・吸収量の算定値を報告しているが、算定方法については十分に説明しておらず、具体的にどのような活動を対象に、どのデータを使用して算定したのかが不明瞭である。そのため、外部機関におけるデータベースの算定値と差があっても、その差が何に由来するのかを特定できず、課題について分析することも困難である。
- 一部の排出・吸収区分をゼロと報告している国があるが、排出・吸収量を算定した結果としてゼロなのか、それとも未推計（NE：Not estimated）なのかの見分けがつかない。インベントリの改善点を明確にするためにも、注釈記号を適切に用いる必要がある。
- 排出・吸収量の単位が適切に記載されていないため、ガス別の重量なのか、それとも地球温暖化係数（GWP）を用いて CO_2 換算された重量なのかが分かりにくい。

2. エネルギー起源 CO_2 排出量の要因分解

2.1 概要

大洋州諸国におけるエネルギー起源 CO_2 を対象に、要因ごとの排出量増減に対する寄与度について分析を行った。具体的には、CO_2 排出量を幾つかの因子の積として表し、それぞれの因子の変化が与える排出量変化分を定量的に算定する茅恒等式による要因分解手法を用いた。

2.2 手法

要因分解手法

エネルギー起源 CO_2 排出量は通常、活動量（燃料消費量）と排出係数の積として産出される。

$$CO_{2_t} = AD_t \cdot EF_t$$

ここで、AD は活動量、EF は排出係数、t は該当年を指す。この時、t 年から t+1 年における CO_2 排出量の変化は以下のとおりとなる。

$$CO_{2_{t+1}} - CO_{2_t} = (AD_{t+1} - AD_t) \cdot (EF_{t+1} - EF_t)$$

t 年から t+1 年までの変化を Δ で表現した場合、上記式は下記式のとおり整理される。

$$\Delta CO_2 = \Delta AD \cdot EF_{t+1} + AD_{t+1} \cdot \Delta EF + \varepsilon$$

上記式による右辺第一項は活動量の変化が CO2 排出量に与える影響（活動量要因）、第二項は排出係数の変化が CO2 排出量に与える影響（排出係数要因）をあらわす。このように特定期間における CO2 排出量の変化量は複数の要因に分割することが可能であり、このような CO2 排出量変化を複数の要因項に分解する分析手法を要因分解手法という。

茅恒等式

茅恒等式は通常、排出量を「排出原単位要因」、「エネルギー消費原単位要因」、「一人当たり GDP 要因」、「人口要因」の 4 つの要因項の積で表し、要因分解手法を用いて各要因が排出量の変化に与えた影響を定量的に推計する手法である。

また、茅恒等式の各要因項のうち温暖化対策で低減可能な要因項は「排出原単位要因」と「エネルギー消費原単位要因」である。これら 2 つの要因項に対する緩和策の具体例として、排出原単位要因では再生可能エネルギーや原子力等の低炭素エネルギーへのスイッチング、エネルギー消費原単位要因では高効率機器の導入や省エネ行動の促進等が挙げられる。要因分解の結果、各要因項の寄与度を整理することで、特にどのような対策が必要か、また、どのような対策により排出量が減少しているか等を整理することが可能となる。

$$CO_2 = \frac{CO_2}{E} \cdot \frac{E}{G} \cdot \frac{G}{P} \cdot P$$

$$\Delta CO_2 = \underbrace{\Delta \frac{CO_2}{E} \cdot \frac{E}{G} \cdot \frac{G}{P} \cdot P}_{\text{排出原単位要因}} + \underbrace{\frac{CO_2}{E} \cdot \Delta \frac{E}{G} \cdot \frac{G}{P} \cdot P}_{\text{エネルギー消費原単位要因}} + \underbrace{\frac{CO_2}{E} \cdot \frac{E}{G} \cdot \Delta \frac{G}{P} \cdot P}_{\text{一人当たりGDP要因}} + \underbrace{\frac{CO_2}{E} \cdot \frac{E}{G} \cdot \frac{G}{P} \cdot \Delta P}_{\text{人口要因}} + \varepsilon$$

CO_2: CO_2排出量
E: エネルギー消費量
G: GDP
P: 人口

図 28　茅恒等式による要因分解

2.3 結果概要

茅恒等式を用いた要因分解を実施するためには、CO2 排出量、エネルギー消費量、GDP、人口のデータが必要である。本調査での 2000 年から 2018 年までを対象とし分析することから、当該期間において対象国の CO2 排出量、エネルギー消費量、GDP、人口データが国際統計等から取得可能か調査した。調査の結果、全 14 か国中 8 か国（表赤字）で茅恒等式が実施可能となった。なお、国家統計なども調査対象に含めた場合、分析対象国は増える可能性は高いと思われる。

表 22　大洋州諸国におけるデータ整備状況

	CO2 from fuel combustion	Energy consumption	GDP	Population	Kaya identity
Cook Islands	✓	✓	✓	✓	✓
Micronesia, Federated States of				✓	
Fiji	✓	✓	✓	✓	✓
Kiribati	✓	✓	✓	✓	✓
Marshall Islands			✓	✓	
Nauru		✓	✓	✓	
Niue		✓	✓	✓	
Palau	✓		✓	✓	
Papua New Guinea	✓	✓	✓	✓	✓
Samoa	✓	✓	✓	✓	✓
Solomon Islands	✓	✓	✓	✓	✓
Tonga	✓	✓	✓	✓	✓
Tuvalu			✓	✓	
Vanuatu	✓	✓	✓	✓	✓

（出典）National Accounts Analysis of Main Aggregates (UN）, World population prospects (UN)を用いて MURC 作成

茅恒等式による要因分解結果を表 23 に示す。要因分解結果を実施可能な８か国は全て、当該期間において排出量が増加している。しかし、排出量の増加要因は国により異なり、フィジー、パプアニューギニア、サモア、ソロモン諸島では排出原単位要因が最大の増加要因となっている。これは、安価な石炭等の高炭素燃料への依存度が高くなっている可能性がある。このため、これら区の国々では、ガス燃料への転換、再生可能エネルギー等の導入により排出量が効果的に減少させることが可能である。一方、キリバス、トンガ、バヌアツでは、「エネルギー消費原単位要因」が最大の増加要因となっているが、これは経済の発展に伴う一人当たりエネルギー消費量の増加が要因として考えられる。このような場合は、高効率機器の導入や省エネ行動の啓発が効果的な対策となりうる。なお、国別の増減要因分解結果は図 29 以降を参照されたい。

表 23　大洋州諸国における要因分解結果

kt CO2

	CO2 changes from 2000 to 2018	Factor of carbon intensity	Factor of energy intensity	Factor of GDP per capita	Factor of Population	Not classifiable
Cook Islands	6	-33	8	36	-4	-1
Micronesia, Federated States of	-	-	-	-	-	-
Fiji	1,000	980	-310	580	130	-380
Kiribati	33	-3	22	-0.4	16	-2
Marshall Islands	-	-	-	-	-	-
Nauru	-	-	-	-	-	-
Niue	-	-	-	-	-	-
Palau	-890	-	-	-	-	-
Papua New Guinea	4,480	1,960	-500	1,770	1,710	-470
Samoa	210	120	10	50	20	5
Solomon Islands	140	100	-90	60	90	-10
Tonga	30	2	20	20	10	-10
Tuvalu	-	-	-	-	-	-
Vanuatu	92	-21	59	2	55	-4

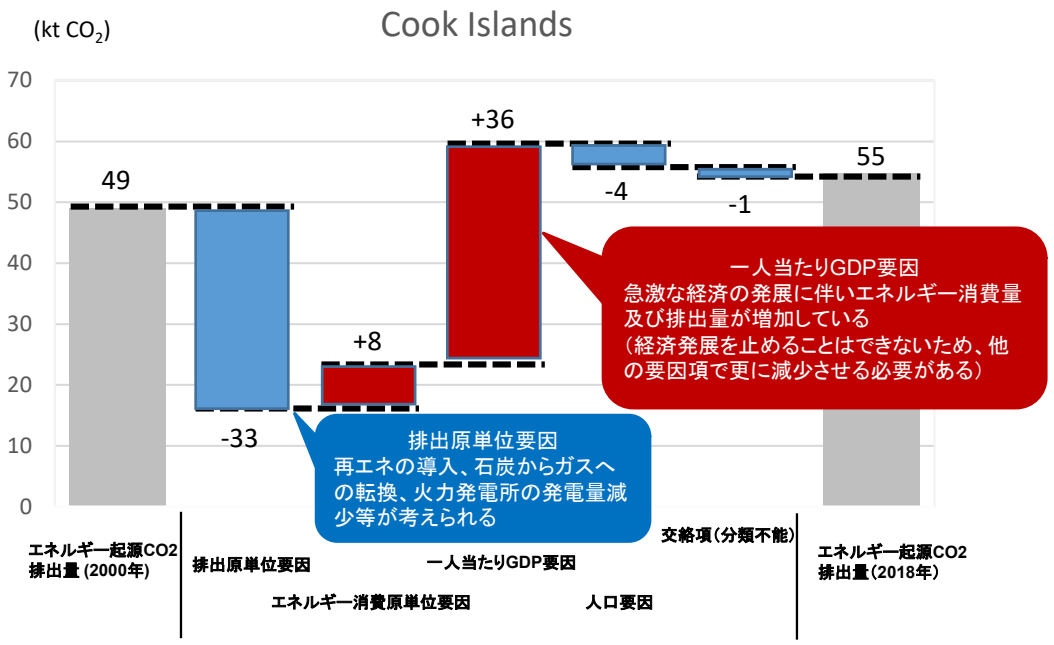

図 29　クック諸島における排出量増減要因分解結果

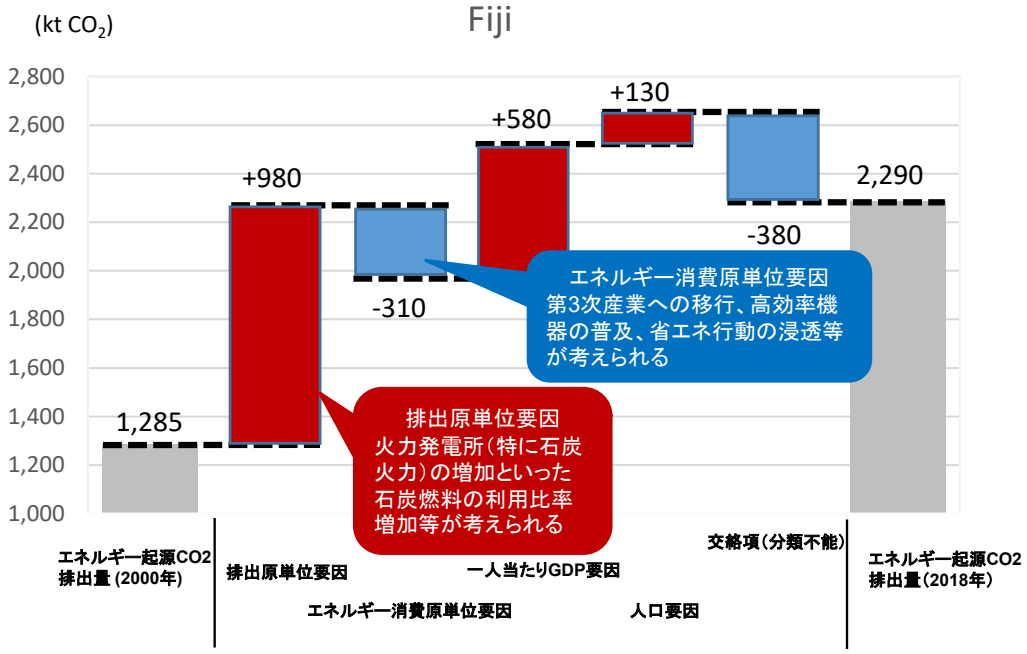

図 30　フィジーにおける排出量増減要因分解結果

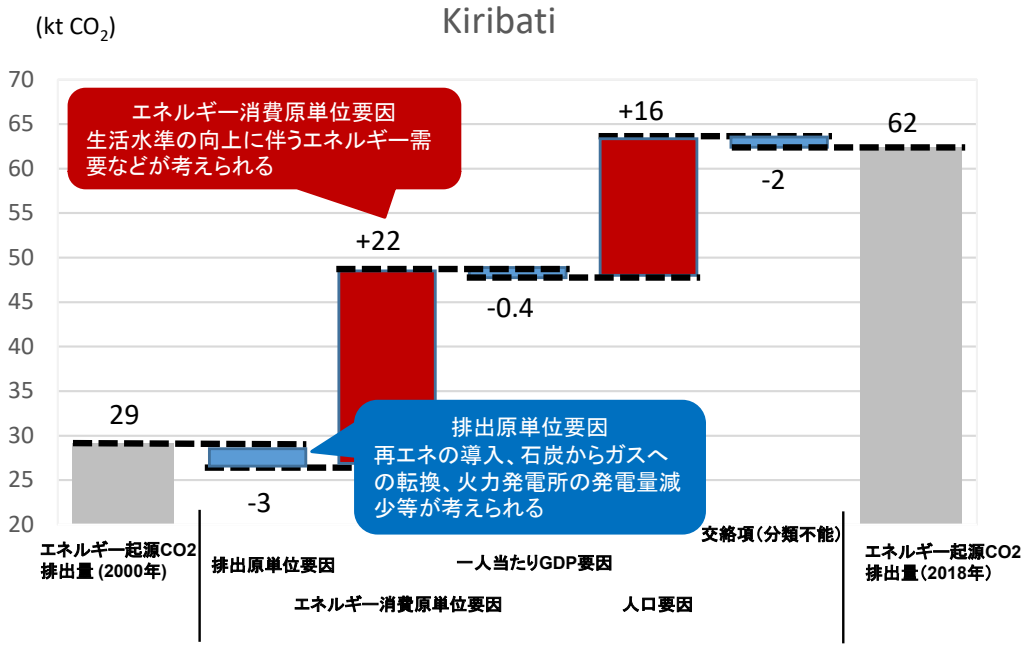

図 31 キリバスにおける排出量増減要因分解結果

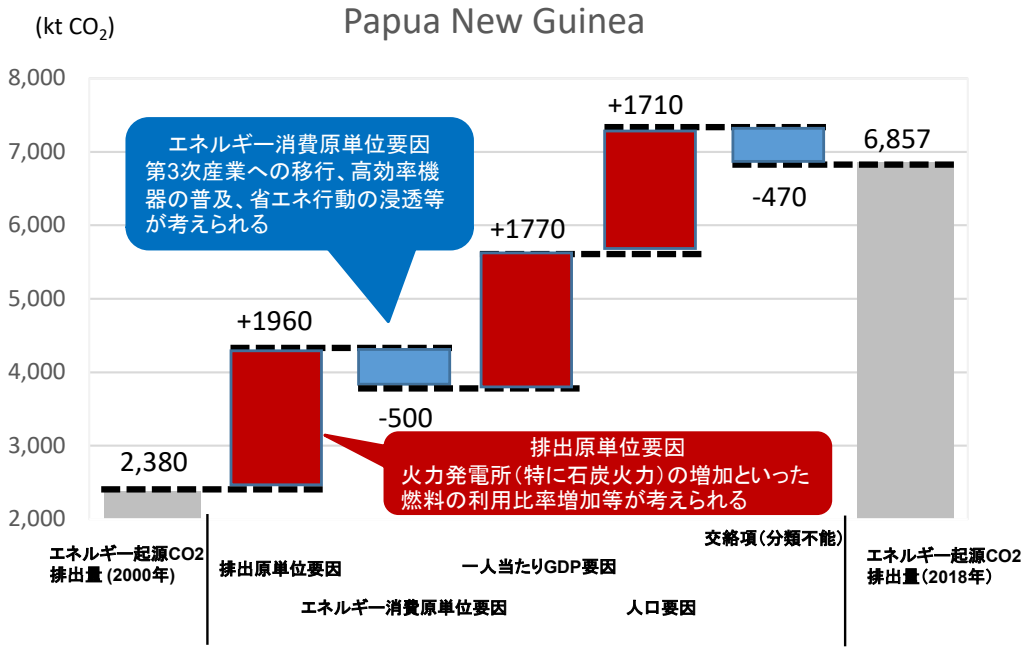

図 32 パプアニューギニアにおける排出量増減要因分解結果

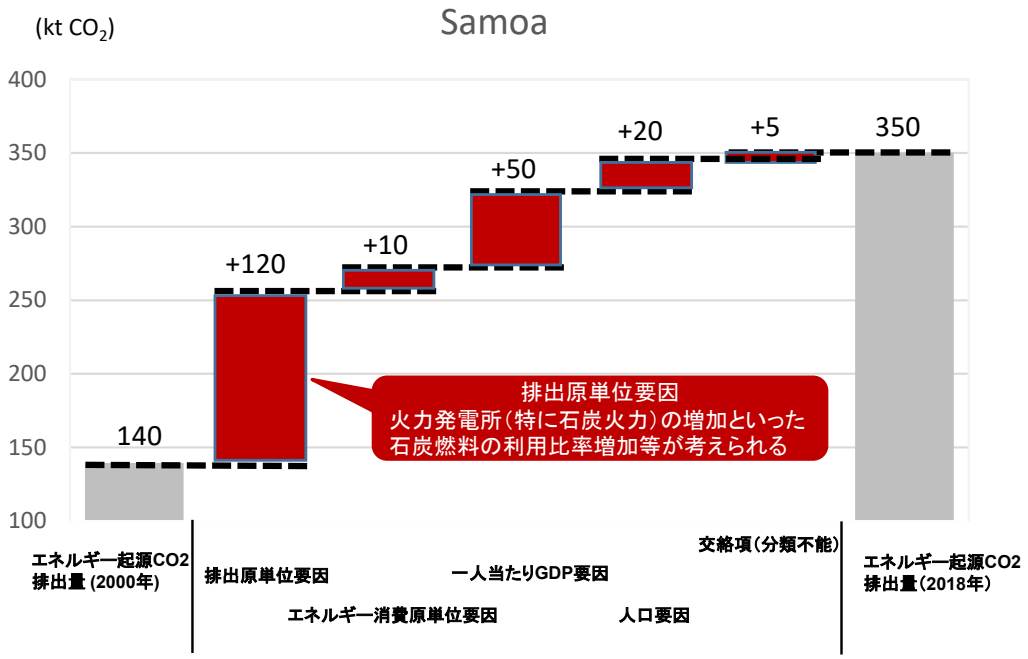

図 33 サモアにおける排出量増減要因分解結果

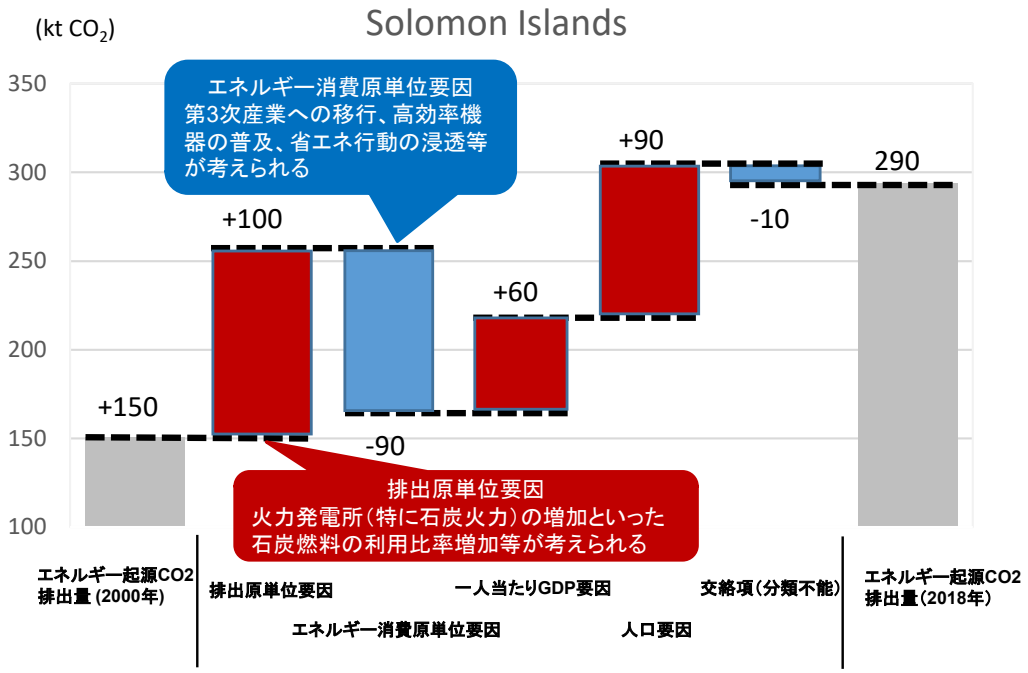

図 34 ソロモン諸島における排出量増減要因分解結果

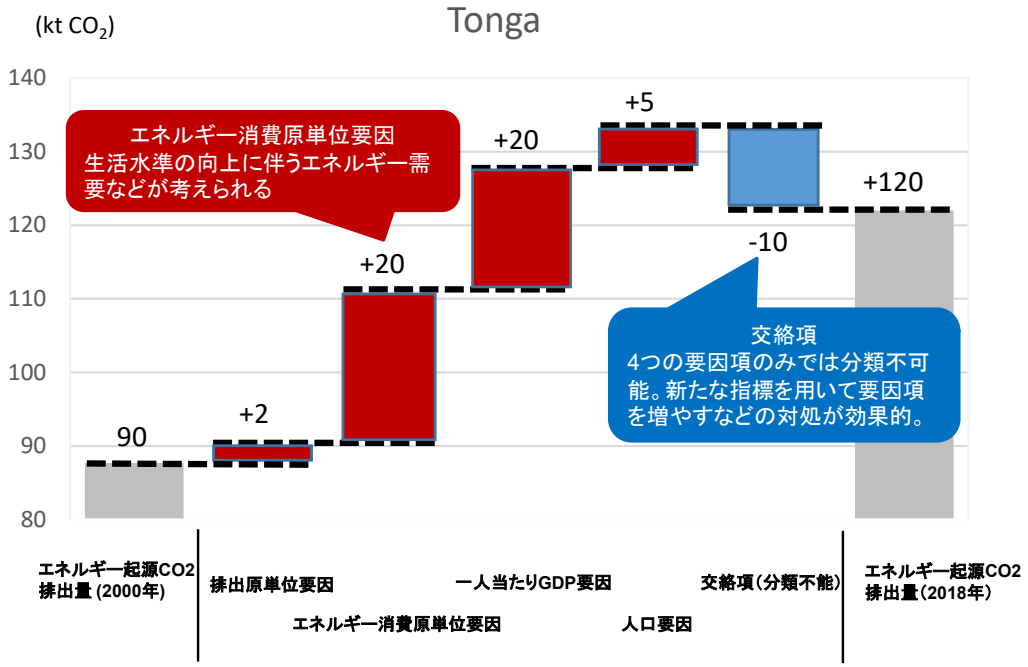

図 35 トンガにおける排出量増減要因分解結果

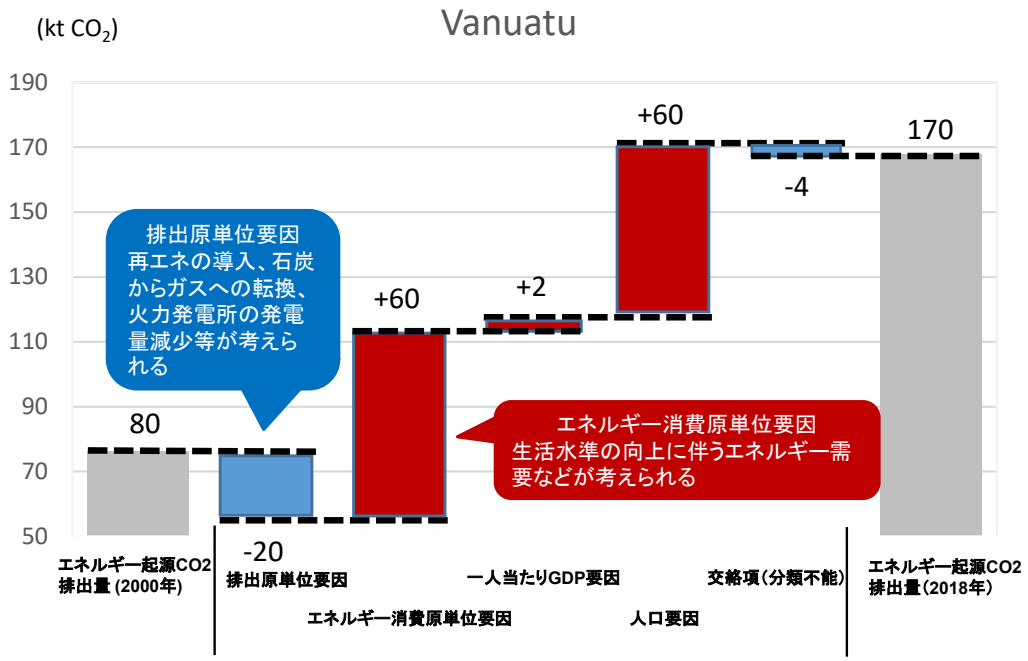

図 36 バヌアツにおける排出量増減要因分解結果

2.4 まとめ

本章では、特定期間における CO_2 排出量の増加要因を定量的に特定するため、茅恒等式を用いた要因分解を実施した。また、茅恒等式で必要となる、「CO_2 排出量」「エネルギー消費量」「GDP」「人口」が得られた計 8 か国を対象とした。

これらの国は全て当該期間において排出量が増加しているという特徴を持っていたが、国によりその増加要因及び効果的な緩和策は異なっていた。具体的には、火力発電所（特に石炭火力）の増加と

いった石炭燃料の利用比率増加等が主要因として考えられる国がフィジー、パプアニューギニア、サモア、ソロモン諸島の 4 か国であるのに対し、生活水準の向上に伴うエネルギー需要の増加が主要因として考えられる国がマーシャル諸島、トンガ、バヌアツであった。なお、クック諸島については、経済の発展に伴いエネルギー需要が増加する「一人当たり GDP 要因」が主要因として考えられるが、経済発展を停滞させる対策は一般的に実施されない。そのため、その他で増加要因となっている「エネルギー消費原単位要因」等が低減されるような緩和策を実施することが重要である。この結果より、フィジー、パプアニューギニア、サモア、ソロモン諸島においてはガス燃料への転換、再生可能エネルギー等の導入促進が効果的な対策として考えられる。一方、クック諸島、キリバス、トンガ、バヌアツでは、効果的な対策として高効率機器の導入や省エネ行動の啓発等が挙げられる。

また、本調査ではエネルギー起源 CO_2 を対象に要因分解を実施したが、部門別排出量を要因分解することでさらに詳細な増減要因を特定することが可能である（Extended Kaya identity）。ただし、部門別に要因分解を実施するためには、より多くのデータ（例えば発電量、産業種別 GDP、車両保有台数、輸送量、世帯数　等）が必要となるため、効果的な緩和策を費用的・時間的に効率よく実施するためにもデータの整備は今後も重要となる。

3. NDC 調査

3.1 概要

大洋州の島嶼国から提出された NDC の記載内容を比較整理しつつ、パリ協定に定められた目標の達成に向けて NDC の有効性を一層高める観点から、どのような改善が必要か等について検討を行った。

3.2 分析結果

項目			クック諸島（2016年9月1日）	フィジー（2020年12月30日）	キリバス（2016年9月21日）	マーシャル諸島（2018年11月22日）
GHG目標	目標のタイプ		基準年目標	ベースライン目標	ベースライン目標	基準年目標
	基準年		2006年	－	－	2010年
	基準年排出量		**23,620［t-CO_2eq］（総排出量の34%）**	2,341［kt-CO_2eq］	**記載なし**	185［kt-CO_2eq］
	目標年		2020年（条件なしの目標）、2030年（条件付きの目標）	2030年	2025年、2030年	2025年、2030年
	目標		2020年（条件なし）：38%減、2030年（条件付き）：81%減	30%減	2025年：13.7%減、2030年：12.8%減	2025年：32%減、2030年：45%減
	対象	ガス	**記載なし**	CO_2/CH_4/N_2O	CO_2	CO_2/CH_4/N_2O
		セクター	電力	エネルギー（発電・送電、省エネ、運輸）	エネルギー（発電、運輸）、海洋と沿岸域	エネルギー（発電、運輸等）、廃棄物
	算定方法論		**記載なし**	2006年IPCC-GL	**記載なし**	1996年改訂IPCC-GL
	市場メカニズムの取り扱い		記載なし	自国のNDC達成及び他国のNDC達成を支援するため、市場ベースの協力の可能性を探求する。	検討する	使用しない
	土地セクターの取り扱い		含まない	含まない	含まない	含まない
GHG以外の目標			あり	あり	なし	なし
目標達成に向けた行動			記載あり	記載あり	記載あり	記載あり
適応目標			あり	あり	あり	あり

項目			ミクロネシア（2016年9月15日）	ナウル（2021年10月14日）	ニウエ（2016年10月28日）	パラオ（2016年4月22日）
GHG目標	目標のタイプ		基準年目標	記載なし	記載なし	基準年目標
	基準年		2000年	記載なし	記載なし	2005年
	基準年排出量		150［kt-CO_2eq］	記載なし	記載なし	88［kt-CO_2eq］
	目標年		2025年	記載なし	記載なし	2025年
	目標		条件なし：28%減、条件付き：35%減	記載なし	記載なし	**22%減（エネルギーセクターのみ）**
	対象	ガス	CO_2	記載なし	記載なし	CO_2/CH_4
		セクター	エネルギー（発電、輸送）	記載なし	記載なし	エネルギー（発電）、運輸、廃棄物
	算定方法論		1996年改訂IPCC-GL	記載なし	記載なし	**記載なし**
	市場メカニズムの取り扱い		使用しない	記載なし	記載なし	使用しない
	土地セクターの取り扱い		含まない	記載なし	記載なし	含まない
GHG以外の目標			なし	あり	あり	あり
目標達成に向けた行動			**記載なし**	記載あり	記載あり	記載あり
適応目標			なし	なし	あり	なし

項目			パプアニューギニア（2020年12月16日）	サモア（2021年7月30日）	ソロモン諸島（2021年7月19日）	トンガ（2020年12月9日）
GHG目標	目標のタイプ		基準年目標	基準年目標	基準年目標	基準年目標
	基準年		2015年	2007年	2015年	2006年
	基準年排出量		1,716［kt-CO_2eq］	352.03［kt-CO_2eq］	707.425［kt-CO_2eq］	120.4［kt-CO_2eq］
	目標年		2030年	2030年	2025年、2030年	2030年
	目標		10,000［kt-CO_2eq］減	26%減（エネルギー：30%減、廃棄物：4%減、AFOLU：26%減）	2025年：14%減（条件なし）、27%減（条件付き） 2030年：33%減（条件なし）、45%減（条件付き）	13%減（16［kt-CO_2eq］減）
	対象	ガス	**CO_2/CH_4/N_2O**	CO_2/CH_4/N_2O	CO_2	CO_2/CH_4/N_2O
		セクター	LULUCF	エネルギー（発電、運輸、観光）、廃棄物、AFOLU	エネルギー（発電、運輸）、AFOLU	エネルギー
	算定方法論		2006年IPCC-GL	2006年IPCC-GL 1996年改訂IPCC-GL	**記載なし**	2006年IPCC-GL
	市場メカニズムの取り扱い		NDCを実施し、結果に基づく支払いを受け取ることで収益化できる。パリ協定第6条の施行に期待。	先進国に対するカーボンクレジットの販売に関心あり。	**使用する**	**使用しない**
	土地セクターの取り扱い		含む	含む	含む	含まない
GHG以外の目標			あり	なし	あり	あり
目標達成に向けた行動			記載あり	記載あり	記載あり	記載あり
適応目標			あり	あり	あり	あり

項目			ツバル （2016年4月22日）	バヌアツ （2021年3月22日）
GHG目標	目標のタイプ		基準年目標	基準年目標
	基準年		2010年	2010年
	基準年排出量		20［kt-CO_2eq］	エネルギー：122.44［kt-CO_2eq］ AFOLU：587.48［kt-CO_2eq］ 廃棄物：10.75［kt-CO_2eq］
	目標年		2025年	2030年
	目標		発電：100%減、エネルギー：60%減	記載なし
	対象	ガス	CO_2/CH_4	記載なし
		セクター	エネルギー（発電、運輸等）、農業、廃棄物	記載なし
	算定方法論		1996年改訂IPCC-GL	記載なし
	市場メカニズムの取り扱い		使用しない	パリ協定第6条に基づく市場メカニズムを含む国際協力と支援により、気候変動に強い社会経済開発の機会を模索する。
	土地セクターの取り扱い		含まない	含まない
GHG以外の目標			なし	あり
目標達成に向けた行動			記載あり	記載なし
適応目標			なし	あり

注 1）ナウルは GHG 目標や適応目標を定めておらず、気候変動対策と SDGs の達成に向けた取組が整合するとした上で、後者の取組の効果を示している。
注 2）ニウエは GHG 目標を定めておらず、緩和及び適応の行動のみを示している。
注）バヌアツは、GHG 目標ではなく、各種緩和策のターゲット指標と各指標の目標値を示し（2030 年に公共バスの 10%を電動バスにする等）、これらを達成した場合に BAU シナリオと比べてどの程度排出削減が達成されるのかを示している。GHG 目標とほぼ同義であるものの、あくまでも直接の目標はターゲット指標において定められているため、GHG 目標は「記載なし」とした。

3.3 詳細

国別の分析結果を以下に示す。

クック諸島

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2006年
	基準年排出量		**23,620［t-CO_2eq］（総排出量の34%）**
	目標年		2020年（条件なしの目標）、2030年（条件付きの目標）
	目標		2020年（条件なし）：38%減、2030年（条件付き）：81%減
	対象	ガス	**記載なし**
		セクター	電力
	算定方法論		**記載なし**
	市場メカニズムの取り扱い		記載なし
	土地セクターの取り扱い		含まない
GHG以外の目標			あり

- 基準年排出量あるいは同データの参照先がNDCに記載されておらず、読み手は独自に調べてNC2を参照しなければならない。
- 対象ガスや算定方法論に関する説明もなされておらず、今後さらなる記述の拡充が必要。

■ GHG目標の達成に向けた行動

- ディーゼル燃料から再エネによる電力供給へ2015年までに50%、2020年までに100%転換。既に50%目標を達成。2020年までに発電に伴うCO_2排出量が基準年（2006年）比38%減となる見通し。
- グリッドストレージの新規構築、エネルギー効率の向上と新技術の統合、技術移転、キャパシティ強化にも取り組み、これによって発電に伴うCO_2排出量はさらに43%減、2030年までに基準年比81%減となる。ただし、これらの実現は外部からの支援を受けることが条件。

■ 適応

- 約200万km²に及ぶ排他的経済水域全域を海洋公園に指定し、海洋生態系のレジリエンスを強化。脆弱性の軽減、レジリエンス強化のための優先課題を示したビジョンや開発計画を策定。また、国家適応計画を更新。
- ロス&ダメージについては上記に含まれていない。レジリエンス構築に関連する費用は国際社会の支援に期待。

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フィジー

■ GHG目標

GHG目標	目標のタイプ		ベースライン目標
	基準年		–
	ベースライン排出量		2,341［kt-CO_2eq］
	目標年		2030年
	目標		30%減
	対象	ガス	CO_2/CH_4/N_2O
		セクター	エネルギー（発電・送電、省エネ、運輸）
	算定方法論		2006年IPCC-GL
	市場メカニズムの取り扱い		自国のNDC達成及び他国のNDC達成を支援するため、市場ベースの協力の可能性を探求する。
	土地セクターの取り扱い		含まない
GHG以外の目標			あり

- GHG目標に関する情報はひと通りNDCに記載されている。
- 対象ガスにはCO_2のほか、CH_4、N_2Oも含まれている。また、算定方法論として2006年IPCCガイドラインが使用されている。

■ GHG目標の達成に向けた行動

- 発電・送電、省エネ、運輸のセクター毎に、短期（～2020年）、中期（2021～2025年）、長期（2026～2030年）の行動目標を策定。
  - 発電・送電：グリッドの拡充・更新、再エネ発電の増設（太陽光、バイオマス、水力）、持続可能なバイオ燃料の普及
  - 省エネ：エネルギーラベリングや基準の策定、産業部門や公的部門におけるエネルギー効率化等
  - 運輸：買い替え促進、バイオ燃料の使用等

■ 適応

- 適応目標として、①スマート農業の導入、②公共インフラの改修・更新、③早期警報・監視システムの開発、④脆弱なコミュニティの移転、⑤強力な医療ヘルスケアシステムの構築、⑥自然環境と生物多様性の保全、⑦植林（2035年までに3,000万本）、⑧排他的経済水域の30%を海洋保護区として設定、を策定。

キリバス

■ GHG目標

GHG目標	目標のタイプ		ベースライン目標
	基準年		–
	ベースライン排出量		**記載なし**
	目標年		2025年、2030年
	目標		2025年：13.7%減、2030年：12.8%減
	対象	ガス	CO_2
		セクター	エネルギー（発電、運輸）、海洋と沿岸域
	算定方法論		**記載なし**
	市場メカニズムの取り扱い		検討する
	土地セクターの取り扱い		含まない
GHG以外の目標			なし

- ベースライン排出量や算定方法論がNDCに明記されておらず、目標値だけが示されている。これでは透明性が十分に確保されないため、今後これらの記述を追加する必要がある。

■ GHG目標の達成に向けた行動

- 病院や学校における太陽光発電ミニグリッドシステムの導入、農村コミュニティ向けの淡水化プラントの導入等。
  - 行動毎に目標発電量や必要な資金額、現在の資金調達状況等の情報も記載されている。

■ 適応

- 世界銀行のイニシアティブの下、日本政府の支援を受けてキリバス適応プロジェクト（KAP）を開始。現在は第3フェーズにあり、水資源の利用と管理の改善（地下水取水システムや給水設備の改善、地域社会の意識醸成等）、沿岸域のレジリエンス強化等を進めている。
- また、2014年にはキリバス気候変動・災害リスク管理共同実施計画（KJIP）を策定2023年までの9年間のビジョンには、ガバナンスや法制度の強化、民間セクターにおける意識醸成、水と食料の安全保障確保のほか、資金アクセスの強化、自国のアイデンティティの維持、脆弱なグループの参加とレジリエンス強化等が謳われている。

マーシャル諸島

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2010年
	基準年排出量		185［kt-CO_2eq］
	目標年		2025年、2030年
	目標		2025年：32%減、2030年：45%減
	対象	ガス	CO_2/CH_4/N_2O
		セクター	エネルギー（発電、運輸等）、廃棄物
	算定方法論		1996年改訂IPCC-GL
	市場メカニズムの取り扱い		使用しない
	土地セクターの取り扱い		含まない
GHG以外の目標			なし

- GHG目標に関する情報はひと通りNDCに記載されている。
- 対象ガスにはCO_2のほか、CH_4、N_2Oも含まれている。算定方法論では、1996年改訂IPCCガイドラインが使用されている。

■ GHG目標の達成に向けた行動

- 発電：再エネの導入（太陽光、風力）、蓄電池の導入、省エネシステムへの移行（ヒートポンプ）、建築基準法の改正等
- 運輸：電気自動車の普及、海上輸送の効率化等
- 廃棄物：埋立処理の実施、無秩序な焼却処理の回避等（廃棄物分野における一部の行動は日本の取組がモデルとされている）

■ 適応

- 適応に係る戦略的な原則と優先課題の明確化、気候変動の影響やリスクの理解、段階的な行動が必要。こうした観点から、国別適応計画（NAP）の策定プロセスを進め、2020年、2025年、2030年、2050年までに達成すべきマイルストーンとそれを達成するための方策を示す必要がある。
  - 具体的な適応策は記載されていない。

ミクロネシア

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2000年
	基準年排出量		150［kt-CO_2eq］
	目標年		2025年
	目標		条件なし：28%減、条件付き：35%減
	対象	ガス	CO_2
		セクター	エネルギー（発電、輸送）
	算定方法論		1996年改訂IPCC-GL
	市場メカニズムの取り扱い		使用しない
	土地セクターの取り扱い		含まない
GHG以外の目標			なし

- GHG目標に関する情報はひと通りNDCに記載されているが、目標達成に向けた行動が示されていない。GHG目標の対象セクターであるエネルギー（発電、輸送）において具体的にどのような行動を実施することにより目標を達成する計画なのかを明記する必要がある。

■ GHG目標の達成に向けた行動

- 記載なし

■ 適応

- 記載なし

ナウル

■ GHG目標

GHG目標	目標のタイプ		記載なし
	基準年		記載なし
	基準年排出量		記載なし
	目標年		記載なし
	目標		記載なし
	対象	ガス	記載なし
		セクター	記載なし
	算定方法論		記載なし
	市場メカニズムの取り扱い		記載なし
	土地セクターの取り扱い		記載なし
GHG以外の目標			あり

- ナウルはGHG目標や適応目標を定めておらず、気候変動対策とSDGsの達成に向けた取組が整合するとした上で、NDCには後者の取組の効果を示している。

■ GHG目標の達成に向けた行動／適応

- SDGsの達成に向けた以下の取組を実施することによって、気候変動の緩和及び適応にもベネフィットが及ぶ。
  - 生産性の高い土地利用（重要インフラや住宅の高台移転、海岸浸食の抑制、強靭な港湾施設の設置）
  - 教育・公衆衛生
  - 水資源の安全保障（管理事務所や研究所の設置、貯水槽の補修、海面上昇等の影響のモデル化等）
  - 食料の安全保障（持続可能な農業の戦略計画策定、気候変動影響データの収集・分析等）
  - エネルギーの安全保障（発電における再エネ比率50%目標の達成、省エネ30%目標の達成等）
  - その他（廃棄物処理施設の強化、上下水道マスタープランの実施等）

ニウエ

■ GHG目標

GHG目標	目標のタイプ		記載なし
	基準年		記載なし
	ベースライン排出量		記載なし
	目標年		記載なし
	目標		記載なし
	対象	ガス	記載なし
		セクター	記載なし
	算定方法論		記載なし
	市場メカニズムの取り扱い		記載なし
	土地セクターの取り扱い		記載なし
GHG以外の目標			あり

- GHG目標が定められておらず、緩和及び適応の行動のみが示されている。

■ GHG目標の達成に向けた行動

- 2020年までに電力需要を10%削減しつつ、総発電量に占める再エネ比率を38%とする。
- 加えて、追加的な国際支援を条件として、2025年までに総発電量に占める再エネ比率を80%、あるいはそれ以上のレベルに引き上げる。

■ 適応

- 2009年に、気候変動へのレジリエンスを構築する上での重要文書である「国家気候変動政策」を策定。適応を目標の1つに掲げた。
- さらに、2013年には「気候変動適応及び保健計画」を策定した。
  - 上記が参照されたのみであり、具体的な適応策は記載されていない。

パラオ

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2005年
	基準年排出量		88［kt-CO_2eq］
	目標年		2025年
	目標		**22%減（エネルギーセクターのみ）**
	対象	ガス	CO_2/CH_4
		セクター	エネルギー（発電）、運輸、廃棄物
	算定方法論		**記載なし**
	市場メカニズムの取り扱い		使用しない
	土地セクターの取り扱い		含まない
GHG以外の目標			あり

- GHG目標の対象にはエネルギー（発電）のほか、運輸、廃棄物も含まれているが、具体的な目標値が示されているのはエネルギーのみ。
- 算定方法論に関する説明が記載されていない。NC2におけるインベントリでは1996年改訂IPCCガイドラインが使用されているが、NDCもこれと同じであれば、その旨を明記する必要がある。

■ GHG目標の達成に向けた行動

- 再エネ比率の向上：太陽光発電5MW（既に計画済）、水力10MW、送配電ロスの減少
- エネルギーの効率化：エネルギー改修プログラムの強化、エネルギー効率建築基準法の導入、家電規格の採用、エネルギーラベリング制度の導入、クールルーフプログラムの大幅拡充、エネルギー監査プログラムの対象拡大、ビル管理ワーキンググループの強化、廃水インフラの改善等
- 運輸：廃食油のディーゼル車用バイオ燃料への転換等
- 廃棄物：埋立処理場における排出量の分析、埋立処理場における排出ガス回収プロジェクトのポテンシャル評価等

■ 適応

- 記載なし

パプアニューギニア

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2015年
	基準年排出量		1,716［kt-CO_2eq］
	目標年		2030年
	目標		10,000［kt-CO_2eq］減
	対象	ガス	**CO_2/CH_4/N_2O**
		セクター	LULUCF
	算定方法論		2006年IPCC-GL
	市場メカニズムの取り扱い		NDCを実施し、結果に基づく支払いを受け取ることで収益化できる。パリ協定第6条の施行に期待。
	土地セクターの取り扱い		含む
GHG以外の目標			あり

- GHG目標の対象セクターはLULUCFのみ。
- 対象ガスにはCO_2のほか、CH_4、N_2Oも含まれているが、その説明や参照先がNDCに記載されておらず、読み手は独自に調べてBURを参照しなければならない。

■ GHG目標の達成に向けた行動

- LULUCF：森林減少面積の減少（2030年までに2015年比25%減）、森林劣化面積の減少（2030年までに2015年比25%減）、人工林と森林再生面積の増加、土地利用計画の強化、気候にやさしい農業の推進、合法木材の強化、REDD+の推進、1,000万本植樹イニシアチブの推進、科学的・社会経済的分析に基づく戦略的アクションプランの提示
- その他：エネルギー効率化による電力需要の削減、Nature-based solutionsによる化石燃料由来排出量のオフセット、エネルギー関連データの収集強化

■ 適応

- 優先課題として、①沿岸域における洪水と海面上昇、②内陸部における洪水、③食料、④都市と気候変動、⑤移住、⑥サンゴ礁の被害、⑦感染症、⑧水と衛生管理、⑨土砂災害、⑩その他を特定し、具体的な適応策を支援の有無毎に整理している。

サモア

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2007年
	基準年排出量		352.03［kt-CO_2eq］
	目標年		2030年
	目標		26%減（エネルギー：30%減、廃棄物：4%減、AFOLU：26%減）
	対象	ガス	CO_2/CH_4/N_2O
		セクター	エネルギー（発電、運輸、観光）、廃棄物、AFOLU
	算定方法論		2006年IPCC-GL 1996年改訂IPCC-GL
	市場メカニズムの取り扱い		先進国に対するカーボンクレジットの販売に関心あり。
	土地セクターの取り扱い		含む
GHG以外の目標			なし

- 対象ガスにはCO_2のほか、CH_4、N_2Oも含まれている。
- 算定方法論では、1996年改訂IPCCガイドラインと2006年IPCCガイドラインの両方が使用されている。

■ GHG目標の達成に向けた行動

- エネルギー：2025年までに再エネ発電量を100%、自動車の電動化、電動マイクロモビリティの共有、船舶へのソーラーパネル設置拡大、貨物船や旅客船に対するバイオディーゼルの試験導入等
- 廃棄物：埋立地ガス回収技術の導入
- AFOLU：堆肥管理と肥料使用の改善、森林再生・森林回復・アグロフォレストリーの推進

■ 適応

- AFOLUと沿岸域セクターについて、適応に関する数値目標と活動内容、活動を実施する上でのギャップが記載されている。
- 例えば沿岸域について、マングローブ林面積を2030年までに2019年比で5%拡大することを目標とし、そのためマングローブの再生・植林プログラムに取り組むが、外部からの資金・技術支援が必要であるとしている。

ソロモン諸島

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2015年
	基準年排出量		707.425［kt-CO_2eq］
	目標年		2025年、2030年
	目標		2025年：14%減（条件なし）、27%減（条件付き） 2030年：33%減（条件なし）、45%減（条件付き）
	対象	ガス	CO_2
		セクター	エネルギー（発電、運輸）、AFOLU
	算定方法論		**記載なし**
	市場メカニズムの取り扱い		**使用する**
	土地セクターの取り扱い		含む
GHG以外の目標			あり

- 算定方法論についての説明が記載されていない。NC2に基づき1996年改訂IPCCガイドラインが使用されていると考えられるが、NDCに明記すべき。
- 市場メカニズムの使用が表明されているが、どのように使用するのかに関する説明がなされていない。

■ GHG目標の達成に向けた行動

- エネルギー：ディーゼルへの依存度低減、電力へのアクセス向上、電気製品の輸入規制によるエネルギー効率の向上等
- AFOLU：FAOが支援するREDD+プログラムの実施、国有林インベントリの作成、持続可能な伐採政策を通じた森林保全、保護区の設定（陸地及び内陸水域の少なくとも20%、沿岸及び海洋地域の15%）等

■ 適応

- 気候変動によるリスクや脆弱性を評価しつつ、これらを低減し、予測される気候変動の影響に適応するための能力を構築することが不可欠であるとした上で、異常気象に対する短期的な災害リスク軽減策と長期的な適応策、とりわけ生態系や社会のレジリエンス強化、気候変動に強靭なインフラの整備、そして最後の手段としてコミュニティの移転等の実施を述べている。

トンガ

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2006年
	基準年排出量		120.4［kt-CO_2eq］
	目標年		2030年
	目標		13%減（16［kt-CO_2eq］減）
	対象	ガス	CO_2/CH_4/N_2O
		セクター	エネルギー
	算定方法論		2006年IPCC-GL
	市場メカニズムの取り扱い		**使用しない**
	土地セクターの取り扱い		含まない
GHG以外の目標			あり

- GHG目標の対象セクターはエネルギーのみ。対象ガスにはCO_2のほか、CH_4、N_2Oも含まれている。
- 市場メカニズムは使用しないとされているが、自国のNDC達成には使用しないとの意味合いであり、自国内の排出削減量を他国に移転することの是非については明確に述べられていない。

■ GHG目標の達成に向けた行動

- エネルギー：2030年までに電力の再エネ比率70%を達成、車両規格の義務化、エネルギー性能基準の採用等
- その他、GHG目標には含まれていないが、2023年までに100万本の植林実施を目標にしている。また、AFOLUと廃棄物セクターについて、2025年提出のNDCにおいてGHG目標を設定するとしている。

■ 適応

- 海面上昇に伴う国土の消失を防ぐとともに、海洋資源を維持するため、海洋保護区を排他的経済水域（EEZ）の30%にまで拡大するとしている。
- また、上記の100万本の植林は適応策としても位置づけている。

ツバル

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2010年
	基準年排出量		20［kt-CO_2eq］
	目標年		2025年
	目標		発電：100%減、エネルギー：60%減
	対象	ガス	CO_2/CH_4
		セクター	エネルギー（発電、運輸等）、農業、廃棄物
	算定方法論		1996年改訂IPCC-GL
	市場メカニズムの取り扱い		使用しない
	土地セクターの取り扱い		含まない
GHG以外の目標			なし

- 対象ガスにはCO_2のほか、CH_4も含まれている。

■ GHG目標の達成に向けた行動

- 発電（再エネ）：9つの島全てにおいて再エネによる発電を実施（太陽光、風力、バイオディーゼル）
- エネルギー効率：1人あたりの電力消費量が高いフナフティ島においてエネルギー効率化プログラムを実施

■ 適応

- 記載なし

バヌアツ

■ GHG目標

GHG目標	目標のタイプ		基準年目標
	基準年		2010年
	基準年排出量		エネルギー：122.44［kt-CO_2eq］ AFOLU：587.48［kt-CO_2eq］ 廃棄物：10.75［kt-CO_2eq］
	目標年		2030年
	目標		記載なし
	対象	ガス	記載なし
		セクター	記載なし
	算定方法論		記載なし
	市場メカニズムの取り扱い		パリ協定第6条に基づく市場メカニズムを含む国際協力と支援により、気候変動に強い社会経済開発の機会を模索する。
	土地セクターの取り扱い		含まない
GHG以外の目標			あり

- GHG目標は記載されておらず、緩和行動を実施した結果としてエネルギー、AFOLU、廃棄物セクターの排出量がそれぞれ40%減、9%減、56%減になるとされている。

■ 緩和

- エネルギー：2030年までに発電の再エネ比率をほぼ100%に
- 運輸：2030年までにエネルギー効率を10%向上、公共交通機関において電気自動車を10%導入、ディーゼルにおけるバイオ燃料比率20%達成
- AFOLU：2030年までに牧畜と牧草地管理のための訓練・能力向上を実施、牧草地を牧畜システムへ転用
- 廃棄物：2030年までに都市固形廃棄物（MSW）のための廃棄物発電施設を導入、都市有機ごみを堆肥化して土壌改良剤を生産、排水管理システムを導入

■ 適応

- 2022年までに、農業関連事業者の80%が気候変動災害等が生じても十分な収入を得られるようにする。
- 2030年までに、6つの州において、自給自足農業のレジリエンスを高めるための対策を100%実施する。

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MUFG

3.4 NDC の課題

GHG 目標に関する説明の改善

GHG 目標について説明する際には、対象ガスや対象セクターに加えて、これらの基準年排出量またはベースライン排出量、算定方法論等を明確に示す必要がある。しかし、一部の国の NDC には基準年排出量等や算定方法論が明記されておらず、情報の完全性を欠いている。読み手の理解を促進するためにも、必要な情報を適切に記載する必要がある。

基準年排出量や算定方法論等が NDC ではなく NC や BUR に記載されているケースもある。その場合は、参照先を具体的に記載するとともに、できる限り参照したデータを NDC にも転記すべきである。

NDC 全体としての整合性確保

例えばパラオでは、GHG 目標の対象にエネルギー、運輸、廃棄物の各セクターが含まれているにもかかわらず、示された目標値は対象がエネルギーセクターのみとされている。NDC 全体として整合性を欠いているため、改善する必要がある。仮に目標値を示すことができるだけの情報が不足しているのであれば、その旨を明記するとともに、今後の改善計画を示すことが望ましい。

目標の対象範囲の拡大

多くの国は GHG 目標の対象にエネルギー分野を含めているが、農業分野や LULUCF 分野を含めている国は一部に限られる。また、CO2、CH4、N2O の全てを目標に含めている国も多くない。太洋州の島嶼国ではデータの利用可能性や技術的なキャパシティが限られるため、当面は主要なガスやセ

クターのみを対象にするアプローチでも問題はないが、将来的に改善しつつ、目標の対象範囲を拡げていくことが望ましい。

その他

一部の国は市場メカニズムへの関心を示しているが、どのように活用しようと考えているのかについて十分に説明していない。一般に途上国では、自国内で達成された排出削減量の一部を先進国等に移転し、結果に基づく支払い等の資金を得るケースが多いと考えられるが、自国の GHG 目標達成を補完するために活用する可能性もゼロとは言い切れない。したがって、市場メカニズムを活用するかどうかの情報に加えて、活用を検討している国は、どのような目的で、どのように活用しようと考えているのかについても記載すべき。

4. COP26 の結果

4.1 概要

2021 年 10 月 31 日から 11 月 13 日の間、英国グラスゴーにおいて、国連気候変動枠組条約第 26 回締約国会合（COP26）が開催され、COP24 からの継続議題となっていたパリ協定 6 条（市場メカニズム）の実施指針、第 13 条（透明性枠組み）の報告様式、NDC 実施の共通の期間（共通時間枠）等の重要議題で合意に至り、パリルールブックが完成した。

透明性枠組みについて、CMA1 で採択された実施指針に基づく各国の GHG 排出量の報告及び NDC 達成に向けた取組の報告様式が交渉の論点となった。交渉の結果、全締約国に共通の項目・表で排出量を比較可能な表形式で NDC 達成に向けた取組の報告を行うことが決定された。

4.2 詳細

COP・CMP・CMA全体決定の全体決定（Glasgow Climate Pact）

- 最新の科学的知見（IPCC第6次評価報告書WG Iの結果）を踏まえ、既に人間活動により1.1℃の気温上昇が乗じていることを警告する(para 3)と共に、様々な箇所で既に影響が出ていることを認識（para 3,5)
- 1.5℃及び2℃の気温上昇においては1.5℃上昇の方が気候変動の影響がより少ないことを認識し、1.5℃努力目標を追求するための課題を解決すべきことを言及(paras 15-17)。
- 上記の達成には、早期のより大きな排出削減を継続的に進めることが必要で、それには、CO_2排出量は2030年までに現状比-45%、今世紀中ごろには実質排出ゼロとすることが必要と認識(para 17)。CO_2以外のGHGの排出削減を2030年までに進める更なる行動を各国が検討する(para 19)。
- 途上国に対する気候変動対策への資金支援のスケールアップが必要であると警鐘 (Section III, V)。
- 適応では、適応に関する世界全体の目標（GGA：Global Goal on Adaptation）の議論の進め方や、「GGAに関するグラスゴー・シャルム・エル・シェイク作業計画」を開始することを決定。損失と被害（ロス＆ダメージ）時年よりグラスゴー対話を立ち上げ、議論を継続 (Section II, VIなど)。
- 吸収源及び貯蔵庫としての働きを含めた、重要なサービスを提供する生態系の保全、保護、回復についての重要性を認識。
- 海洋と気候変動の関係について、既存の交渉議題で関係するものがあり、それらにおいて海洋に関係する行動強化の検討を行うとともに、毎年6月頃のSBSTAにおいて年次ダイアログを実施して議論する。

等

パリ協定下の透明性枠組み：概要

- パリ協定13条で定められている透明性枠組み（GHGインベントリや、NDCの進捗等報告を行う隔年透明性報告（BTR）の提出、技術審査、多国間評価等の枠組み）については、2018年末に実施されたCOP24（CMA1）において、基本ルールとなるガイダンスが採択されている（18/CMA.1）。主なポイントは以下。
  - 最初の隔年透明性報告は2024年12月末までに提出する。ただし、LDC及び島嶼国については柔軟性措置として、提出時期はそれらの国の裁量に任せされる。
  - GHGインベントリは、独立した報告書としても良いし、BTRの一部としても良い。
  - GHGインベントリは、先進国・途上国を分けずにすべての国が、2006年IPCCガイドラインに基づき、AR5のGWP100年値を用いて、共通のガイダンスに基づき、共通報告表（Common Reporting Tables: CRT）を用いて実施する。
  - 報告分野は、エネルギー、IPPU、農業、LULUCF、廃棄物の5分野、GHGはCO_2、CH_4、N_2O、HFCs、PFCs、SF_6、NF_3。
  - GHGインベントリの柔軟性措置を求める途上国は、キーカテゴリー分析（累積排出量95%→85%）、微小排出源としてのNE報告の基準値（標準値の倍を利用）、時系列（1990年以降毎年→NDCの基準年／期間及び2000年以降の毎年）などで、緩めのGHGインベントリ作成実施可。
  - 協定4条のNDC（緩和に関する目標）の進捗、達成に必要な情報は18/CMA.1セクションCのガイダンスに基づき必要な情報を透明性高く報告。この際、パラ65～78に記載されている情報を共通の表様式（Common Tabular Format：CTF）を用いて報告する。
  - 先進国は資金支援の情報を、途上国は支援ニーズの情報を提出する。
  - GHGインベントリ審査と、隔年報告書、隔年更新報告書で別々に実施されていた技術評価が統合一本化。

COP26（CMA3）における透明性枠組ルールの合意内容

- 18/CMA.1の実施においては、各国が共通して報告に利用する表、インベントリ報告書の共通アウトライン等が必要であり、この作成及び採択をCMA3までに行うこととなっていた。コロナ禍でUNFCCC交渉の延期があったことにより、当初より1年遅れて2021年11月に開催されたCMA3にて、当該作業結果が採択された。採択された内容は以下の通りである。
  - GHGインベントリ報告に利用するCRT（18/CMA.1のII章に対応）
  - パリ協定4条のNDCの追跡・達成報告に利用するCTF（18/CMA.1のIII章に対応）
  - 資金、技術等支援の報告に用いるCTF（18/CMA.1のV-VI章に対応）
  - BTR、GHGインベントリ報告文書（National Inventory Document：NID）、BTRの技術専門家審査報告書のアウトライン（18/CMA.1に対応）
  - パリ協定に報告制度が変わることに対応するために実施する、BTR技術専門家審査のための訓練プログラム
- 上記の実施においては、更に以下の付随する決定が決められている。
  - CTFの情報は、さらに追加的な補足フォーマットを用いて説明可。
  - GHGインベントリ作成時の柔軟性は、①各報告セルにおいて新注釈記号FXを用いて報告する、②行列を非表示にする、③表を非表示にする等の形で利用可能になった。
  - 2019年IPCC改良ガイドラインの項目はその他項目の下で任意報告が可能な形になった。
  - CRT報告ツールは、2023年6月までの試行版開発、2024年6月の最終版提供を目指すことになり、間に合わない場合には提供が遅延した分提出を遅らせてもよい。
  - 先進国のインベントリの提出期限は4月15日であることを再確認。

2 Mitsubishi UFJ Research and Consulting

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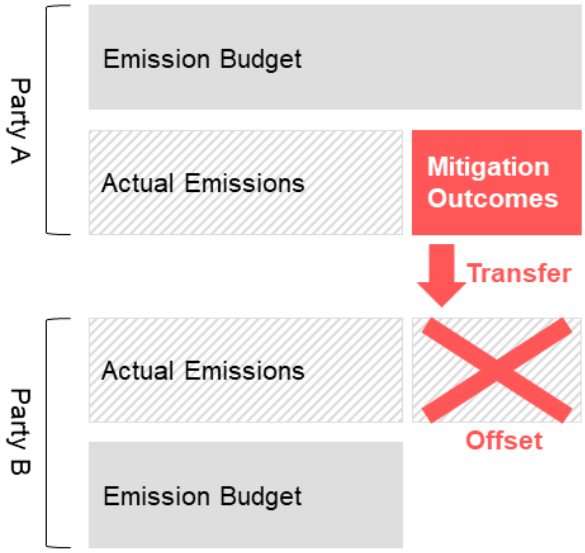
Summary of Article 6 Rulebook

The Paris Agreement allows Parties to use international market mechanism to achieve their Nationally Determined Contributions (NDCs) in addition to domestic mitigation measures.

Article 6 of the Paris Agreement	
Article 6.2	Cooperative Approach ⇒ Parties shall promote sustainable development and ensure environmental integrity and transparency and shall apply robust accounting to ensure the avoidance of double counting.
Article 6.4	New UN-Led Crediting Mechanism ⇒ A mechanism to contribute to the mitigation of GHG emissions and support sustainable development is established under the authority and guidance of the CMA.
Article 6.8	Non-Market Approach ⇒ Parties recognize the importance of integrated, holistic and balanced non-market approaches being available to Parties to assist in the implementation of their NDCs.

How the Market Mechanism Works



1 Mitsubishi UFJ Research and Consulting

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Summary of Article 6 Rulebook

A6.2 Guidance on cooperative approaches

(1) Definition of ITMOs
- Generated from A6.2 or A6.4 for mitigation from 2021 onward
- Measured in tCO_2eq or other non-GHG metrics

(2) Corresponding adjustment
- Single-year NDC: Either multi-year emissions trajectory or annual average option
- Multi-year NDC: Multi-year emissions trajectory option only
- Shall be applied to all ITMOs (including those not covered by NDC and measured in non-GHG metrics)

(3) SoP and OMGE
- Not mandatory but strongly encouraged
- Contributions for adaptation and delivery of OMGE shall be reported periodically

(4) Reporting, review, recording and tracking
- Parties participating in cooperative approaches shall provide "Initial report", "Annual information" and "Regular information (in part of BTR)"
- Initial report and regular information shall be reviewed by Art 6 TER team, and annual information be compiled in Article 6 database for transparency

A6.4 RMPs for A6.4 mechanism

(1) Authorization and corresponding adjustment by host parties
- Host parties shall provide an authorization on whether A6.4 ERs may be used towards achievement of NDCs and/or for other international mitigation purposes
- Host parties shall apply corresponding adjustments for such A6.4 ERs first transferred

(2) SoP and OMGE
- SoP-adaptation: 5% of issued A6.4 ERs
- SoP-administration: Shall be determined by CMA
- OMGE: 2% of issued A6.4 ERs
- A6.4 ERs set aside for SoP-adaptation and canceled for OMGE shall be subject to corresponding adjustments by host parties

(3) Transition of CDM activities and use of CERs
- Any type of CDM activities registered or listed as provisional as per the current temporary measures may transition to A6.4 mechanism, as long as it meets given conditions
- CERs from CDM activities registered on or after 1 January 2013 may be used towards first/first updated NDCs with no corresponding adjustments applied by host parties

A6.8 Work programme under the framework for non-market approaches

(1) Principles and governance
- NMAs are voluntary actions to deliver higher ambitions and support implementation of NDCs
- The Glasgow Committee is established to implement the framework for NMAs and the work programme

(2) Work programme
- May include workshops, engagement with public and private sector stakeholders, submissions from parties, papers and reports by the secretariat
- Will be initiated in 2022

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添付資料

添付資料 1: JICAプロジェクト専門家リスト

添付資料 2: カウンターパートリスト

添付資料 3: JICAプロジェクト専門家の渡航実績

添付資料 4: プロジェクトで作成したアウトプット

添付資料 5: PDM

添付資料 6: プロジェクトのR/D

添付資料 7: JCC ミニッツ

添付資料 8: モニタリングシート

添付資料 1: JICAプロジェクト専門家リスト

添付資料 1: List of Dispatched Experts

#	Name	Position	Organization
1	Takeshi Enoki	Project leader/ generalist	MURC
2	Tomoki Takahashi Takuji Terakawa	Energy sector	MURC
3	Matthew Dudley	Industrial Processes and Product Use sector	Independent consultant
4	Atsushi Sato	AFOLU sector	MURC
5	Hiroyuki Ueda	Waste sector	MURC
6	Masaaki Nakamura	Mitigation actions	MURC
7	Yui Ogawa	Training Coordination	MURC

添付資料 2: カウンターパートリスト

添付資料 2: カウンターパートリスト

#	Name	Position	Organization
1	William Lakain	Acting Managing Director	CCDA
2	Gwen Sissiou	General Manager – REDD+ & Mitigation Division	CCDA
3	Alfred Rungol	General Manager Manager – MRV	CCDA
4	Erick Sarut	National Communication Officer	CCDA
5	Larsen Daboyan	National Communication Officer	CCDA
6	Debra Sungi	MRV Officer	CCDA
7	Jason Paniu	Acting MRV Officer	CCDA
8	Morgan Kai	Trainee Officer – National Communication	CCDA
9	Jacinta Kull	Trainee Officer – National Communication	CCDA
10	Priscilla Pep※	Trainee Officer – MRV	CCDA
11	Nathan Sapala※	Trainee Officer – MRV	CCDA

添付資料 3: JICAプロジェクト専門家の渡航実績

添付資料 3: JICAプロジェクト専門家の渡航実績

Position	name	Organization		# of trips	2017					2018												2019											
					8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
GHG inventory (Leader/General)	Takeshi Enoki	Mitsubishi UFJ research and consulting	plan	11			(14)		(14)		(10)		(14)		(10)			(14)		(10)			(14)			(14)			(12)		(14)		
			actual	11			10/4 10/18 (15)		12/3 12/16 (14)		2/4 2/17 (14)			5/20 5/26 (7)		7/29 7/31 (3)	8/1 8/9 (9)	9/26 9/30 (5)	10/1 10/6 (6)	1/27 11/30 (4)	12/1 12/5 (5)		2/16 2/26 (11)			5/7 5/23 (17)		7/17 (14)			10/9 10/23 (15)	11/27 11/30 (4)	12/1 12/11 (11)
GHG inventory (Energy)	Tomoki Takahashi	Mitsubishi UFJ research and consulting	plan	11			(14)		(14)		(10)		(7)		(4)			(4)		(4)			(5)			(4)			(7)		(7)		
			actual	11			10/4 10/18 (15)		12/3 12/16 (14)		2/4 2/15 (12)		4/15 4/21 (7)				8/9 8/15 (7)							3/10 3/16 (7)					7/24 (8)	8/1 8/3 (3)		10/13 10/19 (7)		
GHG inventory (IPPU)	Matthew Dudley	consultant	plan	11					(7)						(10)			(10)		(7)			(7)			(7)			(10)		(10)		
			actual	11					12/9 12/15 (7)					5/19 5/25 (7)			8/8 8/15 (8)		10/1 10/6 (6)				2/18 2/24 (7)			5/9 5/17 (9)		7/22 (10)			10/10 10/18 (10)		
GHG inventory (AFOLU)	Atsushi Sato	Mitsubishi UFJ research and consulting	plan	7					(7)		(7)		(7)		(5)			(7)								(7)			(7)		(5)		
			actual	7					12/9 12/16 (8)		2/11 2/17 (7)		4/15 4/18 (4)				8/15 8/22 (8)											7/27 (5)	8/1 8/3 (3)	9/21 9/28 (8)	10/22 10/30 (9)		
GHG inventory (waste)	Hiroyuki Ueda	Mitsubishi UFJ research and consulting	plan	2					(6)									(7)															
			actual	2					12/11 12/16 (6)							7/29 7/31 (3)	8/1 8/4 (4)																

Position	name	Organization		# of trips	2020												2021												2022		total days	total man-months
					1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
GHG inventory (Leader/General)	Takeshi Enoki	Mitsubishi UFJ research and consulting	plan	11		(14)																									154	5.13
			actual	11																											154	5.13
GHG inventory (Energy)	Tomoki Takahashi	Mitsubishi UFJ research and consulting	plan	18																											80	2.67
			actual	11																											80	2.67
GHG inventory (Energy1)	Takuji Terakawa	Mitsubishi UFJ research and consulting	plan	0																											0	0.00
			actual	0																											0	0.00
GHG inventory (Energy2)	Masaaki Nakamura	Mitsubishi UFJ research and consulting	plan	0																											0	0.00
			actual	0																											0	0.00
GHG inventory (IPPU)	Matthew Dudley	consultant	plan	11		(6)																									74	2.47
			actual	11			3/2 3/11 (10)																								74	2.47
GHG inventory (AFOLU)	Atsushi Sato	Mitsubishi UFJ research and consulting	plan	7																											52	1.73
			actual	7																											52	1.73
GHG inventory (waste)	Hiroyuki Ueda	Mitsubishi UFJ research and consulting	plan	2																											13	0.43
			actual	2																											13	0.43
GHG inventory (waste)	Masato Yano	Mitsubishi UFJ research and consulting	plan	0																											0	0.00
			actual	0																											0	0.00
																														Plan	373	0.00
																														Actual	373	0.00

添付資料 4: プロジェクトで作成したアウトプット

添付資料 4: プロジェクトで作成したアウトプット

1. GHG inventory review template
2. BUR1 consultation workshop presentation slides
3. BUR1 as submitted to the UNFCCC
4. ICA preparation guidebook
5. Presentation for the Facilitative Sharing of Views
6. QA/QC plan
7. National inventory report for Energy, Industrial processes and product use, and waste sectors
8. BUR2 without the agriculture and LULUCF sector information

添付資料 5: PDM

添付資料 5: PDM

Project Design Matrix

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 1

Implementing Agency: CCDA

Dated February 22, 2017

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG

Model Site:

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist			
Project Purpose The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.		
Outputs Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report			
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire			
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1,2) National GHG inventory report			

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3: Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5: Collect data necessary for national GHG inventories from relevant parties. 1-6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8: Compile national GHG inventories with time series consistency. 1-9: Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6: Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	
			Pre-Conditions
			<Issues and countermeasures>

添付資料 6: プロジェクトのR/D

RECORD OF DISCUSSIONS

ON

THE PROJECT FOR ENHANCING CAPACITY TO DEVELOP A SUSTAINABLE GHG INVENTORY SYSTEM FOR PNG

IN

INDEPENDENT STATE OF PAPUA NEW GUINEA

AGREED UPON BETWEEN

CLIMATE CHANGE AND DEVELOPMENT AUTHORITY

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Port Moresby, April 24, 2017

Mr. Takashi Toyama
Chief Representative,
Papua New Guinea Office,
Japan International Cooperation Agency

Mr. Ruel Yamuna
Acting Managing Director,
Climate Change and Development Authority

Witnessed by

Ms. Hakaua Harry
Secretary,
Department of National Planning and Monitoring

Based on the minutes of meetings on the Detailed Planning Survey on the Project for Enhancing Capacity to Develop a Sustainable GHG Inventory System for PNG (hereinafter referred to as "the Project") signed on February 9, 2017 between the Climate Change and Development Authority (hereinafter referred to as "CCDA") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA held a series of discussions with CCDA and relevant organizations to develop a detailed plan of the Project.

Both parties agreed the details of the Project and the main points discussed as described in the Appendix 1 and the Appendix 2 respectively.

Both parties also agreed that CCDA, the counterpart to JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of Independent State of Papua New Guinea (hereinafter referred to as "PNG").

The Project will be implemented within the framework of the Agreement on Technical Cooperation signed on October 27, 2015 (hereinafter referred to as "the Agreement") and the Note Verbales exchanged on May 2, 2016 between the Government of Japan (hereinafter referred to as "GOJ") and the Government of PNG (hereinafter referred to as "GOPNG").

Appendix 1: Project Description
Appendix 2: Main Points Discussed
Appendix 3: Minutes of Meetings on the Detailed Planning Survey on the Project for Enhancing Capacity to Develop a Sustainable GHG Inventory System for PNG

Appendix 1

PROJECT DESCRIPTION

Both parties confirmed that there is no change in the Project Description in the minutes of meetings for Preparatory Survey on the Project signed on February 9, 2017 (Appendix 3).

I. BACKGROUND

The GOPNG set Environmental Sustainability and Climate Change as one of the seven strategic focus areas, which are referred to as pillars to underpin its long-term strategy of PNG Vision 2050. The vision pursues the pathway to realize the carbon neutral society by 2050 and to work on the mainstreaming of climate change consideration. PNG, has been an advocacy country of REDD (Reducing Emissions from Deforestation and Forest Degradation) and has especially been actively working on the emission reduction in forestry sector as a pilot country of UN REDD program. Also, recognizing the increasing trend of GHG emisions from the energy sector due to the growth in economy and increase in fossil fuel consumption, GOPNG announced the ambitious target of full transition to a renewable energy society by 2030, cross-field improvement of energy efficiency and emission reduction in the transport sector in its Nationally Determined Contribution (NDC).

So far, PNG has experienced GHG inventory preparation twice in order to submit the Initial and Second National Communications (INC/SNC) under its obligations to UNFCCC. The GOPNG has been responding positively to the challenges in GHG inventory preparation analyzed in the SNC. For instance, the parliament certified the Climate Change (Management) Act in 2015 and the Act declared the establishment of the Climate Change and Development Authority (CCDA) to replace the Office of Climate Change and Development as the comprehensive promoting and management authority in climate change related policies. In addition, the launch of UNFCCC Paris Agreement (Implementation) Bill 2016 made the emission reduction target set in the NDC domestically binding.

In the background of the obligation of BUR submission, the biennial development of GHG inventory became a requirement of all Non-Annex I countries in 2011,. Accordingly, GOPNG made a decision to switch its implementing structure from the ad-hoc, project-based approach to the internal and institutional approach in order to realize the periodical GHG inventory preparation. However, there is an issue of shortage of human resources with the skill set required for GHG inventory development such as database design, data collection and management, and establishment of the implementing system in addition to knowledge of the IPCC Guidelines, UNFCCC reporting guidelines. The CCDA has already been increasing the number of staff but the enhancement of their capacity is the remaining issue. As PNG is currently under the development of the Third National Communication (TNC) and the first Biennial Update Report (BUR), the enhancement of the National Capacity including the capacity building of the CCDA is requested by GOPNG in this project.

II. OUTLINE OF THE PROJECT

Details of the Project are described in the Logical Framework (Project Design Matrix: PDM) (Annex 1) and the tentative Plan of Operation (Annex 2).

1. Title of the Project

The Project for Enhancing Capacity to Develop a Sustainable GHG Inventory System for PNG

2. Expected Goals which will be attained after implementing the Proposed Plan

(1) Overall Goal

TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.

(2) Project Purpose

The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.

3. Outputs

Output 1.

Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.

Output 2.

Capacity to promote understanding of national GHG inventories is enhanced.

Output 3.

Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste).

4. Input

(1) Input by JICA

(a) Dispatch of Experts

Short-term experts of GHG inventory (General: Energy: Industrial Processes and Product Use: Agriculture: Land Use, Land Use Change and Forestry: Waste) with sound experience on National GHG inventory development. The number and the expertise of experts will be determined through the discussions between both sides within the framework of the Project.

(b) Training

Necessary short training courses (in-country, in Japan and/or in third countries) will be conducted.

(c) Machinery and Equipment

JICA will provide, according to the priority, such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project.

Input other than indicated above will be determined through mutual consultations between JICA and CCDA during the implementation of the Project, as necessary.

(2) Input by CCDA

CCDA will take necessary measures to provide at its own expense:

(a) Services of counterpart personnel and administrative personnel as referred to in II-5;
(b) Suitable office space with necessary equipment;
(c) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA;
(d) Information as well as support in obtaining medical service;
(e) Credentials or identification cards;
(f) Available data (including maps and photographs) and information related to the Project;
(g) Running expenses necessary for the implementation of the Project;
(h) Expenses necessary for transportation within PNG of the equipment referred to in II-4 (1) as well as for the installation, operation and maintenance thereof; and
(i) Necessary facilities to the JICA experts for the remittance as well as utilization of the funds introduced into PNG from Japan in connection with the implementation of the Project

5. Implementation Structure

The project organization chart is given in the Annex 3. The roles and assignments of relevant organizations are as follows:

(1) Responsible and Implementing Agency

CCDA will be the responsible agency of the Project as Project Director. CCDA will organize the GHG inventory team as shown in Annex 4. Roles and responsibilities of team members are defined as follows:

(a) Inventory coordinator

Inventory coordinator will be responsible for overall administration and implementation of the Project. He/she will be specifically in charge of overall planning, coordination, management and technical oversight of the inventory.

(b) Inventory compiler

Inventory compiler will be responsible for overall data and document management of the Project. He/she will combine sector experts' work into a cohesive inventory product and identify an propose ways to cross cutting issues of the Project

(c) Sector experts

At least one sector expert will be assigned to each sector and he/she will be responsible for undertaking research, data collection, calculations, drafting, quality control, archiving, and documentation of the Project.

(d) QA/QC coordinator

QA/QC coordinator will be responsible for overall quality assurance /

quality control coordination and/or overall data and document management of the Project.

(2) JICA Experts
The JICA experts will give necessary technical guidance, advice and recommendations to CCDA on any matters pertaining to the implementation of the Project.

(3) Joint Coordinating Committee
Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held at least once a year and whenever deems it necessary. JCC will review the progress, revise the overall plan when necessary, approve an annual work plan, conduct evaluation of the Project, and exchange opinions on major issues that arise during the implementation of the Project. A list of proposed members of JCC is shown in the Annex 5.

7. Project Site(s) and Beneficiaries
   (1) Project sites: Port Moresby
   (2) Direct beneficiary: CCDA

8. Duration
The duration of the Project will be four (4) years from the first arrival of the JICA experts team.

9. Reports
CCDA and JICA experts will jointly prepare the following reports in English:
   (1) Monitoring Sheet on semiannual basis until the project completion
   (2) Project Completion Report at the time of project completion

10. Environmental and Social Considerations
CCDA will abide by 'JICA Guidelines for Environmental and Social Considerations' in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

III. <u>UNDERTAKINGS OF CCDA and relevant PNG authorities</u>

1. CCDA and relevant PNG authorities will take necessary measures to:
   (1) ensure that the technologies and knowledge acquired by the PNG nationals as a result of Japanese technical cooperation contributes to the economic and social development of PNG, and that the knowledge and experience acquired by the personnel of PNG from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project;
   (2) grant privileges, exemptions and benefits to the JICA experts referred to in II-4 (1) above and their families, which are no less favorable than those granted to experts and members of the missions and their families of third countries or international organizations performing similar missions in PNG.
2. Other privileges, exemptions and benefits will be provided in accordance

with the Agreement on Technical Cooperation signed on October 27, 2015 and Note Verbales exchanged on May 2, 2016 between the GOJ and the GOPNG.

IV. MONITORING AND EVALUATION

JICA and the CCDA will jointly and regularly monitor the progress of the Project through the Monitoring Sheets based on the Project Design Matrix (PDM) and Plan of Operation (PO). The Monitoring Sheets will be reviewed every six (6) months.
Also, Project Completion Report will be drawn up one (1) month before the termination of the Project.

JICA will conduct the following evaluations and surveys to verify sustainability and impact of the Project. The CCDA is required to provide necessary support for them.

1. Ex-post evaluation three (3) years after the project completion, in principle
2. Follow-up surveys on necessity basis

V. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, CCDA will take appropriate measures to make the Project widely known to the people of PNG.

VI. MISCONDUCT

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, CCDA and relevant organizations will provide JICA with such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations of the PNG.
CCDA and relevant organizations will not, unfairly or unfavorably treat the person and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

VII. MUTUAL CONSULTATION

JICA and CCDA will consult each other whenever any major issues arise in the course of Project implementation.

VIII. AMENDMENTS

The record of discussions may be amended by the Minutes of Meetings between JICA and CCDA. However, PO may be amended in the Monitoring Sheets.
The Minutes of Meetings will be signed by authorized persons of each side who may be different from the signers of the Record of Discussions.

Annex 1 Logical Framework (Project Design Matrix:PDM)
Annex 2 Tentative Plan of Operation
Annex 3 Project Organization Chart
Annex 4 A List of proposed GHG inventories Team members
Annex 5 A List of Proposed Members of Joint Coordinating Committee/ Steering Committee

Appendix 2

MAIN POINTS DISCUSSED

1. Contribution to promotion of mitigation action

JICA has exchanged opinions with CCDA with regard to the expected impact of the Project in the promotion of mitigation action as well as how the outcomes of the mitigation action should be reflected into the GHG inventories. Especially, the latter point was included as an activity 3-4.

2. Implementing structure

The CCDA is currently undergoing a restructuring. The final draft of new structure has already submitted to the the responsible authority, the Department of Personnel Management, and been waiting for the final appraisal. The timing is uncertain. However, CCDA confirmed that the current restructuring will not have implications on the setup of the GHG inventory team, and the implementing structure and project team members shown in Annex 3 and 4 will be ensured. In case of change of the team composition or reduction of the number of the team members, both sides agreed to review the implementing structure based on further discussion.

3. Schedule for inventory preparation

Both sides noted that the terms of the Project and the PO are to be confirmed based on the state of progress of the GHG inventory preparation for the TNC/ BUR1 at the timing of the project inception. Considering the current status, the inventory year for the Project will be 2015 and 2017.

4. Data provision from other ministries and institutions

Both sides confirmed that the CCDA will proceed the drafing of the MOU/ MOA between the lead organizations in each sector as well as other relevant institutions. The CCDA noted that, in such case, the roles and the responsibilities as well as the purpose of the data usage defined in the MOU/MOA should be consistent with the assumption in the Project.

5. Donor collaboration and partnership

Both sides noted that the FAO is planning a capacity building project, GEF/CBIT project, in regard to the improvement of transparency in AFOLU sector inventory, and the part of its possible project scope has duplication with the scope of this Project. However, the project proposal which is supported by FAO has not been approved yet and the details of the project are not ensured. Therefore, both sides agreed that the possibility of FAO project is not enough to reasonably change the scope of the Project and JICA will proceed the project with original agreement in the first detailed planning survey mission conducted in September 2016 which includes all sectors inventory within the scope. Also, both sides confirmed the necessity of avoiding unnecessary duplications between donors and CCDA agreed to clarify the scope of the Project to FAO in order to have clear demarcation between the two projects. Based on the assumption, both sides agreed to have discussion among CCDA, PNGFA, FAO and JICA on

the best way to collaborate efforts, in case that the project proposal by FAO gets approval.

6. Contribution to mitigation and/or adaptation to climate change

The Project is expected to contribute to mitigation to climate change. Improvement of the National GHG inventory identifies the trend of GHG emissions in PNG and the key category of the emission reduction. This will help planning and reviewing of the mitigation policies including NDC.

Project Design Matrix

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 1

Dated February 9, 2017

Implementing Agency: CCDA

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG Model Site:

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal					
TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist			
Project Purpose					
The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.		
Outputs					
Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report			
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire			
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report			

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3: Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5: Collect data necessary for national GHG inventories from relevant parties. 1-6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8: Compile national GHG inventories with time series consistency. 1-9: Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	

2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2 : Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR).			**Pre-Conditions** **<Issues and countermeasures>**

3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.			

Annex 2

Version 0

Dated February 9, 2017

Tentative Plan of Operation

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Year	2017		2018				2019				2020				2021			Remarks
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	
Expert																			
GHG inventory (General)	Plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	approximately 1 week to 2 weeks a quarter/expert
	Actual																		
GHG inventory (Energy)	Plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Actual																		
GHG inventory (Industrial Processes and Product use)	Plan		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	Actual																		
GHG inventory (Agriculture, Land use change and Forestry)	Plan		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	Actual																		
GHG inventory (Waste)	Plan		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	Actual																		
Equipment																			
PC for data management	Plan	■																	
	Actual																		
Training in Japan																			
Training for Counterpart on GHG inventories in Japan	Plan					■	■												1 week training
	Actual																		
In-country/Third country Training																			
Training for Counterpart on GHG inventories in developing country	Plan													■	■				1 week training
	Actual																		

Activities / Sub-Activities		Year	2017		2018				2019				2020				2021			Responsible Organization	
			Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.																					
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	○ ○ ○ ○ ○	Plan			■								■							JICA	CCDA
		Actual																			
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	○ △ △ △ △	Plan			■	■							■	■						JICA	CCDA
		Actual																			
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	○ ○ ○ ○ ○	Plan				■	■							■						JICA	CCDA
		Actual																			
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	△ ○ ○ ○ ○	Plan					■	■							■					JICA	CCDA
		Actual																			
1.5 Collect data necessary for national GHG inventories from relevant parties.	△ ○ ○ ○ ○	Plan						■	■	■	■	■			■	■	■			JICA	CCDA
		Actual																			

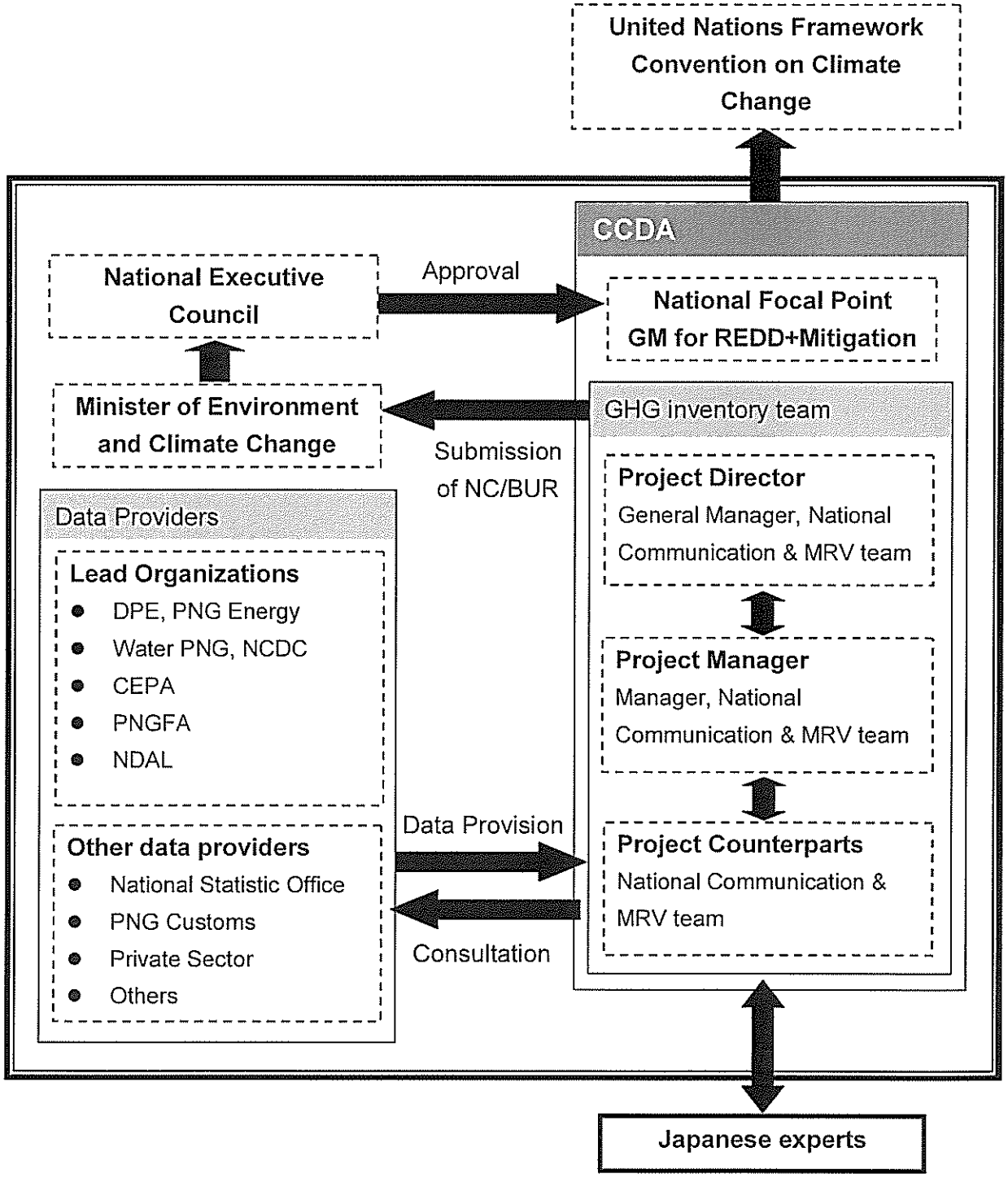
A6-014

1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Δ	O	O	O	O	Plan		JICA	CCDA
						Actual			
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Δ	O	O	O	O	Plan		JICA	CCDA
						Actual			
1.8 Compile national GHG inventories with time series consistency.	Δ	O	O	O	O	Plan		JICA	CCDA
						Actual			
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Δ	O	O	O	O	Plan		JICA	CCDA
						Actual			
Output 2:Capacity to promote understanding of national GHG inventories is enhanced.									
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	O	O	O	O	O	Plan			
						Actual			
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	O	O	O	O	O	Plan			
						Actual			
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)									
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Δ	O	O	O	O	Plan			
						Actual			
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	O	Δ	Δ	Δ	Δ	Plan			
						Actual			
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	Δ	O	O	O	O	Plan			
						Actual			
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Δ	O	O	O	O	Plan			
						Actual			
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	O	O	O	O	O	Plan			
						Actual			
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	O	Δ	Δ	Δ	Δ	Plan			
						Actual			
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	O	Δ	Δ	Δ	Δ	Plan			
						Actual			

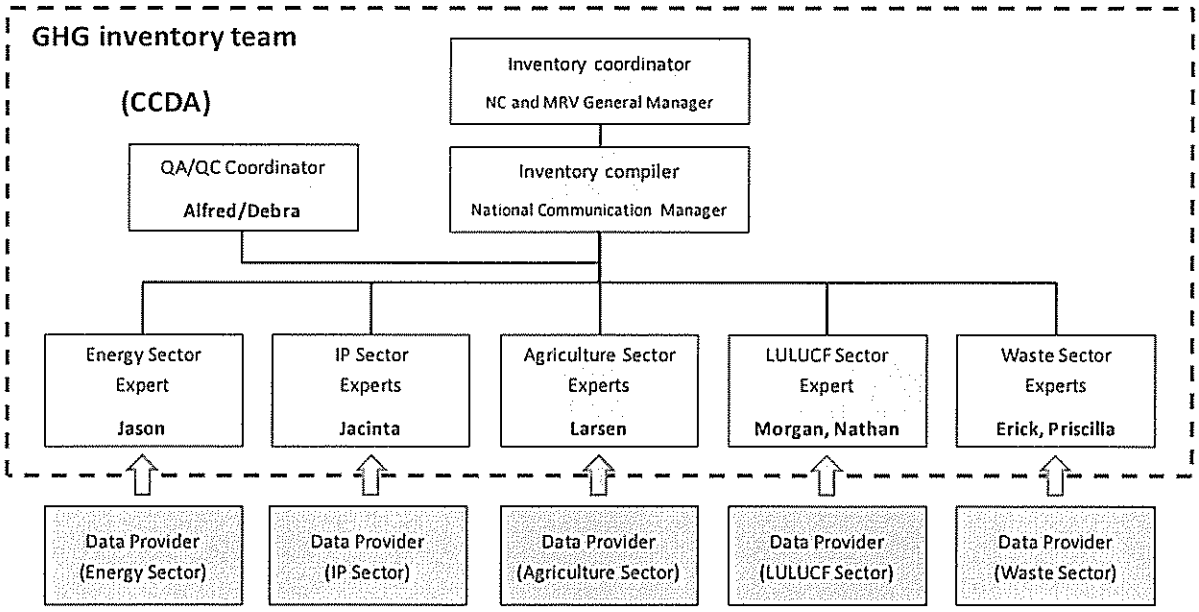
Duration / Phasing	Plan	
	Actual	

Monitoring Plan	Year	2017		2018				2019				2020				2021			Remarks
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	
Monitoring																			
Joint Coordinating Committee	Plan					●				●				●				●	
	Actual																		
Set-up the Detailed Plan of Operation	Plan				▲														
	Actual																		
Submission of Monitoring Sheet	Plan	●		●		●		●		●		●		●		●			
	Actual																		
Reports/Documents																			
Inception Report	Plan	▲																	
	Actual																		
National GHG inventory Report	Plan										▲						▲		
	Actual																		
Project Completion Report	Plan																		
	Actual																▲		
Public Relations																			
Establishment and operation of JICA TC website	Plan																		
	Actual																		

ANNEX 3 Project Organization Chart



JICA Project Implementation setup



GHG Inventory team setup

role of members

Position	General role
Coordinator	•provide overall planning, coordination, management and technical oversight of the inventory
Inventory compiler	•Overall data and document management. •Combine sector experts' work into a cohesive inventory product •Identify an propose ways to resolve cross cutting issues
Sector experts	•Undertake research, data collection, calculations, drafting, quality control, archiving, and documentation.
QA/QC coordinator	•Overall quality assurance / quality control coordination and/or overall data and document management

Annex4

A List of Proposed GHG inventories Team Members

#	Name	Title	Roles and Responsibilities	Academic Background	Engagement
1	to be confirmed by the start of the project	General Manager, MRV and National Communication Division	Inventory Coordinator	tbc	tbc
2	to be confirmed by the start of the project	National Communication Manager	Inventory Compiler	tbc	tbc
3	Alfred Rungol	Manager-MRV	QA/QC Coordinator	Climate change & Forestry, Environmental Science	Non-exclusive
4	Erick Sarut	National Communication Officer	Waste Sector Experts Data Collection, Compilation, Estimation, QC	Economics, Environmental Science	Exclusive
5	Larsen Daboyan	Acting National Communication Officer	Agriculture Sector Experts Data Collection, Compilation, Estimation, QC	Environmental Science and Geography	Exclusive
6	Jason Paniu	Acting MRV Officer	Energy Sector Experts Data Collection, Compilation, Estimation, QC	Chemistry	Exclusive
7	Jacinta Kull	Trainee Officer-IPPU	Industrial Process Sector Experts Data Collection, Compilation, Estimation, QC	Geographic Information Science	Exclusive
8	Morgan Kai	Trainee Officer-LULUCF	LULUCF Sector Experts Data Collection, Compilation, Estimation, QC	Environmental Science and Geography	Exclusive
9	Priscilla Pep	Trainee Officer-MRV	Waste Sector Experts Data Collection, Compilation, Estimation, QC	Environmental Science and Geography	Non-exclusive
10	Nathan Sapala	Trainee Officer-MRV	LULUCF Sector Experts Data Collection, Compilation, Estimation, QC	Environmental Science and Geography	Non-exclusive
11	Debra Sungi	MRV Officer	QA/QC Support	Public Policy	Non-exclusive

ANNEX 5 JOINT COORDINATING COMMITTEE (JCC)

1. Functions

The Joint Coordinating Committee (hereinafter referred to as "JCC") will meet at least once a year or whenever the necessity arises, in order to fulfill the following functions:

(1) To approve an annual work plan of the Project based on the Plan of Operation within the framework of the Record of Discussions;

(2) To monitor and review the overall progress of the Project carried out under the above-mentioned annual work plan; and

(3) To exchange views and ideas on major issues those arise during the implementation of the Project.

2. Members of the JCC

The JCC will be composed of the chair, the members and the observers. The chair may declare closed sessions against the observers. The rules and guidelines for the management of the JCC will be determined at the initial stage of the Project.

(1) Chairperson: Managing Director, Climate Change Development Authority

(2) Vice Chairperson: General Manager, National Communication & MRV team, Climate Change Development Authority

(3) PNG side

- Climate Change Development Authority
- Department of National Planning and Monitoring
- Water PNG
- National Capital District Comission
- Conservation and Environment Protection Authority
- PNG Forestry Authority
- Department of Agriculture and Livestock
- National Statistics Office
- Department of Petroleum and Energy
- PNG Power
- PNG Customs

(4) Japanese side

- JICA Expert(s) of the Project
- JICA PNG Office

Note: Official(s) of Embassy of Japan may attend the JCC meeting as observer(s). The chairperson can name new members or request the attendance of other participants, as necessary, upon agreement of the JCC.

添付資料 7: JCCミニッツ

MINUTES OF MEETING

ON

THE FIRST JOINT COORDINATION COMMITTEE

OF

THE PROJECT FOR ENHANCING CAPACITY TO DEVELOP A SUSTAINABLE GHG INVENTORY SYSTEM FOR PNG

Port Moresby, 23 May, 2018

Mr. Ruel Yamuna
Managing Director
Climate Change and Development Authority
JCC Chair

Mr. Takashi Toyama
Chief Representative
Japan International Cooperation Agency
PNG Office

Mr. Takeshi Enoki
Team Leader, GHG Inventory (Institutional Arrangements)
The Project for Capacity Development to Establish a National GHG Inventory Cycle of Continuous Improvement

The first Joint Coordination Committee (hereinafter referred to as the "JCC") of the Project for enhancing capacity to develop a sustainable GHG inventory system for PNG (hereinafter referred to as the "Project") was held at Lamana Hotel, Port Moresby, Papua New Guinea on May 23, 2018.

The Climate Change and Development Authority (hereinafter referred to as "CCDA"), Japan International Cooperation Agency (hereinafter referred to as "JICA") and relevant parties of the Project participated in the JCC meeting, chaired by Mr. Erick Sarut, officer of the MRV and National Communication Division of the CCDA. The list of participants is shown in Appendix 1.

The opening address was delivered by the JCC chair and Mr. Takashi Toyama, the Chief Representative of the PNG JICA.

Mr. Larsen Daboyan, officer of the MRV and National Communication Division, CCDA, gave the first presentation on climate change policy in PNG and provided participants with a history of the evolution of climate change policy in PNG.

Mr. Matthew Dudley, GHG inventory (Industrial Processes and Product Use) expert of the Project, then delivered a presentation on the importance of GHG inventories in the UNFCCC, highlighting the need for PNG to establish institutional arrangements that will allow PNG to continuously and routinely produce GHG inventories.

Mr. Jason Paniu, officer of the MRV and National Communication Division, CCDA, delivered a presentation on PNG's previous experience with GHG inventories. He highlighted that although PNG has moved from a project based approach to an institutional approach, there are several gaps, needs, and capacity building needs. He was also looking forward to addressing those challenges in the Project.

Mr. Takeshi Enoki, team leader of the Project, delivered a presentation providing an overview of the Project and the Work Plan. The participants agreed with the contents of the Work Plan and the updated Plan of Operation, as attached. The following items were presented and confirmed:

1. The overall goal of the Project is that TACCC (Transparent, accurate, consistent, comparable, and complete) GHG inventories will be prepared periodically in PNG.

To that end, the purpose of the Project is that the basic capacity of CCDA to periodically prepare TACCC GHG inventories will be strengthened.

2. There are three outputs to the Project. The first output focuses on the development of the national system and institutional arrangements, the second on the enhancement of the understanding of GHG inventories, and the third, on improving the estimation methods in each sector.
3. As the Project is an on the job training project, all Project activities will be carried out by the CCDA staff and JICA experts together.
4. The JICA experts will directly work on Project activities with the counterpart agency, the CCDA. However, the cooperation of other government agencies, academic institutions, NGOs, and others are crucial in establishing the necessary inventory arrangements. As such, the participants agreed to cooperate in providing necessary technical and data input to the Project members, as needed.

Below are some comments and questions that were raised in the meeting.

1. A participant asked a question with regards to the current level of emissions and removals, and the measures to address them at the global level. Mr. Takeshi Enoki answered that the purpose of all countries preparing GHG inventories is to understand the emissions and removals at the global scale, so that policymakers can understand how much needs to be abated and what the gaps are. Furthermore, the biennial update report (BUR) and national communications (NC) include information on the capacity building needs and needs provided in order to have an understanding of what countries are doing to deal with climate change. An important activity that will arise from the Paris Agreement is the transparency framework, which will make these points clearer in the near future.

2. A participant asked whether there are penalties involved in not submitting, or submitting the BURs and NCs late. As the deadlines are agreed by all countries involved in the UNFCCC negotiations, these should be recognized as legally binding deadlines. As of now, there are no penalties for delay of submission, but this may change when the transparency framework under the Paris Agreement is set at the end of the year 2018.

3. Participants were comfortable with cooperating with the Project members and CCDA in terms of data provision. However, some requested the CCDA to be clear about what data is needed, how it would be used, and how it would be presented to the international community. Mr. Takeshi Enoki explained that Project members would draft documents for the stakeholders in advance of asking for data. He also pointed out that this consultation between CCDA and data providers will be opportunities for JICA and CCDA to provide

capacity building for stakeholders.

Mr. Sarut informed the members that the next JCC meeting will be held in 2019. The main objective of the Second JCC will be to confirm the progress of the Project activities. Any challenges/issues would be shared at the JCC if any, and necessary guidance would be provided to the Project members to facilitate the progress of the Project, as needed.

Appendix I: Participants list

Title: First Joint Coordination Committee
Date: May 23,2018 9:00-11:00
Venue: Lamana Hotel, Room Artemis
JICA Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Name	Institution	Telephone	e-mail
Toyama	JICA	-	-
Erick Sarut	CCDA	75450336	esarutat@gmail.com
Debra Sungi	CCDA	75430335	debra.sungi@gmail.com
Larsen Daboyan	CCDA	75430334	larsendaboyan@gmail.com
Jason Paniu	CCDA		jpaniu@gmail.com
Morgan icai	CCDA	71282932	margan7kai@gmail.com
Nathan Saraea	CCDA	73906791	nathanchmatechangre@gmail.com
Tsutomu Koyama	PNGFA/JICA	78125001	ktytmm@gmail.com
Watanabe	JICA	-	-
Harada	JICA	70318007	Harada.Masatele@jica.go.jp
Margaret	JICA	-	
Lillian Sukot	PNGPOWER LTD	71933906	lsukot@pngpower.com.pg
TASIBA	PNGPOWER LTD	72014019	tasiba@pngpower.com.pg
Raka T	WATER PNG	76660681	rtavini@walrpng.wn.pg
Dorcas Ttutu	DIVPM	79961318	dorcashutu443@gmail.com
Elilab Kth Kaidovg	PNG FOREST AUTHORITY	3277894	ekaidnag@pngfa.ga.pg
Idau Kopi	DEPARTMENT OF PETROLEUM AND ENERGY	72183317	cdaukopi1357@gmail.com
Marhi Bonou	DEPARTMENT OF PETROLEUM AND ENERGY	75300822	banarmarfm@gmail.com
Takeshi Enoki	JICA/MURC	-	enoki@murc.jp
Matthew Dudley	JICA/MURC	-	-

Appendix II: 1st JCC agenda

First Joint Coordinating Committee for the Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

May 23, 2018

Lamana Hotel, Artemis Room, Port Moresby, Papua New Guinea

Agenda

Time	Agenda	Speaker
8:30～9:00	Registration (coffee)	
9:00～9:05	Prayer	Nathan Sapala, CCDA
9:05～9:10	Opening remarks	Mr. Ruel Yamuna, Managing Director of CCDA
9:10～9:15	Welcome remarks	Mr. Toyama, Chief Representative of JICA PNG office
9:15～9:20	Self-introduction by participants	
9:20～9:30	Overview of climate change policy in PNG	Mr. Larsen Daboyan, CCDA
9:30～9:40	Importance of GHG inventories in the UNFCCC	Mr. Matthew Dudley, JICA expert
9:40～9:50	The PNG experience with GHG inventories	Mr. Jason Paniu, CCDA
9:50～10:05	Overview of the JICA project for enhancing capacity to develop a sustainable GHG inventory system for PNG	Mr. Takeshi Enoki, JICA expert
10:05～10:50	Q&A, Discussion	
10:50～11:00	Closing	Ms. Erick Sarut, CCDA

Japan International Cooperation Agency

The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Work Plan

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Mitsubishi UFJ Research and Consulting Co., Ltd.

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1. Overview (background and purpose)

1.1. Background

The GHG inventory aims to clarify the GHG balance of a country by calculating anthropogenic emissions and removals from each category. The GHG inventory is the national statistics which serves as the fundamental data for developing mitigation actions, or actions to reduce emissions/increase removals. It is also important input data to help understand the impacts of mitigation actions on the mid/long term GHG balance, and to measure progress towards the shift to low-carbon society.

In order to fulfill the reporting requirements to the UNFCCC, PNG has prepared GHG inventories twice, namely, for the first and second National Communications (hereinafter "NC"). However, both were carried out with the support from GEF under an ad-hoc organizational structure. Therefore, PNG lasks the institutional capacity that enables continuous and regular GHG inventory preparation. The experts of PNG also face challenges with regards to the technical expertise of preparing inventories, leading to the lack of capacity to accurately estimate emissions and removals. Based on such background, the government of PNG requested JICA for technical assistance to strengthen their capacity for preparing its 2014 GHG inventory.

JICA conducted the First survey for technical cooperation for this project in September 2016 followed by the Second survey in February 2017(hereinafter either reffered to as "the First Survey", "the Second Survey" or "the Surveys"). The Surveys summarized the issues of GHG inventory preparation in PNG as the following: (1) the lack of basic capacity necessary to prepare GHG inventory regularly; (2) the lack of capacity among relevant institions to promote understanding on GHG inventory; and (3) the lack of capacity to technically review the GHG inventory and make improvements in each sector.

During the Second Survey, JICA and PNG reached an agreement on the project purpose, activities, and cooperation framework, and the Minutes of the Meeting (M/M) was signed. The Record of Discussion (R/D) of the project operation was signed on April 24th, 2017 and the cooperation starts from August 2017 for four years.

1.2. Objective

The overall goal of this project is to enhance the basic capacity of CCDA (Climate Change and Development Authority) to be able to prepare GHG inventories satisfying the transparency, accuracy, consistency, comparability and completeness principles on a regular basis.

Specifically, to develop the capacity of CCDA members, they will undergo on the job training (OJT) for two cycles of inventory development (for years 2015 and 2017), which will include the steps of methodology selection, data collection, estimation spreadsheets preparation, and compilation of GHG emissions and removals.

Project overview is as follows.

[Overall Goal]

TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.

[Project Purpose]

The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.

[Expected Outputs]

Output1 : The capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC (Quality Assurance / Quality Control) procedures is enhanced.

Output2 : The capacity to promote understanding of national GHG inventories is enhanced.

Output3. The capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, and waste).

2. Project implementation principles

2.1. Basic principles

2.1.1. Follow PDM/PO with flexibility

Activities of this project are to be conducted with PNG counterparts following the PDM and PO agreed in the Surveys. If necessary, the PDM may be revised according to the discussion at Joint Coordiating Committee (JCC) between JICA and PNG.

(1) CCDA Support by FAO

Under the support of FAO, CCDA applied for an approximately 2 million US dollar project lasting for 3 years from 2017 provided by GEF/CBIT (hereinafter "GEF/CBIT project") for comprehensive support in data development in the AFOLU sector, and was approved in June 2017[1]. The GEF/CBIT project contains activities to comprehensively support the GHG inventory preparation, from data collection to reporting, in the AFOLU sector. On the other hand, JICA provides GHG inventory preparation support to all sectors. Therefore there are some overlapping activities in the AFOLU sector.

Given this situation, the roles in each project will be discussed, and the agreement will be made among CCDA, JICA, and FAO. The PDM, PO and resource allocation will be modified accordingly.

Table 1 Roles of the projects (draft)

	JICA/CCDA (all sectors)	GEF/CBIT (AFOLU sector)	Other agencies
Data development	△	○	○
Data collection	○		
GHG emissions and removals estimation	○		
Document Inventory report	○		
Compile and edit Inventory (cross-sectorial)	○		

At the point of proposing the project(draft)

	JICA/CCDA (all sectors)	GEF/CBIT (AFOLU sector)	Other agencies
Data development	△	○	○
Data collection	○	○	
GHG emissions and removals estimation	○	○	
Document Inventory report	○	○	
Compile and edit Inventory (cross-sectorial)	○		

After coorinating with GEF/CBIT project(draft)

(2) GHG inventory in progress

CCDA is currently working on the Third National Communication (TNC) and the First Biennial Report (BUR1), and work on the GHG inventory to be included in those reports is underway. At the beginning of this project, the status of inventory preparation for TNC/BUR1 will be checked, and PO may be revised as necessary.

[1] https://www.thegef.org/project/strengthening-capacity-agriculture-and-land-use-sectors-enhanced-transparency-0

(3) CCDA Re-organization and project implementation structure

At the point of the Second Survey, CCDA re-organization was still in progress. The Second Survey indicates that the re-organization would not affect the implementation of this project. However, the progress and status will be checked again at the beginning of this project.

Additionally, there is a possibility that a General Manager and a Manager position (co-acting) in the CCDA project team are yet to be apoointed at the start of the project. Noone was assigned to theses positions at the time of the Second Survey. In the project, the General Manager is the position in charge of the GHG inventory, and shall discuss with other leading institutions when required, reprensenting the CCDA. The Manager edits the GHG inventory as a leader of the group in charge of practical tasks. Since both are important positions in this project, CCDA organizational structure will be reviewed and CCDA project members' roles should be discussed as necessary at the beginning of the project.

(4) Internet Platform

There are several options for creating GHG inventory estimation files; (1) by using spreadsheet application (eg. Microsoft Excel), (2) by using a specialized software developed by international institutions or reseach centers[2], (3) by developing a project/country-specifc system, with merit and demerit for each (Table 2). The appropriate format should be selected which is in line with the work environment of the country in order to configure GHG inventory estimation files.

Table 2 Examples of GHG inventory estimation files, merit and demerit

File format	Merit	Demerit
Spreadsheet application (e.g.: Microsoft Excel)	・Does not require special knowledge to develop estimation files ・Less cost	・Improvement in work efficiency is limited; e.g.: not suitable for simultaneous editing by multiple parties, graphs/tables are made manually
Specialized software	・Works efficienctly with partially task automation such as emission calculation ・Less cost when a free software is used	・Need to familiarize with the operation ・Cannot run methodologies not programmed in the software, cannot enter data not provisioned by the software
Project/country-specific system	・May be capable of noticeable improvement of work efficiency, such as simultaneous editing by multiple parties, automated calculations.	・Requires high level of knowledge on GHG inventory and IT ・Development cost can be high ・Development can be time consuming ・Operational cost required for running a web based system

[2] The IPCC Inventory Software, publicly available from IPCC TFI, Agriculture and Land Use National Greenhouse Gas Inventory Software ("ALU Software") developed by Colorado State University

At the point of submitting the request document of the project and at the point of the Surveys, CCDA assumed that a project/country-specific web based database will be used as the format of the estimation file. CCDA expected a system that the data providers directly access the database and enter the data, so that the GHG emissions and removals are automatically calculated. As a result of the discussion held during the Surveys, JICA and CCDA agreed that in the first cycle of inventory development, improvement of institutional and procedural capacity is prioritized, and the development of the automated web based proprietary system will be considered after the completion of the first cycle.

With the agreement above, in the first cycle, GHG inventory will be developed using spreadsheets that would not require special knowledge in compiling the files. Then a consultation will be held with CCDA and JICA on the necessity of developing a project/country-specific system. If as a consequence a project/country-specific system is decided to be used in the second cycle, the priciples and relevant activities of the project shall immediately be revisited through consultations with JICA.

(5) Impact of the negotiation of The Paris Agreement

The national GHG inventory prepared by this project is to be submitted to UNFCCC, therefore it needs to be in accordance with the rules agreed by the negotiations within UNFCCC. GHG inventory preparation and reporting criteria to be included in the NC are defined in the Guidelines for the Preparation of National Communications from Parties not included in Annex I to the Convention[3]. Criteria for the GHG inventory to be included in BUR is defined in the UNFCCC Biennial Reporting Guidelines for Developed Country Parties[4]. In this project, GHG inventories will be prepared in full compliance with the criteria in both guidelines.

Currently negotiations on the Paris Agreement is taking place under the UNFCCC, and new rules for preparation, reporting and review criteria of NC/BUR/GHG inventory for all countries are being considered. The new rules are expected to be adopted at COP24 in 2018. In the new reporting rules, revisions of the gases to be included in GHG inventory, and/or emssions and removals source are likely to be made. Therefore the project members will follow the discussion in the international negotiations at UNFCCC and revisit the contents of the GHG inventory prepared in this project as required. At the moment, no revisions to PO or PDM are expected as a result of the negotiations.

2.1.2. Capacity Development

(1) Comprehensive improvement

This project consists of members from each sector of GHG inventory (Energy, IPPU, AFOLU, and Waste) and a general manager in charge of cross-sectorial issues. During the terms of this project, each member will work on technology/ know-how transfer by OJT to individuals, through joint activities with CCDA members and managers

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[3] http://unfccc.int/resource/docs/cop8/07a02.pdf

[4] http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf#page=4

from each sector. In addition, project members will work on activities targeting the enhancement of organizational cooperation among CCDA, leading institutions and data providers. Institutional capacity will be strengthened for example by creating a table of roles of each stakeholder in the GHG inventory development. Other examples include developing a QA / QC plan which includes timetables and MoU templates for data provision. Moreover, efforts on public relations activities are to be made in this project. The country level capacity improvement is planned by issuing general information not limited to this project but also on PNG's overall strategy on climate change, mitigation actions and GHG inventories.

UNFCCC define rules for national GHG inventory development, reporting and archiving[5]. Organizational, legal and procedural rules are covered, and are referred when the national system for GHG inventories is reviewed. In this project, activities will be conducted targeting enhancement of organizational, legal and procedural rules in addition to individual capacity improvement.

(2) OJT

The project members will go through OJT for approximately two years by working together with the CCDA team members. For the second cycle of GHG inventory development, CCDA will lead a main role to conduct the activities while the project team members provide supplementary technical support.

In order to encourage a sense of ownership of CCDA members, the project team members bear in mind the followings:

- Sharing awareness of issues
- Participatory approach to identifying issues
- Proper motivation
- Choosing appropriate relationship with CCDA members
- Learning by doing
- Influence from technical experts
- Establishing trust
- Promoting communication

Reference: "Capacity Development (CD): Improving capacity to cope with comprehensive issues by the primary role of developing countries"

(3) Maintaining the sense of ownership

The Surveys indicate that CCDA members' sense of ownership towards the project and their motivations for achieving the goal seems significantly high. The project leader Mr. Enoki received technical questions from CCDA members even after the Surveys. While activities within PNG play main part of this project, the project members are ready to support the motivation and ownership of the local members by following up through email / Skype from Japan.

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[5] http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf

Apart from the Project PO, CCDA project team will have individual target, and the progress will be checked from time to time. Activities shall be conducted with additional incentives to the CCDA members, such as learning IPCC Guideline alongside receiving a program to acquire the reviewer qualification under UNFCCC.

2.1.3. Principles of the GHG inventory

(1) Inventory preparation in accordance with The UNFCCC Reporting Guidelines for non Annex I Party countries

GHG inventory emissions and removals are estimated in accordance with the rules in the Guideline for National Inentory Report for Non-Annex I Parties as well as BUR reporting guidelines that developing countries are to follow. As mentioned earlier, status and contents of the negotiation of the Paris Agreement will be considered.

(2) The five principles of GHG inventories

The UNFCCC inventory reporting guidelines require parties to prepare their inventories in accordance with the five principles shown in Table 3. These five principles will be followed to prepare inventories in this Project.

Table 3 The Five principles of GHG inventory

Principles	Description
Transparency	The assumptions and methodologies used for an inventory should be clearly explained to facilitate replication and assessment of the inventory by users of the reported information.
Consistency	An inventory should be internally consistent in all its elements with inventories of other years. An inventory is consistent if the same methodologies are used for the base and all subsequent years and if consistent data sets are used to estimate emissions or removals from sources or sinks.
Comparability	Estimates of emissions and removals reported by Annex I Parties in inventories should be comparable among Annex I parties. For this purpose, Annex I Parties should use methodologies and formats agreed by the COP for estimating and reporting inventories.
Completeness	An inventory covers all sources and sinks, as well as all gases, included in the IPCC Guidelines as well as other existing relevant source/sink categories which are specific to individual Annex I Parties and, therefore, may not be included in the IPCC Guidelines. Completeness also means full geographic coverage of sources and sinks of an Annex I Party.
Accuracy	A relative measure of the exactness of an emission or removal estimate. Estimates should be accurate in the sense that they are systematically neither over nor under true emissions or removals, as far as can be judged, and that uncertainties are reduced as far as practicable

Source : UNFCCC reporting guidelines on annual inventories

(3) Methodological Issues

In accordance with the UNFCCC inventory reporting guideline, emissions and removals are estimated using

methodologies described on the 2006 IPCC Guidelines. In the IPCC guidelines, primarily three estimation methodologies (see Table 4) are described and 2006 IPCC Guidelines provide decision trees that guide the user on which method should be used. Generally higher tier generates more accurate emissions estimation, but it is also more data intensive. As an accurate estimation is possible even using Tier1 depending on the emissions / removals source, an approapriate selection of the Tier is required considering the availability of data and the required level of estimation accuracy.

Table 4 Description of tiers

Methodology	General description of methodology
Tier 1	Simple estimation method that can be applied by all countries. Generally, emissions or removals can be estimated by multiplying activity data by default emission factors provided in the IPCC guidelines.
Tier 2	Estimation method using country-specific emission factors.
Tier 3	Use of country-specific emission method and actual measured values.

(4) Data gaps

Lack of sufficient data statistics is common in developing countries, and is also expected to be raised as an issue with PNG. In this project statistics prepared by the central government will be checked for each sector, followed by looking into the international statisctics, statistics prepared by regional government and statistics prepared by industrial bodies and individual companies. Ideally, as indicated in the IPCC Guideline, data with time series consistancy should be used, however in some cases activity data can be estimated from multiple statistics, or other indicators relevant to the requested activity data can be used for estimation.

Data gaps as such are referred in a chapter in the 2006IPCC Guidelines. By referring to the Guideline's chapter and taking advice from experts in each sector of PNG, data gaps will be filled using the appropriate approaches. When possible, the project will seek cooperation with the organization/ institution responsible for data collection.

(5) QA/QC system

Quality Assurance / Quality Control (QA/QC) activities described below play an important role in order to develop GHG inventory with a certain level of quality/accuracy.

(a) Draft inventory development plan with defined organizational structure, procedures, and schedule.

(b) Apply methodology approapriate for PNG considering the country's situation, and have it documented.

(c) Receive checks and reviews by the external experts.

(d) Measure the emission uncertainty quantitatively.

(e) Set up an organizational structure to regularly revisit the methodology. Draft plan(s) to improve actual

measurement and statistics for emission factor calculation, prioritizing emission source with higher uncertainty levels.

In this project, QA / QC activities from 2006 IPCC Guidelinies and QA /QC activities of other countries including Japan will be referred to to develop the QA/QC system compatible to PNG's circumstances.

2.1.4. Public relations activity

Upon implementation of the project, public relations activity on this project will be run to promote the correct understanding of the purpose of the cooperation, contents of the activities and the result among the people of PNG. Concretely, three activities described below are planned.

- Writing and sending draft for the project webpage
- Posts to JICA PNG office website
- Provide support to newsletter publication by PNG

Concrete descriptions of each activity are as below.

(1) Drafting contents for the project webpage

Provided that a webpage for this project will be available on JICA website and that information will be published, project status or results will be put into a draft on a regular basis and sent to JICA.

Activites below are assumed as possible themes of the webpage. If any additional important project activities are carried out, contents may be added as needed.

- When workshops are held
- When a Joint-Cordination Committee (JCC) is held
- When trainings in Japan or in a third country are held
- When GHG inventory is completed
- When output(s) are accomplished (Work plan/Guidebook/check list of national GHG inventory development, inventory editing procedure and technical document of QA/QC activities in each sector, Guidebook/ FAQ on international negotiations / analysis procedure, etc)

When workshops or trainings in Japan or in a third country are held, training overview, schedule, discussions, and activity output are put together into a separate workshop/ training report, and will be submitted with the webpage draft.

The draft and the report will include photos or tables to promote visual understanding.

(2) Posts to JICA PNG office website

Assuming the project information is published on JICA PNG office website, drafts on activities will be written and sent to JICA PNG office. Concretely, when writing drafts on activities as listed in (1), in addition to the Japanese version the English version will also be made and sent to JICA PNG office.

(3) Provide support to newsletter publication by PNG

When CCDA issues newsletter on this project, contents necessary for drafting will be provided, as well as to support the publication.

2.1.5. Project team structure appropriate for this project

The project team structure consists of members with very high expertise on GHG inventory for UNFCCC to achieve the highest level of project objectives.

Expert knowledge and professional experiences are necessary for GHG inventory preparation in addition to understanding UNFCCC inventory rules, scientific knowledge on GHG emissions and removals (IPCC Guidelines), knowledge on data collection, specific know-how on emissions and removals methodologies. In this project team, in all sectors, experts are UNFCCC certified inventory reviewer having experiences of not only preparing but also reviewing inventories, thus enable the high level of support.

To reduce logistic activities of the project members, a local assistant is hired enabling the project members to focus on the core project activities. For Energy and Waster sectors, difficulties are expected with activity data collections. An expert in PNG with data collection know-how will be hired if identified, for a short period of time to improve project efficiency.

2.1.6. Utilizing existing tools

For efficient project implementation, available tools and materials will be utilized, and data are shared in cooperation with relative ongoing projects in PNG. Tools likely to be used in this project are showed in Table 5.

Table 5 Tools to be used for inventory preparation

Sector	Tools	Description
Overall inventory	CGE tools	· Technical tools for NC/BUR preparation · Manuals of UNFCCC Guidelines · Sectorial guide of GHG inventory
	Guidebooks and templates used to support project on JICA's GHG inventory preparation for Vietnam, Indonesia	· 2006 IPCC Guideline summary · Inventory report template used in the project
	IPCC Inventory software	· 2006 IPCC Guideline software
	IPCC EFDB	· Country specific emission factor or parameter database
Energy	Energy balance table by Asia Pacific Energy Research Center	· Simplified version of the energy balance table made from the data collected from

		relative institutions in PNG
IPPU	Ozone depletion material data supported by GIZ	· Data on import volume of ODS equipment developed by GIZ under the support provided to Public Corporation of Environmental Protection and Maintenance
AFOLU	AFOLU software	· Emissions and removals estimation software from Agriculture and Land Use
Waste	Waste tool developed in the JICA Indoenesia GHG inventory development project	· Manual on organizing waste data, estimation tool
	J-PRISM data	· Data on solid waste

2.1.7. On-site activities

Project members support the technical capacity building of CCDA, through joint data collection from other ministry bodies, estimation of emissions and removals, and editing inventory report. Each project member plan to visit PNG for 1 to 2 weeks per quarter based on the PO. A few members will visit at the same time from safety management point of view as well as from the necessity to work together among the sectors to share / separate overlapping activity data efficiently and effectively, and to use consistant methodologies.

2.1.8. Support activities in Japan

As mentioned earlier, the sense of ownership among CCDA, the counterpart of this project, is very high. During the project terms, very frequent communications are expected to continue. Regular Email and Skype communications even when the project members are away from PNG will support the continuity of the activities and seamless management of the project output.

As the communication infrastrure at CCDA is not sufficiently organized, internet WiFi modem for CCDA office and mobile phones for the project are purchased and set to secure an environment for smooth operation for internet searches and Skype meetings.

2.2. Project implementation plan

2.2.1. Implementation Plan for Each Output

(1) Output 1

1) Capacity assessment (Activity1-1, 1-2)

Check PNG's inventory preparation structure and capacity (Activity1-1), and then investigate/propose improvement.

Upon capacity assessment, a checklist (capacity assessment checkilist) shall be used for checking PNG's capacity and consider the areas for improvements. Table 6 shows the draft of the checklist. The actual list will be finalized by following UNFCCC rules and 2006 IPCC Guidelines and by consultations with CCDA members.

Table 6 Capacity Assessment Checklist (draft)

Areas for assessment		Detailed criteria for assessment	assessment	Improvement
National inventory arrangements	Institutional arrangements	Check if there is one institution that has main responsibility for the inventory preparation. Are all relevant stakeholders of GHG inventory sectors involved in the inventory process? Are the roles of each stakeholder clarified?		
	Legal arrangements	Is there a law or regulation that formalizes the institutional setup for the inventory preparation? Are there formal legal contracts between the inventory preparation institution and the relevant ministries?		
	Procedural arrangements	Is there a timeline or an inventory preparation schedule that is agreed by all stakeholders? Is it documented? Is there a concrete schedule? How often is the timeline or schedule updated?		
QC Activity		Does the Party have a QA/QC plan? Is it described or summarized in the inventory report? Does the Party have a QC check list? Is the QC check list used in the inventory made in the previous round? Are there any obvious errors or inconsistencies in the reporting? In the inventory development process this time, are there comparisons against the volumes from the past GHG emissions and removals? In case judgements by the experts are directly		

	reflected to the estimation, is there an application guidline?		
QA Activity	Are QA activities in place? What are the institutions and the content of contracts? Are the results documented?		
Key category analysis	Is a key category analysis conducted? Is the methodology in line with 2006 IPCC Guideline? Is analysis without LULUCF conducted? What is the key category analysis results used for?		
Uncertainty analysis	Is the uncertainty analysis conducted? Is the methodology in line with 2006 IPCC Guideline? What is the uncertainty analysis results used for?		
Improvement plans	Is there an improvement plan? How are the necessary improvements prioritized within the improvement plan? Is the improvement plan concrete and realistic?		
Archiving	Are the GHG inventory estimation files, reports and relative information archived? How are they organized? Are there any rules or guidelines on archiving?		

*Check list for individuals prepared separately

2) Development of TACCC check list Activity1-3)

According to the UNFCCC rules, a GHG inventory must satisfy Transparency (T), Accuracy (A), Consistency (C), Comparability (C), and Completeness (C). On the other hand, there are no clear criteria provided by neither UNFCCC nor IPCC. For this reason, the team will develop a check list to review TACCC of PNG's GHG inventory.

Check list will be made based on the experience of the project members in addition to rules by UNFCCC and IPCC Guidelines. The check list will be finalized based on the discussions with CCDA project members. The draft checklist is in Table 7.

Table 7 TACCC check list (draft)

		Check items	assessment	Improvement required
Transparency	Documentation	Are choice of methodologies, EF data, methodology actually used, result, uncertainty, and issues reported in the Inventory report?		
	Confidential information	How is the confidential information described in the report?		
	Data	Are there explanations provided on organization,		

		range, and appropriateness for data used in GHG emissions and removals estimation?		
Accuracy	Tier selection	Are Tiers selected in accordance with the decision tree by the IPCC Guideline? When not, are the reasons provided, and recorded as points to improve in the Improvement Plan?		
	Estimation equation	Has the Party used the correct estimation equation (Is the IPCC Guideline interpreted correctly)?		
	Activity data	Are the data correctly applied? (Are the activity data from national statistics or collection of regional / corporate statistics? How are the data organized?)		
	Recalculation	Has the recalculationbeen done? What are the impacts of the recalculation, other than the increase / decrease of emissions and removals? Are uncertainties reduced?		
	Data gap	How the project overcame the data gap? Were the approaches taken from IPCC Guidelines?		
Consistency	Data	Are the activity data / emission factor / other parameters used for the emissions and removals source time series consistent? If the data are not used with consistency, what are the reasons? How were data gap filled?		
Comparability	Category	Is the interpretation of estimation category as described in IPCC Guideline?		
	Estimation equation	Has the correct estimation equation described in the IPCC Guideline being used?		
	Allocation	Have the emissions and removals being allocated into accurate sub categories? If not, what is the reason?		
Completeness	Region	Are the emissions and removals estimated nationwide?		
	Timeline	Are emissions and removals factor (or notation keys reported) estimated for all years?		
	Notation key	Are notation keys (NE, NO, NA, C) reported for estimation categories without estimations?		
	emissions and removals source category	Are all emissions and removals source estimated per sub categories (or notation keys reported)?		
	Report	Does the Improvement plan address all improvement points?		

3) Draft GHG inventory work plan and guidebook (Activity1-3)

Inventory work plan is made at the beginning of the GHG inventory preparation cycle. A feasible work plan, taking the current GHG inventory development process by PNG as a basis, and considering the reporting period to UNFCCC will be developed. This plan will includes generic contents such as work procedure, background information, explanation on GHG inventory, roles of each stakeholder, and descriptions of QA / QC activities, so that the management positions of each stakeholder can understand. At the beginning of the 2nd cycle, the work plan will be updated following the process used in the 1st cycle.

In Activity 1-3, technical manual will be developed for GHG inventory experts in PNG. This manual includes the scientific information and methodologies from IPCC Guidline 2006 in a simplified manner, and will be updated at the 2nd cycle.

4) Institutionalization of arrangements (Activity1-4)

On data sharing, CCDA drafted MoU/MoA with the data providers and currently working on the contents. The objective described in the draft MoU/MoA which was shared during the Second Survey did not refer to details on necessary data. As the draft of MoU/MoA was prepared unilaterally by CCDA without explanations or consultations with data providers in advance, discussions are facing difficulties. In this project, the most efficient and effective way to secure data regularly will be identified first and then new MoU/MoA will be drafted as needed. The MoU/MoA draft will clarify purposes of data sharing and describe necessary data. The content will also cover other subjects for cooperation, such as schedules and deadlines.

At the beginning of 2nd cycle, based on the experiences from the 1st cycle the revisions may be made if necessary, andMoU/MoA will be signed again between CCDA and data providers.

5) Skills transfer related to the inventory preparation process(Activity1-5～1-8)

As described in 2.1, the project members will work together with CCDA project members on data collection, data management, emissions and removals estimation and editing GHG inventory. The most important points are described in 2.1 but Table 8 shows issues and draft countermeasure on data collection, the part regarded as the most difficult in the GHG inventory process.

Table 8 Technical issues/remarks and draft countermeasure

Sector	Issues / Remarks	Draft countermeasure
Cross-cutting	In the interview during the Second Survey, many data providers commented they do not know which and why the data are needed, as well as its usages. Even though considering the situation that MoU/MoA	Make materials for data providers in advance, fully explain this project and the purpose of GHG inventory development, to build trustworthy relationships. From the project members' standpoint,

	discussion just started to take place, there is a room for improvement on CCDA's ways to request data provision.	data providers are also subject to capacity development. Therefore it is importance to provide explanation about GHG inventory data to them.
	The data was not provided due to its confidentiality	Handling of confidential data in GHG inventory preparation is already assumed. Options of treating confidential data will be fully explained and investigated.
Energy	There is no energy balance table available as national statistics in PNG. Simple energy balance table for PNG is available from Asia Pacific Energy Research Center, however, due to insufficient data, the data is incomplete. Some data may be available from Ministry of Petroleum / Energy, PNG Electric Power Corporation, and Ministry of Transport but data with consistency are limited.	Hold interview with an expert who is involved in APERC energy balance table. Need to hold interviews not with government bodies but with private companies for each data. Environment reports or CSR reports must be checked prior to requesting interview to such private companies.
IPPU	Data provision from private companies seems to be an issue. Coverage of GHG inventory currently developed may possibly be less than SNC. Information exchange with GIZ is necessary as GIZ is currently providing technical support to Conservation and Environment Protection Authority (CEPA) on ODS.	Environment reports or CSR reports must be checked prior to requesting data provision to such private companies. Profiles of Industrial products in PNG need to be researched before starting on data collection in order to improve completeness of the inventory. Build trusting relationship with CEPA and GIZ. Estimate HFC emission referring to the processes of GIZ projects.
AFOLU	Suburban live stock data is under development; however there is no information available on agriculture. Need to check whether the data development or emissions and removals estimation methodologies by other donors are based on IPCC Guideline.	List up necessary data and request data development in a planned manner. Discuss countermeasures in advance in case modifications are required after reviewing results from each donor.
Waste	Part of solid waste data of Port Moresby is available from a CEPA J-PRISM project. Part of annual processed waste water volume and required volume of biochemical enzyme for wastewater are also available.	Data provision to be done after running research on wasteprocessing situation in PNG. If data from certain area is available, consider how to fill the data gap using those data.

6) Draft and update technical documents on inventory development (Activity1-9)

Activities, estimation result, and QA / QC of each sector will be drafted. Also, inventory report will be made by consolidating documents written in activities 1-3, 1-9, 3-2, and 3-6. Structure (draft) of the inventory report is as below.

Table 9 Structure of GHG inventory report (draft)

項目	Activity
Overview	Activity 1-9
Chapter 1 Introduction	
Background of GHG Inventory	Activity 1-3
Agreement related to GHG Inventory	Activity 1-3
Development procedure, Data collection, Data processing, Data archives, QA/QC of GHG Inventory	Activity 1-3
Overview of the methodologies	Activity 1-9
Result of key category analysis and uncertainty assessment	Activity 3-2
Chapter 2 GHG Emissions Trends	
Total Emissions / Removals Trends	Activity 1-9
Trends by Sector / Gas	Activity 1-9
Chapter 3 Energy Chapter 4 Industrial Processes and Product Use Chapter 5 Agriculture Chapter 6 LULUCF Chapter 7 Waste	
Sector overview	Activity 1-9
(For each caterogy)	
About category (Explanation of GHG emission process)	Activity 1-3
Current status of category in PNG	Activity 1-9
Methodologies (Methodology, Emission Factor, Activity Data)	Activity 1-9
Emission and removal trends	Activity 1-9
Uncertainty	Activity 3-2
QA/QC	Activity 1-3, 1-9
Recalculation	Activity 1-9
Improvement plan and Issues	Activity 3-6
Chapter 8 Recalculation and Improvement Plan	Activity 3-6
References	Activity 1-9

(2) Output 2

1) Inception workshop (Activity2-1)

Inception workshop of this project is planned in prior to 2015 inventory development start, after the completion of 2013 inventory that CCDA is developing under the support of UNEP/GEF. To note, the workshop may be held later as there is a possiblility of CCDA not being able to complete the 2013 inventory by its deadline, December 2017. Although it is subject to change depending on the result of consultations with CCDA and JICA which will be held after the start of the project , the current estimation for the timing, participants, size and contents are as

shown below.

Table 10 Overview of Inception workshop (without participants from regional government)

Timing	February or March, 2018, half day (plan)	
Objective	Understanding the objective of this project Understanding basic knowledge on climate change, UNFCCC, GHG inventory	
Participants	JCC members, donors (around 30 people)	
Day / time	Agenda	Speaker
9:00～9:30	Opening	CCDA, PNG JICA, Participants
9:30～10:00	Overview of the Project	The Project team
10:00～10:40	Climate change, UNFCCC, and GHG Inventories	The Project team, CCDA
10:40～11:00	Break	
11:00～12:00	Institutional arrangements of the Project	The Project team
11:30～12:00	Closing	CCDA

2) Workshops to promote understanding on GHG inventory (Activity2-2)

The workshops are planned to be held four times during the term of this project, targeting data providers, aiming to promote understandings towards GHG inventory and to build good cooperative relationship.

The 1st workshop will be held as a presentation opportunity of 2013 inventory output. In case CCDA's 2013 inventory development is behind the schedule, the 1st workshop may be delayed.

Table 11 Overview of the 1st workshop (with participants from regional government)

Timing		December 2017, 2 days (plan)	
Objective		Outputs and issues of 2013 inventory, issues towards the next cycle of inventory development	
Participants		Data providers (including regional government), JCC members, donors (around 80 people)	
Day / time		Agenda	Speaker
Day 1	AM	Opening	CCDA
	PM	National Arrangements, Energy sector	CCDA
Day 2	AM	IPPU sector, AFOLU sector	CCDA
	PM	Waste sector, Closing	CCDA

The 2nd workshop is planned to be held after the inception workshop, targeting leading ministries to provide

lectures on GHG inventory development, reporting items and necessary data as well as to hold discussion on data collection.

Table 12 Overview of the 2nd workshop (without participants from regional government)

Timing	February or March 2018, half day (plan)	
Objective	Understanding development of GHG inventory, reporting items, basic knowledge on required data	
Participants	JCC members, donors (around 30 people)	
Day / time	Agenda	Speaker
14:00～14:15	Opening	CCDA, the project team
14:15～14:30	UNFCCC Reporting Guidelines	The project team
14:30～15:15	IPCC Guidelines	The project team、 CCDA
15:15～15:30	Break	
15:30～16:00	Institutional arrangements of the Project, data needs	The project team
16:00～16:40	Discussion	
16:40～17:00	Closing	

The 3rd and the 4th workshops are held to present output of 2017 and 2019 inventory.

Table 13 3rd and 4th workshop (with participants from regional government)

Timing		December 2019, July 2021 for 2 to 3 days (plan)	
Objective		Output of 2017 and 2019 inventory	
Participants		Data provider (including regional government), JCC members, donors (around 80 people)	
Day / time		Agenda	Speaker
Day 1	AM	Opening	CCDA
	PM	National Arrangements	CCDA, the Project team
Day 2	AM	Energy sector, IPPU sector	CCDA, the Project team
	PM	AFOLU sector	CCDA, the Project team
Day 3	AM	Waste sector	CCDA, the Project team
	PM	Further improvement Areas of further collaboration	CCDA, the Project team
	PM	Closing	CCDA

(3) Output 3

1) IPCC methodology (Activity3-1)

In this project, methodologies from 2006 IPCC Guideline are referred to estimate GHG emissions and removals. The first step of the inventory cycle is to understand the methodologies of IPCC Guideline on emissions and removals estimation, and to decide approapriate method considering PNG's country situation per emissions and removals source. The data required to implement the selected methodology (data activity, emission factor, and other parameters) are listed up, and the data storage options are explored.

The project members will explain and guide the methodologies from IPCC Guidelines and QA/QC method for each category, utilizing the materials made during the GHG inventory capacity development support project by JICA for Vietnam and for Indonesia.

This activity will be conducted steadily and gradually along with the learning curve of the counterpart, as in order to investigate technical analysis and the points for imporovement, the technical contents of the relative sector in the IPCC Guideline must firmly be understood and methodologies need to be interpreted profoundly. The materials to be used for explanation by the project members will be used as a reference for Guidebook(s) which are made in Activity 1-3.

2) Activities related to technical improvement (Activity3-2, 3-3)

The objective of reviewing key category analysis uncertainties is to identify emissions and removals source to improve accuracy of the GHG inventory. Identification methods are first explained to CCDA project members followed by a joint implementation with the project members. The important points to explain are that identification methods are not intended for judging the rightfulness of a country's GHG inventory by the level of uncertainty, or for comparing the accuracy of the inventories among countries.

According to 2006 IPCC Guidelines, emissions and removals whose source are identified as key categories, should be estimated using country specific emission factor or higher level of tier. In this project therefore, to the possible extent, for emissions and removals source identified as key categories, emission factors which reflect PNG's country situation will be investigated. Concretely, academic literature or IPCC EFDB (as mentioned in 2.1.6) will be reviewed. When the search result is compared against the IPCC default values and regarded as reflecting PNG's country specific situation, the result is used to measure the emissions and removals.

3) Reflecting mitigation actions to GHG inventory (Activity3-4)

In September 2015, PNG submitted its Intended Nationally Determined Contribution (INDC) to UNFCCC. In the following year as the Paris Agreement was adopted, contents of INDC has became the NDC, with legal basis based on the Paris Agreement (refer to Table 14). Moreover, in 2016 the Act on Implementing the Paris Agreement for Papua New Guinea was approved, which provided domestic legal basis to the activities described in the NDC.

Collecting relevant data is required to monitor progress on each NDC activities, and CCDA is responsible for this activity. In this project, employees of the relevant CCDA divisions on implementing the NDC as well as monitoring the progress will be interviewed. Monitoring methods on NDC progress and the contents of collected data are clarified, and the project will investigate whether the data can be utilized for GHG inventory.

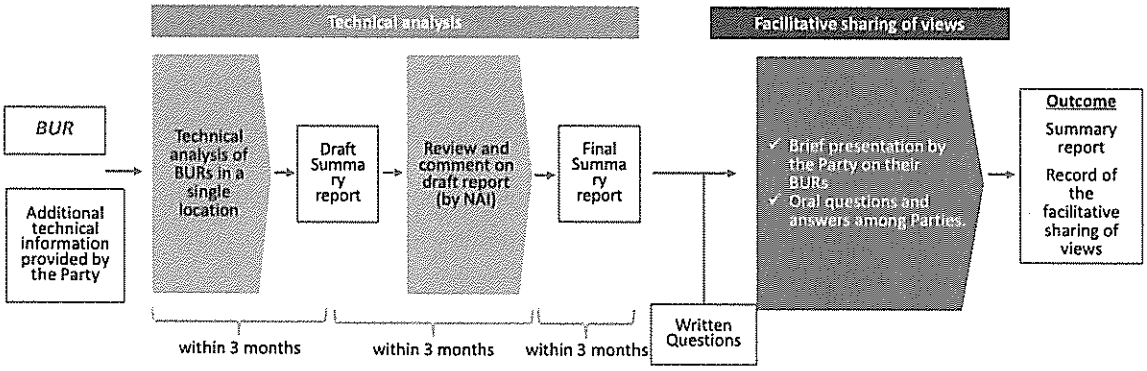
Table 14 Mitigation action and target for PNG NDC

Sector	Action / Target
Energy	By 2030 replace all power supply to hydro, thermal, biomass and / or solar
	Improvement of energy efficiency in Transport and Forest sectors
	Reduction of emission in Transport sector
LULUCF	Formulate national REDD+ strategy by 2018
	Improve Forest Inventory, accurately assess emissions from deforestation

4) Supporting ICA process (Activity3-5)

For BURs from developing countries, ICA (International Consultation and Analysis) is held under UNFCCC. In ICA, three componesnts of the BUR are technically analysed (Technical analysis; TA) by external experts – GHG inventory, mitigation actions, and support. The result of the analysis becomes the subject of discussion at Facilitative Sharing of Views (see Figure 1). GHG inventory expert of the developing countries is required to correspond with the ICA process, in addition to estimating GHG emissions and removals and creating relevant reports. Specifically, the expert of the developing countries is expected to respond to technical questions from external experts during TA.

In this project, the ICA process is explained in detail at the end of the cycle of PNG's GHG inventory preparion. Then the work around plan and expected TA questions and answers are made in cooperation with the counterpart. To note, the project member in charge of GHG inventory (General) has experience as an external expert, participating in the TA twice. His experience and knowledge are utilized to support PNG to prepare for following the ICA process.



Reference: UNFCCC. (2011), UNFCCC.(2013d)

Figure 1 Flow of BUR ICA Process

5) Improvement plan (Activity 3-6)

Members responsible for each sector will clarify the issues identified during the GHG emissions and removals process by the category, and put them in the order of priority based on the result of key category analysis and uncertainty assessment conducted in Activity 3-2. Project members will work and document jointly with CCDA

project members to reinvestigate the countermeasures for the listed issues, schedule, and priorities. Draft structure of the improvement plan is shown in Table 15.

Table 15 Structure of improvement plan (draft)

Emissions and removals source	Gas	Key category or not	Issues	Countermeasure	Resource required for countermeasure	Due
・・・	・・・	・・・	・・・	・・・	・・・	・・・
・・・	・・・	・・・	・・・	・・・	・・・	・・・
・・・	・・・	・・・	・・・	・・・	・・・	・・・

2.2.2. Other Activities

(1) Training in Japan and a third country

1) Training in Japan

In this project, the training in Japan will be held in order to improve technical knowledge of counter part members for their GHG inventory development. Visits to Japanese GHG inventory compilers and academic contacts are planned, and the lectures to be held on GHG inventory preparation and improvement process, and case studies on improving the accuracy of the methodologies for particular sectors. In addition, visit to IPCC Inventory Task Force (IPCC-TFI) will be included to learn technical skillsof key category analysis and uncertainty review, and to be introduced to relative tools for inventorypreparation. Table 16 shows the visit plan.

Table 16 Places to visit during the training in Japan (plan)

Places to visit (plan)	Description
National Institute for Environmental Studies Greehouse Gas Inventory Office(GIO) Mr. Yukihiro NOJIRI	・Representative of GIO, the development institute of the GHG inventory for Japan.
Forestry and Forest Products Research Institute Mr. Kazuo HOSODA	・Researcher of forest biomass. Currently the committee member of Methodology Committee for Japan, forest sector.
National Institute for Agro-Environmental Sciences Mr. Kazuyuki YAGI	・Agriculture researcher, head of Agriculture sector of the Methodology Committee for Japan. He has profound understandings on IPCC activities.
IPCC-TFI Mr. Kiyohito TANABE	・Co-chair of IPCC-TFI that develops and distributes guidelines and tools on GHG emissions and removals methodology and reporting.
Ministry of Environment, Global Environment Bureau	・Bureau of Ministry of Environment, in charge of climate change policies.
Ministry of Foreign Affairs, International Cooperation	・Bureau of Ministry of Foreign Affairs, in charge of

Bureau	international cooperations of Japan.

The training in Japan is planned once in 2018, for 8 days. Table 17 shows the training overview. The final points of visit, training contents and the schedule are subject to the availabilities of the candidate institutes and government bodies, as well as discussion among the counterpart, JICA Global Environment Department and JICA PNG Office.

Table 17 Training schedule in Japan (overview)

Day		Schedule	Contents (draft)
Wed	PM	Trainees arrive Japan	-
Thu	AM	Visit JICA	・Briefing, training in Japan
		Visit Ministry of Foreign Affairs, International Cooperation Bureau	・Courtesy visit
	PM	Visit Ministry of Environment, Global Environment Bureau	・Japan's policy on climate changes
Fri	AM	National Institute for Environmental Studies Visit Greehouse Gas Inventory Office (GIO)	・Background of Japan's GHG inventory development structure
	PM		・Improvement process of GHG inventory in Japan ・Remarks on the practical side of GHG inventory preparation
Sat		Document reports	-
Sun		Document reports	-
Mon	AM	Visit Forestry and Forest Products Research Institute	・Forest related methodologies, implementationof REDD+, technical issues, GHG inventory cooperation
	PM	Visit National Institute for Agro-Environmental Sciences	・AFOLU sector methodologies, coordination with mitigations, linkages between research and improvement of methodologies
Tue	AM	Visit IPCC-TFI	・Introduction to GHG inventory development support tool ・Abount key category analysis, uncertainty review
	PM	Document reports	-
Wed	AM	Visit JICA	・Report presentation and review
	PM	Trainees leave Japan	-

2) The training in a third country

A third country training is planned in this project where CCDA members and the inventory experts from other developing country learn from each other on inventory preparationand usages. Creating occasions where, for

instance, inventory experts from both countries present on their inventory, share issues and lessons learned, and to ask questions and provide answers on technical issues on each sector, are considered very useful mutually.

As a candidate country to visit, Vietnam, where JICA had implemented the capacity development project for GHG inventory preparation in the past, is considered as suitable, but will be decided through consultations with JICA and CCDA, considering the feasibility and the impact of the training. Possible contacts to visit in case the training is held in Vietnam are in Table 18.

Table 18 Places to visit during the third country training (plan)

Places to visit (plan)	Description
The deparment of Hydrology, Meteology, and Climate change(DMHCC), Ministry of Natural Resources and Environment	・Bureau in change of climate change policies (including GHG inventory) in Vietnam
Institute of Strategy and Policy on Natural Resources and Environement(ISPONRE)	・Institute in charge of GHG inventory development organization and OA/QC activities in Vietnam
Institute of Meteorology, Hydrology and Environment(IMHEN)	・Institute in charge of GHG inventory of Energy and IPPU sectors in Vietnam
Natural Conservation and Community Development Center	・Institute in charge of GHG inventory of Agriculture and Waste sectors in Vietnam

The third country training is to be held after the completion of the first cycle of inventory development, currently planned in April 2020 for total 6 days. Overview is shown in Table 19.

Contacts to visit / tranining contents / schedule will be decided taking the availability of the partners in the third country account and through consultations with CCDA JICA Global Environment Department and JICA PNG Office.

Table 19 Training schedule in third country (overview)

Day		Schedule	Contents (draft)
Mon	PM	Trainees arrive	-
Tue	AM	Visit JICA Vietnam Office	・Briefing, training in third country
	PM	The deparment of Hydrology, Meteology, and Climate change(DMHCC), Ministry of Natural Resources and Environment	・Vietnam's policy on climate change ・Experience of Vietnam's GHG inventory development
Wed	AM	Institute of Strategy and Policy on Natural Resources and Environement(ISPONRE)	・Background of Vietnam's GHG inventory development structure
	PM	Study and review Inventory of both parties	・Discussion with IMHEN and Natural Conservation and Community Development

Day		Schedule	Contents (draft)
Thu	AM	Study and review Inventory of both parties	Center on the results, issues and utilizations of each country's GHG inventory
	PM	Study and review Inventory of both parties	
Fri	AM	Work on the presentation	
	PM	Visit JICA	・Report presentation and review
Sat	AM	Trainees leave	-

(2) Project brief note

As part of public relations activities, project brief note will be made and be provided to external bodies, covering major points of project achievements and learnings. Project brief note will be published with visual appeal using photographs, and shall include contents listed below.

- Background of the project and issues
- Problem solving approaches
- Result of the approaches taken
- Attempts and learning

(3) Training on spreadsheet software operation

Spreadsheet software must be used in order to calculate emissions from multiple data source in preparing GHG inventory. However, there are certain numbers of CCDA members who are not well aquainted with such software. In this project, training on the spreadsheet software for CCDA employees will be held. Described below are the proposals on the training contents, timing and duration, style and implementing agency. Final decisions will be made through discussions with CCDA and Global Environment Department of JICA.

1) Contents of the training

Configuration of the GHG inventory estimation file requires calcuations by referring to the data from other sheets in the same file or from other files, using spreadsheet software. To run the calculation efficiently, one must be familiar with how to run calculations between different sheets and files, or about functions to look up and refer to a certain data. One needs also to be familiar with creating diagrams and tables as they need to be presented in NIR and BUR. Considering the required skillset and the current skillset level of CCDA employees, the training provided in this project shall satisfy requirements below:

- Shall be applicable for beginners, starting from basics such as making files and arithmetic operations.
- Include training on operation between multiple sheets / files, and functions to find / look up data.
- Include training on drawing graphs and tables.

For the spreadsheet software, Microsoft Excel is planned to be used

2) Timing and duration

Since the spreadsheet software skills are inevitable for inventorypreparation, the training shall be held in 2017 during the preparation of GHG inventory for TNC / BUR1. The training is planned for one week in total, and may be held in couple of sessions depending on CCDA members' availabilities.

3) Training formality / implementation agency

Training will be done as a lecture and is to be outsourced to a company in PNG that provides spreadsheet software training. Candidates of outsourcing companies are shown in Table 20. As the cost is currently estimated to be less than 1 million Japanese yen[6], the training will be contracted with a purchase agreement by requesting for quotations and comparing the cost.

Table 20 Candidate subcontractors for spreadsheet software operation training

Company name	Training overview
Datec New Horizons Computer Learning Centers	・Provides training programs for Microsoft Excel 2013 and 2016. There are levels 1 to 3, covering basic operation of Excel to advanced operations such as fuctions and operations using multiple sheets or files.
Daltron Training Centre	・Provides training programs for Microsoft Excel 2013 and 2016. There are 3levels – Introduction, Intermediate, and Advanced.
Kenmore Ltd Training Centre	・Provides training program for Microsoft Excel 2000.

2.2.3. Reports and Outputs

Reports and their submission time are described in Table 21.

Table 21 Deliverables

Year	Report	Time	No. of copies / Language	Summary
2017	Work Plan	Within 10 days business from the contract date	Japanese x 5 Electronic data	Project principle, Activities / summary, assignment schedule, member assignment plan
	Work Plan (English)	1 week prior to the first visit to	English x 5 Electronic data	English version of the Work Plan

6 Pricing from Datec New Horizons Computer Learning Centers was 27,280 PGK (tax included, approximately 980K Japanese Yen) for Microsft Excel Level 1 to 3 training.

		PNG		
	Monitoring sheet	With the Work Plan (September)	English x 5 Electronic data	Ver.1
2018	Progress report	January	Japanese x 5. English x 5 Electronic data	Project progress
	Monitoring sheet	March, September	English x 5 Electronic data	
2019	Progress report	January	Japanese x 5, English x 5 Electronic data	Project progress
	Monitoring sheet	March, September	English x 5 Electronic data	
2020	Progress report	January	Japanese x 5, English x 5 Electronic data	Project progress
	Monitoring sheet	March, September	English x 5 Electronic data	
2021	Progress report	January	Japanese x 5, English x 5 Electronic data	
	Monitoring sheet	June	English x 5 Electronic data	Final version
	Project Brief Note	August	Electronic data	
	Project Completion report	Final draft by July 31st	Japanese x 5, English x 5 CD-R (Japanese and English, 3 copies)	Overall project tasks

2.3. Operational organization

2.3.1. Project organization

The overall organization of this project is presented in Figure 2. The counterpart of the project is CCDA. Capacity building on GHG inventory preparation is provided to total ten members from National Communication & MRV team.

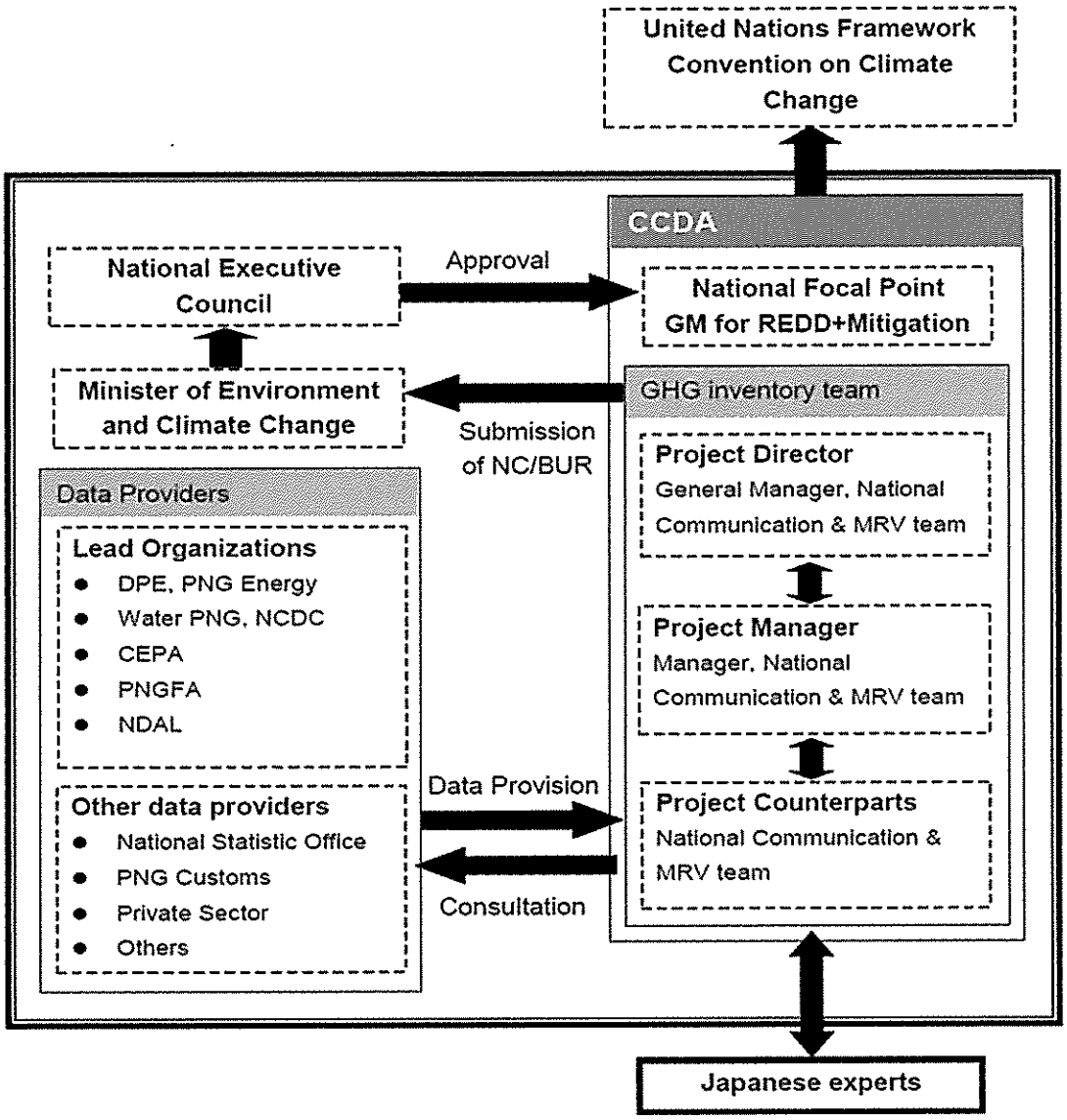


Figure 2 Project Organization

2.3.2. On-site operational organization

On-site operaton organization is shown in Figure 3.

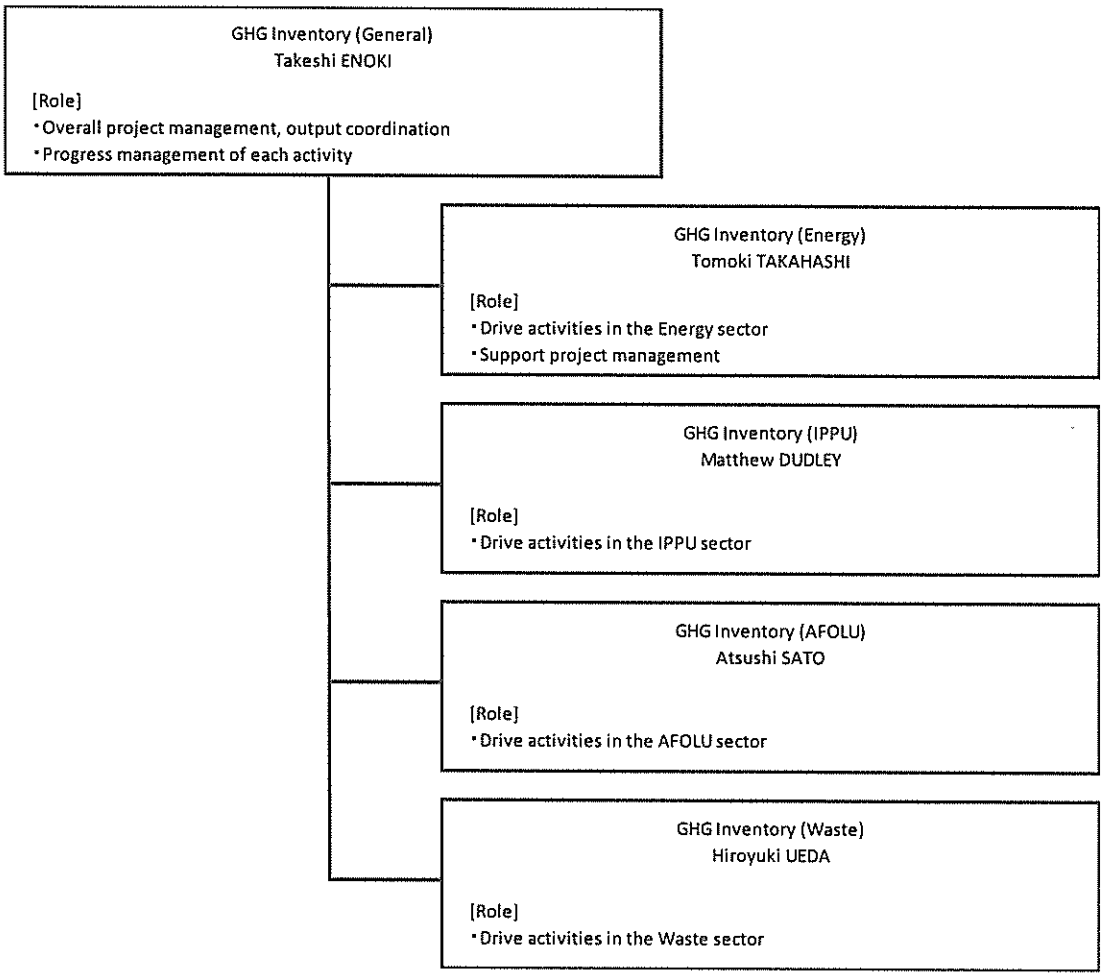


Figure 3 On-site operational organization

2.3.3. JCC organization

JCC organization is subject to finalization during the first visit to PNG; currently planned as below.

Table 22 Proposed JCC Members

Chairperson	Managing Director, CCDA
Vice Chairperson	General Manager, National Communication & MRV Team, CCDA
PNG side	CCDA
	Department of National Planning and Monitoring
	Water PNG
	National Capital Distric Commission
	Conservation and Environment Protection Authority
	PNG Forestry Authority
	Department of Agriculture and Livestock
	National Statistics Office
	Department of Petroleum and Energy

	PNG Power
	PNG Customs
Japan side	JICA expert(s) of the project
	JICA PNG Office

2.3.4. Backup structure of the organization

(1) Supporting structure

Regarding the implementation of the project, Mitsubishi UFJ Research and Consulting Co., Ltd. (MURC) encompasses sufficient backup structure for both technical and operational side. The members shown in Figure 4 will provide full support for the project through frequent comminications and coordinations with the project members, as well as by securing the structure where project members are able to have sufficient communication with JICA and respond to any questions.

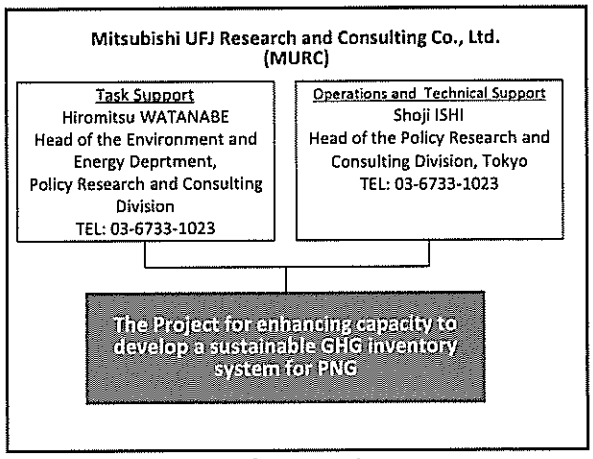


Figure 4 MURC supporting structure

(2) Technical backup

1) Expert team

The Global Environment team (9 members) and the Forestry and Land Ecosystem team (6 members) in the department of Environment and Energy in MURC have much experience working on GHG inventories, and the project members all belong to either team. Both teams share information on daily basis, and it is possible for project members to receive technical support from the team members at any point.

The project members have knowledges on GHG inventories and also have networks with Low-carbon Society Promotion Office, Global Environment Bureau, Ministry of the Environment Japan and IPCC Inventory Taskforce Technical Support Unit, Institute for Global Environmental Studies who publishes the IPCC guidelines. If necessary, it is possible for the project members to receive technical support through these networks. In addition, the GHG Inventory (General) expert is a member of Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE), and has networks with UNFCCC secretariat and other experts who are involved in GHG inventory preparation in developing countries. It is possible for the project members to receive support from these experts if necessary.

2) Logistics and documentation team

Within Global Environment team, the department of Environment and Energy, MURC, there are two assistants who support the team in administrative tasks, such as preparation of the estimate and contracts, translation and review of the reports. For this project, these assistants will be providing logistical support. One of the

assistants has participated in the seminar provided by JICA on accounting procedures for consultancy agreements and has experience of working on the administrative tasks for JICA projects.

2.3.5. Safety management system

The project members will collect sufficient security-related information in prior to the travel and will be aware of the measures to avoid any danger. In addition, by informing the stakeholders and related members of the project with the contact details of the peoject members' local mobile phones and the accomodations, the environment where on-site project members would be 24 hours reachable would be secured. Even though MURC does not have a backup structure in PNG, project members will be in close touch with the Japanese embassy, JICA PNG office, Japanese companies operaring in PNG and other stakeholders.

Based on "Risk Management Regulations" by MURC and "MUFG Risk Management Regulations", MURC has established "Crisis Management Regulations" which sets out the company's basic principles and rules towards crisis management. When the emergency such as disaster, terrorism/riot/severe crime, spread of infectious disesase or sudden disruption in political/economic situation of the country happens, depending on the necessity, measures such as set up of the crises response unit (the company president will be the director) will be taken.

In case of injury or illness, project members are able to use the company insurance service by Sompo Japan Nipponkoa Insurance Inc., and members are also entiltled to receive medical care and emergency transport service provided by International SOS Japan Ltd.

2.3.6. Compliance

Mitsubishi UFJ Research and Consulting Co., Ltd strictly follows "Privacy Policy" established in January 2006. Any personal information obtained from this Project shall be treated in compliance with the Privacy Policy. As one of the Related Companies in MUFG Group, MURC is in a position to strictly follow "MUFG Ethical Framework" and "Principles of Ethics and Conducts" and shall conform to the rules defined in the Framework and the Principles (such as Strict observance of laws, Thorough observance of confidentiality duty, Awareness of public accountability, Task fulfillment based on high ethical perspective and in good faith). Privacy Mark is obtained as part of controlling confidential duties.

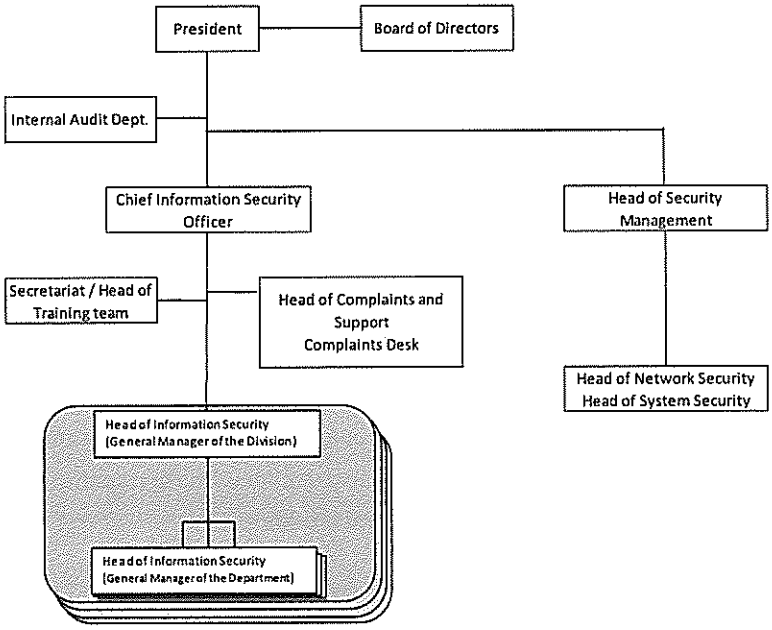


Figure 5 MURC Information control system and Privay Mark

Table 23 Compliance system

	Description	Yes/No
1	Has a company compliance regulation	(Yes / No)
2	Has a systematic management and organization for compliance	(Yes / No)
3	Management member is assigned as the head of the compliance system	(Yes / No)
4	Has in-house systems such as internal reporting or auditing in place to monitor or audit compliance system	(Yes / No)
5	Employees training on compliance more than once a year continuously	(Yes / No)
6	Compliance related activities to note	
	Mitsubishi UFJ Research and Consulting Co., Ltd strictly follows "Privacy Policy" established in January 2006. Any personal information obtained from this Project shall be treated in compliance with the Privacy Policy. As one of the Related Companies in MUFG Group, MURC is in a position to strictly follow "MUFG Ethical Framework" and "Principles of Ethics and Conducts" and shall conform rules defined in the Framework and the Principles (such as Strict observance of laws, Thorough observance of confidentiality duty, Awareness of public accountability, Task fulfillment based on high ethical perspective and in good faith). Privacy Mark is obtained as part of controlling confidential duties. Strict in-house check system is in operation centralized by Internal Audit Department for the compliance of copyright and excluding anti-social activities.	

2.4. PDM

Project Design Matrix

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Implementing Agency: CCDA

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG

Model Site:

Version 1

Dated February 9, 2017

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist			
Project Purpose The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.		
Outputs Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report			
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire			
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1,2) National GHG inventory report			

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3:Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5:Collect data necessary for national GHG inventories from relevant parties. 1-6:Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8:Compile national GHG inventories with time series consistency. 1-9:Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1:Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2:Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6: Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	Pre-Conditions <Issues and countermeasures>

2.5. Work flow chart

Based on the basic pronciples mentioned above, the task flow chart is designed to implement project activities efiicienty and effectively.

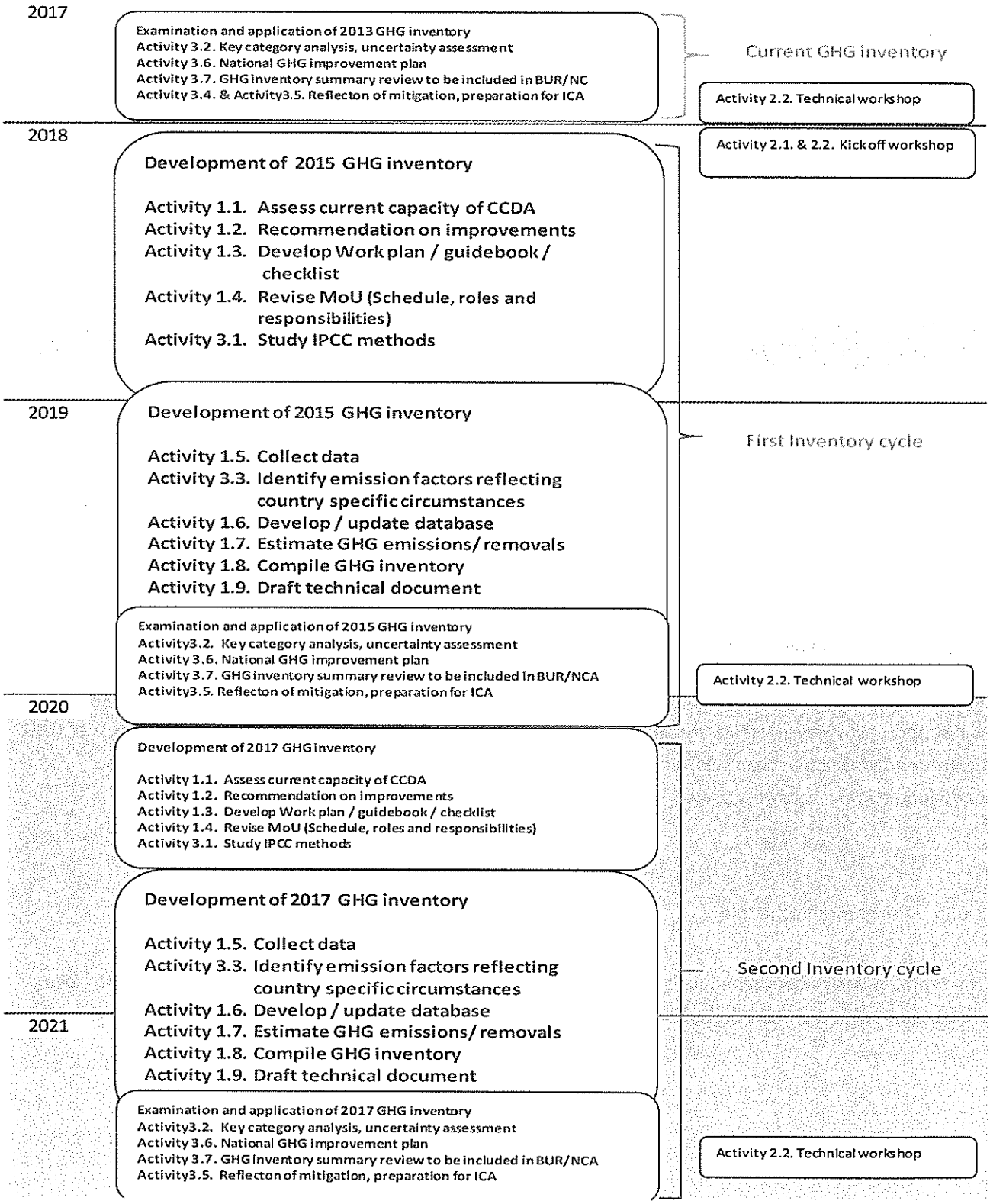


Figure 6 Work flow chart

2.6. Resource plan

2.6.1. Project team organizational structure

In addition to the positions in the Work Instruction from JICA, there is a Logistic Coordinator in this project for effective and smooth operation, covering arrangements of the workshop, training in Japan and in the third country, working in Japan.

In addition to managing the activities in the responsible sector, the project member in charge of GHG inventory (Energy) will also support management tasks run by the project member in charge of GHG inventory (General), and other activities such as supporting training in Japan, locally supporting the training in the third country, negotiation with locally hired staff in PNG.

Table 24 Positions and areas in charge

Positions presented in the Work Instruction from JICA	The person in charge
GHG inventory (General)	Takeshi ENOKI
GHG inventory (Energy)	Tomoki TAKAHASHI
GHG inventory (Industrial Processes and Product Use)	Matthew DUDLEY
GHG inventory (Agriculture, Land use change and Forestry)	Atsushi SATO
GHG inventory (Waste)	Hiroyuki UEDA
Coodinator / Training	Yui OGAWA

<u>The support from individual consultant</u>

MURC will not establish a joint venture in order to implement this project, however a non-Japanese consultant will support activities in the IPPU sector. The indivisual consultant, who is one of the UNFCCC reviewers of GHG inventory of developed countries, has experience in GHG inventory development for Australia and also participated in the inventory project in Indonesia with JICA. His task fulfillment capacity is very high.

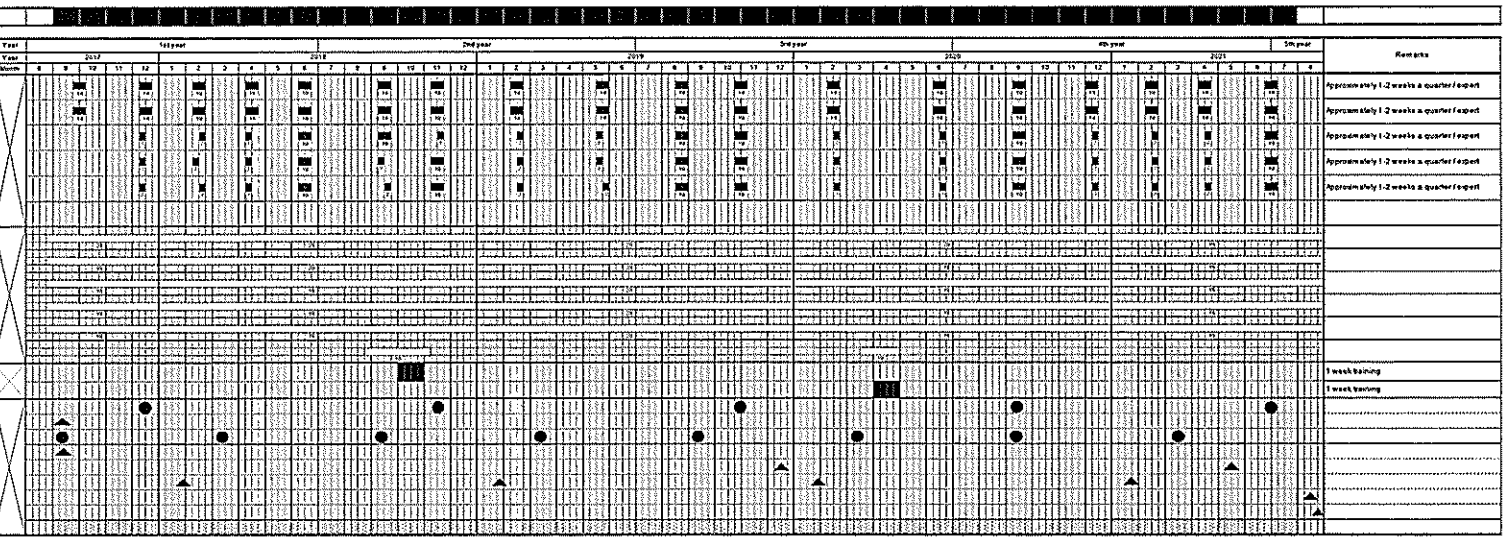
2.6.2. Assignment schedule

The tentative assignment schedule is shown in Table 25. The actual schedule will be determined with close consultation with the CCDA project member.

Table 25 Assignment Schedule

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Duration / Phasing



Inputs

					Remarks
Expert	1	GHG Inventory (General)	Takeshi ENOKI	MURC	Approximately 1-2 weeks a quarter/expert
	2	GHG Inventory (Energy)	Tomoki TAKAHASHI	MURC	Approximately 1-2 weeks a quarter/expert
	3	GHG Inventory (Industrial Processes and Product Use)	Matthew DUDLEY	Individual Consultant	Approximately 1-2 weeks a quarter/expert
	4	GHG Inventory (Agriculture, Land use change and Forestry)	Atsushi SATO	MURC	Approximately 1-2 weeks a quarter/expert
	5	GHG Inventory (Waste)	Hiroyuki UEDA	MURC	Approximately 1-2 weeks a quarter/expert
	6	Project administrative coordination / coordinator for training	Yui OGAWA	MURC	
Assistant Expert	1	GHG Inventory (General)	Takeshi ENOKI	MURC	
	2	GHG Inventory (Energy)	Tomoki TAKAHASHI	MURC	
	3	GHG Inventory (Industrial Processes and Product Use)	Matthew DUDLEY	Individual Consultant	
	4	GHG Inventory (Agriculture, Land use change and Forestry)	Atsushi SATO	MURC	
	5	GHG Inventory (Waste)	Hiroyuki UEDA	MURC	
	6	Project administrative coordination / coordinator for training	Yui OGAWA	MURC	
Counterpart	Training in Japan	Training for Counterpart on GHG inventories in Japan			1 week training
	Training in third country	Training for Counterpart on GHG inventories in developing country			1 week training
Supervision	Monitoring	Joint Coordinating Committee			
		Set-up the Detailed Plan of Operation			
		Submission of Monitoring Sheet			
	Reports/Documents	Work Plan			
		National GHG Inventory Report			
		Project Progress Report			
		Project Brief Note			
		Project Completion Report			
	Public Relations	Establishment and operation of JICA TC website			

Activities

Activities	Sub-Activities							Responsible Organization: Japan	Responsible Organization: GOPNG
Output 1 Capacity to periodically and systematically prepare the national GHG inventories including implementation of GAGC procedures is enhanced	1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation	○	○	○	○	○	Plan / Actual	JICA	CCDA
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements	○	△	△	△	△	Plan / Actual	JICA	CCDA
	1.3. Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting GAGC activities (to be part of the national GHG inventory report (NIR))	○	○	○	○	○	Plan / Actual	JICA	CCDA
	1.4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	△	○	○	○	○	Plan / Actual	JICA	CCDA
	1.5: Collect data necessary for national GHG inventories from relevant parties.	△	○	○	○	○	Plan / Actual	JICA	CCDA
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	△	○	○	○	○	Plan / Actual	JICA	CCDA
	1.7. Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors	△	○	○	○	○	Plan / Actual	JICA	CCDA
	1.8: Compile national GHG inventories with time series consistency	△	○	○	○	○	Plan / Actual	JICA	CCDA
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's GAGC activities (to be part of the NIR).	△	○	○	○	○	Plan / Actual	JICA	CCDA
Output 2 Capacity to promote understanding of national GHG inventories is enhanced	2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories	○	○	○	○	○	Plan / Actual		
	2.2: Conduct workshops on preparation for the national GHG inventories, methods and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders	○	○	○	○	○	Plan / Actual		
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land use change and forestry, waste)	3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and GAGC for each sector of the national GHG inventories	△	○	○	○	○	Plan / Actual		
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	○	△	△	△	△	Plan / Actual		
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories)	△	○	○	○	○	Plan / Actual		
	3.4. Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	△	○	○	○	○	Plan / Actual		
	3.5. Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC	○	○	○	○	○	Plan / Actual		
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	○	△	△	△	△	Plan / Actual		
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BURNC	○	△	△	△	△	Plan / Actual		

2.6.3. Team members' assignment (domestic and on-site)

Main tasks each team member will be responsible for is shown in Table 26. The team members will actively work to fulfill the responsibilities assigned to him/her. The members will also support other members' tasks whenever the need arises.

Table 26 Roles and responsibilites of the team members

Name	In charge	Activities
Takeshi ENOKI	GHG inventory (General)	<u>Management</u> Activity1-4 : Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. Activity1-5 : Collect data necessary for national GHG inventories from relevant parties. Activity1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. Activity1-7 : Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions and removals from each of the sectors. Activity3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). Activity3-4 : Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. Activity3-5 : Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. <u>In charge</u> Activity1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. Activity1-2 : Consider and recommend ways to improve the national GHG inventory arrangements. Activity1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). Activity1-8 : Compile national GHG inventories with time series consistency. Activity1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). Activity2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. Activity2-2 : Conduct workshops for the stakeholders on preparation, methods, progress, and the improvement of the national GHG inventories.

		Activity3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. Activity3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. Activity3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). Activity3-7 : Review the summary of the GHG inventory prepared by CCDA which is to be included in the BUR/NC.
Tomoki TAKAHASHI	GHG inventory (Energy)	<u>In charge of</u> Activity1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. Activity1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). Activity1-4 : Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. Activity1-5 : Collect data necessary for national GHG inventories from relevant parties. Activity1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. Activity1-7 : Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions and removals from each of the sectors. Activity1-8 : Compile national GHG inventories with time series consistency. Activity1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). Activity2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. Activity2-2 : Conduct workshops for the stakeholders on preparation, methods, progress, and the improvement of the national GHG inventories. Activity3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. Activity3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. Activity3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). Activity3-4 : Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. Activity3-5 : Prepare a guidebook/FAQ for the international consultation and

		analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. Sub-Leader (Support GHG inventory (General)) Activity1-2 : Consider and recommend ways to improve the national GHG inventory arrangements. Activity3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). Activity3-7 : Review the summary of the GHG inventory prepared by CCDA which is to be included in the BUR/NC.
Matthew DUDLEY	GHG inventory (Industrial Processes and Product Use)	<u>In charge of</u> Activity1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. Activity1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). Activity1-4 : Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. Activity1-5 : Collect data necessary for national GHG inventories from relevant parties. Activity1-6 : :Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. Activity1-7 : Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions and removals from each of the sectors. Activity1-8 : Compile national GHG inventories with time series consistency. Activity1-9 : :Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). Activity2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. Activity2-2 : Conduct workshops for the stakeholders on preparation, methods, progress, and the improvement of the national GHG inventories. Activity3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. Activity3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. Activity3-4 : Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. Activity3-5 : Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.
Atsushi	GHG inventory	Same as GHG inventory (Industrial Processes and Product Use)

SATO	(Agriculture, Land use change and Forestry)	
Hiroyuki UEDA	GHG inventory (Waste)	Same as GHG inventory (Industrial Processes and Product Use)
Yui OGAWA	Workshop coordinator / coordinator for training in japan/third country	Logistics in Japan Workshops, training in Japan, logistics support for training in third country

2.7. Support and contribution by the counterpart

Below are the support and countribution by the counterpart in PNG.

a. Services of counterpart personnel and administrative personnel as reffered to in the Record of Disucussions II-5.

b. Suitable office space with necessary equipment

c. Supply or replacement of machinery, equipment. Instrumens and vehicles, tools, spare parts and any other materials necessary for the implementation of the project other than the equipment provided by JICA

d. Information as well as support in obtaining medical service

e. Credentials or identification cards

f. Available data(including maps and photographs) and information related to the project

g. Running expenses necessary for the implementation of the project

h. Expenses necessary for transportation within PNG of the equipment referred to in the Record of Discussions II-4(1) as well as for the installation, operation and maintenance thereof; and

i. Necessary facilities to the JICA experts for the remittance as well as utilization of the funds introduced into PNG from Japan in connection with the implementation of the project

2.8. Others (Outsourced from MURC)

As described in 2.2.2(3)Training on spreadsheet software operation, the training on spreadsheet software to CCDA will be outsourced.

PNG Plan of Operation (UPDATED AS OF MAY 2018)

Activities	Sub-Activities	Year	2017	2018	2019	2020	2021
		Month	8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan					
		Actual					
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan					
		Actual					
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report (NIR)).	Plan					
		Actual					
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan					
		Actual					
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan					
		Actual					
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan					
		Actual					
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan					
		Actual					
	1.8: Complie national GHG inventories with time series consistency.	Plan					
		Actual					
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan					
		Actual					
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan					
		Actual					
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan					
		Actual					
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan					
		Actual					
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan					
		Actual					
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan					
		Actual					
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan					
		Actual					
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan					
		Actual					
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan					
		Actual					
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan					
		Actual					

MINUTES OF MEETING

ON

THE SECOND JOINT COORDINATION COMMITTEE

OF

THE PROJECT FOR ENHANCING CAPACITY TO DEVELOP A SUSTAINABLE GHG INVENTORY SYSTEM FOR PNG

Port Moresby, 26 July, 2019

Mr. Ruel Yamuna
Managing Director
Climate Change and Development Authority
JCC Chair

Mr. Takashi Toyama
Chief Representative
Japan International Cooperation Agency
PNG Office

Mr. Takeshi Enoki
Team Leader, GHG Inventory (Institutional Arrangements)
The Project for Capacity Development to Establish a National GHG Inventory Cycle of Continuous Improvement

The second Joint Coordination Committee (hereinafter referred to as the JCC) of the Project for enhancing capacity to develop a sustainable GHG inventory system for PNG (hereinafter referred to as the Project) was held at the CCDA Conference Room, Port Moresby, Papua New Guinea on July 26, 2019.

The Climate Change and Development Authority (hereinafter referred to as CCDA), Japan International Cooperation Agency (hereinafter referred to as JICA) and relevant parties of the Project participated in the JCC meeting, chaired by Mr. Alfred Rungol, Acting General Manager of the MRV and National Communication Division of the CCDA. The list of participants and agenda are provided in Appendix 1 and Appendix 2, respectively.

The opening remarks were delivered by the JCC chair and Mr. Masato Koinuma, Senior Representative of the PNG JICA.

Mr. Takeshi Enoki, the team leader of the Project, delivered the first presentation that provided an overview of the BUR 1 GHG inventory and identified necessary improvements for the next GHG inventory.

Key points raised in this presentation include:

1. The timeline for BUR1 and milestones achieved, and to underscore a shared understanding to compress the timeline for BUR2
2. The extent of JICA Project support to CCDA to compile BUR1
3. An overview of the BUR1 including commentary on the GHG emissions and removal trend
4. Necessary improvements identified by CCDA including planning, preparing and coordination processes with key stakeholders in regards to timelines, data collection and emissions estimation
5. An overview of key challenges identified by CCDA for each sector and priorities therein. Completeness remains an ongoing challenge for CCDA to resolve in regard to the GHG inventory, and CCDA is to continue working with key stakeholders to resolve completeness issues
6. Institutional arrangements are necessary to improve the completeness and accuracy of the GHG inventory

Mr. Jason Paniu, officer of the MRV and National Communication Division, CCDA, delivered a presentation on the plan for the BUR2 inventory and progress to date. Improvements within

each sector of the GHG inventory was delivered by respective CCDA officers responsible for the energy (Mr. Jason Paniu), industrial processes and other product use (Ms. Jacinta Krull), agriculture (Mr. Larson Daboyan), land use, land-use change and forestry (Mr. Matthew Dudley of the JICA Project) and waste (Erick Sarut) sectors.

This presentation highlighted the following points:

1. Structured plan developed to deliver a GHG inventory for BUR2 by the end of 2019
2. Memorandum of Understanding (MoU) for data collection are critical for strengthened institutional arrangements
3. Quality assurance/Quality control plan is to be developed, as well as a document management procedure
4. Completeness is a critical challenge an improvement plan has been developed for each sector to confirm completeness of the GHG inventory
5. Timeline for PNG NC/BUR provided. JICA experts to work with CCDA to deliver a further 2 GHG inventories with the last to be developed by 2021
6. Cross-cutting/General challenges including strengthened institutional arrangements, QA/QC plan, completeness
7. Sector-specific challenges including the role of key stakeholders to overcome completeness and accuracy issues, and in data collection and data quality

Mr. Alfred Rungol delivered a presentation on enhancing the institutional arrangements. Key points from this presentation include:

1. A recognition that there is a lack of published statistics as a source of activity data.
2. Strengthened institutional arrangements are important to ensure provision of activity data under BUR reporting requirements. Previously legal, procedural and institutional arrangements were temporary
3. Introduced key elements of institutional arrangements that CCDA wishes to strengthen, namely long term cooperation, data sharing process and clear identification of roles and responsibilities
4. Outlined 2 options for PNG on institutional arrangement a national regulation, or pursue MoUs or contract between CCDA and individual stakeholders.
5. MoU preferred approach and benefits and characteristics of this option presented.
6. Outlined next steps including pursuing MoUs with key stakeholders, establish technical committees but trial this concept with energy first.

Below are some comments and questions that were raised in the meeting.

1. A participant suggested that CCDA should develop project proposals as a basis to work with key stakeholders on activity data, and to identify capacity needs. This was supported by the Department of National Planning and Monitoring who suggested CCDA develop a Strategy for developing GHGs/BURs, and that this strategy includes data requirements, timeframes, capacity needs etc. The Department also advised that they would be willing to support a process to develop this strategy. The JCC Chair appreciated the suggestion of developing a strategy and also acknowledged that training could be pursued through the Paris Committee on Capacity Building under the UNFCCC and will confirm this pathway.

2. In regards to the sub-technical working groups, a participant advised that all stakeholders need to be aware of the existence of these committees. A participant asked whether there is an overarching committee that is to exist above these sub-technical working groups. The JCC Chair advised that the process is for the sub- technical working groups to report to the REDD+ MRV working group, but he also acknowledged that the technical nature of GHG development requires consultations at the technical level (as opposed to a higher level group).

3. A participant recommended that CCDA timelines for developing GHG inventories and BURs need to be mindful of data provider timelines. It was suggested that a national workshop could be held to discuss and agree timelines. The team leader of the Project advised that the UNFCCC sets the due dates of BURs, and that at the national level, a QA/QC Plan will be developed through the Project to identify the process to develop BURs every 2 years, which will facilitate the development of GHG inventories on a regular basis.

4. An observer indicated they were expecting the meeting to provide information on progress of the Project activities. The team leader of the Project acknowledged that the team could explain specific JICA experts achievements in the context of the detailed Project activities, but emphasized that all Project activities are in line with CCDA activities and timelines. The PNG JICA office highlighted that technical cooperation projects are counterpart driven, and that the Project is supporting the CCDA work as expected.

The next JCC meeting will be held in 2020. The main objective of the Third JCC will be to confirm the progress of the Project activities. Any challenges/issues would be shared at the JCC if any, and necessary guidance would be provided to the Project members to facilitate the progress of the Project, as needed.

Appendix I: Participants list

No	Name	Organization	Job Title
1	Mitsugu Yachidate	Embassy of Japan	First Secretary
2	Masato Koinuma	JICA	Senior Representative
3	Ippei Shimizu	JICA	Project Formulator Adviser
4	Fiona Silo	JICA	Staff
5	Melinda Benjamin	FAO	Program Officer
6	Erick Sarut	CCDA	National Communication Officer
7	Matthew Dudley	JICA Project Expert	IPPU expert
8	Takeshi Enoki	JICA Project Expert	JICA Project Team Leader
9	Tomoki Takahashi	JICA Project Expert	Energy expert
10	Wakai Digine	DNPM	Senior Programming Officer-Renewables
11	Brian Kunai	DNPM	Policy Officer-General
12	Sailas-Tipayamb	Water PNG	Environment Officer
13	Daisy Lepon	DAL	Policy Advisor
14	Jason Paniu	CCDA	MRV Officer
15	Jacinta Kull	DDCA	NC Officer
16	Debra Sungi	CCDA	MRV Officer-International Negotiation

Appendix II: 2nd JCC agenda

Climate Change and Development Authority

JICA

Second Joint Coordinating Committee for the Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

July 26, 2019

CCDA conference room, Port Moresby, Papua New Guinea

Agenda

Time	Agenda	Speaker
8:30～9:00	Registration	
9:00～9:05	Prayer	Erick Sarut, CCDA
9:05～9:10	Opening remarks	Mr. Alfred Rungol, acting General Manager of MRV and NC Division, CCDA
9:10～9:15	Welcome remarks	Mr. Masato Koinuma, Deputy Chief Representative of JICA PNG office
9:15～9:20	Self-introduction by participants	
9:20～9:45	Overview of the BUR 1 GHG inventory and necessary improvements for the next GHG inventory	Mr. Takeshi Enoki, JICA Project leader
9:45～10:15	Plan for the BUR2 inventory and the progress	Mr. Jason Paniu, CCDA
10:15～10:30	Enhancing institutional arrangements	Mr. Alfred Rungol, acting General Manager of MRV and NC Division, CCDA
10:30～10:55	Q&A, Discussion	
10:55～11:00	Closing	Alfred Rungol, CCDA

MINUTES OF MEETING
ON
THE THIRD JOINT COORDINATION COMMITTEE
FOR
THE PROJECT FOR ENHANCING CAPACITY TO DEVELOP A SUSTAINABLE GHG INVENTORY SYSTEM FOR PNG

Based on the Record of Discussion signed April 24, 2017 between Climate Change and Development Authority (hereinafter referred to as "CCDA") and Japan International Cooperation Agency (hereinafter referred to as "JICA"), both parties have been jointly implementing the Project for enhancing capacity to develop a sustainable GHG inventory system for PNG (hereinafter referred to as "Project") since August 2017.

Taking into account the COVID19 pandemic which has affected the implementation of the Project, CCDA and JICA had discussions during third Joint Coordination Committee (hereinafter referred to as the "JCC") held March 10, 2021 and hereby agree on the tasks described for each of the Project activities listed in the Annex.

Port Moresby, 10 March, 2021

Mr. Ruel Yamuna
Managing Director
Climate Change and Development Authority
JCC Chair

Mr. Masato Koinuma
Chief Representative
Japan International Cooperation Agency
PNG Office

JAPAN INTERNATIONAL COOPERATION AGENCY
JICA
Papua New Guinea

The third JCC was held at the PNG JICA office conference room, Port Moresby, Papua New Guinea on March 10, 2021. The JICA Project experts participated online due to the COVID travel restrictions.

The CCDA, JICA and relevant parties of the Project participated in the JCC meeting, chaired by Mr. Alfred Rungol, General Manager of the MRV and National Communication Division of the CCDA. The list of participants and agenda are provided in Appendix 1 and Appendix 2, respectively.

The opening remarks were delivered by the acting JCC chair and Mr. Masato Koinuma, Chief Representative of the PNG JICA.

Mr. Jason Paniu, officer of MRV & National Communication Division, delivered the first presentation that provided the progress of the Project activities, specifically the BUR2 GHG inventory. Key points of the presentation are of the following:

1. Progress has been made on crosscutting issues such as improved design of the estimation files, inventory report template for the BUR2, mitigation actions template for BUR2, completed international consultation and analysis process of the BUR1.
2. For the energy sector, the Energy Sub-Technical Working Committee (ESTWC) was established for technical consideration of energy emissions, the estimation for fuel combustion is complete.
3. Some progress was made in the industrial processes and product use (IPPU) sector and waste sectors, but delays were acknowledged.

Mr. Takeshi Enoki, Project leader, delivered the second presentation on the remaining activities of the Project. Key points of the presentation are of the following:

1. The Project is on track to complete the deliverables as described in the Project Design Matrix of the Project and the CCDA capacity to prepare transparent, accurate, consistent, comparable, compete inventory has been strengthened. However, due to the impact of COVID19, the progress of the IPPU and waste sectors are behind schedule, specifically stakeholder consultation and data collection.
2. As the Project is developing an estimation file system for the IPPU and waste sectors as well, the members will use data from the BUR1 to test the file and finalize the estimation file system. CCDA will continue data collection activities as possible and replace any data when new information is collected.
3. The mitigation actions chapter of the BUR2 will be completed jointly between JICA Project experts and CCDA, reflecting any developments on mitigation policies/measures.
4. Capacity analysis, arrangement recommendation, and country specific emission factor research documents will be drafted by the JICA Project experts.

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Below are some comments and questions that were raised in the meeting.

- Participants noted the impact of the global COVID-19 pandemic on the Project progress, but also welcomed the update on progress to date including completion of the BUR1 and the current work on compiling BUR2. Participants agreed that with increased collaboration, the Project can continue to enhance the capacity development of PNG to sustainably develop transparent, accurate, comparable, complete, and consistent GHG inventories.
- CCDA confirmed that PNG intends to submit its BUR2 in 2021. In this context, there was a question regarding the use of the dummy data for the IPPU and waste sectors in the BUR2, and whether its use would be accepted by the UNFCCC. Mr. Enoki clarified that the dummy data is a simplification term indicating that data obtained for years 2000 to 2015 for BUR1 could be used to estimate emissions for 2016 and 2017 in BUR1. Mr. Enoki explained that in-lieu of CCDA receiving 2016 and 2017 activity data for BUR2, alternative methods can be used to estimate GHG emissions. These methods include identifying a proxy that can be used to extrapolate a trend, or to have a limiting assumption where by the 2015 data is used for both 2016 and 2017. Mr. Enoki also advised if alternate methods are used then these methods would need to be elaborated transparently in the BUR2 report.
- Mr. Rungol highlighted the work by the ESTWC and the Working Committee for Land Use, Land Use and Change, and Forestry sector for the NDC, and that this platform should be used to make improvements to the energy sector estimation. He further explained that the ESTWC would be meeting monthly starting the week of March 15, and that he would inform the members there of the discussions in the JCC. Although the priority for the ESTWC is the NDC implementation, the GHG inventory is within the scope of the Committee. Mr. Rungol also explained his plan for establishing a similar Working Committee for the IPPU and waste sectors for facilitating data collection in the future. Mr. Dudley noted the need for a structured approach to establish such Working Committees and proposed that the JICA Project experts include a detailed way forward in the institutional arrangement recommendation paper to be drafted under activity 1.2.
- Mr. Rungol reported that there are planning mitigation action projects in PNG such as Global Green Growth Institute and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) that have data collection components. Mr. Enoki noted that such data could be useful input to the GHG inventory and collaboration between inventory experts and mitigation experts can enhance the accuracy of the projects' outputs.

Mr. Rungol acknowledged and thanked the JICA Project for its work to date, noting that the GHG inventory is fundamental statistics used for planning and monitoring mitigation actions and plans such as the Nationally Determined Contributions to the UNFCCC. Mr. Rungol closed the meeting.

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Annex

The table below outlines the detailed contents of activities for the remainder of the Project period. The Project activities have not been revised, but the scope of the activities has been changed to reflect the level of progress between sectors of the GHG inventory. Also, some activities relating to recommendations or guidance papers (activities 1.1, 1.2, 3.2, 3.3, 3.6) will be carried out by the JICA Project members with input from CCDA, and the contents will be used to train CCDA counterparts.

Detailed activities for the remainder of the Project term

Output	Activity	Plan
Output 1 : Capacity to periodically and systematically prepare GHG inventories including implementation of QA/QC procedures	1.1: Examine the arrangements and assess capacity of CCDA and other relevant parties.	JICA Project experts carry out a review of the capacity by the end of the Project. CCDA members will review the assessment results, and revisions will be made as necessary.
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	JICA Project experts will develop a detailed improvement plan by the end of the Project. CCDA members will review the assessment results, and revisions will be made as necessary.
	1.3: Draft/Update workplan/guidebook/ checklist for preparing GHG inventories including QA/QC activities (part of NIR).	JICA Project experts will finalize draft QA/QC Plan in March. CCDA members will review the assessment results, and revisions will be made as necessary.
	1.4: Draft/Update a MoU for data provision.	MoU for data provision and for the Energy Sub-Technical Working Committee has been drafted and updated.
	1.5: Collect data necessary for national GHG inventories from relevant parties.	The energy sector has all data for BUR2, but CCDA will continue to work with the Energy Sub-Technical Working Committee members on a monthly basis, to plan the national energy balance table development, with the support of the JICA Project experts. CCDA will continue data collection for the other sectors.
	1.6: Develop/Update a database/data platform for estimating GHG emission/removals.	Database for energy sector complete. The JICA Project experts will develop a new database for IPPU and waste sectors and test using available data in March. CCDA

		members will review the assessment results, and revisions will be made as necessary.
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate emissions/removals.	Estimation file system for energy sector mostly done. JICA Project experts will develop similar estimation file system for IPPU and waste sectors in April. CCDA members will review the assessment results, and revisions will be made as necessary.
	1.8: Compile national GHG inventories with time series consistency.	JICA Project experts and CCDA will compile inventory using energy data and BUR1 IPPU/waste data.
	1.9: Draft/Update technical document of NIR.	CCDA will fill out NIR template for energy, IPPU and waste sectors with support from JICA Project experts.
Output 2: Capacity to promote understanding of GHG inventories	2.1: Conduct workshops on national GHG inventories.	The Inception workshop was held in 2017
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement.	The consultation workshop for the BUR1 was held in 2018, and the F gases workshop held in 2020.
Output 3: Capacity to technically assess the GHG inventory and make improvements	3.1: Study IPCC methods.	JICA Project experts can provide technical support to sectors as needed.
	3.2: Conduct key category analysis and uncertainty assessment.	Template for key category analysis and uncertainty assessment will be prepared by JICA Project experts. The JICA Project experts will conduct lectures on the two files.
	3.3: Collect and compile information and identify country/region emission factors and other relevant parameters	JICA Project experts will draft short paper on how to look for country specific parameters and will conduct lectures on the approach and the need for improving the accuracy of the inventory.
	3.4: Consider whether/how mitigation actions can be reflected in the GHG inventory to track the progress of targets.	JICA Project experts will work with CCDA to support mitigation chapter of BUR2 and carry out analysis of how actions could be reflected in the inventory
	3.5: Prepare guidebook/FAQ for ICA process and prepare document for the FSV process.	A guidebook for preparing for the ICA process including the FSV was developed in 2019.
	3.6: Draft and improve a national GHG inventory improvement plan (part of NIR).	JICA Project experts will develop a detailed improvement plan and will conduct lectures on the approach and the need for improving the accuracy of the inventory.
	3.7 Review summary of GHG inventory to be prepared by CCDA be included in the BUR/NC.	JICA Project experts will support BUR2 draft for sectors that are complete. CCDA will finalize the draft when estimations are complete.

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MINUTES OF MEETING
ON
THE FOURTH JOINT COORDINATION COMMITTEE
FOR
THE PROJECT FOR ENHANCING CAPACITY TO DEVELOP A SUSTAINABLE GHG INVENTORY SYSTEM FOR PNG

Based on the Record of Discussion signed April 24, 2017 between Climate Change and Development Authority (hereinafter referred to as "CCDA") and Japan International Cooperation Agency (hereinafter referred to as "JICA"), both parties have been jointly implementing the Project for enhancing capacity to develop a sustainable GHG inventory system for PNG (hereinafter referred to as "Project") since August 2017.

The CCDA and JICA had discussions during the fourth and final Joint Coordination Committee (hereinafter referred to as the "JCC") held October 4, 2021 and hereby confirmed the achievements of the Project including the GHG inventory for the energy, industrial processes and product use, and waste sectors, to be included in the second biennial update report (hereinafter referred to as "BUR") of PNG.

Port Moresby, 4 October 2021

Mr. William Lakain
Acting Managing Director
Climate Change and Development Authority
JCC Chair

Mr. Masato Koinuma
Chief Representative
Japan International Cooperation Agency
PNG Office

The fourth and final JCC was held at the PNG JICA office conference room, Port Moresby, Papua New Guinea on October 4, 2021. Some participated online due to the coronavirus disease 2019 (COVID-19) travel restrictions.

The CCDA, JICA and relevant parties of the Project participated in the JCC meeting, chaired by Mr. Alfred Rungol, General Manager of the MRV and National Communication Division of the CCDA. The list of participants and agenda are provided in Appendix 1 and Appendix 2, respectively.

The opening remarks were delivered by the acting JCC chair and Mr. Masato Koinuma, Chief Representative of the PNG JICA.

Mr. Takeshi Enoki, Project leader, delivered the first presentation on the GHG inventories and the JICA Project. Key points of the presentation of the following:

1. The GHG inventory is not only an important policy tool for developing and monitoring climate change mitigation actions, but is also central to all UNFCCC reporting, namely the national communications (NC), the BUR, and the biennial transparency report (BTR) under the Paris Agreement.
2. Papua New Guinea has developed two GHG inventories as part of its initial and second NCs. The BUR1 was submitted in 2019 with the support of the Project and other donors, and the BUR2 is planned for submission in 2021.
3. The CCDA and JICA Project experts prepared two GHG inventories under the Project. The first is a complete GHG inventory including all sectors, energy, industrial processes and product use (IPPU), agriculture land use, land use change and forestry (LULUCF), and waste sectors. The Project produced the second GHG inventory for the energy, IPPU, and waste sectors.

Mr. Jason Paniu, officer of MRV & National Communication Division, delivered a presentation on the overview of the BUR2 inventory. Key points of the presentation are of the following:

1. The CCDA and JICA Project experts were not able to meet stakeholders as planned due to COVID19 and other reasons. In cases where updated data were not available, the 2015 data was used, as agreed in the 3rd JCC. Still, members managed to make improvements in all three sectors. Most important improvement made is transparency of the estimation files and the inventory report. Accuracy and completeness also were improved with additional source categories estimated.
2. Crosscutting improvements of the BUR2 include the following: improved estimation file system; comprehensive and detailed GHG inventory report; drafting of the first QA/QC Plan; updated BUR2 chapters specifically mitigation, which has detailed the policy context, PNG's

nationally determined contribution (NDC), and all mitigation actions.

3. In the energy sector, the improvements include the following: strengthening the institutional arrangements through the development of the Energy Sub-technical working group; updated energy balance; improved allocation for emissions from auto production; and non-methane volatile organic compounds (NMVOC) emissions estimated from fugitive categories.
4. In the IPPU sector, improvements were made in the new HFC emission estimates from the refrigeration and air-conditioning category. Mr. Paniu noted that these emissions are projected to increase in the future and there may be a need to consider planning for mitigation actions in the future.
5. In the waste sector, the improvements include the following: inclusion of methane (CH_4) emissions from open burning of waste; CH_4 from wastewater, lagoon treatment was added as a wastewater treatment type in the estimation of CH_4 from wastewater; and the population for each type of wastewater treatment was improved; and for nitrous oxide (N_2O) from wastewater, the amount of protein in industrial wastewater was taken into account in the parameter.

Mr. Takeshi Enoki delivered a presentation on the achievements of the Project, specifically on the deliverables (objectively verifiable indicators) of the Project and each of the Outputs as described in the Project Design Matrix. Key points of the presentation are of the following:

1. For Output 1, the workplan, the estimation files/database, and GHG inventory report were produced twice by the Project, once for the BUR1 and second for the BUR2. For each of the deliverables, Mr. Enoki noted that significant improvements were made to enhance the user friendliness of the products, which would help CCDA in updating the inventory in the future.
2. For Output 2, questionnaires were conducted to workshop participants to assess the level of satisfaction or understanding of the material delivered. Three workshops were held during the Project duration, the inception workshop, consultation workshop, and F gases workshop. In all workshops, over 80% of participants were either very satisfied or satisfied with the material presented, showing that there was a good understanding of the topics presented and discussed.
3. For Output 3, the GHG inventory report was produced for BUR1 and BUR2. The report includes detailed information on the methods, data used, the results, improvements made, and improvements which need to be made in the future. The BUR1 includes a full key category assessment and some information on uncertainties. The BUR2 includes quantitative information on both key category assessment and uncertainties for the energy, IPPU, and waste sectors.
4. Progress was made in strengthening institutional arrangements such as the Energy sub technical working group and unofficial networks developed through the project. Mr. Enoki stressed the importance of the inventory agency to demonstrate active leadership and hands on management of the GHG inventory preparation process to ensure sustainability of the work. Mr. Enoki also

noted that two CCDA staff left the office and were not replaced during the Project and encouraged CCDA to ensure the necessary technically capable human resources to continue the work on GHG inventories.

Mr. Matthew Dudley delivered the final presentation on some recommendations to PNG and CCDA. Key points of the presentation are of the following:

1. PNG has enhanced its institutional arrangements to prepare GHG inventories on a regular basis. The Climate Change (Management) Act established CCDA as the national authority on GHG inventories and set sector lead agencies for the inventory sectors. The Sub technical working group for LULUCF sector was established before the Project. During the Project, energy was established, and plans are in place for other sectors as well. Mr. Dudley also noted that the NDC Regulation may also enhance the role of CCDA as the lead agency in GHG inventory preparation and facilitate the data provision by relevant stakeholders.
2. An assessment of general competencies of CCDA was made by the JICA Project experts based on criteria such as the following: compile a GHG inventory; incorporate improvement in the GHG inventory; leverage improvement via collaboration; enhance capacity of its stakeholders on GHG inventory; and plan, prepare and manage a GHG inventory. While the CCDA and the JICA Project experts were able to compile two GHG inventories, Mr. Dudley noted that there is still room for CCDA to improve in terms of preparing the best GHG inventory for PNG. In terms of arrangements for the GHG inventory, Mr. Dudley noted that the level of data/information collected, and improvements made in the Project were sufficient but also still should be improved in the future.
3. Existing arrangements could be viewed as procedural than substantive. Mr. Dudley noted that arrangements should set the collaborative framework in which there is full buy in from the management of key stakeholders in order for the inventory work to progress smoothly. A high level of commitment by CCDA is needed to leverage the existing arrangements to lead the process.
4. Some recommendations for CCDA were of the following: leverage opportunities and maximize benefits from sub technical working groups; strengthen current arrangements to ensure effective collaboration on improvements in the GHG inventory such as the approach to include more education, not a stick in dealing with collaborators; investment in an organization, not an individual; develop and implement a structured approach to plan, prepare and manage a GHG inventory.

Below are some comments and questions that were raised in the meeting.

- Mr. Enoki clarified how the recalculations in energy, IPPU, and waste sectors thereby improved

the transparency, accuracy, completeness, comparability, time series consistency (TACCC) of the sector emissions and can inform mitigation policies and measures. This is a key function of the GHG inventory data, and the reason the TACCC of the GHG inventory needs to be improved continuously.

- Participants welcomed the GHG inventory for the energy, IPPU, and waste sectors for the BUR2. Mr. Rungol provided an update on the agriculture and LULUCF sectors that the emission and removal estimations should be concluded in two weeks' time and that the progress has been constrained due to the COVID19 lockdowns. Mr. Rungol informed the participants that the technical annex would also be updated for the BUR2 and that the it will be PNG's last submission under the current MRV framework as PNG will be preparing for the BTR under the ETF for submission in 2024. He also mentioned that the Prime Minister may announce before the twenty sixth meeting of the Conference of the Parties (COP26) progress on BUR2 and its likely submission in December. Mr. Rungol mentioned that he would confirm which IPCC Guidelines was used in the agriculture and LULUCF sector estimations.
- A question was raised regarding the collaboration with other donors throughout the Project. Mr. Enoki emphasized that the JICA Project experts engaged with relevant donors who were working on GHG inventory relevant projects. Mr. Enoki explained that the Food and Agriculture Organization (FAO), Coalition for Rainforest Nations (CfRN) and other donors were supporting the CCDA and PNG Forest Authority in producing the agriculture and LULUCF sector inventories, and that the JICA Project and CCDA agreed at start of the Project for JICA to prioritize the other sectors in order to avoid confusion and duplication of work. Still, the Project experts fully supported CCDA to finalize the estimation in those sectors for the BUR1 inventory. For the waste sector, the CCDA and JICA Project experts consulted the JICA experts working on the "Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries" for information on solid waste management in Port Moresby and in PNG. In the IPPU sector, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), which was supporting the Conservations and Environment Protection Authority (CEPA) with the Montreal Protocol work, was consulted in the process of preparing the F gas inventory. The Project experts engaged in discussion with the Global Green Growth Institute (GGGI), who were supporting CCDA with the NDC work, regarding the energy sector emissions of PNG and discussed potential methods to project emissions in the future. Furthermore, the Project experts participated and lectured on GHG inventories in a GGGI workshop held in 2020.

Mr. Rungol expressed great appreciation to JICA and the Japanese people for successful implementation of the Project, noting that the GHG inventory is fundamental statistics used for

planning and monitoring mitigation actions and plans such as the NDCs to the UNFCCC. He emphasized the importance of the GHG inventory work, explaining that the NDC was predicated on the BUR1 GHG inventory data and that updates to the NDC will also be based on the most recent GHG inventory.

JICA also expressed appreciation to Mr. Rungol, the CCDA, and relevant stakeholders for its cooperation throughout the Project and emphasized that the GHG inventory work needs to be sustained after conclusion of the Project.

Mr. Rungol closed the meeting.

Appendix 1 List of participants

1	Mr. Alfred Rungol	CCDA
2	Mr. Jason Paniu	CCDA
3	Mr. Japheth Gai	CCDA
4	Ms. Anita Poesi	CEPA
5	Mr. Atsushi Namba	Embassy of Japan in Papua New Guinea
6	Mr. Masato Koinuma	JICA PNG Office
7	Mr. Takahiro Yokota	JICA PNG Office
8	Mr. Akira Fujiwara	JICA PNG Office
9	Mr. Masaki Aoki	JICA PNG Office
10	Mr. Takeshi Enoki	JICA Project expert
11	Mr. Takuji Terakawa	JICA Project expert
12	Mr. Masaaki Nakamura	JICA Project expert
13	Mr. Matthew Dudley	JICA Project expert
14	Mr. Atsushi Sato	JICA Project expert

Appendix 2 Agenda

Climate Change and Development Authority

Fourth Joint Coordinating Committee meeting for "The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG"

October 4, 2021 at CCDA conference room

Agenda

Time	Agenda Facilitator: Mr. Alfred Rungol	Speaker
12:45～13:00	Registration	
13:00～13:05	Prayer	Mr. Erick Sarut, CCDA
13:05～13:10	Opening remarks	Mr. Alfred Rungol, General Manager of CCDA
13:10～13:15	Welcome remarks	Mr. Masato Koinuma, Chief Representative of JICA PNG office
13:15～13:25	Introduction to the GHG inventory and the JICA Project	Mr. Takeshi Enoki, JICA Project expert
13:25～13:45	Overview of the second GHG inventory and BUR2	Mr. Jason Paniu, CCDA
13:45～14:10	Question and Answer	
14:10～14:25	Achievements and Challenges of the Project	Mr. Takeshi Enoki, JICA Project expert
14:25～14:40	Recommendations for the future	Mr. Matthew Dudley, JICA Project expert
14:40～14:55	Discussion	
14:55～15:00	Closing Remarks	

添付資料 8: モニタリングシート

Annex 8-1: Project Monitoring Sheet ver.1
Annex 8-2: Project Monitoring Sheet ver.2
Annex 8-3: Project Monitoring Sheet ver.3
Annex 8-4: Project Monitoring Sheet ver.4
Annex 8-5: Project Monitoring Sheet ver.5
Annex 8-6: Project Monitoring Sheet ver.6
Annex 8-7: Project Monitoring Sheet ver.8
Annex 8-8: Project Monitoring Sheet ver.8
Annex 8-9: Project Monitoring Sheet ver.9

Annex 8-1: Project Monitoring Sheet Ver.1

TO CR of JICA　Papua New Guinea　OFFICE

Project Monitoring Sheet

Project Title : The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG
Version of the Sheet: Ver. 1（Term: August, 2017 - September, 2017）

Name: Takeshi Enoki
Title: GHG Inventory (General)
Submission Date: September 7, 2017

I. Summary

1　Progress

1-1 Progress of Inputs

The contract for the JICA Project members started in August 28, 2017, and the members have drafted the Work Plan (Japanese) describing the project objectives, detailed activities, implementation structure, etc. This will be translated into English a week before the first mission to PNG, tentatively scheduled for October 4 to October 18 and shared with the project counterparts.
During this first mission, the JICA Project members, consisting of GHG inventory (General) and GHG inventory (Energy), will hold kickoff meetings with CCDA and other stakeholders, in addition to discussing the contents of the Work Plan with CCDA and finalizing it.

1-2 Progress of Activities

Activity 1-7: Project members are in the initial stages of supporting the PNG counterparts estimate GHG emissions and removals for the first BUR.

1-3 Achievement of Output

None

1-4 Achievement of the Project Purpose

A draft TACCC checklist, which is one of the Objectively Verifiable Indicators of the Project Purpose, has been developed and included in the Work Plan. The Project members will initiate discussion on the list during the first mission.

1-5 Changes of Risks and Actions for Mitigation

There have been no changes in risks of implementation of the Project since the

planning of the Project.
A kickoff teleconference will be held September 11 to clarify the following issues: the Project Implementation structure of CCDA, specifically the Inventory Coordinator and Inventory Compiler positions; and discuss the progress of the GEF/CBIT project and its Project scope, particularly in regards to the GHG inventory preparation activities to be carried out by the GEF/CBIT project. The results of this teleconference may affect the scope of the JICA Project members' work.

1-6 Progress of Actions undertaken by JICA
JICA headquarters, JICA PNG office, CCDA, and the JICA Project member will attend the kickoff meeting on September 11.

1-7 Progress of Actions undertaken by Gov. of PNG
JICA headquarters, JICA PNG office, CCDA, and the JICA Project member will attend the kickoff meeting on September 11.

1-8 Progress of Environmental and Social Considerations (if applicable)
Not applicable

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)
Not applicable

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)
The GEF/CBIT project mentioned in 1-5 aims to improve the quality of GHG inventory data for the Agriculture, Forestry, and other Land Use sector. Since members of the JICA Project will carry out all GHG inventory preparation steps including the collection of data, estimation of GHG emissions/removals, and drafting the Inventory Report for all sectors, there is a duplication of work. The teleconference meeting on September 11 will clarify the overlaps and members will ensure that there is no duplication of work and that there will be good coordination between the two projects.

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail
None

2-2 Cause
None

2-3 Action to be taken
None

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of PNG,etc.)
None

3 Modification of the Project Implementation Plan

Minor revisions were made to the PO attached to the R/D. These were made in light of the fact that the Project duration began a few weeks later than anticipated. In addition, a three month period was added to activity 3.1 to reflect the need for CCDA members to enhance their understanding of the IPCC methods every cycle. Neither changes are expected to impact the implementation of the Project.

3-2 Other modifications on detailed implementation plan
None

4 Current Activities of Gov. of xx to Secure Project Sustainability after its Completion

To be confirmed in the next term.

II. Project Monitoring Sheet I & II *as Attached*

Monitoring sheet I

Project Monitoring Sheet I （Revision of Project Design Matrix）

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 1

Implementing Agency: CCDA

Dated September 11, 2017

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG　**Model Site:**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist		none	none
Project Purpose The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.	a draft TACCC checklist has been developed	none
Outputs Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report		none	none
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire			
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report			

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5 : Collect data necessary for national GHG inventories from relevant parties. 1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8 : Compile national GHG inventories with time series consistency. 1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2 : Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	
			Pre-Conditions
			<Issues and countermeasures> none. A teleconference is scheduled on Sept. 11 to discuss implementation structure and other donor activities.

Monitoring Sheet II

Project Monitoring Sheet II (Revision of Plan of Operation)

Version 1

Dated September 7, 2017

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Remarks	Monitoring: Issue	Monitoring: Solution
Expert			
GHG inventory (General)	approximately 1 week to 2 weeks a quarter/expert	none	none
GHG inventory (Energy)			
GHG inventory (Industrial Processes and Product use)			
GHG inventory (Agriculture, Land use change and Forestry)			
GHG inventory (Waste)			
Project administrative coordination / coordinator for training	support from Japan		
Equipment			
PC for data management		timing of purchase will be as soon as possible but before March 2018	none
Training in Japan			
Training for Counterpart on GHG inventories in Japan	1 week training	none	none
In-country/Third country Training			
Training for Counterpart on GHG inventories in developing country	1 week training	timing changed from 3rd q to 2nd q	none

Duration / Phasing	Remarks	Issue	Solution

Monitoring Plan	Remarks	Issue	Solution
Monitoring			
Joint Coordinating Committee		none	none
Set-up the Detailed Plan of Operation		none	none
Submission of Monitoring Sheet		none	none
Reports/Documents			
Work Plan		none	none
National GHG inventory Report		timing shifted back a month	none
Project Progress Report		none	none
Project Brief Note		none	none
Project Completion Report		none	none
Public Relations			
Establishment and operation of JICA TC website			

Activities / Sub-Activities						Year	2017		2018				2019				2020				2021			Responsible Organization		Achievements	Issue & Countermeasures
							Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG		
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.																											
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	○	○	○	○	○	Plan / Actual																		JICA	CCDA	timing shifted back a month	none
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	○	△	△	△	△	Plan / Actual																		JICA	CCDA	none	none
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	○	○	○	○	○	Plan / Actual																		JICA	CCDA	timing shifted back a 2 months	none
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	△	○	○	○	○	Plan / Actual																		JICA	CCDA	timing shifted back a month	none
1.5 Collect data necessary for national GHG inventories from relevant parties.	△	○	○	○	○	Plan / Actual																		JICA	CCDA	timing extended one month	none
1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	△	○	○	○	○	Plan / Actual																		JICA	CCDA	timing extended one month	none
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	△	○	○	○	○	Plan / Actual																		JICA	CCDA	timing extended one month	none
1.8 Compile national GHG inventories with time series consistency.	△	○	○	○	○	Plan / Actual																		JICA	CCDA	timing extended one month	none
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	△	○	○	○	○	Plan / Actual																		JICA	CCDA	timing extended one month	none
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.																											
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	○	○	○	○	○	Plan / Actual																				none	none
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	○	○	○	○	○	Plan / Actual																				timing shifted back a month	none
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)																											
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	△	○	○	○	○	Plan / Actual																				timing shifted back a month and extended. Additional period in 2020.	none
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	○	△	△	△	△	Plan / Actual																				timing shifted back a month	none
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	△	○	○	○	○	Plan / Actual																				timing shifted back a month	none
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	△	○	○	○	○	Plan / Actual																				timing shifted back a month	none
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	○	○	○	○	○	Plan / Actual																				timing shifted back a month	none
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	○	△	△	△	△	Plan / Actual																				timing shifted back a month	none
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	○	△	△	△	△	Plan / Actual																				timing shifted back a month	none

Annex 8-2: Project Monitoring Sheet ver.2

TO CR of JICA　Papua New Guinea　OFFICE

Project Monitoring Sheet

Project Title : The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version of the Sheet: Ver. 2（Term: August, 2017 - December, 2017）

Name: Takeshi Enoki

Title: GHG Inventory (General)

Submission Date: January 31, 2018

I. Summary

1　Progress

1-1 Progress of Inputs

The contract for the JICA Project members started in August 28, 2017. The detailed Plan of Operation, the first draft of the Monitoring Sheet, and Work Plan of the Project were complete the following month.

During the first mission from October 4 to 18, the JICA expert team members held kickoff meetings with CCDA and other stakeholders, and agreed on the contents of the Work Plan for the Project. The Project members also purchased one desktop computer, two laptop computers, a printer, and relevant appliances, as per the PDM.

During the second mission from December 3 to 16, the JICA expert team members worked with CCDA counterparts to estimate GHG emissions and removals for the GHG inventory to be included in the first Biennial Update Report (hereinafter referred to "BUR 1 inventory"). The Joint Coordinating Committee (hereinafter referred to "JCC") is tentatively scheduled for February 2018, depending on whether the timelines for BUR1 preparation can be clarified by then.

The Project website, describing Project activities and updating milestones was opened in November 2017.

The table below shows the inputs by JICA expert team and monitoring activities in 2017.

Table 1 Input for year 2017

Inputs				Year	2017			
				Month	9	10	11	12
Expert	1	GHG Inventory（General）		Plan	14			14
				Actual	15			14
	2	GHG Inventory（Energy）		Plan	14			14
				Actual	15			14
	3	GHG Inventory（Industrial Processes and Product Use）		Plan				7
				Actual				7
	4	GHG Inventory（Agriculture, Land use change and Forestry）		Plan				7
				Actual				8
	5	GHG Inventory（Waste）		Plan				7
				Actual				6
Japan's Activitie	1	GHG Inventory （General）		Plan	20			
				Actual	21			
	2	GHG Inventory （Energy）		Plan	15			
				Actual	15			
	3	GHG Inventory （Industrial Processes and Product Use）		Plan	10			
				Actual	10			
	4	GHG Inventory （Agriculture, Land use change and Forestry）		Plan	10			
				Actual	9			
	5	GHG Inventory （Waste）		Plan	10			
				Actual	10			
	6	Project administrative coordination / coordinator for training		Plan				
				Actual				
Equipment	PC for data management			Plan				
				Actual				
Plan Monitoring	Monitoring	Joint Coordinating Committee		Plan				
				Actual				
		Set-up the Detailed Plan of Operation		Plan				
				Actual				
		Submission of Monitoring Sheet		Plan				
				Actual				
	Reports/Documents	Work Plan		Plan				
				Actual				
		National GHG inventory Report		Plan				
				Actual				
		Project Progress Report		Plan				
				Actual				
		Project Brief Note		Plan				
				Actual				
		Project Completion Report		Plan				
				Actual				
	Public Reations	Establishment and operation of JICA TC website		Plan				
				Actual				

1-2 Progress of Activities

a. Overview of activities carried out in 2017

Due to the delay of the BUR 1 inventory preparation by CCDA, some of the Project activities have yet to be carried out. For example, activities 2.2, 3.2, 3.3 are activities planned under the assumption that the BUR 1 inventory would be completed by December 2017, and have yet to be implemented.

The table below shows an overview of the progress of activities.

Table 2 Overview of progress of activities

	Activities	Year	2017				
		Month	8	9	10	11	12
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan					
		Actual					
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan					
		Actual					
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan					
		Actual					
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan					
		Actual					
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan					
		Actual					
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan					
		Actual					
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan					
		Actual					
	1.8: Complie national GHG inventories with time series consistency.	Plan					
		Actual					
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan					
		Actual					
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan					
		Actual					
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan					
		Actual					
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan					
		Actual					
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan					
		Actual					
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan					
		Actual					
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan					
		Actual					
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan					
		Actual					
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan					
		Actual					
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan					
		Actual					

b. Output 1activities

JICA expert team members began supporting the PNG counterparts to estimate GHG emissions and removals for the BUR 1 inventory (activities 1-7, 1-8, and 1-9). Regarding data management, CCDA members have taken an inconsistent approach in approach to estimating GHG emissions and removals for the BUR1. Some have used excel spreadsheets while others used different software for the GHG estimation. When the BUR1 inventory is complete, the Project members will discuss a consistent and common approach to managing inventory data and the

most efficient and effective way to estimate emissions and removals. Below is a summary of the current approach to data management.

Table 3 Data management approach for the BUR1 inventory

Sector	Approach
Energy	Data is managed and emissions are estimated on a series of excel spreadsheets.
Industrial Processes and Product Use (IPPU)	Emissions are estimated using the 2006 IPCC Guidelines software.
Agriculture	Emissions are estimated using the UNFCCC software based on 1996 IPCC Guidelines. The different IPCC Guidelines is used, making compilation difficult for the inventory compiler.
Land use, Land use change, and Forestry (LULUCF)	The tables included in the 2006 IPCC Guidelines have been modified to estimate emissions and removals.
Waste	Data is managed and emissions are estimated on a series of excel spreadsheets.
General (compilation of emissions and removals)	Not yet designed. At the beginning of the Project, CCDA had not considered or planned the compilation of the sector results into a national GHG inventory.

c. Output 2 activities

The inception workshop of the Project (activity 2-1) was held in the morning of December 6, 2017. The objectives of the inception workshop were of the following:

i. To familiarize participants with the GHG inventory and the UNFCCC reporting requirements and guidelines;

ii. To familiarize participants with the objectives, activities, and outputs of the JICA project; and

iii. To discuss the challenges of GHG inventory preparation, specifically the institutional arrangements and data collection.

More than 30 representatives from over 10 organizations participated in the inception workshop. The inception workshop successfully provided participants with general information on GHG inventory such as its uses, the UNFCCC reporting requirements, and the importance of institutional arrangements for regular preparation of GHG inventories. The participants found the workshop to be informative and that they have a better understanding of the objectives, outputs, and activities of the JICA project. For more details, see Annex: inception workshop report.

The workshop to present the results of the BUR 1 inventory (activity 2-2) was originally scheduled to be held in Nov. to Dec. but will be postponed until the BUR 1 inventory is complete.

d. Output 3 activities

As the BUR 1 inventory has yet to be completed, the key category analysis (activity 3.2) and compiling information on country specific parameters (activity 3.3) has yet to be carried out. The summary of the GHG inventory has yet to be drafted due to the delay of inventory activities, but during the December mission, the Project members discussed the structure to be used in the GHG inventory chapter of the BUR1 (see figure below). This structure takes into consideration the reporting criteria as described in the *"Guidelines for the Preparation of National Communications from Parties not included in Annex I to the Convention" and the "UNFCCC Biennial Reporting Guidelines for Developed Country Parties."*

Chapter 2. GHG Inventory

2.1. National GHG inventory arrangements

2.2. Methodology

2.2.1. Which IPCC GLs used (1 or 2 sentences) SHOULD REQUIREMENT

2.2.2. Which reporting guidelines (1 or 2 sentences)

2.2.3. Which tiers/methods used (table of categories)

2.2.4. Which years (1 or 2 paragraphs. Include reason for inclusion of 2015)

2.2.5. Source of activity data, emission factors (1 or 2 sentences)

2.2.6. Which the GWP used (1 or 2 sentences)

2.2.7. Estimated using what software/spreadsheet (1 or 2 sentences)

2.3. Emission removal trend

2.3.1. Overview table and/or figure showing SHALL REQUIREMENT

2.3.2. Table 1/Table 2 of the 17CP8 for the most recent year SHOULD REQUIREMENT

2.3.3. Key category assessment

2.4. Sectors

2.4.1. Energy

2.4.1.1. General breakdown of emissions in the sector

2.4.1.2. Tiers, Methods, source of activity data, emission factors

2.4.1.3. Improvements made, challenges, areas for further improvement in the future

2.4.2. IPPU

2.4.3. Agriculture

2.4.4. LULUCF

2.4.5. Waste

Figure 1 Proposed structure of the GHG inventory chapter of BUR1

1-3 Achievement of Output

As mentioned above, a half day inception workshop for the Project was held in December 2017. A questionnaire was handed out to the participants at the end of the workshop asking the following questions:

- **How would you rate this training workshop?**
- **How satisfied were you with these sessions?**
- **How useful/relevant were the individual sessions for your work?**

Assuming that the level of satisfaction reflects the level of understanding of the workshop, most participants had a good level of understanding of the workshop. Specifically, 86% of participants were either very satisfied or satisfied with the "climate change policy in PNG" session, 93% very satisfied or satisfied with the "UNFCCC Reporting (MRV) requirements" and "PNG and inventories" sessions, and 100% for "Overview of the JICA Project" and "Institutional arrangements" sessions. Details of the questionnaire are included in Annex I: inception workshop report.

The level of understanding/satisfaction of each of the sessions is shown in the figure below.

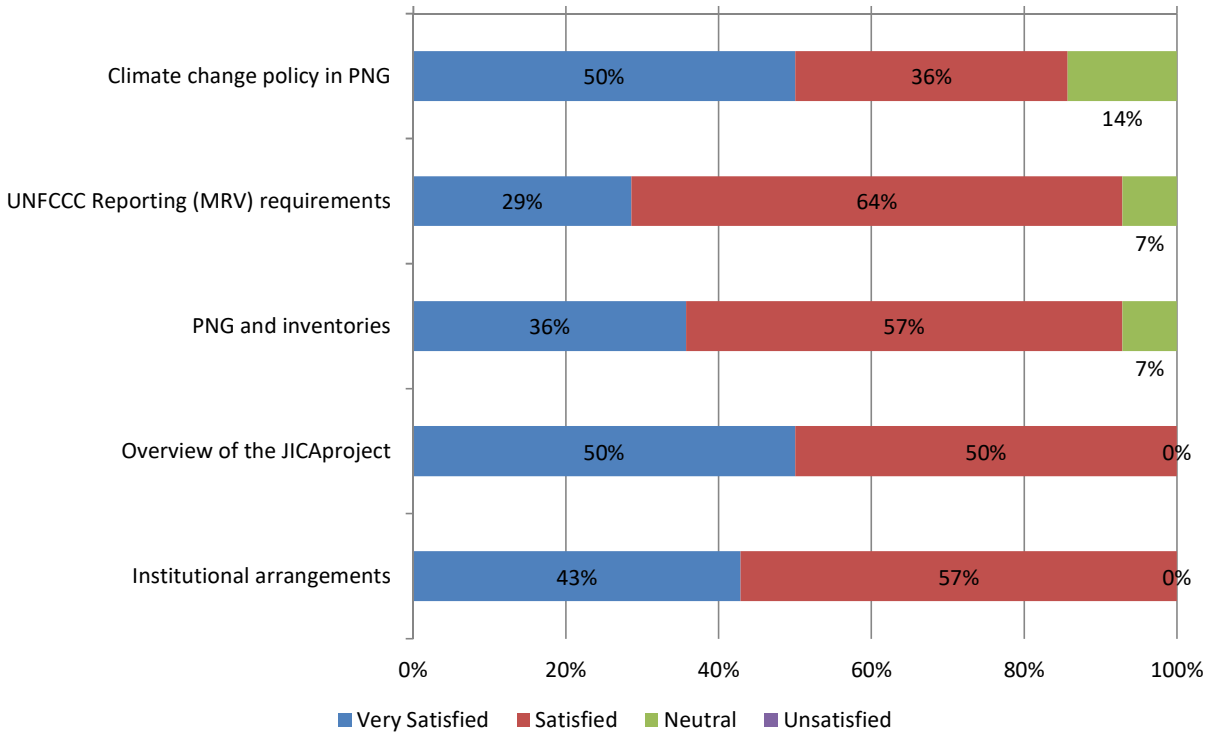


Figure 2 Level of satisfaction of each session

1-4 Achievement of the Project Purpose

A draft TACCC checklist, which is one of the Objectively Verifiable Indicators of the Project Purpose, has been developed and included in the Work Plan. The Project members will discuss the contents when the BUR 1 inventory is complete.

1-5 Changes of Risks and Actions for Mitigation

There have been no changes in risks of implementation of the Project since the planning of the Project.

The risks to the Project implementation are as below.

Table 4 Risks of implementation of the Project

Assumed risk	Background and Implication of risk	Measures taken in 2017
Progress of BUR1 inventory	During the Survey for technical cooperation for this Project carried out in Sept. 2016 and Feb. 2017, JICA was informed by CCDA that PNG was aiming to submit its BUR1 in December 2017. The activities of the Project are designed under this assumption. The timelines and plans of the Project were carefully designed based on this deadline/assumption, with some flexibility built in in case there were minor delays. However, significant delays in the BUR 1 inventory process would result in a delay in the Project activities. The Project is designed to implement two GHG inventory cycles, but with significant delays, the Project may not be able to complete an entire two cycles.	The progress of the BUR1 inventory was discussed during the first and second mission to PNG. The progress for energy, IPPU, and waste were relatively positive, but significant delays in the AFOLU sector. In addition, the CCDA is uncertain about the times lines for the AFOLU sector work and deadlines of the BUR1.
Management positions	The Project Director and Project Manager positions were vacant at the time of the signing of the Record of Discussions in April 2017. The two positions have been tentatively filled by the General Manager of REDD+ and Mitigation, and the Manager of MRV, respectively. However, this is an unfair burden on both managers, as this Project requires full time commitment from the top in order to properly coordinate with JICA and other donors, and other stakeholders relevant to the preparation of GHG inventories.	A kickoff teleconference was held in Sept. 11 for clarification. During the first mission to PNG, the JICA team was informed that General Manager of REDD+ and Mitigation, and the Manager of MRV would fill the Project Director and Project Manager positions, respectively.
Duplication of work with other donors	The FAO has been supporting CCDA with the AFOLU inventory as part of the UN-REDD support to CCDA. In addition, the CCDA requested further support from the Capacity Building Initiative for Transparency (CBIT)/GEF and The Coalition for Rainforest Nations (CfRN) to estimate GHG emissions and removals from the AFOLU sector. Depending on the scope of the other donor projects, the JICA Project will need to adjust their scope and input to the Project. There are also considerations with regards to timing, and producing a GHG inventory. The coordination of projects will be critical for timely and efficient GHG inventory process.	A kickoff teleconference was held in Sept. 11 for clarification. During the two missions, the JICA expert team was informed of the two projects for AFOLU support, but there is still a lack of clarity on the timelines and deadlines of the two projects.

1-6 Progress of Actions undertaken by JICA

Given the situation described in 1.5, JICA will consider taking formal steps to request CCDA to provide clarity on the deadline of the BUR1 and the management positions.

1-7 Progress of Actions undertaken by Gov. of PNG

The CCDA is in the process of considering actions to address the risks outlined in 1.5.

1-8 Progress of Environmental and Social Considerations (if applicable)

Not applicable

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

Not applicable

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

Described in 1.5. Under the support of FAO, CCDA applied for an approximately 2 million US dollar project lasting for 3 years from 2017 provided by GEF/CBIT for comprehensive support in data development in the AFOLU sector, and was approved in June 2017. The GEF/CBIT project contains activities to comprehensively support the GHG inventory preparation, from data collection to reporting, in the AFOLU sector. In addition, the CCDA has requested the Coalition for Rainforest Nations (CfRN) to support the estimation of GHG emissions and removals from the AFOLU sector as well. However, there is little coordination between these projects, and the timelines, the outputs, and deadlines for the BUR1 are unclear.

The JICA Project initially planned to provide GHG inventory preparation support to all sectors but the scope will need to be adjusted when there is clarity on what the scope, activities, and timelines are for the other projects.

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

Described in 1.5. JICA conducted two Detailed Planning Surveys specifically for this Project, in September 2016 and in February 2017. During both Survey missions, CCDA informed JICA that it was expecting to submit its first BUR to the UNFCCC at the end of 2017. The timelines and plans of the Project were carefully designed based on this deadline/assumption, with some flexibility built in in case there were minor delays. However, CCDA does not consider the end of 2017 as a deadline anymore, and has not clearly assessed how long the delay will be. This uncertainty and lack of urgency has implications on the activities of the Project, which is designed to carry out two cycles of GHG inventory preparation.

2-2 Cause

The NC/BUR manager position in CCDA was vacated in the middle of the year, which has negatively impacted the GHG inventory preparation in CCDA, specifically in terms of planning, setting goals, and timelines for preparing the GHG inventory.

In addition, there are delays in the FAO support to the GHG estimation of the LULUCF sector. Furthermore, other donors are influencing CCDA to reconsider the submission contents and timing. However, the CCDA has not been able to coordinate and manage the other projects, leading to confusion about timelines for the BUR submission.

2-3 Action to be taken

The JICA expert team discussed the issues above with the Project Director, Ms. Gwen Sissiou during the December mission. Ms. Sissiou mentioned that the CCDA will try to improve its donor coordination and clarify the deadline for BUR1 submission. It was mentioned that a letter of concern to the CCDA Managing Director could facilitate the actions by CCDA. The JICA expert team will consult JICA headquarters to plan a way forward to support the smooth implementation of the Project.

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of PNG,etc.)

JICA will consider the steps forward, including sending a letter of concern to the Managing Director of CCDA, with a view to have senior management provide more clarity on the submission timing of the BUR and coordination of donors.

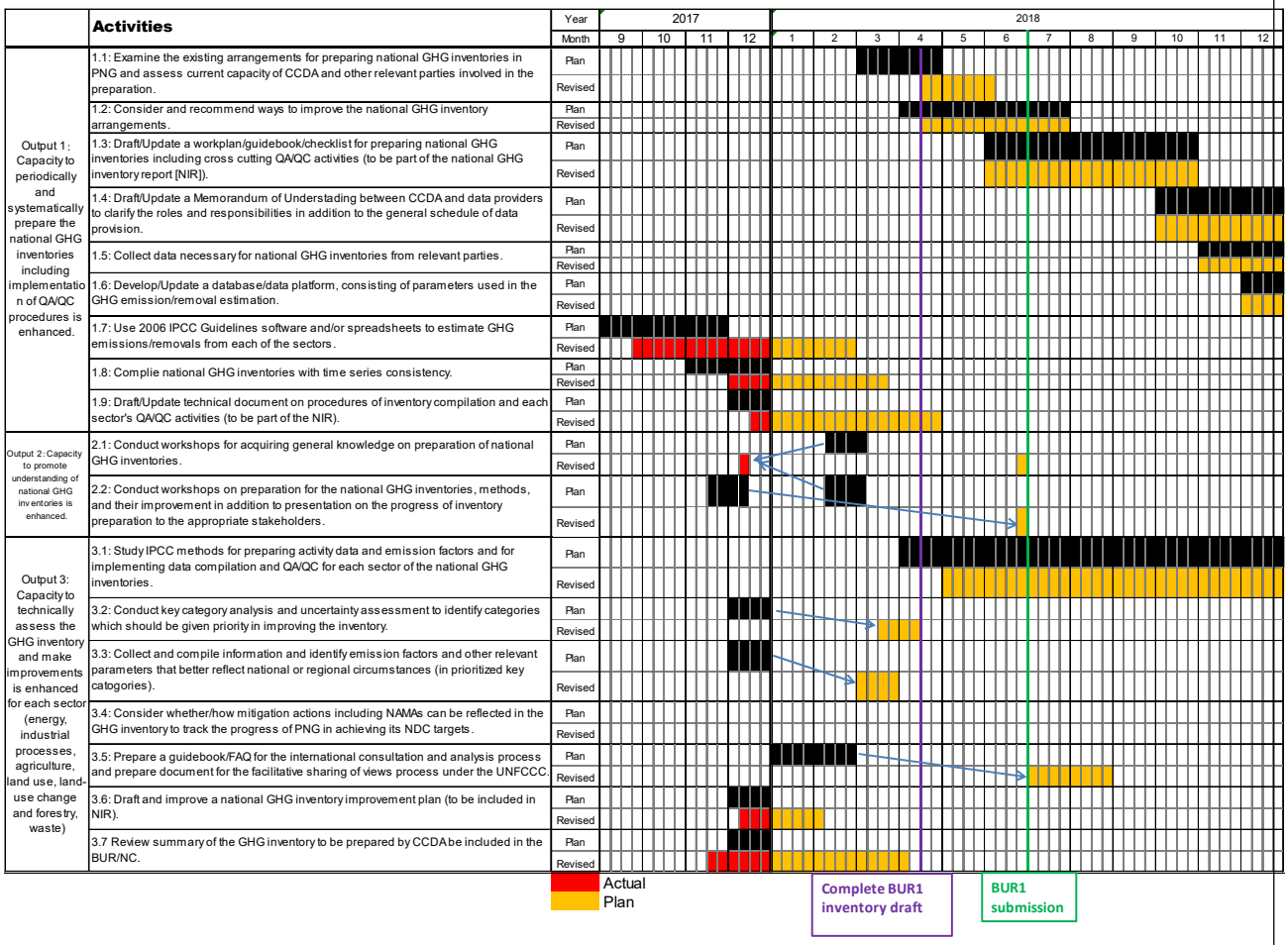
3 Modification of the Project Implementation Plan

3.1 Plan of Operation

Minor revisions were made to the PO attached to the R/D when the Project began. These were made in light of the fact that the Project duration began a few weeks later than anticipated. In addition, a three month period was added to activity 3.1 to reflect the need for CCDA members to enhance their understanding of the IPCC methods every cycle. Neither change is expected to impact the implementation of the Project.

Given the delay of the BUR 1 inventory preparation, further revisions will be needed in the future. However, without a clear deadline/goal for the BUR1, it is difficult to propose the changes at this time. Assuming that the BUR1 will be submitted in June 2018, a revised PO could be as below.

Table 5 Plan for 2018



3-2 Other modifications on detailed implementation plan

None

4 Current Activities of Gov. of PNG to Secure Project Sustainability after its Completion

none

II. Project Monitoring Sheet I & II *as Attached*

Monitoring Sheet I

Project Monitoring Sheet I （Revision of Project Design Matrix）

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 2

Implementing Agency: CCDA

Dated January 31, 2018

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG　　**Model Site:**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist		none	none
Project Purpose The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.	Draft TACCC checklist developed	none
Outputs Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report		none	none
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire		level of satisfaction was over 70% for inception workshop	none
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report			

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1：Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3：Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5：Collect data necessary for national GHG inventories from relevant parties. 1-6：Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8：Compile national GHG inventories with time series consistency. 1-9：Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1：Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2：Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1：Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2：Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3：Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6：Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	
			Pre-Conditions
			<Issues and countermeasures>

Monitoring Sheet II

Project Monitoring Sheet II (Revision of Plan of Operation)

Version 2

Dated January 31, 2018

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ			
Expert																					
GHG inventory (General)	Plan																		approximately 1 week to 2 weeks a quarter/expert	none	none
	Actual																				
GHG inventory (Energy)	Plan																				
	Actual																				
GHG inventory (Industrial Processes and Product use)	Plan																				
	Actual																				
GHG inventory (Agriculture, Land use change and Forestry)	Plan																				
	Actual																				
GHG inventory (Waste)	Plan																				
	Actual																				
Equipment																					
PC for data management	Plan																			none. All purchased in October 2017	none
	Actual																				
Training in Japan																					
Training for Counterpart on GHG inventories in Japan	Plan																		1 week training	timing changed from 2018 to 2019	none
	Actual																				
In-country/Third country Training																					
Training for Counterpart on GHG inventories in developing country	Plan																		1 week training	timing changed from 3rd q to 2nd q	none
	Actual																				

Duration / Phasing																					
	Plan																				
	Actual																				

Monitoring Plan	Year	2017		2018				2019				2020				2021			Remarks	Issue	Solution
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ			
Monitoring																					
Joint Coordinating Committee	Plan																			to be held when there is clarity on BUR1	none
	Actual																				
Set-up the Detailed Plan of Operation	Plan																			none	none
	Actual																				
Submission of Monitoring Sheet	Plan																			none	none
	Actual																				
Reports/Documents																					
Work Plan	Plan																			none	none
	Actual																				
National GHG inventory Report	Plan																			timing shifted back a month	none
	Actual																				
Project Progress Report	Plan																			none	none
	Actual																				
Project Brief Note	Plan																			none	none
	Actual																				
Project Completion Report	Plan																			none	none
	Actual																				
Public Relations																					
Establishment and operation of JICA TC website	Plan																				
	Actual																				

Activities / Sub-Activities						Year	2017		2018				2019				2020				2021			Responsible Organization		Achievements	Issue & Countermeasures
							Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG		
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.																											
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	○	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	○	△	△	△	△	Plan																		JICA	CCDA	none	none
						Actual																					
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	○	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.5 Collect data necessary for national GHG inventories from relevant parties.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.8 Compile national GHG inventories with time series consistency.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.																											
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	○	○	○	○	○	Plan																		JICA	CCDA	held in December	none
						Actual																					
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	○	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)																											
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	○	△	△	△	△	Plan																		JICA	CCDA	none	none
						Actual																					
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	○	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	○	△	△	△	△	Plan																		JICA	CCDA	none	none
						Actual																					
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	○	△	△	△	△	Plan																		JICA	CCDA	none	none
						Actual																					

Annex 8-3: Project Monitoring Sheet ver.3

TO CR of JICA　Papua New Guinea　OFFICE

Project Monitoring Sheet

Project Title : The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG
Version of the Sheet: Ver. 3（Term: January, 2018 - September, 2018）

Name: Takeshi Enoki
Title: GHG Inventory (General)
Submission Date: October 1, 2018

I. Summary

1　Progress

1-1 Progress of Inputs

During the term January ~ September 2018, the JICA experts made 13 man trips to PNG to work with CCDA counterparts to estimate GHG emissions and removals for the GHG inventory to be included in the first Biennial Update Report (hereinafter referred to “BUR 1 inventory”).　In addition to guiding the CCDA members prepare their GHG inventory, the JICA experts supported the drafting of the other chapters of the BUR such as national circumstances, mitigation actions, and support need/received.　The first draft of the BUR was mostly completed during the August mission.　A consultation workshop is scheduled to be held on October 4-5, where stakeholders will be asked to review and approve the BUR.　If stakeholders have revision proposals for the BUR1 draft, the CCDA staff will reflect these by mid-November, so that the document can be officially approved by the Minister, and submitted to the UNFCCC secretariat in December 2018.

The Joint Coordinating Committee (hereinafter referred to “JCC”) was held on May 23, 2018.　The objectives of the JCC were to familiarize JCC members with the GHG inventory and the UNFCCC reporting requirements and guidelines, and to agree on the objectives, activities, timelines, and outputs of the JICA Project.　The JCC members agreed to the work plan presented at the meeting, and also agreed to cooperate with CCDA in providing necessary technical and data input to the CCA members, as needed.

The table below shows the inputs by JICA experts and monitoring activities from January to September 2018.

Table 1 Input for term January ~ September 2018

Inputs				Year	2017				2018								
				Month	9	10	11	12	1	2	3	4	5	6	7	8	9
Expert	1	GHG Inventory（General）		Plan		14		14		10		14		10			14
				Actual		15		14		14			7			12	5
	2	GHG Inventory（Energy）		Plan		14		14		10		14		10			14
				Actual		15		14		12		7				7	
	3	GHG Inventory（Industrial Processes and Product Use）		Plan				7		7		7		10			10
				Actual				7					7			8	
	4	GHG Inventory（Agriculture, Land use change and Forestry）		Plan				7		7		7		10			7
				Actual				8		7		4				8	
	5	GHG Inventory（Waste）		Plan				7		7		7		10			7
				Actual				8								7	
Japan's Activitie	1	GHG Inventory （General）		Plan	20				25								
				Actual	21				22								
	2	GHG Inventory （Energy）		Plan	15				20								
				Actual	15				15								
	3	GHG Inventory （Industrial Processes and Product Use）		Plan	10				15								
				Actual	10				14								
	4	GHG Inventory （Agriculture, Land use change and Forestry）		Plan	10				15								
				Actual	9				13								
	5	GHG Inventory （Waste）		Plan	10				15								
				Actual	10				15								
	6	Project administrative coordination / coordinator for training		Plan	10										7		
				Actual	10										3		
Plan Monitoring	Monitoring		Joint Coordinating Committee	Plan													
				Actual													
			Set-up the Detailed Plan of Operation	Plan													
				Actual													
			Submission of Monitoring Sheet	Plan													
				Actual													
	Reports/Documents		Work Plan	Plan													
				Actual													
			National GHG inventory Report	Plan													
				Actual													
			Project Progress Report	Plan													
				Actual													
			Project Brief Note	Plan													
				Actual													
			Project Completion Report	Plan													
				Actual													
	Public Reations		Establishment and operation of JICA TC website	Plan													
				Actual													

1-2 Progress of Activities

a. Overview of activities carried out in this term

The work plan/Plan of Operation of the Project was revised in April 2018 to reflect the revised BUR1 submission deadline from December 2017 to June 2018. However, due to further delays with the technical annex on REDD+ and the BUR1 chapters, the submission date was further postponed to end of 2018. The drafts of the BUR1 chapters were mostly complete in August, and a consultation workshop to receive feedback from stakeholders is scheduled for October 4 and 5. On October 18, a separate consultation workshop organized by the FAO will present the results of the annex on REDD+. The CCDA members will reflect any comments from the consultation workshops by mid-November and finally submit to the UNFCCC secretariat in December.

As a result of the delay, some Project activities planned for this term, such as activities 1.3, 2.2, and 3.5, have not implemented yet, but most other activities have been carried out as outlined in the work plan/ Plan of Operation as revised in April.

The table below shows an overview of the progress of activities.

Table 2 Overview of progress of activities

	Sub-Activities	Year	2017					2018								
		Month	8	9	10	11	12	1	2	3	4	5	6	7	8	9
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan														
		Actual														
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan														
		Actual														
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan														
		Actual														
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan														
		Actual														
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan														
		Actual														
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan														
		Actual														
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan														
		Actual														
	1.8: Complie national GHG inventories with time series consistency.	Plan														
		Actual														
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan														
		Actual														
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan														
		Actual														
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan														
		Actual														
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan														
		Actual														
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan														
		Actual														
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan														
		Actual														
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan														
		Actual														
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan														
		Actual														
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan														
		Actual														
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan														
		Actual														

Work plan/Plan of operation as approved by the 1st JCC

b. Output 1 activities

JICA experts continued to support PNG counterparts to estimate GHG emissions and removals for the BUR 1 inventory (activities 1-7, 1-8, and 1-9). Regarding data management, CCDA members have taken an inconsistent approach in approach to estimating GHG emissions and removals for the BUR1. Some have used excel spreadsheets while others used different software for the GHG estimation. When the BUR1 inventory is complete, the members will discuss a consistent and common approach to managing inventory data and the most efficient and effective way to estimate emissions and removals.

Below is a summary of the CCDA approach to data management for the BUR1 inventory.

Table 3 Data management approach for the BUR1 inventory

Sector	Approach
Energy	Data is managed and emissions are estimated on a series of excel spreadsheets.
Industrial Processes and Product Use (IPPU)	Emissions are estimated on excel spreadsheets.
Agriculture	Emissions are estimated using the UNFCCC software based on the 1996 IPCC Guidelines. The FAO reorganized the results to make the estimates comparable to other sectors.
Land use, Land use change, and Forestry (LULUCF)	Tables included in the 2006 IPCC Guidelines have been modified to estimate emissions and removals
Waste	Data is managed and emissions are estimated on a series of excel spreadsheets.
General (compilation of emissions and removals, KCA)	JICA expert developed a compilation file on excel file

From June to August, the JICA experts conducted a review of the existing arrangements in preparing the GHG inventory in PNG (activities 1-1, 1-2). Some of the major findings and recommendations for BUR 2 are shown in the table below.

Table 4 Findings and recommendations (crosscutting issues)

Theme	Findings	Recommendations
Inventory arrangements	Institutional arrangements between CCDA and data providers need to be enhanced to facilitate the sustainability of the inventory preparation.	During the data collection for the BUR2 inventory, CCDA should discuss and document long term/sustainable provision of data from stakeholders.
Procedural arrangements	CCDA does not have a clear timeline or a QA/QC plan to describe the inventory process in detail.	CCDA should develop clear timelines for themselves and share this with the stakeholders to have common understanding on the inventory process and deadlines.
Key category analysis	A key category analysis and uncertainty assessment were not conducted in the previous inventory.	The JICA experts will explain the key category analysis and uncertainty assessment and its purpose.
Improvement plan	CCDA does not have a clear improvement plan for the GHG inventory. It only has lists of necessary improvements that donors develop.	CCDA should take an active role to prioritize necessary improvements and develop a plan to be included as part of its QA/QC plan.
Archiving/Data management	Data are not stored in a systematic way and not shared among team members making compilation difficult.	The JICA experts will propose ways to manage data and methods to archive information.

c. Output 2 activities

The inception workshop of the Project (activity 2-1) was held on December 6, 2017. The workshop successfully provided participants with general information on GHG inventory such as its uses, the UNFCCC reporting requirements, and the importance of institutional arrangements for regular preparation of GHG inventories. The participants found the workshop to be informative and that they have a better understanding of the objectives, outputs, and activities of the JICA Project.

The consultation workshop to present the results of the BUR 1 inventory (activity 2-2) will be held October 4 and 5, 2018.

d. Output 3 activities

The JICA experts and PNG counterparts studied and used the IPCC Guidelines to review the inventory that the CCDA began compiling (activity 3.1). Revisions were made to the inventory so that it was in line with the methods described in the IPCC Guidelines. The inventory estimation was complete in September, after which the data from all sectors were compiled and a key category analysis conducted by the JICA experts (activity 3.2).

The drafting of the GHG inventory chapter in the BUR1 (activity 3.7) was a group effort, and the draft was completed in September, in time for the consultation workshop (see attachment for the BUR1 draft).

1-3 Achievement of Output

The major achievement during this term is the completed BUR1 draft. This is the first climate change report to be drafted by CCDA internally, without outsourcing the technical work. Although there are many gaps and much room for improvement, this process has been a confidence building activity for the CCDA staff, and the JICA experts are hopeful that the BUR2 inventory will be prepared more efficiently and in a timely manner to make up for lost time.

1-4 Achievement of the Project Purpose

A GHG inventory summary report has been drafted as part of the BUR1. This report summarizes the methods, data used, assumptions, results, challenges, etc. for all sectors of the inventory. This will be elaborated into a technical report for the next inventory cycle. A TACCC checklist, which is one of the Objectively Verifiable Indicators of the Project Purpose, has been agreed by the JICA experts and CCDA staff. This checklist was used to carry out the capacity assessment of PNG to prepare GHG inventories.

1-5 Changes of Risks and Actions for Mitigation

There have been no changes in risks of implementation of the Project since the inception of the Project. Although the BUR1 completion has been delayed a full year, the JICA experts and CCDA staff will continue to carry out the Project activities on the basis of the current work plan/Plan of Operation, with a view to complete two full inventory cycles during the Project duration.

1-6 Progress of Actions undertaken by JICA

none

1-7 Progress of Actions undertaken by Gov. of PNG

none

1-8 Progress of Environmental and Social Considerations (if applicable)

Not applicable

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

Not applicable

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

none

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

Described in 1-2 and 1-5.

2-2 Cause

The NC/BUR manager position in CCDA was vacated in the middle of the 2017, which has negatively impacted the GHG inventory preparation in CCDA, specifically in terms of planning, setting goals, and timelines for preparing the GHG inventory.

In addition, there were delays in the FAO support to the GHG estimation of the LULUCF sector. Furthermore, other donors are influencing CCDA to reconsider the submission contents and timing. However, the CCDA has not been able to coordinate and manage the other projects, leading to confusion about timelines for the BUR submission.

2-3 Action to be taken

JICA sent a letter to CCDA in January 2018, to express concern regarding the poor management of the BUR1 process including setting deadlines and coordinating donors. To this, the CCDA informally agreed to set a soft deadline of June 2018, which was delayed again to December 2018.

As mentioned in 1-5, the JICA experts and PNG counterparts will continue to work under the basis of the current work plan/Plan of Operation, with a view to complete two full inventory cycles during the Project duration. The JICA experts expect the BUR2 inventory cycle to be less time consuming, as this is the CCDA staffs' second iteration of the inventory process, and should be carried out more efficiently than the first.

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of PNG,etc.)

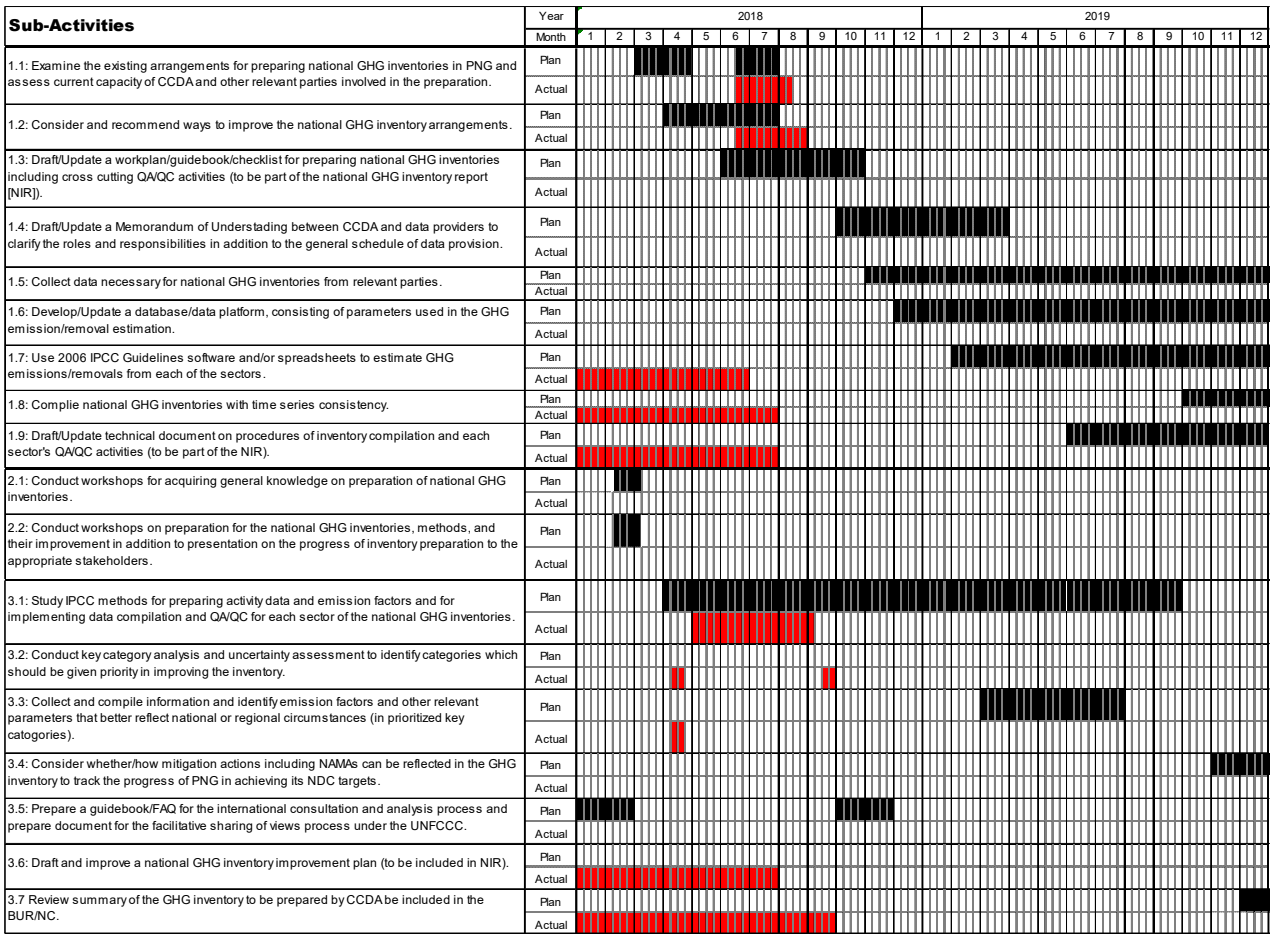
none

3 Modification of the Project Implementation Plan

3.1 Plan of Operation

As mentioned before, revisions were made to the work plan/Plan of Operation and agreed at the first JCC.　Although there have been further delays in the BUR1 submission, JICA experts and PNG counterparts will do their best to carry out the Project activities as shown below.

Table 5 Work Plan for 2018 ~ 2019



3-2 Other modifications on detailed implementation plan

None

4 Current Activities of Gov. of PNG to Secure Project Sustainability after its Completion

none

II. Project Monitoring Sheet I & II *as Attached*

Monitoring Sheet I

Project Monitoring Sheet I （Revision of Project Design Matrix）

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 3

Implementing Agency: CCDA

Dated October 1, 2018

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG　　**Model Site:**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist		none	none
Project Purpose The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.	A GHG inventory summary report has been drafted as part of the BUR1 Draft TACCC checklist developed	none
Outputs Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report		GHG estimation files and summary report completed for the BUR1	none
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire		level of satisfaction was over 70% for inception workshop	none
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report		A summary GHG inventory reportdrafted as part of the BUR1	none

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5 : Collect data necessary for national GHG inventories from relevant parties. 1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8 : Compile national GHG inventories with time series consistency. 1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2 : Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	
			Pre-Conditions
			<Issues and countermeasures> The BUR1 submission was further delayed from June to December 2018. However, the team members will carry out the mandated activities as shown in the revised PO as contained in PM Form 3-3.

Monitoring Sheet II

Project Monitoring Sheet II (Revision of Plan of Operation)

Version 3

Dated October 1, 2018

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III			
Expert																					
GHG inventory (General)	Plan																		approximately 1 week to 2 weeks a quarter/expert	none	none
	Actual																				
GHG inventory (Energy)	Plan																				
	Actual																				
GHG inventory (Industrial Processes and Product use)	Plan																				
	Actual																				
GHG inventory (Agriculture, Land use change and Forestry)	Plan																				
	Actual																				
GHG inventory (Waste)	Plan																				
	Actual																				
Project administrative coordination / coordinator for training	Plan																		support from Japan		
	Actual																				
Equipment																					
PC for data management	Plan																		none. All purchased in October 2017	none	none
	Actual																				
Training in Japan																					
Training for Counterpart on GHG inventories in Japan	Plan																		1 week training, to be conducted with the in country/third country training	none	none
	Actual																				
In-country/Third country Training																					
Training for Counterpart on GHG inventories in developing country	Plan																		1 week training, to be conducted with the in country/third country training	none	none
	Actual																				

Duration / Phasing																					
	Plan																				
	Actual																				

Monitoring Plan	Year	2017		2018				2019				2020				2021			Remarks	Issue	Solution
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III			
Monitoring																					
Joint Coordinating Committee	Plan																			none	none
	Actual																				
Set-up the Detailed Plan of Operation	Plan																			none	none
	Actual																				
Submission of Monitoring Sheet	Plan																			none	none
	Actual																				
Reports/Documents																					
Work Plan	Plan																			none	none
	Actual																				
National GHG inventory Report	Plan																			timing shifted to December 2020	none
	Actual																				
Project Progress Report	Plan																			none	none
	Actual																				
Project Brief Note	Plan																			none	none
	Actual																				
Project Completion Report	Plan																			none	none
	Actual																				
Public Relations																					
Establishment and operation of JICA TC website	Plan																				
	Actual																				

Activities / Sub-Activities							Year	2017		2018				2019				2020				2021			Responsible Organization		Achievements	Issue & Countermeasures
								Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG		
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.																												
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	○	○	○	○	○	Plan																			JICA	CCDA	developed a checklist to assess capacity of institution to prepare inventories	none
						Actual																						
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	○	△	△	△	△	Plan																			JICA	CCDA	identified institutional challenges and ways to address challenges	none
						Actual																						
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	○	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	△	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
1.5 Collect data necessary for national GHG inventories from relevant parties.	△	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	△	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	△	○	○	○	○	Plan																			JICA	CCDA	Spreadsheets developed for the BUR1	none
						Actual																						
1.8 Compile national GHG inventories with time series consistency.	△	○	○	○	○	Plan																			JICA	CCDA	compilation file developed	none
						Actual																						
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	△	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
Output 2:Capacity to promote understanding of national GHG inventories is enhanced.																												
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	○	○	○	○	○	Plan																			JICA	CCDA	held inception workshop in December	none
						Actual																						
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	○	○	○	○	○	Plan																			JICA	CCDA	to be held in October	none
						Actual																						
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)																												
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	△	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	○	△	△	△	△	Plan																			JICA	CCDA	key categories file developed	none
						Actual																						
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	△	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	△	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	○	○	○	○	○	Plan																			JICA	CCDA	none	none
						Actual																						
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	○	△	△	△	△	Plan																			JICA	CCDA	developed a general improvement plan for BUR2	none
						Actual																						
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	○	△	△	△	△	Plan																			JICA	CCDA	BUR1 developed under JICA supervision	none
						Actual																						

TO CR of JICA Papua New Guinea OFFICE

Project Monitoring Sheet

Project Title : The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG
Version of the Sheet: Ver. 4（Term: October, 2018 – March, 2019

Name: Takeshi Enoki
Title: GHG Inventory (General)
Submission Date: April 1, 2019

I. Summary

1. Progress

1.1 Progress of Inputs

Experts

During this reporting period of January 2018 to March 2019, the Japan International Cooperation Agency (JICA) Project expert team made 18 man-trips to Papua New Guinea (PNG). Total man months was 5.03 in PNG and 5.10 for activities in Japan.

Meetings

The First Joint Coordinating Committee (JCC) was held on May 23, 2018, with the objectives of familiarizing JCC members with the GHG inventory, United Nations Framework Convention on Climate Change (UNFCCC) reporting requirements, and guidelines, and to agree on the objectives, activities, timelines, and outputs of the JICA Project. See Annex I for the first JCC Meeting Minutes. In October 2018, the Project counterparts Climate Change Development Agency (CCDA), JICA Project expert team, and Food and Agriculture Organization (FAO) co-hosted the 'National Stakeholder consultation workshop on PNG's first Biennial Update Report to the UNFCCC' to provide stakeholders a summary of the draft First Biennial Update Report (BUR1) and collect comments for further improvement.

Equipment

In October 2017, the JICA Project expert team purchased one desktop computer, two laptop computers, a printer, and relevant appliances, as per the PDM.

Reports

After confirming the progress of the Project with the CCDA, the second and third monitoring sheets were submitted in March and October 2018, respectively.

Public relations

The Project website (https://www.jica.go.jp/project/english/png/006/index.html), describing Project activities and updating milestones was opened in November 2017, under the JICA website.

Table 1 shows the inputs by JICA Project expert team for this reporting period.

Table 1 Input for this reporting period

Inputs				Year	2018												2019		
				Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Expert	1	GHG Inventory (General)		Plan		10		14		10			14		10			14	
				Actual		14			7			12	11		9			11	
	2	GHG Inventory (Energy)		Plan		10		14		10			14		10			14	
				Actual		12		7				7							1
	3	GHG Inventory (Industrial Processes and Product Use)		Plan		7		7		10			10		7			1	
				Actual					7			8		6				1	
	4	GHG Inventory (Agriculture, Land use change and Forestry)		Plan		7		7		10			7		10			1	
				Actual		7		4				8							
	5	GHG Inventory (Waste)		Plan		7		7		10			7		10			1	
				Actual							7								
Activities in Japan	1	GHG Inventory (General)		Plan	25														
				Actual	23														
	2	GHG Inventory (Energy)		Plan	20														
				Actual	16														
	3	GHG Inventory (Industrial Processes and Product Use)		Plan	15														
				Actual	15														
	4	GHG Inventory (Agriculture, Land use change and Forestry)		Plan	15														
				Actual	15														
	5	GHG Inventory (Waste)		Plan	15														
				Actual	15														
	6	Project administrative coordination / coordinator for training		Plan							7								
				Actual							4								
Monitoring Plan		Monitoring	Joint Coordinating Committee	Plan															
				Actual					1										
			Set-up the Detailed Plan of Operation	Plan															
				Actual															
			Submission of Monitoring Sheet	Plan			1						1						
				Actual			1							1					
		Reports/Documents	Work Plan	Plan															
				Actual															
			National GHG inventory Report	Plan															
				Actual															
			Project Progress Report	Plan															
				Actual															
			Project Brief Note	Plan															
				Actual															
			Project Completion Report	Plan															
				Actual															
		Public Relations	Establishment and operation of JICA TC website	Plan															
				Actual															

1.2 Progress of Activities

a. Overview of activities carried out in this reporting period

The BUR1 was originally planned to be completed by CCDA before inception of the JICA Project, but due to the untimely passing of the CCDA team leader who

was in charge of managing the preparation process and quality control, the BUR1 preparation was the primary focus from beginning of the Project to this reporting period. This consisted mainly of supporting CCDA to manage the database for parameters to be used in the estimation, to estimate the GHG emissions and removals, and to draft the report. A draft BUR1 inventory was completed in October 2018 for the consultation workshop and finalized in December. The BUR1 is under consideration for approval by the PNG Government in December and will be sent to the UNFCCC afterwards (submission timing is not set, but as of now, scheduled for April 2019).

Table 2 shows an overview of the progress of activities for this reporting period.

Table 2 Progress of the JICA Project activities

	Sub-Activities	Year	2018												2019		
		Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan															
		Actual															
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan															
		Actual															
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan															
		Actual															
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan															
		Actual															
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan															
		Actual															
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan															
		Actual															
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan															
		Actual															
	1.8: Complie national GHG inventories with time series consistency.	Plan															
		Actual															
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan															
		Actual															
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan															
		Actual															
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan															
		Actual															
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan															
		Actual															
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan															
		Actual															
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan															
		Actual															
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan															
		Actual															
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan															
		Actual															
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan															
		Actual															
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan															
		Actual															

b. Output 1 activities

Overview

JICA Project expert team supported CCDA to estimate GHG emissions and removals for the GHG inventory (activities 1.7, 1.8, and 1.9) which would be part of BUR1. After the draft BUR1 GHG inventory was complete, the JICA Project expert team and CCDA experts conducted a review of their BUR1 GHG inventory to identify the most critical challenges/issues to be addressed in the second inventory cycle (activities 1.1, 1.2). The data collection process for the GHG inventory (activities 1.5, 3.1, 3.6) for the BUR2 GHG inventory cycle began February 2019.

Developing databases and estimating GHG emissions/removals (1.7, 1.8, 1.9)

The JICA Project expert team and CCDA organized the data collected into a database for emission/removal estimation. However, regarding data management in the estimation, CCDA members have taken an inconsistent approach in approach to estimating GHG emissions and removals for the BUR1. Some have used excel spreadsheets while others used different software for the GHG estimation. The JICA Project expert team plan to discuss a consistent and common approach to managing inventory data and the most efficient and effective way to estimate emissions and removals in May 2019.

Below is a summary of the current approach to data management.

Table 3 Data management approach for the BUR1 GHG inventory

Sector	CCDA approach	Typical approach
Energy	Data is managed and emissions are estimated on a series of excel spreadsheets.	In other countries, one of the approaches as shown below is taken: 1. Data is managed and GHG emissions/removals estimated on a series of excel spreadsheets. 2. Data is managed in excel spreadsheets and the GHG emissions/removals estimated by the 2006 IPCC Guidelines software
Industrial Processes and Product Use (IPPU)	Emissions are estimated using the 2006 IPCC Guidelines software.	
Agriculture	Emissions are estimated using the UNFCCC software based on 1996 IPCC Guidelines. The different IPCC Guidelines is used, making compilation difficult for the inventory compiler.	
Land use, Land use change, and Forestry (LULUCF)	The tables included in the 2006 IPCC Guidelines have been modified to estimate emissions and removals.	
Waste	Data is managed and emissions are estimated on a series of excel spreadsheets.	

General (compilation of emissions and removals)	Not yet designed. At the beginning of the Project, CCDA had not considered or planned the compilation of the sector results into a national GHG inventory.	

Review of the BUR1 GHG inventory (1.1, 1.2)

A simple review of the BUR1 GHG inventory was carried out by the JICA Project expert team and CCDA, particularly for the crosscutting, energy, industrial processes and product use (IPPU), and waste sectors. The review was conducted using a review checklist/template developed by the UNFCCC ('Guide for Peer Review of National GHG Inventories', UNFCCC, 2017) with some alterations. As an example, the review results of the national GHG inventory arrangements is shown in Table 4.

Table 4 Review results on GHG inventory arrangements

	Processes for data collection, estimation, and approval of the inventory information		
Detailed review element	**Question**	**Findings/recommendations**	**priority (high/medium/low)**
Institutional arrangements	Check if there is one entity that has main responsibility for the inventory preparation.	The CCDA is responsible for the inventory preparation and submmision.	Not applicable
	Are all relevant government agencies (statistics office, energy, forestry, agriculture agency, etc.) involved in the inventory process?	Not all relevant institutions involved.	high
	On what basis do data providers provide data to the inventory agency? Are there potential data providers that are not providing data?	Data providers send data upon request by CCDA (letter from MD's office). For AFOLU sector, MoA on data sharing on climate change with DAL, PNGFA was signed. MoA and MoUs were drafted with other agencies but not signed. There are data providers that are not providing data for confidentiality reasons, data sharing policy, etc.	high
	How are the data collected (purchasing statistics, online submission of data, telephone interview, fax, etc.)?	Data are collected via email, hard copy, online.	Not applicable
	Check if the experts estimating the emissions and removals and those compiling the inventory have a common understanding of the limitations in the data.	my job to enhace capacity	high
Procedural arrangements	Is there a time line or an inventory preparation schedule that is agreed by all stakeholders?	No. Internally, CCDA had timelines drafted, but not shared/agreed with all stakeholders.	high
	How often is the timeline or schedule updated?	Never	high
Legal arrangements	Is there a law or regulation that formalizes the institutional setup for the inventory preparation?	The Climate Change (Management) Act does describe the institutional setup for inventory preparation. However, this Act has not been implemented or enforced.	high priority but a political issue
	Are there formal legal contracts between organizations?	No, apart from the MoA with DAL and PNG FA.	Not applicable
Documentation	Has the Party described the inventory arrangements in the country?	Yes inventory arrangements are described, but further elaboration needed.	medium

A summary of the high priority challenges and planned improvements for the BUR2 are as follows.

Table 5 Summary of review findings

Sector	High priority challenge	Planned improvement
Crosscutting	· Not all relevant government agencies are involved in the inventory process	· Ensure complete participation of institutions/experts in the country
	· Stakeholders are unwilling to share data	· Take appropriate steps to understand why they are unwilling and address them. Also, document all findings
	· Stakeholders need capacity building	· Ensure that each bilateral meeting with stakeholders includes a capacity building component.
	· There are no timelines for the inventory preparation	· Develop a timeline for CCDA and stakeholders.
	· No QA/QC plan	· Develop together with JICA expert team
	· JICA experts carried out the key category analysis for the BUR1 GHG inventory	· Learn the method to carry out the analysis, and carry out for BUR2
	· No uncertainty analysis was conducted	· Carry out the uncertainty analysis for the BUR2 using default values.
	· There is no archiving system in CCDA	· Discuss a free online server that all experts will upload all relevant files
Energy	· (Accuracy issue) The source of all activity data in BUR1 was taken from an international source. · (Completeness issue) Not all categories have been estimated	· Collect data on petroleum refining, other energy industries, mining and quarrying and fugitive emissions from oil and natural gas, in addition to emission factors for fugitive emission and fuel combustion · Collect activity data for the transport (land, aviation, marine) category
Industrial Processes and Product Use (IPPU)	· (Completeness issue) Not all categories have been estimated	· Conduct research for all categories of the sector (for example, lime production, glass production, ammonia production, nitric acid production, carbide production, soda ash production, and all other categories).
Agriculture	· Conducting with FAO	· Conducting with FAO
Land use, Land use change, and Forestry (LULUCF)		
Waste	· (Completeness issue) Not all categories have been estimated · (Accuracy issue) many assumptions were made in estimating the activity data	· Collect amount of industrial waste water, industrial solid waste, incineration and open burning to improve the completeness of the sector. · Collect composition data, waste generation ratio for solid waste disposal

<u>Identify the data needs and collect data (1.5, 3.1, 3.6)</u>

Based on the review conducted under activities 1.2 and 1.3, the JICA Project expert team and CCDA counterparts developed a plan (3.6) to prepare the BUR2 GHG inventory. After reviewing the respective sections of the 2006 IPCC Guidelines, the CCDA counterparts developed technical papers and questionnaires for the relevant stakeholders (3.1). The technical paper describes the background to GHG inventories, an explanation of what data is needed, how the data will be used in the emission/removal estimation, followed by technical questions to the stakeholder in question. This paper is meant to explain the reasons for data collection, while also attempting to build capacity on the stakeholder side to understand GHG inventories better. A sample technical paper is shown in Annex II.

As of March 2019, the JICA Project expert team and CCDA counterparts have approached the following stakeholders (1.5):

Table 6 Stakeholders met for BUR2 GHG inventory

Sector	Stakeholder	Necessary data/information	Result
crosscutting	· National Statistics Office	· Fuel consumption, industrial product production	· Not able to meet yet.
Energy	· Department of Petroleum and Energy	· Oil and gas production data · Energy consumption data from a refinery	· Some oil and gas production data available but not amount of fuel refined.
	· Civil Aviation Safety Authority	· Fuel consumption from airports	· There is a plan to collect international aviation data, but not available now.
	· National Maritime Safety Authority	· Fuel consumption data from shipping industry	· There are plans to collect data from shipping industries, but not available now.
Industrial Processes and Product Use (IPPU)	· HFC consultants	· Amount of HFC imported, consumed	· HFC consultants working with CCDA to collect data for project. Data to be collected later in 2019.
	· The Conservation and Environment Protection	· Information on what types of industries exist in PNG	· Need to develop an MoU to receive any information
	· Private company	· Amount of lubricants sold in PNG	· Not able to meet. However, data expected to be provided

c. Output 2 activities

The 'National Stakeholder consultation workshop on Papua New Guinea's first Biennial Update Report to the UNFCCC' (activity 2.2) was held on October 4-5, 2018 to present the draft BUR1 to all stakeholders. The specific objectives of the workshop were:

a) To present the summary of the BUR1 to participants;
b) To agree on any necessary revisions to the BUR1 for finalization; and
c) To present the next steps in the JICA Project

More than 50 representatives from over 15 organizations participated in the workshop. Mr. Ruel Yamuna, the Managing Director of CCDA opened the workshop, followed by opening remarks by the leader of the JICA Project expert team, and a representative of the FAO. The workshop consisted of the following five sessions: 1. Overview and background of the BUR1; 2. The GHG inventory; 3. Mitigation actions; 4. Support; and 5. Next steps.

JICA Project expert team and CCDA compiled all comments from the participants regarding the necessary improvements to the BUR1. Most comments were either editorial comments or comments that should be addressed in future BURs. A summary of the comments is shown in Table 7.

Table 7 Overview of necessary revisions

Comment/proposal	CCDA action	Deadline
・BUR to be clear on the references used, especially for the national circumstances chapter.	・CCDA to double check the facts to ensure the document represents an accurate account of the country.	・Before BUR1 submission
・GHG inventory chapter, most comments were on recent developments in PNG that the CCDA will need to include in the next BUR such as LNG projects and recent mining operations.	・These will be addressed in future BURs, as the inventory covers years from 2000 to four years before year of submission.	・Future BURs
・Important to formalize institutional arrangements for providing data for the preparation of the GHG inventory by, for example, establishing a MoU or MoA between data providers and the CCDA.	・CCDA will implement the appropriate arrangement	・Future BURs
・Description of methods not described in detail	・CCDA will draft a national inventory report for BUR2	・Future BURs

The consultation workshop successfully met the three objectives mentioned above and participants were satisfied with the outcome. For details on the consultation workshop, see Annex III: consultation workshop report.

d. Output 3 activities

Overview

The JICA Project expert team and the CCDA counterparts drafted the GHG inventory chapter for the BUR1 (3.7). Included is the results of the key category assessment of the GHG inventory (3.2), which identify the most important categories which should be the focus of improvements in the future.

It should be highlighted that the JICA Project expert team supported the CCDA counterparts draft and edit all sections of the BUR1 including national circumstances, mitigation, and support which are outside the scope of the JICA Project.

Drafting the GHG inventory chapter of the BUR1 (3.7)

The JICA Project team and the CCDA counterparts drafted the GHG inventory chapter of the BUR1. The chapter describes crosscutting issues such as the roles and responsibilities of all stakeholders, the GHG inventory preparation process, a description of the guidelines used for the GHG inventory, the methods and global warming potentials used, the years covered, an overview of the activity data and emission factors used, with a section on the emission and removal trend results of the inventory, and results of the key category analysis. For each of the inventory sectors (Energy, IPPU, AFOLU, Waste), the BUR describes an overview of the emissions and removals within the sector, the methods/activity data/emission factors used, and the improvements made along with necessary improvements for the future.

Conducting the key category analysis (3.2)

The key category analysis (activity 3.2) was carried out as described in the 2006 IPCC Guidelines, for both with and without the LULUCF sector. Thirteen categories are identified as key including LULUCF, 12 were identified as key without LULUCF. These categories have been prioritized in terms of future improvement.

See Table 8 for the list of key categories with LULUCF, and Table 9 for the list of key categories without LULUCF.

Table 8 Key categories (with LULUCF) of the BUR 1 GHG inventory

crf code	category name	gas	2015 emissions	absolute value of 2015 emissions	Level assessment	cumulative total
3B2	Cropland	CO2	12,648	12,647.58	32.510%	32.510%
3B1	Forest land	CO2	-11,855	11,855.41	30.473%	62.983%
1.A.1:	1A1 Energy Industries	CO2	4,120	4,119.9	10.590%	73.573%
1.B.2.b.iii.2	Gas Production	CH4	2,395	2,394.5	6.155%	79.728%
1.A.3	1A3 Transport	CO2	1,938	1,937.6	4.980%	84.708%
1.A.2:	1A2 Manufacturing Industries and Construction	CO2	1,445	1,445.0	3.714%	88.422%
1.B.2.a.iii2	Production and Upgrading	CH4	556	555.6	1.428%	89.851%
4D	Wastewater Treatment and Discharge	CH4	488	487.68	1.254%	91.104%
1.A.4:	1A4 Other Sectors	CO2	457	456.7	1.174%	92.278%
3C4	Direct N2O Emissions from Managed Soils	N2O	411	411.0	1.056%	93.335%
3C1	Biomass burning - FL	CH4	395	394.89	1.015%	94.350%
1.B.2.b.iii.5	Gas Distribution	CH4	354	353.6	0.909%	95.258%

Table 9 Key categories (without LULUCF) of the BUR 1 GHG inventory

crf code	category name	gas	2015 emissions	absolute value of 2015 emissions	Level assessment	cumulative total
1.A.1:	1A1 Energy Industries	CO2	4,119.87	4,119.87	30.57%	30.57%
1.B.2.b.iii.2	Gas Production	CH4	2,394.52	2,394.52	17.77%	48.34%
1.A.3	1A3 Transport	CO2	1,937.59	1,937.59	14.38%	62.71%
1.A.2:	1A2 Manufacturing Industries and Construction	CO2	1,444.99	1,444.99	10.72%	73.44%
1.B.2.a.iii2	Production and Upgrading	CH4	555.61	555.61	4.12%	77.56%
4D	Wastewater Treatment and Discharge	CH4	487.68	487.68	3.62%	81.18%
1.A.4:	1A4 Other Sectors	CO2	456.73	456.73	3.39%	84.57%
3C4	Direct N2O Emissions from Managed Soils	N2O	411.00	411.00	3.05%	87.62%
1.B.2.b.iii.5	Gas Distribution	CH4	353.58	353.58	2.62%	90.24%
4A	Solid Waste Disposal	CH4	250.26	250.26	1.86%	92.10%
3A1	Enteric Fermentation	CH_4	168.30	168.30	1.25%	93.35%
1.B.2.b.iii.3	Gas Processing	CH4	155.18	155.18	1.15%	94.50%
3A2	Manure Management	CH_4	144.83	144.83	1.07%	95.57%

1.3 Achievement of Output

As mentioned above, the consultation workshop for the Project was held in October 2018. The JICA Project expert team conducted an online questionnaire to the participants to evaluate the consultation workshop, specifically asking the following questions:

- How would you rate this workshop?
- How satisfied were you with each of the 5 sessions?

All participants responded to the first question that the workshop met expectations.

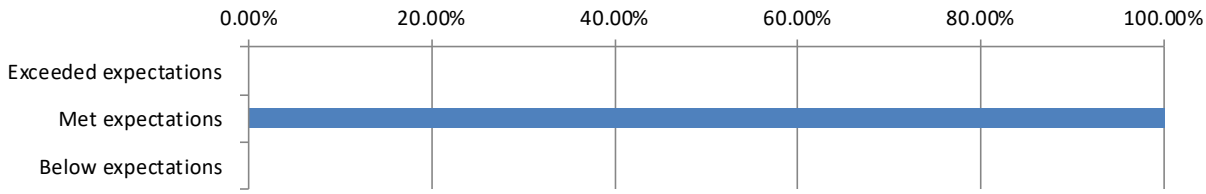


Figure 1 Overall level of satisfaction of the consultation workshop

Assuming that the level of satisfaction reflects the level of understanding of the workshop, most participants had a good level of understanding of the workshop. Specifically, 92% of participants were either very satisfied or satisfied with the "national circumstances of PNG" session, 100% were very satisfied or satisfied with the "GHG inventories," 83% were very satisfied or satisfied with "mitigation actions" sessions, and 100% for "support" session. The level of understanding/satisfaction of each of the sessions is shown in the figure below.

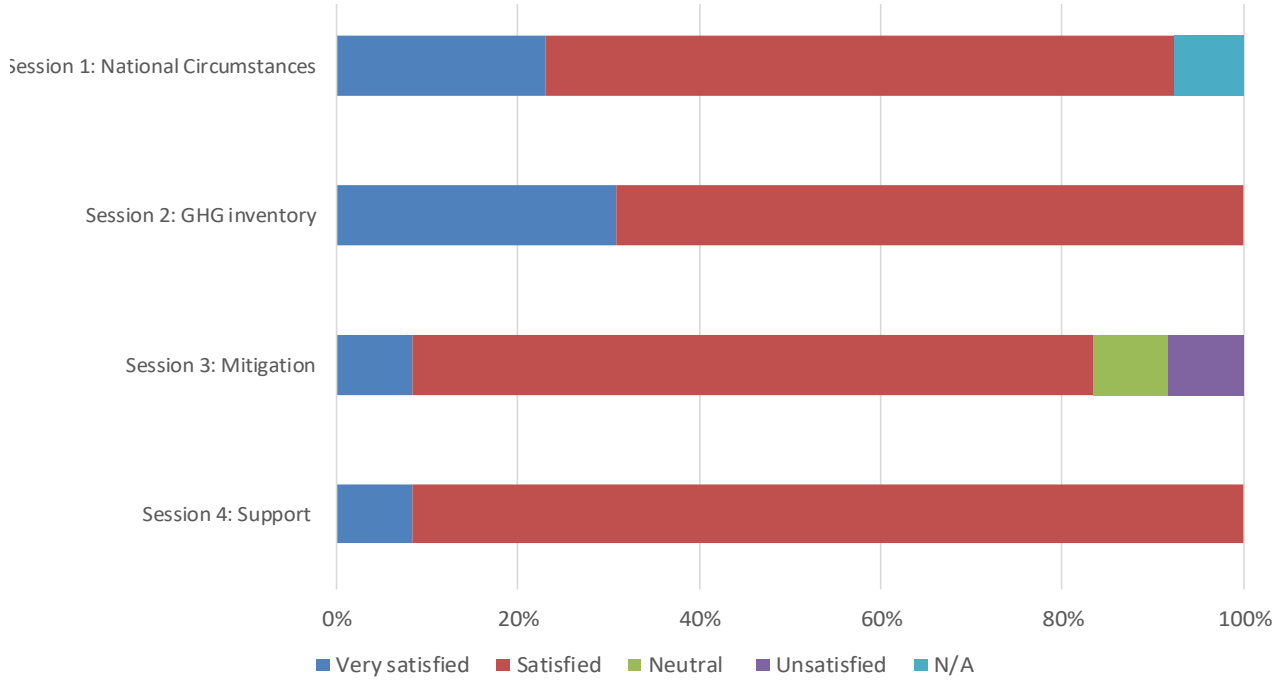


Figure 2 Level of satisfaction of each session

1.4 Achievement of the Project Purpose

A draft transparency, accuracy, completeness, comparability, consistency (TACCC) checklist, which is one of the Objectively Verifiable Indicators of the Project Purpose, was developed and used for the BUR1 inventory review (activity 1.1, 1.2).

A summarized national inventory report has been drafted and included in the BUR1 as the GHG inventory chapter. See chapter 2 of the “PNG’s first BUR” file.

1.5 Changes of Risks and Actions for Mitigation

There have been no changes in risks of implementation of the Project since the previous reporting period. The risk regarding management structure of CCDA and the JICA Project implementation structure has been addressed by CCDA in 2018, but Progress of the BUR1 inventory and the duplication with other donor projects continues to be a risk for implementation.

The risks to the Project implementation are shown in Table 10.

Table 10 Risks of implementation of the Project

Assumed risk	Background and Implication of risk	Measures taken in 2017	Further measures taken in 2018
Progress of BUR1 inventory	During the Survey for technical cooperation for this Project carried out in Sept. 2016 and Feb. 2017, JICA was informed by CCDA that PNG was aiming to submit its BUR1 in December 2017. The activities of the Project are designed under this assumption. The timelines and plans of the Project were carefully designed based on this deadline/assumption, with some flexibility built in in case there were minor delays. However, significant delays in the BUR 1 inventory process would result in a delay in the Project activities. The Project is designed to implement two GHG inventory cycles, but with significant delays, the Project may not be able to complete an entire two cycles.	The progress of the BUR1 inventory was discussed during the first and second mission to PNG. The progress for energy, IPPU, and waste were relatively positive, but significant delays in the AFOLU sector. In addition, the CCDA is uncertain about the times lines for the AFOLU sector work and deadlines of the BUR1.	JICA Headquarters sent a concern letter to CCDA in January 2018, addressing all three issues. In response, CCDA replied that 1) it will try to finalize and submit the BUR1 in June 2018; 2) Mr. Alfred Rungol will officially be the Manager of MRV and NC team; 3) CCDA will do a better job to coordinate with all donors in the MRV field The P/O was revised in February 2018 to reflect the revised deadline for BUR1. This was approved at the first JCC meeting in May. Although the BUR1 has not been submitted as of March 29, CCDA is planning to do so in early April.
Management positions	The Project Director and Project Manager positions were vacant at the time of the signing of the Record of Discussions in April 2017. The two positions have been tentatively filled by the General Manager of REDD+ and Mitigation, and the Manager of MRV, respectively. However, this is an unfair burden on both managers, as this Project requires full time commitment from the top in order to properly coordinate with JICA and other donors, and other stakeholders relevant to the preparation of GHG inventories.	A kickoff teleconference was held in Sept. 11 for clarification. During the first mission to PNG, the JICA team was informed that General Manager of REDD+ and Mitigation, and the Manager of MRV would fill the Project Director and Project Manager positions, respectively.	
Duplication of work with other donors	The FAO has been supporting CCDA with the AFOLU inventory as part of the UN-REDD support to CCDA. In addition, the CCDA requested further support from the Capacity Building Initiative for Transparency (CBIT)/GEF and The Coalition for Rainforest Nations (CfRN) to estimate GHG emissions and removals from the AFOLU sector. Depending on the scope of the other donor projects, the JICA Project will need to adjust their scope and input to the Project. There are also considerations with regards to timing, and producing a GHG inventory. The coordination of projects will be critical for timely and efficient GHG inventory process.	A kickoff teleconference was held in Sept. 11 for clarification. During the two missions, the JICA expert team was informed of the two projects for AFOLU support, but there is still a lack of clarity on the timelines and deadlines of the two projects.	

1.6 Progress of Actions undertaken by JICA

Given the situation described in 1.5, JICA Headquarters sent an official letter of concern to CCDA in January 2018.

1.7 Progress of Actions undertaken by Gov. of PNG

As stated in 1.5., CCDA sent a reply to the concern letter. In the letter, CCDA responded that 1) it will try to finalize and submit the BUR1 in June 2018; 2) Mr. Alfred Rungol will officially be the Manager of MRV and NC team; 3) CCDA will do a better job to coordinate with relevant donors.

In September 2018, Mr. Nathan Sapala, one of the LULUCF experts, resigned, and Mr. Paul Hasagama was appointed as a replacement staff. In November 2018, Ms. Priscilla Pep, the waste expert, also resigned. As a response to the staff resignations and any possible resignations in the future, from January 2019 onward, all sectors of the inventory were assigned an expert and a backup, to improve the information sharing among the team.

In November 2018, Mr. Afred Rungol was promoted to General Manager of the CCDA.

1.8 Progress of Environmental and Social Considerations

Not applicable

1.9 Progress of Considerations on Gender/Peace Building/Poverty Reduction

Not applicable

1.10 Other remarkable/considerable issues related/affect to the project

As described in 1.5, CCDA has requested many donors for GHG inventory support. The coordination of these projects and their roles in the GHG inventory preparation became clearer in 2018.

Table 11 Relevant donors supporting CCDA

Donor	Overview of support	Aid partner	Duration	Role in GHG inventory preparation
FAO	Support PNG Forest Authority (PNGFA) in	PNGFA	2014~2019	CCDA collected data from PNG FA to estimate emissions/removals from the

	developing data bases			LULUCF sector.
	Support AFOLU sectors in preparing GHG inventories	CCDA	Unknown	Team in Rome serves as a help desk. Progress of work is dependent on the CCDA staff working on AFOLU sector.
	Support AFOLU sector data development	CCDA, Department of Agriculture	2018~2021	Project has not begun actual work as of now.
Coalition for Rainforest Nations (CfRN)	Unclear support	CCDA	Unknown	CfRN conducted a review of the LULUCF sector before finalization

2. Delay of Work Schedule and/or Problems

2.1 Detail

Described in 1.5. During the two Detailed Planning Survey missions carried out in 2016 and 2017, CCDA informed JICA that it was expecting to submit its first BUR to the UNFCCC at the end of 2017. The Project Design Matrix (PDM) and Plan of Operation (P/O) were carefully designed based on this deadline/assumption, with some flexibility built in in case there were minor delays. However, in late 2017, CCDA informed the JICA Project expert team that it did not consider the end of 2017 as a deadline and did not assess how long the delay will be.

Therefore, in early 2018, the JICA Headquarters sent a concern letter to CCDA. After discussion on a submission target date, the JICA Project expert team and CCDA agreed to June 2018, and the P/O was revised accordingly. Still, due to major setbacks, particularly in the AFOLU sector estimation, the GHG inventory completion was delayed significantly.

2.2 Cause

The NC/BUR manager position in CCDA was vacated in the middle of the year, which has negatively impacted the GHG inventory preparation in CCDA, specifically in terms of planning, setting goals, and timelines for preparing the GHG inventory.

In addition, there are delays in the FAO support to the GHG estimation of the LULUCF sector. Furthermore, other donors are requesting CCDA to reconsider the submission contents and timing. However, the CCDA has not been able to coordinate and manage the other projects, leading to confusion about timelines for the BUR submission.

2.3 Action to be taken

Although there is a significant delay in the submission of the BUR1, the JICA Project expert team and CCDA have carried out activities for the BUR2 GHG inventory since January 2019, and plan to finalize the GHG inventory by the end of 2019.

2.4 Roles of Responsible Persons/Organization

None.

3. Modification of the Project Implementation Plan

3.1 Plan of Operation

Minor revisions were made to the Plan of Operation (P/O) at the inception of the JICA

TO CR of JICA　Papua New Guinea　OFFICE

Project Monitoring Sheet

Project Title : The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG
Version of the Sheet: Ver. 5（Term: April, 2019 - September, 2019）

Name: Takeshi Enoki
Title: GHG Inventory (General)
Submission Date: December 13, 2019

I. Summary

1　Progress

1-1 Progress of Inputs

Experts

During this reporting period of April 2019 to September 2019, the Japan International Cooperation Agency (JICA) Project expert team made 7 man-trips to Papua New Guinea (PNG).　Total man months during this reporting period was 2.73 in PNG and 3.00 for activities in Japan.

Meetings

The Second Joint Coordinating Committee (JCC) was held on July 26, 2019, with the objectives to report to JCC members the progress of the Project activities, specifically the submission of the first Biennial Update Report (BUR 1) and on preparing the second BUR GHG inventory; and to present the plan for strengthening the institutional arrangements to prepare GHG inventories in PNG.　The JCC members welcomed news that the CCDA submitted in April 2019 its first BUR under the United Nations Framework Convention on Climate Change (UNFCCC).　All participants acknowledged the importance of strengthened institutional arrangements to ensure the ongoing sustainability of compiling GHG inventories and BURs.

Public relations

During this reporting period, one post on the Second JCC was made on the Project website (https://www.jica.go.jp/project/english/png/006/index.html).

Table 1 shows the inputs by JICA Project expert team for this reporting period.

Table 1 Input for term April ~ September 2019

Inputs				Year	2019					
				Month	4	5	6	7	8	9
Expert	1	GHG Inventory（General）		Plan		14			10	
				Actual		17		14		
	2	GHG Inventory（Energy）		Plan		14			10	
				Actual				11		
	3	GHG Inventory（Industrial Processes and Product Use）		Plan		7			10	
				Actual		8		9		
	4	GHG Inventory（Agriculture, Land use change and Forestry）		Plan		7			10	
				Actual				8		8
	5	GHG Inventory（Waste）		Plan		7			10	
				Actual						
Japan Activities in	1	GHG Inventory （General）		Plan						
				Actual						
	2	GHG Inventory （Energy）		Plan						
				Actual						
	3	GHG Inventory （Industrial Processes and Product Use）		Plan						
				Actual						
	4	GHG Inventory （Agriculture, Land use change and Forestry）		Plan						
				Actual						
	5	GHG Inventory （Waste）		Plan						
				Actual						
	6	Project administrative coordination / coordinator for training		Plan						
				Actual						
Plan Monitoring	Monitoring		Joint Coordinating Committee	Plan						
				Actual						
			Set-up the Detailed Plan of Operation	Plan						
				Actual						
			Submission of Monitoring Sheet	Plan						
				Actual						
	Reports/Documents		Work Plan	Plan						
				Actual						
			National GHG inventory Report	Plan						
				Actual						
			Project Progress Report	Plan						
				Actual						
			Project Brief Note	Plan						
				Actual						
			Project Completion Report	Plan						
				Actual						
	Public Relations		Establishment and operation of JICA TC website	Plan						
				Actual						

1-2 Progress of Activities

a. Overview of activities carried out in this term

Papua New Guinea's first BUR was approved by the PNG Government in April 2019 and submitted to the UNFCCC secretariat on April 17, 2019. Since submission of the BUR1, the JICA Project expert team and CCDA have continued to make progress in collecting data for the BUR2 GHG inventory, in particular, for the energy, industrial processes and product use (IPPU), and waste sectors. The JICA Project expert team and CCDA have spent most time consulting with stakeholders to discuss the methods to estimate GHG emissions, the necessary data to estimate emissions, and the steps necessary for CCDA to acquire the data from the stakeholders. In September 2019, the technical analysis for PNG's BUR1 was conducted in Bonn, Germany. The JICA Project expert team and CCDA

answered all questions posed to the CCDA from the experts carrying out the technical analysis.

Table 2 shows an overview of the progress of activities for this reporting period.

Table 2 Overview of progress of activities

	Sub-Activities	Year	2019					
		Month	4	5	6	7	8	9
Output 1：Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan						
		Actual						
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan						
		Actual						
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan						
		Actual						
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan						
		Actual						
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan						
		Actual						
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan						
		Actual						
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan						
		Actual						
	1.8: Complie national GHG inventories with time series consistency.	Plan						
		Actual						
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan						
		Actual						
Output 2：Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan						
		Actual						
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan						
		Actual						
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan						
		Actual						
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan						
		Actual						
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan						
		Actual						
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan						
		Actual						
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan						
		Actual						
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan						
		Actual						
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan						
		Actual						

b. Output 1 activities

Overview

JICA Project expert team supported CCDA to identify the necessary data to estimate GHG emissions and removals for the GHG inventory, prepared for stakeholder meetings (activity 3.1) and held the stakeholder meetings to inform stakeholders of the necessary data and make the data requests. In many cases, follow up was necessary by preparing a Memorandum of Understanding (MoU) between CCDA and the stakeholder for the sharing of data (activity 1.4). Some data have been sent to the CCDA (activity 1.5) but most stakeholders are still in the process of reviewing the MoU.

Detail

After reviewing the respective sections of the 2006 IPCC Guidelines, the CCDA counterparts developed technical papers and questionnaires for the relevant stakeholders (activity 3.1). The technical paper describes the background to GHG inventories, an explanation of what data is needed, how the data will be used in the emission/removal estimation, followed by technical questions to the stakeholder in question. This paper is meant to explain the reasons for data collection, while also attempting to build capacity on the stakeholder side to understand GHG inventories better. The status of stakeholder meetings and the data collected by sector is shown below.

- Energy sector

subsector	stakeholder	assigned to	date interview request was sent	met	minutes	followup action required?
1. Energy sector						
crosscutting	Department of Petroleum and Energy (Energy Wing)	Jason	5-Mar-19	12-Mar-19	Y	need to consult petroleum div.
	Chamber of Mines and Petroleum	Jason	16-Jul-19	no	N	
1.A.1. Energy Industries	Independent Consumer Competition Commission	Jason	31-Jul-19	31-Jul-19	Y	send data request letter
	PNG Power	Jason	2-Jul-19	29-Jul-19	Y	send data request letter
1.A.2. Manufacturing	PNG Conservation and Environment Protection Authority	Jason	not yet			
1.A.3. Transport	Department of Transportation	Jason	11-Mar-19	no	N	
	National Maritime Safety Authority	Jason	11-Mar-19	14-Mar-19	Y	get annual report
	Civil Aviation Safety Authority	Jason	5-Mar-19	15-Mar-19	Y	none
	Department of Transportation	Jason	1-Aug-19	1-Aug-19	Y	send draft ToR of energy sector WG
	National Airports Corporation and Road Traffic Authority	Jason	not yet			
1.A.4. Other		Jason				
1.B.1 Coal		Jason				
1.B.2 Oil and gas	Exxon Mobile	Jason		20-May-19	Y	share guidelines
	Department of Petroleum and Energy (Petroleum Wing)	Jason	not yet			

The JICA Project expert and CCDA have met most energy sector stakeholders and have also sent official data request letters to stakeholders including the Independent Consumer Competition Commission, and PNG Power. CCDA has also informed many of the stakeholders of an Energy sector technical working group meeting that CCDA plans to hold, with the view to facilitate the data sharing for the estimation of GHG in the energy sector.

- IPPU sector

subsector	stakeholder	assigned to	date interview request was sent	met	minutes	followup action required?
2. IPPU sector						
crosscutting	National Statistics Office	Jacinta	19-Feb-19	no	N	
	PNG Conservation and Environment Protection Authority	Jacinta	19-Feb-19	23-Feb-19	Y	
	PNG Conservation and Environment Protection Authority	Jacinta	15-May-19	15-May-19	Y	share activity data map. Sent letter in July
	National Statistics Office	Jacinta	15-May-19	15-May-19	Y	need MoU
	PNG Customs	Jacinta	1-May-19	17-May-19	Y	send data request letter
2.A. Mineral		Jacinta	not yet			
2.B. Chemical		Jacinta	not yet			
2.C. Metal		Jacinta	not yet			
2.D. Non energy	BOC Papua New Guinea Limited	Jacinta	19-Feb-19	no	N	data request letter sent
2.E. Electronics		Jacinta	not yet			
2.F. Substitutes for ODS	Econoler	Jacinta	19-Feb-19	19-Feb-19	Y	
	Econoler	Jacinta	3-Aug-19	3-Aug-19	Y	follow up ODS project?
		Jacinta				

The JICA Project expert and CCDA have met most IPPU sector stakeholders that have been identified and have also sent official data request letters to stakeholders including the PNG Conservation and Environment Protection Authority, PNG Customs, and BOC PNG Limited. An MoU has been drafted and shared with National Statistics Office and is under review. The JICA Project expert and CCDA are attempting to develop a mapping of all relevant manufacturing industries in PNG by using NSO, PNG Conservation and Environment Protection Authority, and Customs data, which have yet to be shared. This exercise will help clarify which categories in the 2.A. Mineral, 2.B. Chemical, and 2.C. Metal industries should be included in the BUR2 GHG inventory.

- Waste sector

subsector	stakeholder	assigned to	date interview request was sent	met	minutes	followup action required?
5. Waste sector						
5.A. Solid Waste	NCDC	Erick	sent	In October		
	Total Waste Management (TWM)	Erick	not yet	In October		
	Pasifika Eagle Chemical Ltd	Erick	not yet	In October		
	UPNG	Erick	not yet			
	JPRISM	Erick	not yet			
	Town authorities	Erick	not yet			
5.B. Biological treatment of Solid waste	Town authorities?	Erick	not yet			
5.C. Incineration	Health Department	Erick	13-May-19	13-May-19	Y	none
	hospital	Erick	call made		Y	
	DAL?	Erick	not yet			
5.D. Wastewater	Water PNG	Erick	31-Jul-19	31-Jul-19	Y	First set of data received. followup question sent.
	Eda Ranu	Erick	1-Aug-19	26-Sep-19	Y	followup question sent
	UPNG Medfac	Erick	not yet			

The JICA Project expert and CCDA have held meetings with the Health Department, hospitals in the Port Moresby area, Water PNG, and Eda Ranu, but have yet to meet any stakeholders for solid waste. As of September, CCDA has received datasets from Water PNG on population connected to the sewerage treatment system, amount of wastewater generated and the share by type of customer, biological oxygen demand, chemical oxygen demand, and nitrogen load for select regions of PNG.

- Memorandum of Understanding

Most stakeholders that have data have requested an MoU between CCDA and the data provider to solidify the institutional arrangements between institutions. The JICA Project expert team and CCDA drafted such MoU and have submitted them to the relevant authorities. The structure of the MoUs that have been drafted by the JICA Project experts and CCDA is as follows:

1. APPLICABLE LAW
2. PURPOSE OF THE MEMORANDUM OF UNDERSTANDING
3. BACKGROUND TO THE MOU
4. MOU JOINT COMMITMENTS
5. CONFIDENTIALITY
6. PROTECTION OF CONFIDENTIAL INFORMATION
7. RETURN OF CONFIDENTIAL INFORMATION
8. INDEMNIFICATION

9. SPECIFIC PERSONS TO RECEIVE INFORMATION
10. MARKING OF CONFIDENTIAL INFORMATION
11. RELATIONSHIP OF THE PARTIES
12. CONTINUATION OF MOU
13. AGREEMENT ON COST
14. AMMENDMENT AND TERMINATION OF MOU
15. WARRANTIES
16. ENTIRE AGREEMENT

c. Output 2 activities

There were no Output 2 activities during this reporting term.

d. Output 3 activities

Overview

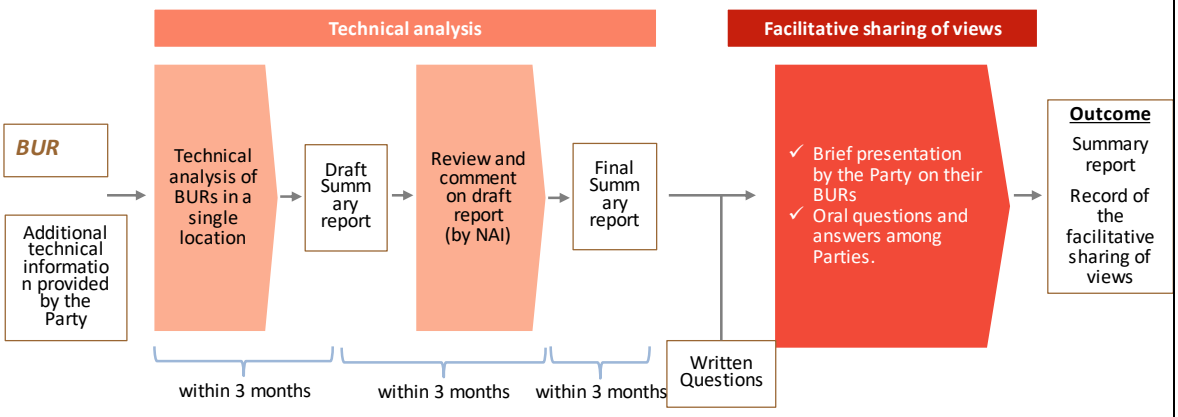
The JICA Project expert team and CCDA counterparts drafted technical papers and questionnaires for the relevant stakeholders (activity 3.1) as described in Output 1 activities section. In preparation for the technical analysis of PNG's BUR1, the JICA Project expert team developed a guidebook/FAQ for CCDA describing the process and explaining the types of questions to expect from the technical analysis process. In September 2019, the JICA Project experts supported CCDA in answering all questions from the technical analysis team.

Detail

The JICA Project expert team drafted a power point presentation describing the process of the technical analysis and how PNG can better prepare. This guidebook/FAQ will be used by CCDA for the International Consultation and Analysis process for the BUR1 and future BURs. An excerpt of the presentation is shown below.

International Consultation and Analysis

- International Consultation and Analysis (ICA) process which consists of:
  - Technical analysis (TA)
  - Facilitative sharing of views (FSV)



Reference: UNFCCC. (2011), UNFCCC.(2013d)

Aim of the technical analysis

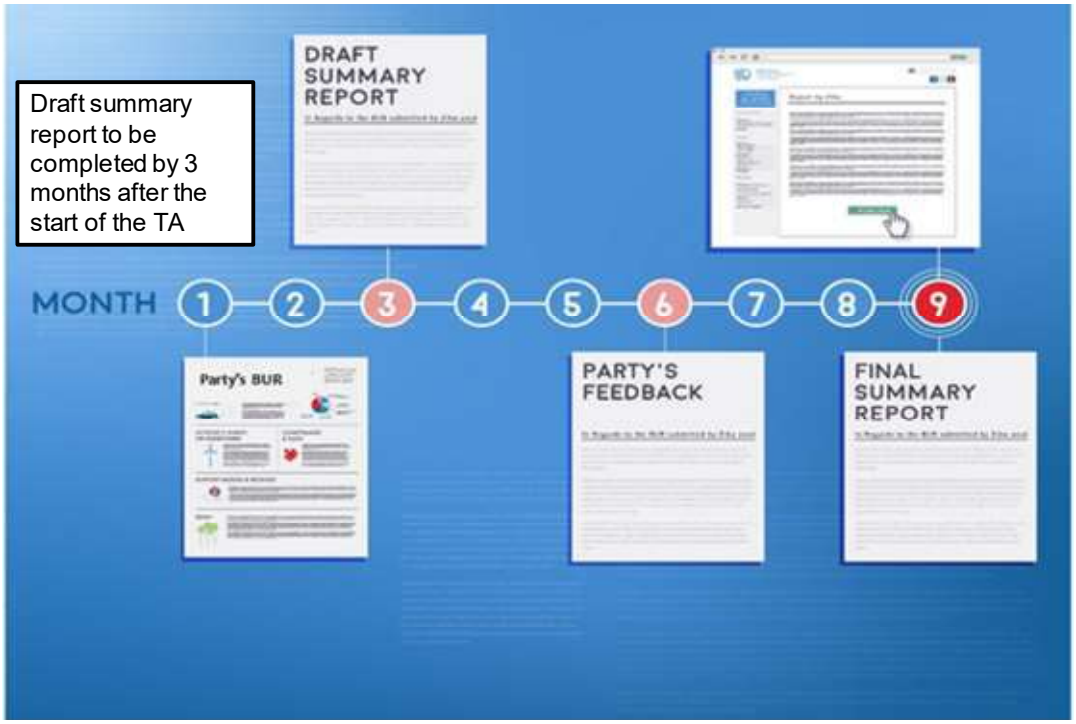
The technical analysis will aim to **increase transparency** of mitigation actions and their effects. The TTE shall:

(a) **Identify information**: Identify the extent to which the elements of information listed in paragraph 3(a) of the guidelines contained in decision 2/CP.17, annex IV, are included in the BUR of the Party concerned;

(b) Undertake a **technical analysis** of information contained in the BUR as outlined in the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" contained in annex III to decision 2/CP.17, and any additional technical information that may be provided by the Party concerned;

(c) In consultation with the Party concerned, **identify capacity-building needs** in order to facilitate reporting in accordance with annex III to decision 2/CP.17, and participating in international consultation and analysis in accordance with annex IV to decision 2/CP.17, taking into account Article 4, paragraph 3, of the Convention.

Timeline for the technical analysis



http://unfccc.int/playground/items/10345.php

General Steps to the TA

When	Activity
Before the TA week	1. TTE will read the BUR and begin filling out the checklist. 2. TTE will ask Party any issues that need further explanation/clarification. This is particularly for information that is partly or not provided.
During the TA week	1. TTE will complete the checklist. 2. For reporting element that is "partly provided" or "not provided," TTE will ask Party whether that issue can be resolved by themselves, or whether there is a capacity building need. 3. Consultation meeting between TTE and Party to confirm the capacity building needs. 4. TTE will draft the Summary Report.
After the TA week	1. Team, Co leads, and secretariat reviews Summary Report draft. 2. Draft report sent to Party for comments (3 months after the TA week). 3. Party provide feedback to TTE (3 months after receiving the Summary Report Draft). 4. Report published (3 moths after receiving feedback from Party).

If the TA for PNG is held from 9/2 to 9/6

- Sometime July: UNFCCC secretariat confirm TA schedule with PNG through focal point
- July: UNFCCC secretariat organize the TTE members
- 8/28: Questions of clarification emailed to PNG through secretariat or co-leads of the TTE
- 9/2 (Mon), 9/3 (Tue), 9/4 (Wed): Final questions of clarification sent to PNG.
- 9/5 (Thu), 9/6 (Fri): TTE will draft list of capacity building needs in consultation with PNG (via Skype, teleconference, email)
- 12/6: Draft Summary Report sent from secretariat to PNG
- 3/6/2020: PNG provide feedback to TTE
- 6/6/2020: Secretariat finalize Summary Report

Questions to expect from TTE on GHG inventories

- The TTE could not find information on uncertainties. Could PNG elaborate on uncertainties? Is this a capacity building need for PNG?
- Sectoral sheets are not included in the BUR. Is this a capacity building need for PNG?
- The TTE noted that PNG uses the GWP from AR4 instead of the SAR. Could PNG explain why?
- The TTE noted that PNG did not report HFCs, PFCs, SF6, Nox, Sox, NMVOCs. Could PNG explain why PNG did not report these gases. Is this a capacity building need?

- NOTE: The NC Guidelines are very old and the some reporting requirements are outdated. Deviating from the guidelines is not a bad thing for some cases.

To prepare for the technical analysis

- Before the analysis
  - In-depth understanding on the reporting guidelines
  - Fill out the table by yourselves to prepare
- During the analysis week
  - Helpful to respond to the questions by TTE fast to give them good understanding on capacity building needs.
- After the analysis
  - Check the TTE findings! (PARTS OF SUMMARY REPORT MIGHT BE WRONG)
  - Use the Summary Report as input to your next BUR cycle.
- The approach to the technical analysis: good opportunity to learn and receive guidance/advice.

In addition to developing the FAQ/Guidebook for the technical analysis, the JICA Project expert team supported the CCDA in preparing and responding to the actual technical analysis questions for the BUR1.　A sample of the questions asked during the technical analysis are as follows:

- Could the Party clarify whether it experienced any challenges or constraints in reporting the information for it National GHG Inventory?
- To enable the TTE to better understand the National GHG Inventory trends, could the party clarify the reasons for LULUCF emission fluctuation?
- The BUR1 notes that it took 5-years to prepare the GHG inventory, could the Party clarify whether it experienced any challenges or constraints in establishing a process than enable the Party to prepare it GHG inventory?
- Could the Party clarify whether it experienced and challenges or constraints to undertake key source analysis as indicated in the IPCCC good practice guidance?
- To enable the TTE to better understand the information that describes procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved

1-3 Achievement of Output

There are no achievements during this term.

1-4 Achievement of the Project Purpose

There are no achievements during this term.

1-5 Changes of Risks and Actions for Mitigation

There have been no changes in risks of implementation of the Project since the previous reporting period.

1-6 Progress of Actions undertaken by JICA

none

1-7 Progress of Actions undertaken by Gov. of PNG

none

1-8 Progress of Environmental and Social Considerations (if applicable)

Not applicable

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

Not applicable

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

none

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

None.

2-2 Cause

None.

2-3 Action to be taken

None.

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of PNG, etc.)

none

3 Modification of the Project Implementation Plan

3.1 Plan of Operation

No changes have been made to the Plan of Operation.

3-2 Other modifications on detailed implementation plan

None

4 Current Activities of Gov. of PNG to Secure Project Sustainability after its Completion

none

II. Project Monitoring Sheet I & II *as Attached*

Monitoring Sheet I

Project Monitoring Sheet I （Revision of Project Design Matrix）

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Implementing Agency: CCDA

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG

Model Site:

Version 5

Dated December 13, 2019

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist		none	none
Project Purpose The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.	A GHG inventory summary report has been drafted as part of the BUR1 Draft TACCC checklist developed	none
Outputs Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report		GHG estimation files and summary report completed for the BUR1	none
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire		level of satisfaction was over 70% for inception workshop	none
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report		A summary GHG inventory report drafted as part of the BUR1	none

	The Japanese Side	The PNG Side	
1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5 : Collect data necessary for national GHG inventories from relevant parties. 1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8 : Compile national GHG inventories with time series consistency. 1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2 : Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	**Pre-Conditions** **<Issues and countermeasures>** none

Monitoring Sheet II

Project Monitoring Sheet II (Revision of Plan of Operation)

Version 5

Dated December 13, 2019

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ			
Expert																					
GHG inventory (General)	Plan																		approximately 1 week to 2 weeks a quarter/expert	none	none
	Actual																				
GHG inventory (Energy)	Plan																				
	Actual																				
GHG inventory (Industrial Processes and Product use)	Plan																				
	Actual																				
GHG inventory (Agriculture, Land use change and Forestry)	Plan																				
	Actual																				
GHG inventory (Waste)	Plan																				
	Actual																				
Project administrative coordination / coordinator for training	Plan																		support from Japan		
	Actual																				
Equipment																					
PC for data management	Plan																		none. All purchased in October 2017	none	none
	Actual																				
Training in Japan																					
Training for Counterpart on GHG inventories in Japan	Plan																		1 week training, to be conducted with the in country/third country training	none	none
	Actual																				
In-country/Third country Training																					
Training for Counterpart on GHG inventories in developing country	Plan																		1 week training, to be conducted with the in country/third country training	none	none
	Actual																				

Duration / Phasing																					
	Plan																				
	Actual																				

Monitoring Plan	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ			
Monitoring																					
Joint Coordinating Committee	Plan																			none	none
	Actual																				
Set-up the Detailed Plan of Operation	Plan																			none	none
	Actual																				
Submission of Monitoring Sheet	Plan																			none	none
	Actual																				
Reports/Documents																					
Work Plan	Plan																			none	none
	Actual																				
National GHG inventory Report	Plan																			none	none
	Actual																				
Project Progress Report	Plan																			none	none
	Actual																				
Project Brief Note	Plan																			none	none
	Actual																				
Project Completion Report	Plan																			none	none
	Actual																				
Public Relations																					
Establishment and operation of JICA TC website	Plan																				
	Actual																				

Activities / Sub-Activities						Year	2017		2018				2019				2020				2021			Responsible Organization		Achievements	Issue & Countermeasures
							Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG		
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.																											
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	○	○	○	○	○	Plan																		JICA	CCDA	Developed a checklist to assess capacity of institution to prepare inventories	none
						Actual																					
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	○	△	△	△	△	Plan																		JICA	CCDA	Identified institutional challenges and ways to address challenges	none
						Actual																					
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	○	○	○	○	○	Plan																		JICA	CCDA	drafted summary of the institutional arrangements and process	none
						Actual																					
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	△	○	○	○	○	Plan																		JICA	CCDA	MoUs have been drafted and sent to relevant stakeholders	none
						Actual																					
1.5 Collect data necessary for national GHG inventories from relevant parties.	△	○	○	○	○	Plan																		JICA	CCDA	some data have been shared with CCDA	none
						Actual																					
1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	△	○	○	○	○	Plan																		JICA	CCDA	data management rules are under discussion	none
						Actual																					
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.8 Compile national GHG inventories with time series consistency.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
Output 2:Capacity to promote understanding of national GHG inventories is enhanced.																											
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	○	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	○	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)																											
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	△	○	○	○	○	Plan																		JICA	CCDA	Drafted technical papers for data collection	none
						Actual																					
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	○	△	△	△	△	Plan																		JICA	CCDA	none	none
						Actual																					
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	△	○	○	○	○	Plan																		JICA	CCDA	none	none
						Actual																					
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	○	○	○	○	○	Plan																		JICA	CCDA	Guidebook/FAQ for the international consultation and analysis process drafted	none
						Actual																					
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	○	△	△	△	△	Plan																		JICA	CCDA	none	none
						Actual																					
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	○	△	△	△	△	Plan																		JICA	CCDA	none	none
						Actual																					

TO CR of JICA　Papua New Guinea　OFFICE

Project Monitoring Sheet

Project Title : The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG
Version of the Sheet: Ver. 6（Term: April, 2019 - March, 2020）

Name: Takeshi Enoki
Title: GHG Inventory (General)
Submission Date: April 13, 2020

I. Summary

1　Progress

1-1 Progress of Inputs

Experts

During this reporting period, the Japan International Cooperation Agency (JICA) Project expert team made 13 man-trips to Papua New Guinea (PNG).　Total man months during this reporting period was 4.69 in PNG and 6.00 for activities in Japan.

Meetings

The Second Joint Coordinating Committee (JCC) was held on July 26, 2019, with the objectives to report to JCC members the progress of the Project activities, specifically the submission of the first Biennial Update Report (BUR1) and on preparing the second BUR Greenhouse gas (GHG) inventory; and to present the plan for strengthening the institutional arrangements to prepare GHG inventories in PNG.　The JCC members welcomed news that the CCDA submitted in April 2019 its first BUR under the United Nations Framework Convention on Climate Change (UNFCCC).　All participants also acknowledged the importance of strengthened institutional arrangements to ensure the ongoing sustainability of compiling GHG inventories and BURs.

A workshop on fluorinated substitutes for ozone depleting substances was held on March 6, 2020, with the objective of obtaining agreements with key Refrigeration and Air Conditioning (RAC) stakeholders on a pathway forward to develop a refrigerants and air conditioning GHG inventory for BUR2.　Key stakeholders such as the Conservation and Environment Protection Authority (CEPA), PNG Refrigeration and Air Conditioning Association, and RAC importers/distributors attended the meeting.　Participants agreed to respond to the CCDA survey that seeks activity data to enable a GHG inventory to be compiled for 2016 and 2017 by June 2020, provide a list of additional relevant stakeholders, and provided in-principle agreement to be part of a technical working group

on fluorinated gases.

Public relations

During this reporting period, one post on the Second JCC was made on the Project website on the second JCC (https://www.jica.go.jp/project/english/png/006/index.html).

Table 1 shows the inputs by JICA Project expert team for this reporting period of April 2019 to March 2020.

Table 1 Input for term April ~ March 2020

Inputs				Year	2019										2020		
				Month	4	5	6	7	8	9	10	11	12	1	2	3
Expert	1	GHG Inventory (General)		Plan		14			10			14			14	
				Actual		17		14			15		15			
	2	GHG Inventory (Energy)		Plan		14			10			10			14	
				Actual				11			5					
	3	GHG Inventory (Industrial Processes and Product Use)		Plan		7			10			10			7	
				Actual		9		12			10					10
	4	GHG Inventory (Agriculture, Land use change and Forestry)		Plan		7			10			10			7	
				Actual				11		8	9					
	5	GHG Inventory (Waste)		Plan		7			10			10			7	
				Actual												
Japan's Activitie	1	GHG Inventory (General)		Plan												
				Actual												
	2	GHG Inventory (Energy)		Plan												
				Actual												
	3	GHG Inventory (Industrial Processes and Product Use)		Plan												
				Actual												
	4	GHG Inventory (Agriculture, Land use change and Forestry)		Plan												
				Actual												
	5	GHG Inventory (Waste)		Plan												
				Actual												
	6	Project administrative coordination / coordinator for training		Plan												
				Actual												
Monitoring Plan	Monitoring		Joint Coordinating Committee	Plan												
				Actual				1								
			Set-up the Detailed Plan of Operation	Plan												
				Actual												
			Submission of Monitoring Sheet	Plan												
				Actual												
	Reports/Documents		Work Plan	Plan												
				Actual												
			National GHG inventory Report	Plan												
				Actual												
			Project Progress Report	Plan												
				Actual												
			Project Brief Note	Plan												
				Actual												
			Project Completion Report	Plan												
				Actual												
	Public Relations		Establishment and operation of JICA TC website	Plan												
				Actual												

1-2 Progress of Activities

a. Overview of activities carried out in this term

Papua New Guinea's BUR1 was approved by the PNG Government in April 2019 and submitted to the UNFCCC secretariat on April 17, 2019. Since submission of the BUR1, the JICA Project expert team and CCDA have continued to make progress in collecting data for the BUR2 GHG inventory, in particular, for the energy, industrial processes and

product use (IPPU), and waste sectors. The JICA Project expert team and CCDA have spent most time consulting with stakeholders to discuss the methods to estimate GHG emissions, the necessary data to estimate emissions, and the steps necessary for CCDA to acquire the data from the stakeholders. Most JICA Project expert team missions from January 2020 have been postponed due to the coronavirus situation. However, in March 2020, a workshop on fluorinated gases was held by JICA Project expert and CCDA.

In September 2019, the technical analysis for PNG's BUR1 was conducted in Bonn, Germany. The JICA Project expert team and CCDA answered questions posed to the CCDA from the experts carrying out the analysis. The Summary report by the technical analysis team was submitted to CCDA in February 2020. The JICA Project expert team and CCDA analyzed the draft and made revision proposals to the report.

Table 2 shows an overview of the progress of activities for this reporting period.

Table 2 Overview of progress of JICA Project activities

	Sub-Activities	Year	2019									2020		
		Month	4	5	6	7	8	9	10	11	12	1	2	3
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan												
		Actual												
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan												
		Actual												
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan												
		Actual												
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan												
		Actual												
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan												
		Actual												
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan												
		Actual												
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan												
		Actual												
	1.8: Complie national GHG inventories with time series consistency.	Plan												
		Actual												
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan												
		Actual												
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan												
		Actual												
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan												
		Actual												
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan												
		Actual												
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan												
		Actual												
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan												
		Actual												
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan												
		Actual												
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan												
		Actual												
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan												
		Actual												
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan												
		Actual												

b. Output 1 activities

Overview

JICA Project expert team supported CCDA to identify the necessary data to estimate GHG emissions and removals for the GHG inventory, prepared for stakeholder meetings (activity 3.1) and held the meetings to inform stakeholders of the necessary data and

make data requests. In many cases, follow up was necessary by preparing a Memorandum of Understanding (MoU) between CCDA and the stakeholder for the sharing of data (activity 1.4). Some data have been sent to the CCDA (activity 1.5) but most stakeholders are still in the process of reviewing the MoU.

The inventory preparation/compilation structure is as shown in Figure 1. A CCDA staff is assigned as a lead for each of the four sectors of the GHG inventory, namely, Energy, IPPU, Waste, and the Agriculture, Forestry, and Land use (AFOLU) sectors. Several stakeholders/data providers have been identified, and for the energy and IPPU sectors, CCDA plans to establish a technical working group, which will consider the inventory data, methods, and other technical issues regarding the GHG inventory.

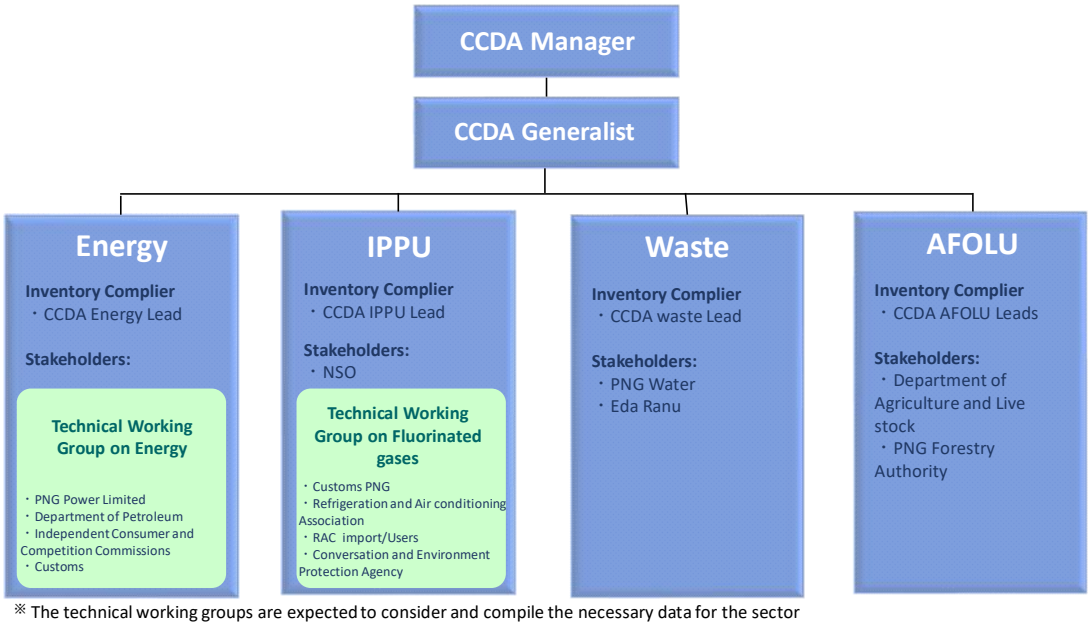


Figure 1　GHG inventory implementation structure for the BUR2 inventory

<u>Detail</u>

<u>Data collection (Activity 3.1, 1.5)</u>

After reviewing the respective sections of the 2006 IPCC Guidelines, the JICA Project experts and CCDA counterparts developed technical papers and questionnaires for the relevant stakeholders (activity 3.1). The technical paper describes the background to GHG inventories, an explanation of what data is needed, how the data will be used in the emission/removal estimation, followed by technical questions to the stakeholder in question. This paper is meant to explain the reasons for data collection, while also attempting to build capacity on the stakeholder side to understand GHG inventories better.

The status of stakeholder meetings and the data collection (activity 1.5) by sector is shown below.

- Energy sector

Table 3 Progress of the energy sector

subsector	stakeholder	assigned to	date interview request was sent	met	minutes	followup action required?
1. Energy sector						
crosscutting	Department of Petroleum and Energy (Energy Wing)	Jason	5-Mar-19	12-Mar-19	Y	need to consult petroleum div.
	Chamber of Mines and Petroleum	Jason	16-Jul-19	no	N	
1.A.1. Energy Industries	Independent Consumer Competition Commission	Jason	31-Jul-19	31-Jul-19	Y	send data request letter
	PNG Power	Jason	2-Jul-19	29-Jul-19	Y	send data request letter
1.A.2. Manufacturing	PNG Conservation and Environment Protection Authority	Jason	not yet			
1.A.3. Transport	Department of Transportation	Jason	11-Mar-19	no	N	
	National Maritime Safety Authority	Jason	11-Mar-19	14-Mar-19	Y	get annual report
	Civil Aviation Safety Authority	Jason	5-Mar-19	15-Mar-19	Y	none
	Department of Transportation	Jason	1-Aug-19	1-Aug-19	Y	send draft ToR of energy sector WG
	National Airports Corporation and Road Traffic Authority	Jason	not yet			
1.A.4. Other		Jason				
1.B.1 Coal		Jason				
1.B.2 Oil and gas	Exxon Mobile	Jason		20-May-19	Y	share guidelines
	Department of Petroleum and Energy (Petroleum Wing)	Jason	not yet			

The JICA Project expert and CCDA have met most energy sector stakeholders and have also sent official data request letters to stakeholders including the Independent Consumer Competition Commission and PNG Power. CCDA has also informed many of the stakeholders of an Energy sector technical working group meeting that CCDA plans to hold, with the view to facilitate the data sharing for the estimation of GHG in the energy sector. Terms of Reference (ToR) for the technical working groups have been sent out to the stakeholders. However, the ToRs have not been signed and no technical working group meetings have been scheduled as of March 2020.

- IPPU sector

Table 4 Progress of the IPPU sector

subsector	stakeholder	assigned to	date interview request was sent	met	minutes	followup action required?
2. IPPU sector						
crosscutting	National Statistics Office	Jacinta	19-Feb-19	no	N	
	PNG Conservation and Environment Protection Authority	Jacinta	19-Feb-19	23-Feb-19	Y	
	PNG Conservation and Environment Protection Authority	Jacinta	15-May-19	15-May-19	Y	share activity data map. Sent letter in July
	National Statistics Office	Jacinta	15-May-19	15-May-19	Y	need MoU
	PNG Customs	Jacinta	1-May-19	17-May-19	Y	send data request letter
2.A. Mineral		Jacinta	not yet			
2.B. Chemical		Jacinta	not yet			
2.C. Metal		Jacinta	not yet			
2.D. Non energy	BOC Papua New Guinea Limited	Jacinta	19-Feb-19	no	N	data request letter sent
2.E. Electronics		Jacinta	not yet			
2.F. Substitutes for ODS	Econoler	Jacinta	19-Feb-19	19-Feb-19	Y	
	Econoler	Jacinta	3-Aug-19	3-Aug-19	Y	follow up ODS project?
		Jacinta				

The JICA Project expert and CCDA have met most IPPU sector stakeholders that have been identified and have also sent official data request letters to stakeholders including the CEPA PNG Conservation and Environment Protection Authority, PNG Customs, and BOC PNG Limited. An MoU has been drafted and shared with National Statistics Office and is under review. The JICA Project expert and CCDA are attempting to develop a mapping of all relevant manufacturing industries in PNG by using NSO, PNG Conservation and Environment Protection Authority, and Customs data, which have yet to be shared. This exercise will help clarify which categories in the 2.A. Mineral, 2.B. Chemical, and 2.C. Metal industries should be included in the BUR2 GHG inventory.

The JICA Project experts and CCDA held a technical workshop to consult stakeholders for 2.F. Substitutes for ODS, specifically the RAC importers/distributors. This approach was taken as there are several private companies that import RAC equipment that emit hydrofluorocarbons (HFCs) during its production, usage, and destruction processes.

- Waste sector

Table 5 Progress of the waste sector

subsector	stakeholder	assigned to	date interview request was sent	met	minutes	followup action required?
5. Waste sector						
5.A. Solid Waste	NCDC	Erick	sent	In October		
	Total Waste Management (TWM)	Erick	not yet	In October		
	Pasifika Eagle Chemical Ltd	Erick	not yet	In October		
	UPNG	Erick	not yet			
	JPRISM	Erick	not yet			
	Town authorities	Erick	not yet			
5.B. Biological treatment of Solid waste	Town authorities?	Erick	not yet			
5.C. Incineration	Health Department	Erick	13-May-19	13-May-19	Y	none
	hospital	Erick	call made		Y	
	DAL?	Erick	not yet			
5.D. Wastewater	Water PNG	Erick	31-Jul-19	31-Jul-19	Y	First set of data received. followup question sent.
	Eda Ranu	Erick	1-Aug-19	26-Sep-19	Y	followup question sent
	UPNG Medfac	Erick	not yet			

The JICA Project expert and CCDA have held meetings with the Health Department, hospitals in the Port Moresby area, Water PNG, and Eda Ranu, but have yet to meet any stakeholders for solid waste. As of March 2020, CCDA has received datasets from Water PNG on population connected to the sewerage treatment system, amount of wastewater generated and the share by type of customer, biological oxygen demand, chemical oxygen demand, and nitrogen load for select regions of PNG. The JICA Project experts and CCDA have identified some irregularities with the data, and have made inquiries to the Water PNG for clarification.

AFOLU sector

The CCDA is working with the Food and Agriculture Organization to collect the necessary data and estimate GHG emissions and removals.

Memorandum of Understanding (activity 1.5)

As of March 2020, four stakeholders have requested an MoU between CCDA and the data provider to strengthen the institutional arrangements for data sharing. The JICA Project expert team and CCDA drafted MoUs and have submitted them to the relevant authorities. A summary of the progress of MoU signing is shown in the table below.

Table 6 Progress of MoU signing

Sector	Stakeholder	Progress
Crosscutting	National Statistics Office	Draft MoU have been drafted by CCDA and sent to National Statistics Office for their approval
	Customs PNG	Draft MoU have been drafted by CCDA and sent to Customs PNG for their approval
Energy	Energy, Independent Consumer and Competition Commission (ICCC)	Draft MoU have been drafted by CCDA and sent to Commission for their approval
	PNG Power Limited (PPL)	Draft MoU have been drafted by CCDA and sent to PNG Power Limited for their approval

The structure of the MoUs that have been drafted by the JICA Project experts and CCDA is as follows:

1. APPLICABLE LAW
2. PURPOSE OF THE MEMORANDUM OF UNDERSTANDING
3. BACKGROUND TO THE MOU
4. MOU JOINT COMMITMENTS
5. CONFIDENTIALITY
6. PROTECTION OF CONFIDENTIAL INFORMATION
7. RETURN OF CONFIDENTIAL INFORMATION
8. INDEMNIFICATION
9. SPECIFIC PERSONS TO RECEIVE INFORMATION
10. MARKING OF CONFIDENTIAL INFORMATION
11. RELATIONSHIP OF THE PARTIES
12. CONTINUATION OF MOU
13. AGREEMENT ON COST
14. AMMENDMENT AND TERMINATION OF MOU
15. WARRANTIES
16. ENTIRE AGREEMENT

<u>Developing database structure for BUR2 inventory (Activity 1.6)</u>

The JICA Project experts and CCDA discussed ways to improve the data management system in CCDA. As a result, the CCDA agreed to properly utilize the shared storage/server to save all relevant inventory files regularly, and sector experts agreed to use a consistent structure in the data storage and emission estimation (see Figures 2 and 3).

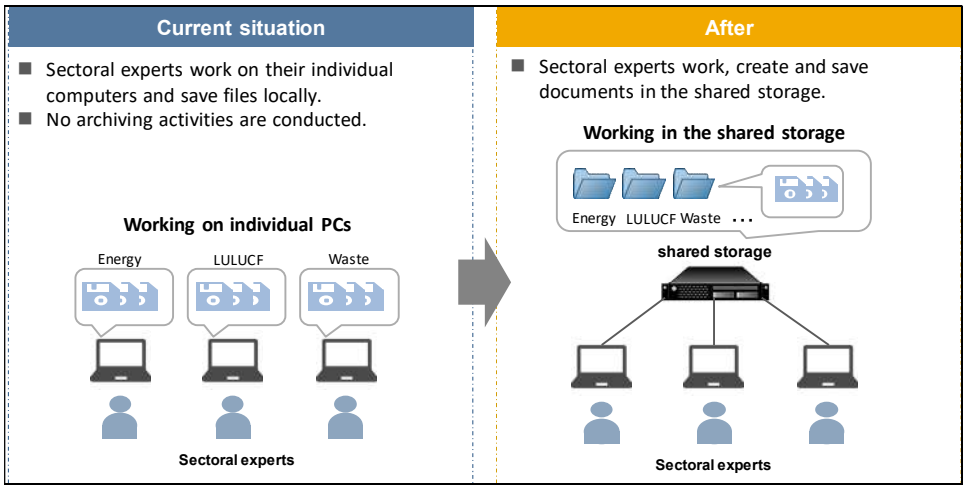


Figure 2　Improvement of data management

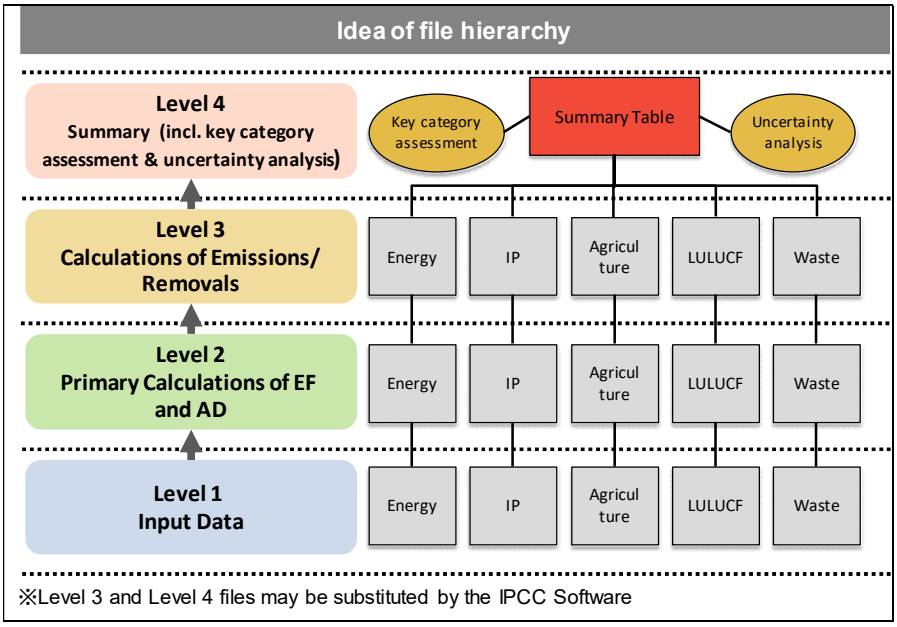


Figure 3　Possible file hierarchy for the GHG inventory

c.　Output 2 activities

A workshop on fluorinated substitutes for ozone depleting substances was held on March 6, 2020 (activity 2.2), with the objective of obtaining agreements with key RAC stakeholders on a pathway forward to develop a refrigerants and air conditioning GHG inventory for BUR2.　Key stakeholders such as the CEPA, PNG Refrigeration and Air Conditioning Association, and RAC importers/distributors attended the meeting.

The workshop consisted of the following five sessions: 1. The UNFCCC reporting requirements and inventory requirements; 2. Planned improvements for PNG's BUR2 GHG inventory; 3. CEPA regulatory framework on HFCs; 4. Methodologies to estimate GHG emissions from RAC equipment; 5. Discussion on how to collect activity data.

While many of the participants were willing to cooperate with CCDA to estimate the HFC emissions, there was some reluctance to provide detailed data.
Participants agreed to respond to the CCDA survey that seeks activity data to enable a GHG inventory to be compiled for 2016 and 2017 by June 2020, provide a list of additional relevant stakeholders, and provided in-principle agreement to be part of a Technical Working Group on fluorinated gases.

d. Output 3 activities

Overview

The JICA Project expert team and CCDA counterparts drafted technical papers and questionnaires for the relevant stakeholders (activity 3.1) as described in Output 1 activities section.
In preparation for the technical analysis of PNG's BUR1, the JICA Project expert team developed a guidebook/FAQ for CCDA describing the process and explaining the types of questions to expect from the technical analysis process and the facilitative sharing of views process under the UNFCCC. The JICA Project expert team also supported the CCDA in responding to technical analysis of PNG's BUR1 which was conducted in September 2019.

Detail

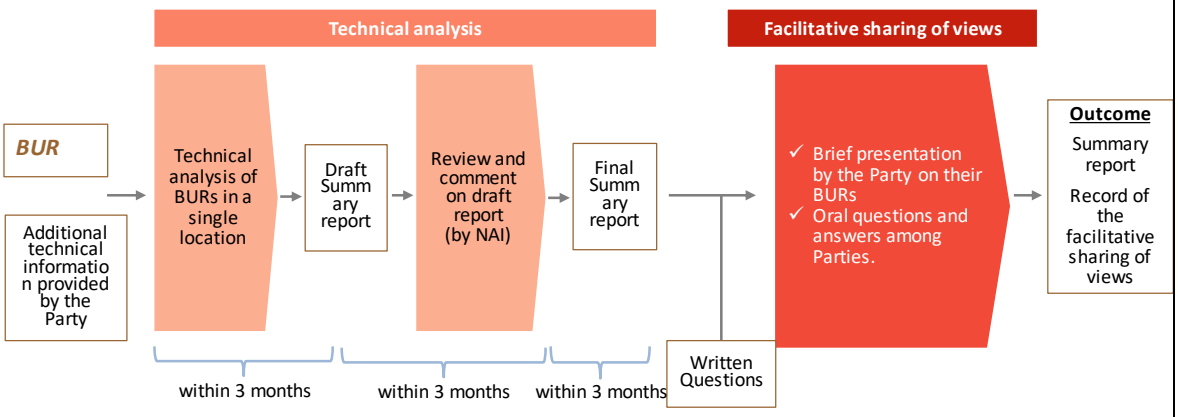
Understanding the IPCC methods (activity 3.1)
As described in output 1 activities.

Guidebook (activity 3.5)

Development of Guidebook
The JICA Project expert team drafted a power point presentation describing the process of the technical analysis and how PNG can prepare for the process. This guidebook/FAQ will be used by CCDA for the International Consultation and Analysis (ICA) for the BUR1 and future BURs. An excerpt of the presentation is shown below.

International Consultation and Analysis

- International Consultation and Analysis (ICA) process which consists of:
  - Technical analysis (TA)
  - Facilitative sharing of views (FSV)



Reference: UNFCCC. (2011), UNFCCC.(2013d)

Aim of the technical analysis

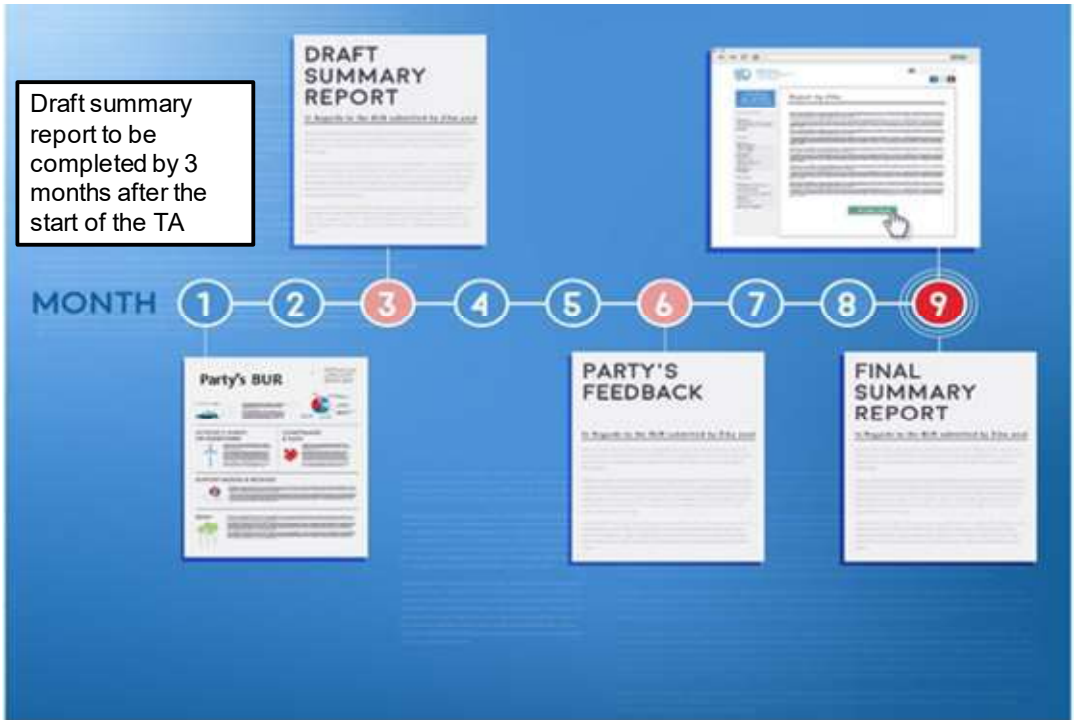
The technical analysis will aim to **increase transparency** of mitigation actions and their effects. The TTE shall:

(a) **Identify information**: Identify the extent to which the elements of information listed in paragraph 3(a) of the guidelines contained in decision 2/CP.17, annex IV, are included in the BUR of the Party concerned;

(b) Undertake a **technical analysis** of information contained in the BUR as outlined in the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" contained in annex III to decision 2/CP.17, and any additional technical information that may be provided by the Party concerned;

(c) In consultation with the Party concerned, **identify capacity-building needs** in order to facilitate reporting in accordance with annex III to decision 2/CP.17, and participating in international consultation and analysis in accordance with annex IV to decision 2/CP.17, taking into account Article 4, paragraph 3, of the Convention.

Timeline for the technical analysis



http://unfccc.int/playground/items/10345.php

General Steps to the TA

When	Activity
Before the TA week	1. TTE will read the BUR and begin filling out the checklist. 2. TTE will ask Party any issues that need further explanation/clarification. This is particularly for information that is partly or not provided.
During the TA week	1. TTE will complete the checklist. 2. For reporting element that is "partly provided" or "not provided," TTE will ask Party whether that issue can be resolved by themselves, or whether there is a capacity building need. 3. Consultation meeting between TTE and Party to confirm the capacity building needs. 4. TTE will draft the Summary Report.
After the TA week	1. Team, Co leads, and secretariat reviews Summary Report draft. 2. Draft report sent to Party for comments (3 months after the TA week). 3. Party provide feedback to TTE (3 months after receiving the Summary Report Draft). 4. Report published (3 moths after receiving feedback from Party).

Questions to expect from TTE on GHG inventories

- The TTE could not find information on uncertainties. Could PNG elaborate on uncertainties? Is this a capacity building need for PNG?
- Sectoral sheets are not included in the BUR. Is this a capacity building need for PNG?
- The TTE noted that PNG uses the GWP from AR4 instead of the SAR. Could PNG explain why?
- The TTE noted that PNG did not report HFCs, PFCs, SF6, Nox, Sox, NMVOCs. Could PNG explain why PNG did not report these gases. Is this a capacity building need?

- NOTE: The NC Guidelines are very old and the some reporting requirements are outdated. Deviating from the guidelines is not a bad thing for some cases.

To prepare for the technical analysis

- Before the analysis
  - In-depth understanding on the reporting guidelines
  - Fill out the table by yourselves to prepare
- During the analysis week
  - Helpful to respond to the questions by TTE fast to give them good understanding on capacity building needs.
- After the analysis
  - Check the TTE findings! (PARTS OF SUMMARY REPORT MIGHT BE WRONG)
  - Use the Summary Report as input to your next BUR cycle.
- The approach to the technical analysis: good opportunity to learn and receive guidance/advice.

Supporting the International Consultation and Analysis for the PNG BUR1

In addition to developing the FAQ/Guidebook for the technical analysis, the JICA Project expert team supported the CCDA in responding to the ICA process. The table below describes the timeline for PNG's BUR1 ICA process.

Table 7 ICA process for PNG

Time	Action	CCDA action (JICA support)
July 2019	UNFCCC secretariat confirm technical analysis schedule with PNG through focal point	None
July 2019	UNFCCC secretariat organize the team of technical experts (TTE)	None
8/28/2019	Questions of clarification emailed to PNG through secretariat or co-leads of the TTE	Answer questions by the TTE
9/2- 9/4	Final questions of clarification sent to PNG.	Answer questions by the TTE
9/5-9/6	TTE will draft list of capacity building needs in consultation with PNG (via Skype, teleconference, email)	Confirm list of capacity building needs by the TTE
12/6	Draft Summary Report sent from secretariat to PNG	None
3/6/2020	PNG provide feedback to TTE	Analyze the Summary report and identify any issues
6/62020	Secretariat finalize Summary Report	None
Summer SBI	Facilitative Sharing of Views during the Subsidiary Body of Implementation negotiations session.	Plan to support CCDA in drafting presentation for the Facilitative Sharing of Views workshop

In August and September 2019, the JICA Project experts supported CCDA in responding to the technical analysis, specifically by helping CCDA answer questions posed by the technical team of experts conducting the technical analysis. A sample of the questions and answers during the technical analysis (TA) are shown in the table below.

Table 8 Questions and answers during the TA

Questions	Answers
Could the Party clarify whether it experienced any challenges or constraints in reporting the information for it National GHG Inventory?	Since it was the first National GHG inventory that was developed by CCDA, PNG faced challenges on understanding the 2006 IPCC Guidelines and what to report as per Decision 2/CP.17. As such it took five years to complete. But with technical support from Food and Agriculture Organization and JICA which started in 2017, PNG was able to complete the inventory.
To enable the TTE to better understand the National GHG Inventory trends, could the party clarify the reasons for LULUCF emission fluctuation?	The reasons for fluctuation of emissions and removals in the LULUCF sector, is decrease in forest lands mainly from forest degradation and deforestation. This section also mentions the drivers which were logging (degradation) and subsistence agriculture and oil palm planation (deforestation).
The BUR1 notes that it took 5-years to prepare the GHG inventory, could the Party clarify whether it experienced any challenges or constraints in establishing a process than enable the Party to prepare it GHG inventory?	This wasn't the first inventory to be undertaken by PNG but the first inventory to be developed internally by CCDA. PNG faced challenges on understanding the 2006 IPCC Guidelines and what to report as per Decision 2/CP.17.
Could the Party clarify whether it experienced and challenges or constraints to undertake key source analysis as indicated in the IPCCC good practice guidance?	Although not mentioned in the BUR, it can be clearly seen that in table 2.6 and 2.7 that PNG used a quantitative approach to conduct the KCA and on level for the year 2015.
To enable the TTE to better understand the information that describes procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved	CCDA (the agency responsible for GHG inventory in PNG) collects all activity data from data providers in which some are confidential data and achieves them in its server and back-up are stored in an external hard drive. After CCDA estimates the GHG emissions, the estimation files are also archived in the CCDA server and back-up are stored in the same external hard drive that stores the activity data.

In December, the UNFCCC secretariat submitted a draft Summary Report to CCDA for review. The JICA Project expert team and CCDA reviewed the draft and identified errors and areas of misunderstanding by the technical analysis team. These comments were compiled and submitted to the UNFCCC secretariat on March 2, 2020. The UNFCCC secretariat is currently finalizing the report, which will be uploaded on the UNFCCC website by early June. The facilitative sharing of views workshop is scheduled to be held in the summer 2020 during the climate change negotiations.

1-3 Achievement of Output

a. Output 1

The set of databases/spread sheet files for national GHG inventories and national GHG inventory report was finalized and approved in April 2020.

b. Output 2

For output 2, the JICA Project expert team conducted an online questionnaire to the participants to evaluate the workshop on fluorinated substitutes for ozone depleting substances, specifically asking the following questions:

- How would you rate this workshop?
- How satisfied were you with each of the 5 sessions?

Six participants responded to the questionnaire. Assuming that the level of satisfaction reflects the level of understanding of the workshop, only 67% of participants had a good level of understanding of the workshop.

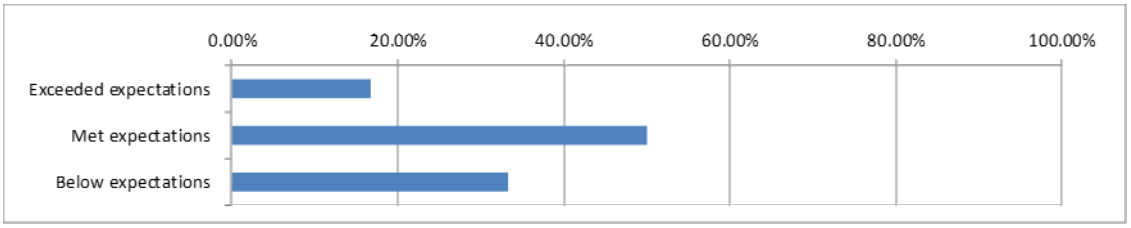


Figure 4 Level of satisfaction of the workshop

However, the level of understanding of the specific sessions were high. Specifically, 100% of participants were either very satisfied or satisfied with the “UNFCCC reporting obligations” session, 83% were very satisfied or satisfied with the other three sessions. The level of understanding/satisfaction of each of the sessions is shown in the figure below.

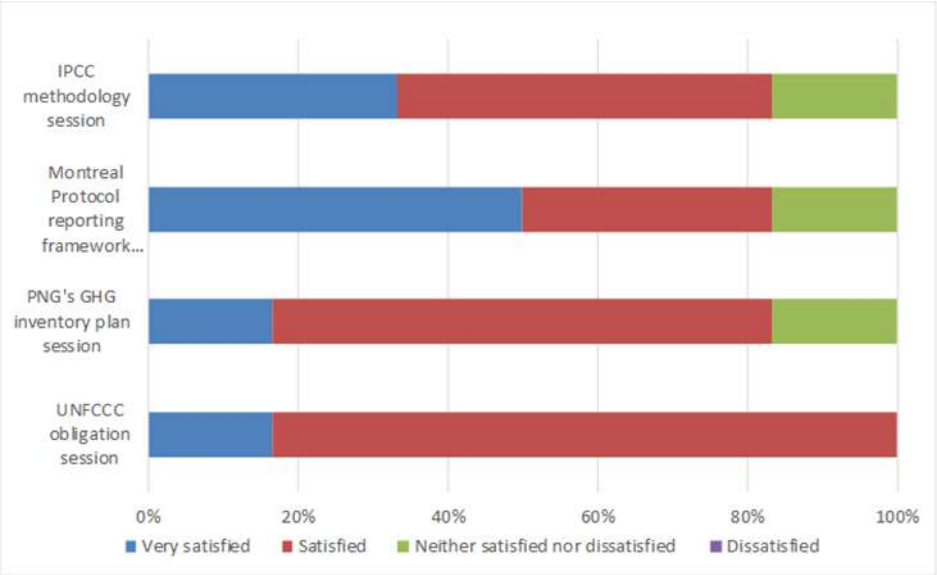


Figure 5 Level of satisfaction of each session of the workshop

c. Output 3

The national GHG inventory report was finalized and approved in April 2020.

1-4 Achievement of the Project Purpose

The BUR1, which contains a summarized national GHG inventory report was approved in April 2020

1-5 Changes of Risks and Actions for Mitigation

The risks of implementation of the Project are mostly the same as the previous reporting period. An additional risk is the coronavirus situation which has limited the JICA Project experts' travel to PNG since January 2020.

Table 9 Risks of implementation of the Project

Assumed risk	Background and Implication of risk	Measures taken in this reporting term
Progress of BUR1 inventory	During the Survey for technical cooperation for this Project carried out in Sept. 2016 and Feb. 2017, JICA was informed by CCDA that PNG was aiming to submit its BUR1 in December 2017. The timelines and plans of the Project were carefully designed based on this deadline/assumption, with some flexibility built in in case there were minor delays. The Project is designed to implement two GHG inventory cycles, but with significant delays, the Project may not be able to complete an entire two cycles.	The BUR1 has been submitted in April 2019. The BUR2 GH inventory is planned to be compile during early 2020, and the BUI GHG inventory, in the summer of 2011.
Management positions	The General Manager of National Communications and MRV division in CCDA is also serving as the manager of the GHG inventory team. This has limited the involvement of the CCDA manager in the technical work of the GHG inventory.	The CCDA informed the JICA Project expert team that the Gener Manager will delegate the JICA Project management to one of the officers of the division.
Duplication of work with other donors	The FAO has been supporting CCDA with the AFOLU inventory as part of the UN-REDD support to CCDA. In addition, the CCDA requested further support from the Capacity Building Initiative for Transparency (CBIT)/GEF and The Coalition for Rainforest Nations (CfRN) to estimate GHG emissions and removals from the AFOLU sector. The CCDA will need to coordinate the scope of work for the donors supporting the GHG inventory work, in particular the AFOLU sector.	The JICA Projectexperts and CCI have agreed that CCDA will coordinate with the forestry dono to ensure the timely completion c the AFOLU sector inventory in tin for the BUR2 and BUR3 submissions.
Coronavirus situation	International travel to PNG has been restricted since January 2020 due to the coronavirus pandemic.	The JICA Project experts and CCI will work on the BUR2 GHG inventory remotely, but the extent the travel restrictions is not clear a of now.

1-6 Progress of Actions undertaken by JICA

none

1-7 Progress of Actions undertaken by Gov. of PNG

none

1-8 Progress of Environmental and Social Considerations (if applicable)

Not applicable

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

Not applicable

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

none

2　Delay of Work Schedule and/or Problems (if any)

2-1 Detail

Due to the coronavirus situation, the Japanese experts have not been in PNG since December 2019.　This has caused some delays in progress of the BUR2 GHG inventory.

2-2 Cause

None.

2-3 Action to be taken

The JICA Project experts and CCDA are currently considering ways to continue Project activities while the JICA Project experts are in Japan.

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of PNG, etc.)

none

3 Modification of the Project Implementation Plan

3.1 Plan of Operation

No changes have been made to the Plan of Operation.

The JICA Project experts and CCDA held a series of discussions with the CCDA regarding its timeline for future BURs and National Communications. As a result, the JICA Project experts confirmed that CCDA was planning to submit its NC3 in the end of 2019 and the BUR2 and BUR3 in 2021 and 2023, respectively.　The JICA Project experts also confirmed that the Plan of Operation will not be revised, and that the GHG inventories prepared during the Project will be included in BURs 2 and 3.

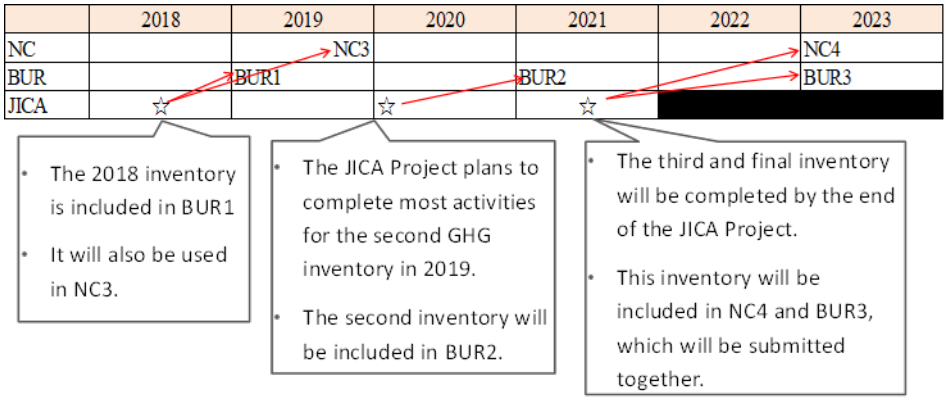


Figure 6　Timeline for future NCs and BURs

3-2 Other modifications on detailed implementation plan

None

4 Current Activities of Gov. of PNG to Secure Project Sustainability after its Completion

none

II. Project Monitoring Sheet I & II *as Attached*

Monitoring Sheet I

Project Monitoring Sheet I （Revision of Project Design Matrix）

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 6

Implementing Agency: CCDA

Dated April 1, 2020

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG　　**Model Site:**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal					
TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist		none	none
Project Purpose					
The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.	A GHG inventory summary report was included in the BUR1	none
Outputs					
Output1：Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report		GHG estimation files and summary report completed for the BUR1	none
Output2：Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire		level of satisfaction was over 70% for sessions of the RAC workshop	none
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report		A GHG inventory summary report was included in the BUR1	none

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5 : Collect data necessary for national GHG inventories from relevant parties. 1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8 : Compile national GHG inventories with time series consistency. 1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2 : Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	
			Pre-Conditions
			<Issues and countermeasures>
			none

Monitoring Sheet II

Project Monitoring Sheet II (Plan of Operation)

Version 6

Dated April 1, 2020

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III			
Expert																					
GHG inventory (General)	Plan																		approximately 1 week to 2 weeks a quarter/expert	Due to the coronavirus situation, Japanese experts have not been to PNG since December 2019	JICA Project experts and CCDA are considering ways to make progress while JICA Project experts are in Japan
	Actual																				
GHG inventory (Energy)	Plan																				
	Actual																				
GHG inventory (Industrial Processes and Product use)	Plan																				
	Actual																				
GHG inventory (Agriculture, Land use change and Forestry)	Plan																				
	Actual																				
GHG inventory (Waste)	Plan																				
	Actual																				
Project administrative coordination / coordinator for training	Plan																		support from Japan		
	Actual																				
Equipment																					
PC for data management	Plan																		All purchased in October 2017	none	none
	Actual																				
Training in Japan																					
Training for Counterpart on GHG inventories in Japan	Plan																		1 week training, to be conducted in Japan as necessary	none	none
	Actual																				
In-country/Third country Training																					
Training for Counterpart on GHG inventories in developing country	Plan																		To be conducted when PNG will participate in the facilitative sharing of views	none	none
	Actual																				
Duration / Phasing	Plan																				
	Actual																				

Monitoring Plan	Year	2017		2018				2019				2020				2021			Remarks	Issue	Solution
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III			
Monitoring																					
Joint Coordinating Committee	Plan																			none	none
	Actual																				
Set-up the Detailed Plan of Operation	Plan																			none	none
	Actual																				
Submission of Monitoring Sheet	Plan																			none	none
	Actual																				
Reports/Documents																					
Work Plan	Plan																			none	none
	Actual																				
National GHG inventory Report	Plan																			none	none
	Actual																				
Project Progress Report	Plan																			none	none
	Actual																				
Project Brief Note	Plan																			none	none
	Actual																				
Project Completion Report	Plan																			none	none
	Actual																				
Public Relations																					
Establishment and operation of JICA TC website	Plan																				
	Actual																				

Activities / Sub-Activities	Year	2017		2018				2019				2020				2021			Responsible Organization		Achievements	Issue & Countermeasures
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG		
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is																						
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan																		JICA	CCDA	none	none
	Actual																					
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	Plan																		JICA	CCDA	none	none
	Actual																					
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan																		JICA	CCDA	none	none
	Actual																					
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan																		JICA	CCDA	MoUs have been drafted and sent to relevant stakeholders	none
	Actual																					
1.5 Collect data necessary for national GHG inventories from relevant parties.	Plan																		JICA	CCDA	some data have been shared with CCDA	none
	Actual																					
1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan																		JICA	CCDA	data management rules agreed	none
	Actual																					
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan																		JICA	CCDA	none	none
	Actual																					
1.8 Compile national GHG inventories with time series consistency.	Plan																		JICA	CCDA	none	none
	Actual																					
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan																		JICA	CCDA	none	none
	Actual																					
Output 2:Capacity to promote understanding of national GHG inventories is enhanced.																						
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan																		JICA	CCDA	none	none
	Actual																					
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan																		JICA	CCDA	RCA workshop held in March 2020	none
	Actual																					
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)																						
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan																		JICA	CCDA	Drafted technical papers for data collection	none
	Actual																					
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan																		JICA	CCDA	none	none
	Actual																					
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	Plan																		JICA	CCDA	none	none
	Actual																					
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan																		JICA	CCDA	none	none
	Actual																					
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan																		JICA	CCDA	Guidebook/FAQ for the international consultation and analysis process completed.	none
	Actual																					
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan																		JICA	CCDA	none	none
	Actual																					
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan																		JICA	CCDA	none	none
	Actual																					

Annex 8-7 Project Monitoring Sheet ver.7

TO CR of JICA　Papua New Guinea　OFFICE

Project Monitoring Sheet

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG
Version of the Sheet: Ver. 7（Term: January 2020 - July 2020）

Name: Takeshi Enoki
Title: GHG Inventory (General)
Submission Date: September 30, 2020

I. Summary

1　Progress

1-1 Progress of Inputs

Experts

During this reporting period of January to July 2020, the Japan International Cooperation Agency (JICA) Project expert team made 1 man-trip to Papua New Guinea (PNG) in March and have not travelled to PNG since then, due to the global spread of the coronavirus pandemic. Total man months during this reporting period was 0.33 in PNG and 4.05 for activities in Japan. Two energy experts have joined the JICA Project expert team to replace Mr. Takahashi, who left the team in November 2019.

Meetings

A workshop on fluorinated substitutes for ozone depleting substances was held on March 6, 2020, with the objective of obtaining agreements with key Refrigeration and Air Conditioning (RAC) stakeholders on a pathway forward to develop a refrigerants and air conditioning GHG inventory for BUR2. Key stakeholders such as the Conservation and Environment Protection Authority (CEPA), PNG RAC Association, and RAC importers/distributors attended the meeting. Participants agreed to respond to the CCDA survey that seeks activity data to enable a GHG inventory to be compiled for 2016 and 2017 by June, provide a list of additional relevant stakeholders, and provided in-principle agreement to be part of a technical working group on fluorinated gases.

An Initial Meeting for Energy Sector Sub-Technical Working Committee (ESTWC) was held on July 9, 2020. The objective of the Committee to inform key energy sector government agencies of improvement plan for the energy sector GHG emissions and to discuss and agree to the Terms of Reference (TOR) of the ESTWC. Participants generally agreed to participate in future ESTWC meetings but requested more time to review the proposed TOR.

Reports

The Progress Report Volume 3 was submitted to JICA headquarters in June 2020.

Public relations

No posts were made to the Project website during this reporting period.

Table 1 shows the inputs by JICA Project expert team for this reporting period.

Table 1 Input for term January ~ July 2020

Inputs				Year	2020						
				Month	1	2	3	4	5	6	7
Expert	1	GHG Inventory（General）		Plan		14				10	
				Actual							
	2	GHG Inventory（Energy I）		Plan		14				10	
				Actual							
	3	GHG Inventory（Energy II）		Plan							
				Actual							
	4	GHG Inventory（Industrial Processes and Product Use）		Plan		7				7	
				Actual			10				
	5	GHG Inventory（Agriculture, Land use change and Forestry）		Plan		7				7	
				Actual							
	6	GHG Inventory（Waste）		Plan		7				7	
				Actual							
Activities in Japan	1	GHG Inventory （General）		Plan	34						
				Actual	21						
	2	GHG Inventory （Energy I）		Plan	15						
				Actual	6						
	3	GHG Inventory （Energy II）		Plan	14						
				Actual	6						
	4	GHG Inventory （Industrial Processes and Product Use）		Plan	27						
				Actual	17						
	5	GHG Inventory （Agriculture, Land use change and Forestry）		Plan	27						
				Actual	13						
	6	GHG Inventory （Waste）		Plan	27						
				Actual	12						
	7	Project administrative coordination / coordinator for training		Plan	10						
				Actual	6						
Monitoring Plan		Monitoring	Joint Coordinating Committee	Plan							
				Actual							
			Set-up the Detailed Plan of Operation	Plan							
				Actual							
			Submission of Monitoring Sheet	Plan							
				Actual							
		Reports/Documents	Work Plan	Plan							
				Actual							
			National GHG inventory Report	Plan							
				Actual							
			Project Progress Report	Plan							
				Actual							
		Public Relations	Establishment and operation of JICA TC website	Plan							
				Actual							

1-2 Progress of Activities

a. Overview of activities carried out in this term

Due to the coronavirus pandemic, data collection for the BUR2 GHG inventory has seen little progress. In March and April, the JICA Project experts and CCDA discussed ways to make progress during the travel restriction of international flights, and the lockdown period in PNG. Some progress was made in the IPPU and energy sectors, successfully gathering the stakeholders to discuss data and estimation methods. The

JICA Project team also began drafting the inventory report, which will include more detailed technical information on the GHG inventory preparation and data.

Table 2 shows an overview of the progress of activities for this reporting period.

Table 2 Overview of progress of activities

	Sub-Activities	Year	2020						
		Month	1	2	3	4	5	6	7
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan							
		Actual							
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan							
		Actual							
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan							
		Actual							
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan							
		Actual							
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan							
		Actual							
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan							
		Actual							
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan							
		Actual							
	1.8: Complie national GHG inventories with time series consistency.	Plan							
		Actual							
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan							
		Actual							
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan							
		Actual							
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan							
		Actual							
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan							
		Actual							
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan							
		Actual							
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan							
		Actual							
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan							
		Actual							
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan							
		Actual							
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan							
		Actual							
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan							
		Actual							

b. Output 1 activities

Overview

CCDA has enhanced its GHG inventory implementation structure for the GHG inventory preparation as shown in Figure 1. A CCDA staff has been assigned as a lead for each of the four sectors of the GHG inventory, namely, Energy, IPPU, Waste, and the Agriculture, Forestry, and Land use (AFOLU) sectors. Several stakeholders/data providers have been identified, and for the energy sector, a technical working group, which will consider the inventory data, methods, and other technical issues regarding the GHG inventory has been established and meetings held during this reporting term. For the IPPU sector, a meeting on the F gases was held, and a similar technical working groups is expected to be established.

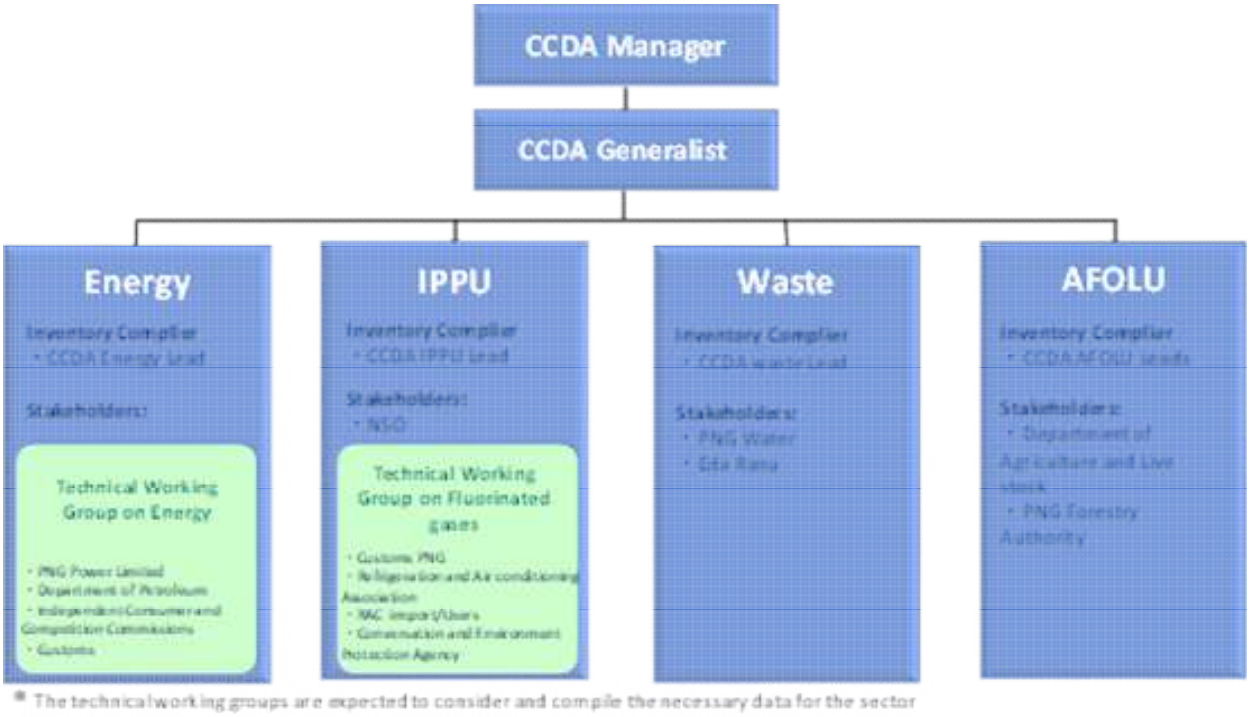


Figure 1 GHG inventory implementation structure for the BUR2 inventory

Detail

The following will describe the progress made in the energy and IPPU sectors and the progress made in drafting the national inventory report.

A. Energy sector

The Initial Meeting for ESTWC was held on July 9, 2020. Nineteen participants attended, including representatives from CCDA, the Department of Petroleum & Energy, PNG Power Ltd, Puma Energy, Independent Consumer & Competition Commission, and

Department of National Planning & Monitoring attended the meeting. The objectives of the meeting were of the following:

- To inform key energy sector government agencies of the improvement plan for the energy sector GHG emissions for the GHG inventory;
- For key energy sector government agencies to agree to be members of the ESTWC;
- To discuss and agree to the ESTWC ToR;
- To inform key energy sector government agencies of the overall NDC preparation plan.

Although participants could not agree on the ToR during the meeting, all agreed to participate in future ESTWC meetings and provide necessary input and data, where possible. The GHG inventory preparation is included in the scope of the ESTWC, but the primary focus for the time being is on the preparation of the enhanced nationally determined contribution (NDC) for PNG. The ToR for the ESTWC was officially delivered to each of the stakeholders, who are expected to review and approve by the next ESTWC meeting, scheduled for September 9.

B. IPPU sector

A workshop on fluorinated substitutes for ozone depleting substances was held on March 6, 2020 (activity 2.2), with the objective of obtaining agreements with key RAC stakeholders on a pathway forward to develop a refrigerants and air conditioning GHG inventory for BUR2. Key stakeholders such as the CEPA, PNG Refrigeration and Air Conditioning Association, and RAC importers/distributors attended the meeting.

The workshop consisted of the following five sessions: 1. The UNFCCC reporting requirements and inventory requirements; 2. Planned improvements for PNG's BUR2 GHG inventory; 3. CEPA regulatory framework on HFCs; 4. Methodologies to estimate GHG emissions from RAC equipment; 5. Discussion on how to collect activity data. While many of the participants were willing to cooperate with CCDA to estimate the HFC emissions, there was some reluctance to provide detailed data, due to the time and effort needed to compile and process the detailed data. For the GHG inventory to be completed in 2020, the stakeholders will provide aggregated data, and after completion of the 2020 GHG inventory, relevant parties will discuss the possibility of sharing the detailed data.

Participants agreed to respond to the CCDA survey that seeks activity data to enable a GHG inventory to be compiled for 2016 and 2017 by June 2020, provide a list of additional relevant stakeholders, and provided in-principle agreement to be part of a Technical Working Group on fluorinated gases. However, the JICA Project experts are still confirming with CCDA with regards to the progress of the CCDA survey.

C. The GHG national inventory report

The BUR1 included a brief overview of the GHG inventory, including general information on the methods and data used, the results, the emission trends/removals. For the BUR2, the JICA Project experts and CCDA will draft a more detailed technical document, which will provide more information on the stakeholders, the inventory preparation process, the institutional arrangements, and more category specific information on the data/methods used, etc. instead of the broad description provided in the BUR1. This document will contain all relevant information on updating the GHG inventory in PNG, therefore serving as a technical manual for the inventory expert who will be tasked to update the inventory next cycle (BUR3).

The table of contents of the inventory report is as follows:

Chapter 1. Introduction
- 1.1. Background information on GHG inventories and climate change
- 1.2. National circumstances
- 1.3. A description of the national inventory arrangements
- 1.4. Inventory preparation process
- 1.5. Brief general description of methodologies and data sources used
- 1.6. Brief description of key categories
- 1.7. General uncertainty evaluation
- 1.8. General assessment of completeness
- 1.9. Recalculations

Chapter 2. Trends in GHG emissions and removals
- 2.1. Description and interpretation of emission trends for aggregated GHG emissions
- 2.2. GHG emission and removal trends by sector
- 2.3. GHG emission and removal trends by gas

Chapter 3. Energy
- 3.1. Overview of sector
- 3.2. Fuel combustion (1.A)
- 3.3. Fugitive emissions from solid fuels (1.B)
- 3.4. CO2 transport and storage (1.C)

Chapter 4. Industrial Processes and Product Use (IPPU)
- 4.1. Overview of sector
- 4.2. Emissions Summary

4.3. Mineral Industry (2.A.)
4.4. Chemical Industry (2.B.)
4.5. Metal Industry (2.C.)
4.6. Non-energy products from fuels and solvent use (2.D)
4.7. Other Product Manufacture and Use (2.G)

Chapter 5. Agriculture
5.1. Overview of sector
5.2. Livestock (3.A)
5.3. Aggregated sources and non-CO2 emission sources from land (3.C)

Chapter 6. Forestry and Other Land Use/LULUCF
6.1. Overview of sector
6.2. Land-use definitions and the classification systems used and their correspondence to the LULUCF categories (e.g. land use and land-use change matrix)
6.3. Information on approaches used for representing land areas and on land-use databases used for the inventory preparation
6.4. Forest land (4.A.)
6.5. Crop land (4.B.)
6.6. Crop land (4.C.)
6.7. Other

Chapter 7. Waste sector
7.1. Overview of sector
7.2. Solid waste disposal (5.A)
7.3. Biological Treatment of Solid Waste (5.B)
7.4. Incineration and Open Burning of Waste (5.C)
7.5. Wastewater Treatment and Discharge (5.D)

Annex I Summary tables

c. Output 2 activities

As described in the previous section, two workshops/meetings have been held during this reporting term.

d. Output 3 activities

As mentioned in 1-1 Progress of inputs, two energy experts have joined the JICA Project expert team to replace Mr. Takahashi, who left the team in November 2019. One expert will continue to support CCDA with the energy sector inventory, while the other will focus on Activity 3.4. to consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets, and to consider improvements to the mitigation chapter of the BUR.

The JICA Project expert tasked with mitigation issues has had a meeting with CCDA to discuss the way forward with regards to improving the mitigation chapter of the BUR. The JICA Project expert will carry out an independent review the BUR1 mitigation chapter using the BUR Guidelines as adopted by the Conference of the Parties (COP) and the Summary Report of the technical analysis carried out in September 2019 to identify the gaps of BUR1 and the priority issues that need to be addressed for BUR2. In addition, the JICA Project expert will follow the discussion on the enhancement of NDCs that is taking place in the ESTWC to identify potential areas of the NDCs that could be reflected in the next GHG inventory.

1-3 Achievement of Output

There are no achievements during this term.

1-4 Achievement of the Project Purpose

There are no achievements during this term.

1-5 Changes of Risks and Actions for Mitigation

Since late March, international travel to PNG has been closed due to the coronavirus pandemic, and PNG has also been under locked down for some periods of time. As a result, the JICA Project experts and CCDA have not been able to carry out activities as planned. For the time being, the JICA Project experts will focus on activities that can be remotely done, for example, supporting CCDA prepare technical papers for stakeholder meetings, workshops, ESTWC meetings, drafting the qualitative sections of the national inventory report, and preparing CCDA for the upcoming facilitative sharing of views (FSV) workshop in which CCDA will need to present a summary of the BUR1 and answer questions from Parties.

1-6 Progress of Actions undertaken by JICA

The JICA Project expert team has consulted JICA headquarters on the approach during the corona virus pandemic and have agreed to the actions for mitigation above.

1-7 Progress of Actions undertaken by Gov. of PNG

none

1-8 Progress of Environmental and Social Considerations (if applicable)

Not applicable

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

Not applicable

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

none

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail/Cause

Due to the global spread of the coronavirus, the JICA Project experts have not been in PNG since March 2020.　This has caused delays in progress of all activities related to the BUR2 GHG inventory:

1-5：Collect data necessary for national GHG inventories from relevant parties.

1-6：Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.

1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.

1-8：Compile national GHG inventories with time series consistency.

1-9：Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).

3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.

2-3 Action to be taken

As described in section 1-5, for the time being, the JICA Project experts will focus on activities that can be remotely done, for example, supporting CCDA prepare technical papers for stakeholder meetings, workshops, ESTWC meetings, drafting the qualitative sections of the national inventory report, and preparing CCDA for the upcoming facilitative sharing of views (FSV) workshop in which CCDA will present a summary of the BUR1 and answer questions from Parties.

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of PNG, etc.)

none

3 Modification of the Project Implementation Plan

3.1 Plan of Operation

No changes have been made to the Plan of Operation.

3-2 Other modifications on detailed implementation plan

None

4 Current Activities of Gov. of PNG to Secure Project Sustainability after its Completion

none

II. Project Monitoring Sheet I & II *as Attached*

Monitoring Sheet I

Project Monitoring Sheet I （Revision of Project Design Matrix）

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 7

Implementing Agency: CCDA

Dated September 30, 2020

Target Group: CCDA

Period of Project: August 2017- July 2021

Project Site: Port Moresby, PNG **Model Site:**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal					
TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	・National GHG inventory report. ・TACCC assessment results of the checklist		none	none
Project Purpose					
The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	・Reports of national GHG inventory (2015 and 2017) ・TACCC assessment results of the checklist	・Relevant agencies cooperate with CCDA.	none	none
Outputs					
Output1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report		none	none
Output2 : Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire		none	none
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report		none	none

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5 : Collect data necessary for national GHG inventories from relevant parties. 1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8 : Compile national GHG inventories with time series consistency. 1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2 : Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	
			Pre-Conditions
			none
			<Issues and countermeasures>
			none

Monitoring Sheet II

Project Monitoring Sheet II (Revision of Plan of Operation)

Version 7

Dated September 30, 2020

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ			
Expert																					
GHG inventory (General)	Plan																		approximately 1 week to 2 weeks a quarter/expert	Global coronavirus pandemic has shut down international travel	JICA Project experts will focus work on activities that can be done remotely.
	Actual																				
GHG inventory (Energy I)	Plan																				
	Actual																				
GHG inventory (Energy II)	Plan																				
	Actual																				
GHG inventory (Industrial Processes and Product use)	Plan																				
	Actual																				
GHG inventory (Agriculture, Land use change and Forestry)	Plan																				
	Actual																				
GHG inventory (Waste)	Plan																				
	Actual																				
Project administrative coordination / coordinator for training	Plan																		support from Japan		
	Actual																				
Equipment																					
PC for data management	Plan																		none. All purchased in October 2017	none	none
	Actual																				
Training in Japan																					
Training for Counterpart on GHG inventories in Japan	Plan																		1 week training, to be conducted with the in country/third country training	none	none
	Actual																				
In-country/Third country Training																					
Training for Counterpart on GHG inventories in developing country	Plan																		1 week training, to be conducted with the in country/third country training	none	none
	Actual																				

Duration / Phasing		
Plan		
Actual		

Monitoring Plan	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ			
Monitoring																					
Joint Coordinating Committee	Plan																			none	none
	Actual																				
Set-up the Detailed Plan of Operation	Plan																			none	none
	Actual																				
Submission of Monitoring Sheet	Plan																			none	none
	Actual																				
Reports/Documents																					
Work Plan	Plan																			none	none
	Actual																				
National GHG inventory Report	Plan																			none	none
	Actual																				
Project Progress Report	Plan																			none	none
	Actual																				
Project Brief Note	Plan																			none	none
	Actual																				
Project Completion Report	Plan																			none	none
	Actual																				
Public Relations																					
Establishment and operation of JICA TC website	Plan																				
	Actual																				

Activities / Sub-Activities	Year	2017		2018				2019				2020				2021			Responsible Organization		Achievements	Issue & Countermeasures
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG		
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is																						
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan																		JICA	CCDA	none	none
	Actual																					
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	Plan																		JICA	CCDA	none	none
	Actual																					
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan																		JICA	CCDA	none	none
	Actual																					
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan																		JICA	CCDA	none	none
	Actual																					
1.5 Collect data necessary for national GHG inventories from relevant parties.	Plan																		JICA	CCDA	none	none
	Actual																					
1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan																		JICA	CCDA	none	none
	Actual																					
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan																		JICA	CCDA	none	none
	Actual																					
1.8 Compile national GHG inventories with time series consistency.	Plan																		JICA	CCDA	none	none
	Actual																					
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan																		JICA	CCDA	none	none
	Actual																					
Output 2:Capacity to promote understanding of national GHG inventories is enhanced.																						
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan																		JICA	CCDA	none	none
	Actual																					
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan																		JICA	CCDA	none	none
	Actual																					
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)																						
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan																		JICA	CCDA	none	none
	Actual																					
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan																		JICA	CCDA	none	none
	Actual																					
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	Plan																		JICA	CCDA	none	none
	Actual																					
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan																		JICA	CCDA	none	none
	Actual																					
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan																		JICA	CCDA	none	none
	Actual																					
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan																		JICA	CCDA	none	none
	Actual																					
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan																		JICA	CCDA	none	none
	Actual																					

Annex 8-8 Project Monitoring Sheet ver.8

TO CR of JICA　Papua New Guinea　OFFICE

Project Monitoring Sheet

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version of the Sheet: Ver. 8（Term: August 2020 - April 2021）

Name: Takeshi Enoki

Title: GHG Inventory (General)

Submission Date: May 16, 2021

I. Summary

1　Progress

1-1 Progress of Inputs

Table 1 Input for term January ~ July 2020

Inputs				Year	2020									2021		
				Month	4	5	6	7	8	9	10	11	12	1	2	3
Expert	1	GHG Inventory (General)		Plan												
				Actual												
	2	GHG Inventory (Energy1)		Plan												
				Actual												
	3	GHG Inventory (Energy2)		Plan												
				Actual												
	4	GHG Inventory (Industrial Processes and Product Use)		Plan												
				Actual												
	5	GHG Inventory (Agriculture, Land use change and Forestry)		Plan												
				Actual												
	6	GHG Inventory (Waste)		Plan												
				Actual												
Activities in Japan	1	GHG Inventory (General)		Plan	34									22		
				Actual	45									13		
	2	GHG Inventory (Energy1)		Plan	15									8		
				Actual	26									9		
	3	GHG Inventory (Energy2)		Plan	14									14		
				Actual	16									1		
	4	GHG Inventory (Industrial Processes and Product Use)		Plan	27									20		
				Actual	28									5		
	5	GHG Inventory (Agriculture, Land use change and Forestry)		Plan	27									20		
				Actual	27									2		
	6	GHG Inventory (Waste)		Plan	27									19		
				Actual	27									6		
	7	Project administrative coordination / coordinator for training		Plan	10									0		
				Actual	6									0		
Monitoring Plan	Monitoring	Joint Coordinating Committee		Plan												
				Actual												
		Set-up the Detailed Plan of Operation		Plan												
				Actual												
		Submission of Monitoring Sheet		Plan												
				Actual												
	Reports/Documents	Work Plan		Plan												
				Actual												
		National GHG Inventory Report		Plan												
				Actual												
		Project Progress Report		Plan												
				Actual												
		Project Brief Note		Plan												
				Actual												
		Project Completion Report		Plan												
				Actual												
	Public Relations	Establishment and operation of JICA TC website		Plan												
				Actual												

Experts

During this reporting period, the Japan International Cooperation Agency (JICA) Project expert team did not carry out activities in PNG due to the Covid-19 pandemic. Total man months during this reporting period was 10.2 for activities in Japan.

Meetings

The Third Joint Coordinating Committee (JCC) was held on March 10, 2021 to report progress of GHG inventory preparation for the second Biennial Update Report (BUR2) and to discuss activities taken until completion of the project. The counterparts of the Project, the Climate Change and Development Authority (CCDA) reported that the BUR2 preparation work was delayed in 2020 due to Covid-19 pandemic and the work to update the Nationally Determined Contribution (NDC) to which top priority was given, but the BUR2 which covers the inventory years 2000 to 2017, will be submitted in 2021. CCDA also reported that Energy Sector Sub Technical Working Committee will be held in late March where activity data for the inventory will be discussed and establishment of a Sub technical Working Committee in the Industrial Processes and Product Use (IPPU) sector and other sectors is under discussion. They also stated that some projects to support implementation of the NDC will be conducted and they would like to use data of the project for the inventory, showing importance of strengthened institutional arrangements to ensure the ongoing sustainability of compiling GHG inventories and BURs. These include signing MoUs on data sharing and establishing technical working groups for technical GHG inventory issues.

Reports

After confirming the progress of the Project with the CCDA, the JICA Project expert team submitted the fifth monitoring sheet in December 2020.

1-2 Progress of Activities

a. Overview of activities carried out in this term

The JICA Project expert team and CCDA collected data for the BUR2 GHG inventory for the energy, industrial processes and product use (IPPU), and waste sectors, estimated GHG emissions, and prepared reports, while organizing data on mitigation actions.

Table 2 shows an overview of the progress of activities for this reporting period.

Table 2 Overview of progress of activities

	Sub-Activities	Year	2020									2021		
		Month	4	5	6	7	8	9	10	11	12	1	2	3
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan												
		Actual												
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan												
		Actual												
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan												
		Actual												
	1.4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan												
		Actual												
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan												
		Actual												
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan												
		Actual												
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan												
		Actual												
	1.8: Compile national GHG inventories with time series consistency.	Plan												
		Actual												
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan												
		Actual												
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan												
		Actual												
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan												
		Actual												
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan												
		Actual												
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan												
		Actual												
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	Plan												
		Actual												
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan												
		Actual												
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan												
		Actual												
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan												
		Actual												
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan												
		Actual												

b. Output 1 activities

Overview

In July 2020, Energy Sector Sub technical Working Committee was established based on the MoU of this project signed between CCDA and stakeholders. In 2020, the NDC was updated, and estimation methods for the GHG inventory was discussed (activity 1.5). GHG emissions in the waste sector was recalculated using data of the BUR1 in 2020, as there was influence of Covid-19 pandemic and top priority was given to the update work of the NDC.

For the energy and IPPU sectors, GHG emissions was estimated using the data from sources used in the BUR1 such as the APERC database, data provided by private companies, and official national statistics (activity 1.7). The emission estimation files of the BUR1 were not consistent among sectors, so the experts have made improvements to the estimation files to enhance transparency and to make them more user-friendly (activity 1.8). The JICA Project expert team and CCDA prepared a detailed draft report of the inventory report (activity 1.9).

Based on the BUR1 and the BUR2, the QA/QC plan was prepared (activity 1.3).

Detail

Data collection (Activity 1.5)

The JICA Project experts and CCDA attempted to collect new data to improve the completeness of the BUR2, in addition to the data collected for the BUR1. However, because of Covid-19 lockdowns and the work for the NDC, the experts have decided to estimate categories in the BUR1. Some data of 2017, the latest year, were not collected, resulting in use of data of 2015.

Activity data by sector are shown below.

Table 3 Activity data for the BUR2 inventory

	Activity data	Source
Energy sector	Productivity by fuel	APERC database
	Supply by fuel	APERC database
	Import/export volume by fuel	APERC database
	The volume of stored energy by fuel	APERC database
	The volume of consumption of energy by fuel and purpose	APERC database
IPPU sector	Volume of lubricating oil sales	Private companies
	Volume of nitrous oxide sales	Private companies（using data of the BUR1）
Waste sector	Population (urban and rural areas)	Census data（using data of the BUR1）
	Population connected to the sewerage treatment system, amount of wastewater generated, population connected to sewage, and the share by biological oxygen demand, chemical oxygen demand, and nitrogen load for select regions of PNG. (Some data may not be used for estimation)	Eda Ranu, Water PNG

Energy Sector Sub technical Working Committee was established on 9 July 2020, and committees were held on 9 and 30 September 2020. The purpose of the working committee is to improve work on the NDC and to prepare the GHG inventory, and representatives of energy stakeholders and experts serve on the committee. The JICA Project experts and CCDA prepared explanatory materials of the GHG inventory for the 1st committee of 2020, proposing to estimate emissions for the BUR2 using APERC data as with the BUR1, and using data from committee members for the BUR3 and later. This approach was approved by the Committee. The 1st committee of 2021 was scheduled to be held in March 2021 but was postponed due to lockdown measures.

Table 4 Overview of Energy Sector Sub technical Working Committee

Purpose	To discuss preparation/revision and monitoring of the NDC, estimation methods and activity data for the GHG inventory
Chairpersons	A General Manager of CCDA and a Director of Department of Energy Planning
Committee members	・CCDA ・Department of Energy Planning ・PNG Power ・Exxon Mobil ・Puma Energy ・Independent Consumer & Competition Commission ・University of PNG ・Department of Transport ・Global Green Growth (as observers) ・International Renewable Energy Agency (as observers) ・United Nations Development Programme (as observers)
Agenda	The 1st committee（July 9, 2020） ・Purpose of the committee, TOR, sharing of work plans and achieving consensus on establishment of the committee ・Estimation methods and sources of activity data for the energy sector The 2nd committee（September 9, 2020） ・Official approval for Energy Sector Sub technical Working Committee ・A draft of the NDC The 3rd committee（September 30, 2020） ・Improvement of the NDC draft

Developing database structure (Activity 1.7 and 1.8)

The JICA Project experts rebuilt files for estimation of GHG emissions based on management capacity and capacity to use Microsoft Excel of CCDA staffs.

The rebuild includes a new design which updates primary data files to automatically calculate emissions for the IPPU and waste sectors and new files regarding activity data and emission factors uploaded to IPCC software in consideration of possibility that IPCC software will be used instead of Excel-based file system in the near future. Classification of estimation files and structures of the files are shown below.

Table 5 Classification of estimation files

Level 0	Files which primary data are organized. Sheets are prepared by source and provider, and raw data are stored as they are.
Level 1	Files which activity data and emission factors are organized by source using the data of Level 0. The files can be used as the files uploaded to IPCC software in the future.
Level 2	Files to estimate emissions using the data of Level 1, including total emissions in sectors.
Level 3	Files to estimate total emissions and removals after aggregation of the data of Level 2 by sector.

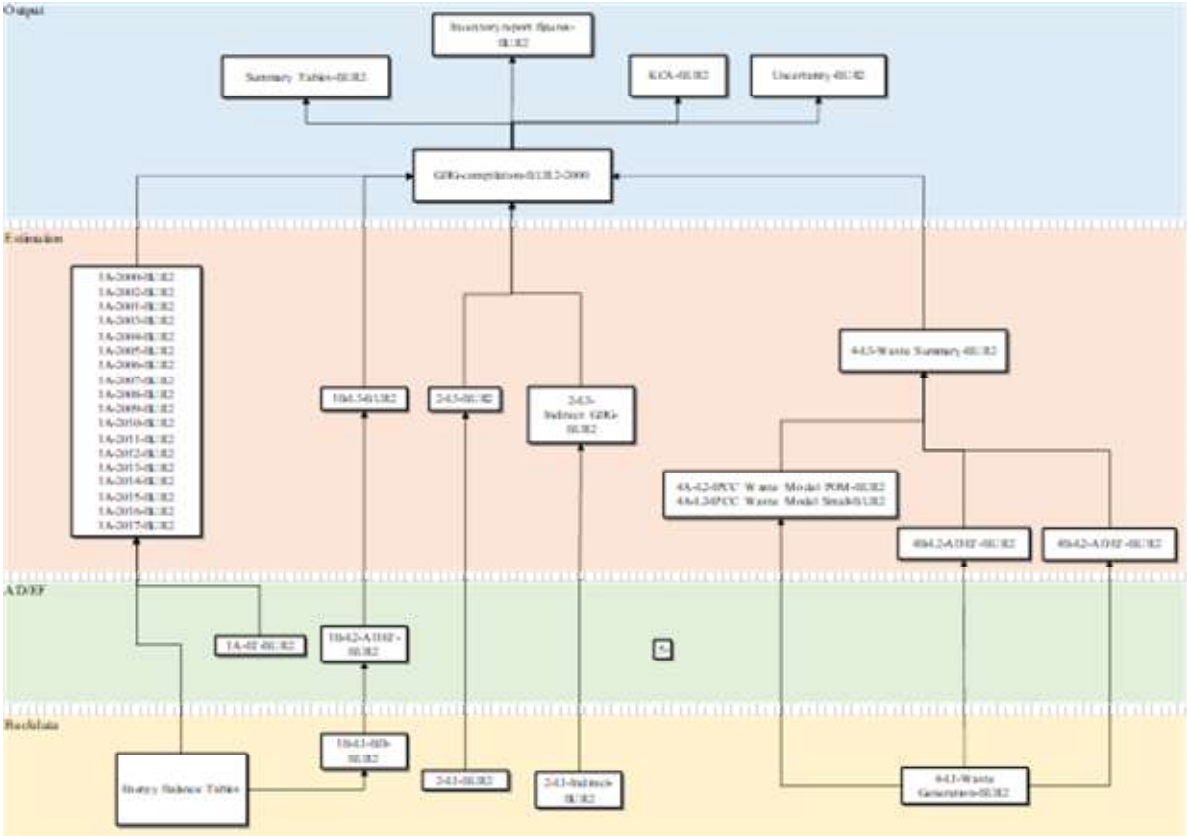


Figure 1 Structure of estimation files for the BUR2 inventory

Preparation of draft of inventory report (Activity 1.9)

In the BUR1, only an overview of the GHG inventory was included, while in the BUR2, a technical inventory report will be submitted as a separate annex. The inventory report includes estimation methods, used data, results, and improvements for total sources and sinks, as well as inventory preparation structure, a preparation timeline, an overview of results. The report is expected to be used as a preparation and update manual of the inventory for CCDA staff in the future.

Preparation of QA/QC plan (Activity 1.4)

The JICA Project experts drafted a QA/QC plan based on the guidelines of IPCC (See Annex II). The plan is expected to be used as a procedure manual to prepare the inventory for CCDA staffs. Main points of the QA/QC plan are shown below.

【Inventory preparation system】

CCDA is a responsible entity and preparation entity of the BUR/the NC under the National Strategy on Climate-Compatible Development" (NEC Decision No 55/2010) and the Paris Agreement Implementation Act. CCDA prepares and submits reports to UNFCCC, while working together with stakeholders.

There is no inter-Ministerial organization in PNG which technically checks contents of the BUR/the NC. A draft of the report prepared by CCDA is discussed at a consultation workshop and is unofficially approved at the workshop. Energy Sector Sub technical Working Committee was established in 2020 to technically discuss the inventory. Sub working committees like Energy Sector Sub technical Working Committee will be established in all sectors in the future.

Figure 2 shows the inventory preparation system in PNG.

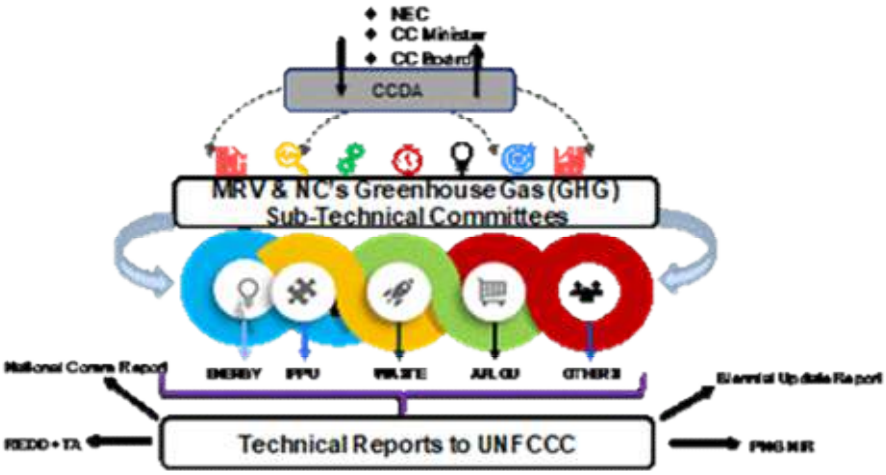


Figure 2 Inventory preparation system in PNG

【Timeline for inventory preparation】

PNG which is categorized into SIDS does not have a legal obligation to prepare and submit the inventory but will make efforts to prepare it every 2 years. The routinized preparation work has not been established yet, but their inventory preparation procedure and its approximate required time are shown below.

Table 6 Timeline for inventory preparation

Milestone	Time
GHG inventory improvement planning	5 months
Project approval by GEF/UNDP/PNG	6 months
Kickoff meeting/workshop	1.5 months
Data collection - Stakeholder identification/stakeholder identification and engagement - Sub technical working committee meetings, as needed - Sending official data request letters including data sheets - Data collection and analysis - Update database	8 months
GHG emission/removal estimation	0.5 months
Compilation of the GHG inventory - Linking all sector files to the summary table files and producing the national total GHG emissions/removals. - updating the key category analysis - updating the uncertainty assessment	0.5 months
Updating the NIR	1 month
Updating the BUR chapter on GHG inventories	0.5 months
Quality control of the inventory products (estimation files and inventory report)	0.5 month
Validation meeting/workshop	1 month
Revision of the GHG inventory, as needed	0.5 months
Quality Assurance activities	1 month
Submission to the PNG NEC and Climate Change Board	1 month
Submission to the UNFCCC	
GHG inventory preparation process	~24 months*

【QC checklist】

Based on IPCC guidelines, a QC checklist was prepared. Only essential items were chosen to be checked due to lack of human resource of CCDA.

Table 7 QC checklist

Checklist for estimation file (for sector experts)	Date checked	Detected errors, and how they were corrected	Name
Data entry done correctly?			
Sources documented?			
Correct units used?			
Eye test for fluctuations?			
Sector totals match summary table emissions/removals?			
Checklist for inventory report	**Date checked**	**Detected errors, and how they were corrected**	**Name**
All values match the estimation file results?			
Table/Figure numbering correct?			
Are sector values consistent throughout the GHG inventory chapter?			
Sources documented correctly?			
Check for confidential data?			

c. Output 2 activities

No workshops were held during the reporting term.

d. Output 3 activities

i. Overview

The JICA Project expert drafted a reporting format regarding BUR mitigation and organized information on the BUR1 and the NDC (activity 3.4). The JICA Project expert team explained a guidebook/FAQ including anticipated questions and planned answers at FSV to CCDA and supported to prepare FSV presentation materials (activity 3.5).

ii. Detail

Mitigation actions (activity 3.4)

The JICA Project experts drafted a reporting format and organized mitigation actions and information included in the NDC in addition to PNG's BUR1 after organizing the reporting requirements as stated in the BUR guidelines. Mitigation actions at the project level which will be stated in the BUR2 are shown below.

Table 8 Mitigation actions in PNG (at the project level)

No.	Name	Implementing institution
1	RE generated from Geothermal Power Project	New Crest Gold Mine (Lihir)
2	RE generated from Methane capture Kumbango POME methane capture project	New Britain Palm Oil Limited (NBPOL) (West New Britain)
3	RE generated from Methane capture Mosa POME methane capture project	New Britain Palm Oil Limited (NBPOL) (West New Britain)
4	RE generated from Methane capture Numudo POME methane capture project (New!)	New Britain Palm Oil Limited (NBPOL) (West New Britain)
5	RE generated from Methane capture Kapiura POME methane capture project (New!)	New Britain Palm Oil Limited (NBPOL) (West New Britain)
6	RE generated from Methane capture Warastone POME methane capture project (New!)	New Britain Palm Oil Limited (NBPOL) (West New Britain)
7	Facilitating Renewable Energy & Energy Efficiency Applications for Greenhouse Gas Emission Reduction	UNDP Climate Change and Development Authority PNG Power Limited Partnering Provinces (Milne Bay, Eastern Highlands, and East Sepik)
8	EU-GIZ Adapting to Climate Change and Sustainable Energy (ACSE) Program "Integrated Water and Sustainable Energy (IWASE) Project" Rigo District, Central Province.	Department of Petroleum and Energy Central Province Local Level Government (LLG) PNG Power Water PNG University of PNG
9	RE generated from Biomass Project	Oil Search, PNG Biomass

1. Geothermal Power Plant

Summary of the mitigation action
Name of Mitigation action
RE generated from Geothermal Power Project
Objectives
Displacement of electricity that would be provided to the user(s) by more- GHG-Intensive means.
Description
(No information in 1st BUR)
Nature of Action
Infrastructure development, Technology
sector
Energy industry
GHG covered
CO_2, CH_4
duration
2006 - (no information)
status
(No information in 1st BUR)
implementing institution
New Crest Gold Mine (Lihir)
quantitative targets
(No information in 1st BUR)
Methodologies and Assumptions
ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources.

Progress of the mitigation action
Name of the progress indicators
Amount of GHG reduced
Unit
(No information in 1st BUR)
Base year
(No information in 1st BUR)
Indicator baseline value
(No information in 1st BUR)
Indicator value in the last reporting year
(No information in 1st BUR)
indicator target value
(No information in 1st BUR)
Reduction impacts in the last reporting year
(No information in 1st BUR)
Most relevant data sources for indicator value
(No information in 1st BUR)

2. Methane capture Kumbango POME methane capture project

Summary of the mitigation action

Name of Mitigation action

RE generated from Methane capture Mosa POME methane capture project

Objectives

This CDM project aims to reduce methane emissions generated by the open anaerobic lagoon wastewater treatment system in Mosa Palm Oil Mill. This is achieved by introducing in-ground anaerobic lagoon digesters which will recover biogas as renewable energy for use in the mill and displacing the fossil fuel usage at the plant and also supply the generated power to the grid reducing the fossil fuel load at grid.

Through the installation of dedicated engines to utilize Biogas for electricity production, the project will also add an additional renewable generation source to the PNG Power Kimbo grid. In doing so, the project helps to increase the amount of environmentally safe renewable electricity which is generated in Papua New Guinea.

Description

The project will be developed in two phases:

Phase I: The installation of one unit covered digestor with two units of biogas engine (2 x 953kW)

Phase II: the installation of another one units of biogas engine once the project activity is connected to the grid.

Thus, the total of three units (3 x 953kW) of biogas engine will be exporting the generated electricity to the grid after meeting internal company deamnd.

The aspects related to QA/QC of the monitoring plan are addressed as the following:

1. On site measurement/sampling
2. Equipment maintenance and calibration
3. Audit and Corrective Actions
4. Training and Communication
5. Record Keeping and Documentation

All measurements will use calibrated measurement equipment that will be maintained regularly and checked for its functioning.

Nature of Action

Infrastructure development, Technology

sector

Energy industry, Waste handling and disposal

GHG covered

CH_4

duration

2012 - 2019

status

(No information)

implementing institution

New Britain Palm Oil Limited (NBPOL) (West New Britain)

quantitative targets

The total emission reductions from the project activity are estimated to be 63,005 tCO2eq. per year over the period of 7 years of crediting periods.

Methodologies and Assumptions

AMS-III.H. ver. 16 - Methane recovery in waste water treatment

AMS-I.D. ver. 16 - Grid connected renewable electricity generation

Progress of the mitigation action

Name of the progress indicators

Amount of GHG reduced

Unit

$tCO_2eq./yr$

Base year

2012

Indicator baseline value

0

Indicator value in the last reporting year

62,433tCO2 eq./yr (2013)

Indicator target value

63,005tCO2 eq.yr

Reduction impacts in the last reporting year

62,433tCO2 eq./yr (2013)

Most relevant data sources for indicator value

CDM Monitoring report

(https://cdm.unfccc.int/filestorage/B/0/X/B0XR1WMOSS3Y87IU2FEAL94CDvHKNI/MR_Mosa%205020.pdf?t=UWh8cWdzem8yfDAy1CNrob-dX63gs_3qEKdLT)

3. Methane capture Mosa POME methane capture project

Summary of the mitigation action

Name of Mitigation action

RE generated from Methane capture Kumbango POME methane capture project

Objectives

This CDM project aims to reduce methane emissions generated by the open anaerobic lagoon wastewater treatment system in Kumbango Palm Oil Mill. This is achieved by introducing in-ground anaerobic covered lagoon digesters which will recover biogas as renewable energy for use onsite at the mill, refinery and fractionation plants displacing the fossil fuel usage at the plant and also supply the generated power to the grid reducing the fossil fuel load at grid.
Through the installation of dedicated engines to utilize biogas for electricity production, the project will also add an additional renewable generation source to the PNG Power Kimbe grid. In doing so, the project helps to increase the amount of environmentally safe renewable electricity which is generated in Papua New Guinea.

Description

The project will be developed in two phases:
Phase I: The installation of one unit covered digestor with two units of biogas engine (2 x 953kW)
Phase II: The installation of another one units of biogas engine once the project activity is connected to the grid.
Thus, the total of three units (3 x 953kW) of biogas engine will be exporting the generated electricity to the grid after meeting internal company deamnd.

The aspects related to QA/QC of the monitoring plan are addressed as the following:
1. On-site measurement/sampling
2. Equipment maintenance and calibration
3. Audit and Corrective Actions
4. Training and Communication
5. Record-keeping and Documentation
All measurements will use calibrated measurement equipment that will be maintained regularly and checked for its functioning.

Nature of Action

Infrastructure development, Technology

sector

Energy industry, Waste handling and disposal

GHG covered

CH_4

duration

2012 - 2019

status

(No information)

implementing institution

New Britain Palm Oil Limited (NBPOL) (West New Britain)

quantitative targets

The total emission reductions from the project activity are estimated to be 55,769tCO2 eq. per year over the period of 7years of crediting periods.

Methodologies and Assumptions

AMS-III.H, ver. 16 - Methane recovery in wastewater treatment
AMS-I.F. - Renewable electricity generation for captive use and mini-grid
AMS-I.D. ver. 16 - Grid connected renewable electricity generation

Progress of the mitigation action

Name of the progress indicators

Amount of GHG reduced

Unit

$tCO_2eq./yr$

Base year

2012

Indicator baseline value

0

Indicator value in the last reporting year

49, 236 tCO2 eq./yr (2013)

Indicator target value

55, 769 tCO2 eq.yr

Reduction impacts in the last reporting year

49, 236 tCO2 eq./yr (2013)

Most relevant data sources for indicator value

CDM Monitoring report
(https://cdm.unfccc.int/filestorage/L/P/1/LP3WM9NG22SVKCN0U1DHO7X6B0FET/MR_Kumbango%20S015.pdf?t=SHl8cWd1MWh4fDDOuap-w-1TjtN-1_qnFKNg)

4. Methane capture Numudo POME methane capture project

Summary of the mitigation action

Name of Mitigation action

RE generated from Methane capture Numudo POME methane capture project (NEWI)

Objectives

This CDM project aims to reduce methane emissions generated by the open anaerobic lagoon wastewater treatment system in Numundo Palm Oil Mill. This is achieved by introducing an in ground anaerobic digester ponds which will recover biogas as renewable energy for use in the mill displacing the fossil fuel usage at plant and also supply to the grid reducing the fossil fuel load in grid.
Through the installation of a dedicated engine to utilise biogas for electricity production, the project will also add an additional renewable generation source in West New Britain. In doing so, the project helps to increase the amount of environmentally safe renewable electricity which is generated in Papua New Guinea.

Description

The project will be developed in two phases:
Phase I: The installation of one unit covered digester with two units of biogas engine (2 x 953kW)
Phase II: The installation of another two units of biogas engine once the project activity is connected to the grid.
Thus, the total of four units (4 x 953kW) of biogas engine will be exporting the generated electricity to the grid after meeting internal company deamnd.

The aspects related to QA/QC of the monitoring plan are addressed as the following:
1. On-site measurement/sampling
2. Equipment maintenance and calibration
3. Audit and Corrective Actions
4. Training and Communication
5. Record keeping and Documentation
All measurements will use calibrated measurement equipment that will be maintained regularly and checked for its functioning.

Nature of Action

Infrastructure development, Technology

sector

Energy industry, Waste handling and disposal

GHG covered

CH_4

duration

2015 - 2021

status

(No information)

implementing institution

New Britain Palm Oil Limited (NBPOL) (West New Britain)

quantitative targets

The total emission reductions from the project activity are estimated to be 54,362tCO2 eq. per year over the period of 7years of crediting periods.

Methodologies and Assumptions

AMS-III.H. ver. 15 - Methane recovery in wastewater treatment
AMS-I.D. ver. 16 - Grid connected renewable electricity generation
AMS-I.A. ver. 14 - Electricity generation by the user

Progress of the mitigation action

Name of the progress indicators

Amount of GHG reduced

Unit

$tCO_2eq./yr$

Base year

2015

Indicator baseline value

0

Indicator value in the last reporting year

(No information)

Indicator target value

54,362 tCO2eq./yr

Reduction impacts in the last reporting year

(No information)

Most relevant data sources for indicator value

(No information)

5. Methane capture Kapiura POME methane capture project

Summary of the mitigation action

Name of Mitigation action

RE generated from Methane capture Kapiura POME methane capture project (NEW !)

Objectives

This CDM project aims to reduce methane emissions generated by the open anaerobic lagoon wastewater treatment system in Kapiura Palm Oil Mill. This is achieved by introducing an inground anaerobic digester pond which will recover biogas as renewable energy for use in the mill displacing the fossil fuel usage at plant and also supply to the grid reducing the fossil fuel load in grid.
Through the installation of a dedicated engine to utilize biogas for electricity production, the project will also add an additional renewable generation source in West New Britain. In doing so, the project helps to increase the amount of environmentally safe renewable electricity which is generated in Papua New Guinea

Description

The project will be developed in two phases:
Phase I: The installation of one unit covered digester with two units of biogas engine (2 x 953kW)
Phase II: The installation of another one unit of biogas engine once the project activity is connected to the grid.
Thus, the total of four units (3 x 953kW) of biogas engine will be exporting the generated electricity to the grid after meeting internal company deamnd.

The aspects related to QA/QC of the monitoring plan are addressed as the following:
1. On-site measurement/sampling
2. Equipment maintenance and calibration
3. Audit and Corrective Actions
4. Training and Communication
5. Record keeping and Documentation
All measurements will use calibrated measurement equipment that will be maintained regularly and checked for its functioning.

Nature of Action

Infrastructure development, Technology

sector

Energy industry, Waste handling and disposal

GHG covered

CH_4

duration

2013 - 2019

status

(No information)

implementing institution

New Britain Palm Oil Limited (NBPOL) (West New Britain)

quantitative targets

The total emission reductions from the project activity are estimated to be 63,801 tCO2 eq. per year over the period of 7 years of crediting periods.

Methodologies and Assumptions

AMS-III.H. ver. 16 - Methane recovery in wastewater treatment
AMS-I.D. ver. 17 - Grid connected renewable electricity generation
AMS-I.A. ver. 14 - Electricity generation by the user

Progress of the mitigation action

Name of the progress indicators

Amount of GHG reduced

Unit

$tCO_2eq./yr$

Base year

2013

Indicator baseline value

0

Indicator value in the last reporting year

(No information)

Indicator target value

63,801 tCO2eq/yr

Reduction impacts in the last reporting year

(No information)

Most relevant data sources for indicator value

(No information)

6. Methane capture Warastone POME methane capture project

Summary of the mitigation action

Name of Mitigation action

REgenerated from Methane capture Warastone POME methane capture project (NEW!)

Objectives

This CDM project aims to reduce methane emissions by introducing an in-ground anaerobic digester ponds which will recover biogas as renewable energy for use in the mill, mill residential compound and Numundo abattoir, that otherwise would get emitted to atmosphere from the open anaerobic lagoon wastewater treatment system which could generally would have got installed at Warastone Palm Oil Mill.
Through the installation of a dedicated engines to utilize biogas for electricity production, the project will also add an additional renewable generation source in West New Britain. In doing so, the project helps to increase the amount of environmentally safe renewable electricity which is generated in Papua New Guinea.

Description

In this project, two sets of 953 kWe (2 x 953kW) biogas generators will be installed with a total installed capacity is estimated at 1,906 kW(1.906MW).
The aspects related to QA/QC of the monitoring plan are addressed as the following:
1. On site measurement/sampling
2. Equipment maintenance and calibration
3. Audit and Corrective Actions
4. Training and Communication
5. Record keeping and Documentation
All measurements will use calibrated measurement equipment that will be maintained regularly and checked for its functioning.

Nature of Action

Infrastructure development, Technology

sector

Energy industry, Waste handling and disposal

GHG covered

CH_4

duration

2013 - 2019

status

(No information)

implementing institution

New Britain Palm Oil Limited (NBPOL) (West New Britain)

quantitative targets

The total emission reductions from the project activity are estimated to be 46,720 tCO2 eq. per year over the period of 7 years of crediting periods.

Methodologies and Assumptions

AMS-III.H. ver. 15 - Methane recovery in wastewater treatment

Progress of the mitigation action

Name of the progress indicators

Amount of GHG reduced

Unit

tCO_2eq./yr

Base year

2013

Indicator baseline value

0

Indicator value in the last reporting year

(No information)

Indicator target value

46,720 tCO2 eq.yr

Reduction impacts in the last reporting year

(No information)

Most relevant data sources for indicator value

(No information)

7. Facilitating Renewable Energy & Energy Efficiency Applications for Greenhouse Gas Emission Reduction

Summary of the mitigation action

Name of Mitigation action

Facilitating Renewable Energy & Energy Efficiency Applications for Greenhouse Gas Emission Reduction

Objectives

Enabling of the application of feasible renewable energy and energy efficiency technologies for achieving greenhouse gas emission reduction in PNG

Description

The mitigation action will achieve the objectives through a comprehensive programme of measures to remove barriers with some components below.

Component 1: Energy Policy, Planning, and Institutional Development

Component 2: Renewable Energy and Energy Efficiency Technologies Applications

Component 3: Financing of Renewable Energy and Energy Efficiency Projects

Component 4: Energy Development and utilization Awareness Enhancement

Nature of Action

Infrastructure development, Technology

sector

Energy industry

GHG covered

CO_2, CH_4, N_2O

duration

2017 - 2021

status

(No information in 1st BUR)

implementing institution

UNDP

Climate Change and Development Authority

PNG Power Limited

Partnering Provinces (Milne Bay, Eastern Highlands, and East Sepik)

quantitative targets

(No information in 1st BUR)

Methodologies and Assumptions

(No information in 1st BUR)

Progress of the mitigation action

Name of the progress indicators

Amount of GHG reduced

Unit

(No information in 1st BUR)

Base year

(No information in 1st BUR)

Indicator baseline value

(No information in 1st BUR)

Indicator value in the last reporting year

(No information in 1st BUR)

indicator target value

(No information in 1st BUR)

Reduction impacts in the last reporting year

(No information in 1st BUR)

Most relevant data sources for indicator value

(No information in 1st BUR)

8. EU-GIZ Adapting to Climate Change and Sustainable Energy (ACSE) Program "Integrated Water and Sustainable Energy (IWASE) Project"

Summary of the mitigation action

Name of Mitigation action

EU-GIZ Adapting to Climate Change and Sustainable Energy (ACSE) Program
"Integrated Water and Sustainable Energy (IWASE) Project"
Rigo District, Central Province.

Objectives

To support the socio-economic development of three rural communities in the Rigo District: Imaugoro, Keapaera and Kalo villages and to reduce their vulnerability against climate change impacts through the provision of reliable, integrated water and sustainable energy. At national level this objective will contribute towards fulfilling PNG's commitment to the Kyoto Protocol.
The project has four outcomes
1. Water supply systems including, protected water sources, treatment and distribution systems, pumps and reservoirs, rainwater harvesting systems are established and used in the target villages.
2. Stand alone street lighting systems are established in the target communities
3. Refrigeration systems are provided to the target communities
4. Health care centers in the target villages are provided with energy and water supply
Different methodologies will be used in each outcome.

Description

(No information in 1st BUR)

Nature of Action

Economic and infrastructure development

sector

Energy industry, Waste

GHG covered

CO_2, CH_4, N_2O

duration

2017

status

(No information in 1st BUR)

implementing institution

Department of Petroleum and Energy
Central Province Local Level Government (LLG)
PNG Power
Water PNG
University of PNG

quantitative targets

(No information in 1st BUR)

Methodologies and Assumptions

(No information in 1st BUR)

Progress of the mitigation action

Name of the progress indicators

Amount of GHG prevented from being emitted

Unit

(No information in 1st BUR)

Base year

(No information in 1st BUR)

Indicator baseline value

(No information in 1st BUR)

Indicator value in the last reporting year

(No information in 1st BUR)

Indicator target value

(No information in 1st BUR)

Reduction impacts in the last reporting year

(No information in 1st BUR)

Most relevant data sources for indicator value

(No information in 1st BUR)

9. Biomass Project

Summary of the mitigation action
Name of Mitigation action
RE generated from Biomass Project
Objectives
Displacement of electricity that would be provided to the user(s) by more GHG intensive means.
Description
The mitigation action is devided into five stages below. Stage 1 (2010-2011): Identification of suitable areas for biomass plantation through soil sampling and studies conducted in more than 2,500 kms across PNG Stage 2 (2010-2014): Planting of over 180,000 trees at over 30 sites across PNG to evaluate growth and survival rates in order to select the best species of trees to support large-scale plantations. Stage 3 (2014-2017): Agreements were negotiated with landowners to lease land covering 16,000 ha to be planted under sustainable forestry practices in order to underwrite the PPA signed with PNG Power Limited for the initial 15MWe. Stage 4 (2018-2019): The 15 MWe power plant modules will be constructed within the plantation area and the power will be tied into the 132kV Ramu electricity grid commencing first delivery of power by 2020. Stage 5 (2020+): Ultimately 30MWe of sustainable power provided into the Ramu grid
Nature of Action
Economic development, coservation sustainable management of forest
sector
Energy industry, LULUCF
GHG covered
CO_2, CH_4, N_2O
duration
2020 (no information)
status
(No information in 1st BUR)
implementing institution
Oil Search, PNG Biomass
quantitative targets
(No information in 1st BUR)
Methodologies and Assumptions
(No information in 1st BUR)

Progress of the mitigation action
Name of the progress indicators
Amount of GHG reduced
Unit
(No information in 1st BUR)
Base year
(No information in 1st BUR)
Indicator baseline value
(No information in 1st BUR)
Indicator value in the last reporting year
(No information in 1st BUR)
Indicator target value
(No information in 1st BUR)
Reduction impacts in the last reporting year
(No information in 1st BUR)
Most relevant data sources for indicator value
(No information in 1st BUR)

Support to prepare FSV presentation materials (activity 3.5)

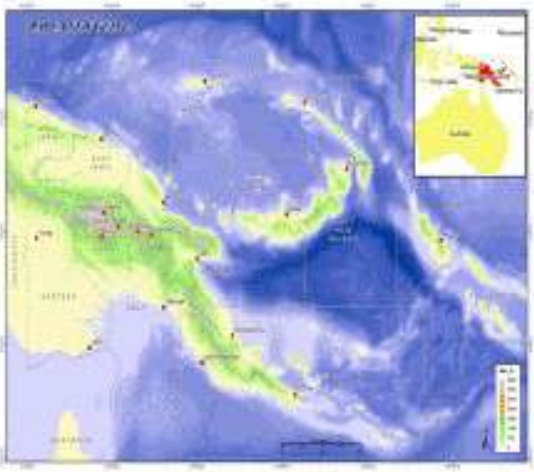
The JICA Project expert team gave a lecture to CCDA on how to prepare for FSV using power point slides describing the guidebook/FAQ for International Consultations and Analysis (ICA) process and supported to prepare FSV materials. The FSV materials are shown below.

Presentation Outline

- **Part I**
  - I. National Context
  - II. Institutional arrangement for report preparation
  - III. GHG inventory
  - IV. Mitigation actions
- **Part II**
  - I. Barriers and support needed and received
  - II. Recent developments
  - III. Experience and lessons learned in participating in the ICA process
  - **IV. Q&A**

National Context

- Papua New Guinea (PNG) is located in the South Pacific comprises the eastern half of the island of New Guinea, located just north of Australia.
- PNG has a total area of about 46.9 million ha, of which 77.8 per cent (36.1 million
- ha) is forest. Collectively with West Papua constitutes the third largest expanse of tropical rainforest on the planet after the Amazon and Congo forests.
- PNG is known for its tropical climate which is influenced by its location in the Pacific Warm Pool. PNG is highly vulnerable to the impacts of climate change.
- With an annual growth rate of 3.1% (2011 National Census) the current population is estimated as 9.6 million. 12% live in urban areas while 88% live in rural areas
- PNG's economy is dominated by a large, labour-intensive agricultural sector and a capital intensive mining and petroleum sector (consisting mostly of Crude Oil, liquefied natural gas (LNG), gold, copper, and silver extraction).



National Context (Cont.)

Climate Change Policies in PNG

- The Government of PNG (GoPNG) has developed long term and short term policies and legislation that addresses climate change.
- **Long term Policy**
  - I. Vision 2050
  - II. PNG Development Strategic Plan (DSP) 2010-2030
  - III. National Strategy for Responsible Sustainable Development (StaRS)
- **Short term Policy**
  - I. National Climate Compatible Development Management Policy
- **Legislation**
  - I. Climate Change (Management) Act
  - II. United Nations Paris Agreement (Implementation) Act

Institutional arrangement for report preparation

- The Climate Change and Development Authority (CCDA) is the National Designated Authority (NDA) that has been assigned responsibility to implement the UNFCCC and the Paris Agreement in collaboration with line agencies.
- CCDA as the single body is responsible for the overall coordination and management of the Biennial Update Report (BUR) and National Communication (NC) preparation process.
- Its' main responsibility is to provide the overall coordination for the preparation of BURs and NCs, with key tasks being to:
  - I. Plan and conduct all coordination and consultation activities with governmental and if appropriate, non-governmental stakeholders;
  - II. Identify all institutions and teams that will be involved in the preparation of the BUR or NC, and establish any formal working arrangements required;
  - III. Allocate responsibilities for all components of the BUR and NC, ensuring there is a clear lead for each section, and establish a formal approval process;
  - IV. Develop and monitor a timeline and schedule for BUR or NC preparation, including specific milestones and dates for deliverables
- CCDA, in cooperation with its stakeholders which consist of the private sector, non-governmental agencies, development partners and the government agencies completed and submitted PNG's BUR1 in April 2019.

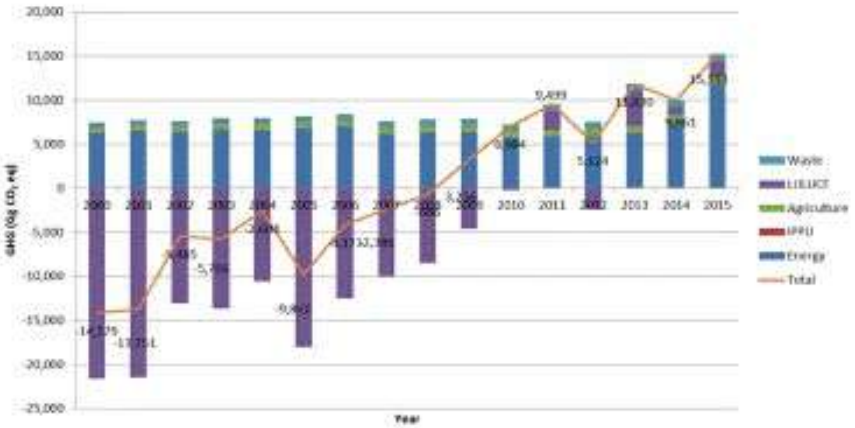
GHG Inventory

Methodology

- 2006 IPCC Guidelines
- GWP from the Second Assessment Report Values
- Years estimated – 2000 to 2015

Sector	Categories Estimated	Method Used	Data Source
Energy	1A (All) 1B1,1B2,1B3	Tier 1	International Source
IPPU	2D1 and 2G4	Tier 1	National Source
Agriculture	3A(All) 3C1,3C4,3C5,3C6, 3C7	Tier 1	National and International Source
LULUCF	3B1,3B2,3B3 and 3B5	Tier 1	National Source
Waste	4A,4B and 4D	4A –Tier 2 4B and 4D- Tier 1	National Source

GHG inventory



- PNG's emissions went from -14,179 Gg CO_2 eq in 2000 to 15,193 Gg CO_2 eq in 2015
- Sectoral Emissions in 2015 were
  I. Energy – 11,806 Gg CO_2 eq
  II. IPPU – 2 Gg CO_2 eq
  III. LULUCF – 1,716 Gg CO_2 eq
  IV. Agriculture – 796 Gg CO_2 eq
  V. Waste – 872 Gg CO_2 eq

Mitigation actions

Sectoral Mitigation Policies

- **LULUCF**

The main mitigation action in this sector is REDD+. The National REDD+ Strategy (NRS) 2017-2027 outlines three action areas

I. Strengthened and Coordinated National Level Development and Land Use Planning
II. Strengthened Environmental Management, Protection and Enforcement
III. Enhanced Economic Productivity and Sustainable Livelihoods

- **Agriculture**

The NCCDMP identifies two mitigation actions in this sector, although they have yet to be implemented

I. Reduce Green House Gas Emissions through improved Agricultural Practices
II. Protect agricultural land from urban and suburban encroachment

- **Energy**

The Vision 2050, PNG's NDC, NEP and NCCDMP identifies two mitigation actions in this sector

I. Provide 100 per cent power generation from renewable sources (Vision 2050, PNG's NDC, NEP
II. Energy Efficiency (NEP and NCCDMP)

- **Transport**

The NCCDMP and NRS identifies two mitigation actions in this sector, although they have yet to be implemented

I. Promote clean fuel technology and standards by establishing low carbon fuel standards
II. Regulation passed to set standards for greenhouse gas emissions from vehicles
III. Economic incentives for fuel efficient vehicles

- **Industrial Process and Product Use (IPPU)**

I. Regulation on Ozone Depleting Substances and Synthetic Green House Gas

- **Waste**

The NCCDMP and NRS identifies two mitigation actions in this sector, although they have yet to be implemented

I. Eco-Industrial Development

Mitigation actions (Cont.)

Mitigation Projects

- There are six quantitative mitigation projects reported in the BUR1, all of which are under the energy sector, and are as follows

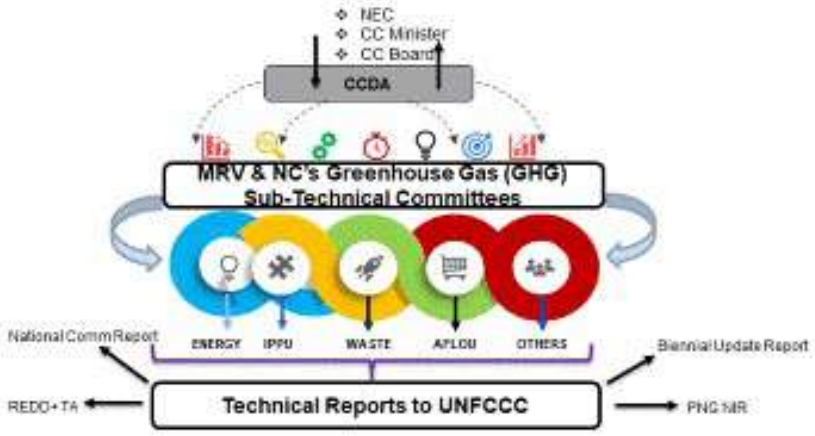
I. Renewable energy from Geothermal Power project
II. Renewable energy generated from methane capture (Kumbango)
III. Renewable energy generated from methane capture (Mosa)
IV. Facilitating Renewable Energy & Energy Efficiency Applications for
V. Greenhouse Gas Emission Reduction
VI. EU-GIZ Adapting to Climate Change and Sustainable Energy (ACSE) Program
VII. RE generated from Biomass Project

Barriers and support needed and received

- **Barriers**
  - I. Data sensitivity
  - II. Limited budget to carry out climate change activities
  - III. Ineffective institutional arrangement
  - IV. Unavailability of data from data source
  - V. Inaccurate and inconsistent data
  - VI. No established monitoring system to monitor climate change activities in the country
- **Support needed**
  - I. Further understanding of 2006 IPCC guidelines
  - II. Mitigation analysis knowledge and skills
- **Support received**
  - I. GEF/UNEP – Financial support for the preparation of the BUR1
  - II. JICA – Technical support for Development of BUR1 and GHG inventory
  - III. FAO – Technical and Financial support for AFOLU sector GHG inventory

Recent developments

- Establishment of AFOLU Sub-Technical Working Committee consisting of key government agencies to improve the AFOLU sector inventory.
- Establishment of Energy Sub-Technical Working Committee consisting of key government agencies and private companies to develop a national energy balance table and improve the energy sector inventory.
- Memorandum of Understanding for data provision



Experience and lessons learned in participating in the ICA process

- PNG now has a fair understanding of the ICA process.
- Enhanced understanding of the BUR reporting requirements under Decision 2/CP17.
- Clear understanding of what information should be reported in the BUR.
- Clear understanding of areas PNG needs to improve on to meet the reporting requirements.
- PNG is aware of the specific capacity building needs it would need to improve its MRV system.

Q&A

- PNG would like to thank those countries that provided written questions to BUR1 in the FSV portal.
- Due to time limitations, PNG will be able to provide answers to only three question. Answers to other questions will be provided in due course.

Category	Question(s)	Answer(s)
Mitigation actions and their effects	Canada congratulates Papua New Guinea on the publication of their first BUR and commends their use of the 2006 IPCC guidelines for their GHG inventory. Can you share any lessons learned from the preparation of this first publication, and how this may have an impact on your future climate policy and plans?	Having used the 2006 IPCC guidelines for the GHG inventory in the BUR1, PNG was able to identify the main emitting categories in PNG. Thus this assisted PNG with the development of its Enhanced NDC in terms of establishing realistic quantitative targets for these main emitting categories that the country may be able to achieve.
General	Since the submission of its first Biennial Update Report is Papua New Guinea able to report any further developments in its progress towards its commitment of 100% renewables by 2030?	The target or 100% renewables by 2030 is currently being reviewed and will be updated in the Enhanced NDC that will be submitted in December. The issue is that there were certain unforeseen circumstances that will have an impact on the 100% renewables target. In terms of progress, there are 10 renewable energy planned projects that will be developed between 2020-2030. The country has also identified 14 proposed renewable projects that will add on to the revised renewable energy target.

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Q&A (cont.)

Category	Question(s)	Answer(s)
Mitigation actions and their effects	The BUR mentions the REDD+ Finance and Investment Plan being under development and due to be completed in 2019. Given the importance of REDD+ in achieving PNGs goals, can you provide an update on this plan?	The REDD+ Finance Investment Plan is indeed an essential part of the implementation of the National REDD+ Strategy. It has been drafted to focus on mapping specific needs, gaps and action areas within key sectors at the national and sub-national levels. Therefore in 2018, the GoPNG through the Climate Change & Development Authority, with the financial and technical support of the UNDP FCPF REDD+ Readiness project undertook a series of Sectoral Retreats held with Environment, Forestry, Lands, and Agriculture sector to enable work on costing sector based action plans. In July of 2018, a concept note on the Implementation of Papua New Guinea's REDD+ Finance Investment Plan was submitted to the Green Climate Fund to support elements of implementation from 2020 to 2030. However, given the nature of the concept note the GCF secretariat preferred that the concept note be fashioned to apply for a loan as opposed to a grant. Given the time elapsed since 2018, the RFIP is currently undergoing a financial and economic assessment of the proposed action areas within and should be finalized for Government endorsement through the National Executive Council by December 2020.

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1-3 Achievement of Output

a. Output 1

The set of databases/spread sheet files for the GHG inventory for the BUR2 is almost finalized.

b. Output 2

No workshop was held during this reporting period.

c. Output 3

The draft of the national GHG inventory report for the BUR2 was finalized.

1-4 Achievement of the Project Purpose

The national GHG inventory report for the BUR2 will be finalized in June 2021.

1-5 Changes of Risks and Actions for Mitigation

PNG has restricted entry of foreign nationals since January 2020 due to Covid-19 pandemic, resulting that the JICA Project expert has not been able to visit PNG since March 2020. Though the JICA Project expert has remotely prepared the GHG inventory for the BUR2, on-site personnel cannot adequately proceed with the work due to lockdown measures. Thus, an agreement was made at the 3rd JCC to estimate GHG emissions based on the BUR1 data for items which were not able to be newly collected.

1-6 Progress of Actions undertaken by JICA

N/A

1-7 Progress of Actions undertaken by Gov. of PNG

N/A

1-8 Progress of Environmental and Social Considerations (if applicable)

N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

N/A

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail/Cause

The operation plan until completion of the project agreed at the 3rd JCC is going on schedule.

2-2 Action to be taken

N/A

2-3 Roles of Responsible Persons/Organization (JICA, Gov. of PNG, etc.)

N/A

Annex 8-9 Project Monitoring Sheet ver.9

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Project Monitoring Sheet

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version of the Sheet: Ver. 9（Term: May 2021 - October 2021）

Name: Takeshi Enoki

Title: GHG Inventory (General)

Submission Date: December 1, 2021

I. Summary

1　Progress

1-1 Progress of Inputs

Table 1 Input for term May~ October 2021

Inputs			Year	2021					
			Month	5	6	7	8	9	10
Expert	1	GHG Inventory（General）	Plan						
			Actual						
	2	GHG Inventory（Energy1）	Plan						
			Actual						
	3	GHG Inventory（Energy2）	Plan						
			Actual						
	4	GHG Inventory（Industrial Processes and Product Use）	Plan						
			Actual						
	5	GHG Inventory（Agriculture, Land use change and Forestry）	Plan						
			Actual						
	6	GHG Inventory（Waste）	Plan						
			Actual						
in Japan Activities	1	GHG Inventory （General）	Plan	24					
			Actual	24					
	2	GHG Inventory （Energy1）	Plan	14					
			Actual	14					
	3	GHG Inventory （Energy2）	Plan	26					
			Actual	26					
	4	GHG Inventory （Industrial Processes and Product Use）	Plan	22					
			Actual	22					
	5	GHG Inventory （Agriculture, Land use change and Forestry）	Plan	13					
			Actual	13					
	6	GHG Inventory （Waste）	Plan	1					
			Actual	1					
	7	Project administrative coordination / coordinator for training	Plan	0					
			Actual	0					
Plan Monitoring	Monitoring	Joint Coordinating Committee	Plan						
			Actual						
		Set-up the Detailed Plan of Operation	Plan						
			Actual						
		Submission of Monitoring Sheet	Plan						
			Actual						
	Reports/Documents	Work Plan	Plan						
			Actual						
		National GHG inventory Report	Plan						
			Actual						
		Project Progress Report	Plan						
			Actual						
		Project Brief Note	Plan						
			Actual						
		Project Completion Report	Plan						
			Actual						
	Public Relations	Establishment and operation of JICA TC website	Plan						
			Actual						

Experts

During this reporting period, the Japan International Cooperation Agency (JICA) Project expert team did not carry out activities in PNG due to the Covid-19 pandemic. Total man months during this reporting period was 5.0 for activities in Japan.

Reports

After confirming the progress of the Project with the CCDA, the JICA Project expert team submitted the fourth progress report in May 2021.

1-2 Progress of Activities

a. Overview of activities carried out in this term

The JICA Project expert team and CCDA completed the BUR2 GHG inventory for the energy, industrial processes and product use (IPPU), and waste sectors, estimating GHG emissions, drafting reports, and also drafting and revising the other chapters of the BUR2.

Table 2 shows an overview of the progress of activities for this reporting period.

Table 2 Overview of progress of activities

	Sub-Activities	Year	2021					
		Month	5	6	7	8	9	10
Output 1 : Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1.1: Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan						
		Actual						
	1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	Plan						
		Actual						
	1.3: Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan						
		Actual						
	1.4: Draft/Update a Memorandum of Understading between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan						
		Actual						
	1.5: Collect data necessary for national GHG inventories from relevant parties.	Plan						
		Actual						
	1.6: Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan						
		Actual						
	1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan						
		Actual						
	1.8: Complie national GHG inventories with time series consistency.	Plan						
		Actual						
	1.9: Draft/Update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan						
		Actual						
Output 2: Capacity to promote understanding of national GHG inventories is enhanced.	2.1: Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan						
		Actual						
	2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan						
		Actual						
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3.1: Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan						
		Actual						
	3.2: Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan						
		Actual						
	3.3: Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key catogories).	Plan						
		Actual						
	3.4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan						
		Actual						
	3.5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan						
		Actual						
	3.6: Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan						
		Actual						
	3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan						
		Actual						

b. Output 1 activities

Overview

The GHG emissions for the energy, IPPU sectors, and waste sectors were completed during this reporting period. Additional research was carried out in the IPPU sector, specifically for the HFC emissions, with the support of an international consultant (activities 1.5~1.7). The JICA Project expert team and CCDA completed the draft inventory report and relevant sections of the BUR2 (activity 1.9).

Detail

Data collection and emission estimation for F gases (Activity 1.5~1.7)

Three sources of information were identified with Chinese export data (2015-2019) and PNG Customs import data (2019-2020) selected as most reliable for the GHG inventory. The PNG Customs data was selected as the primary source on the basis it would be a reliable and sustainable source of bulk HFC import data. The Chinese export data provided the necessary speciation of HFC with species ratios used to adjust PNG Customs data.

HFC emissions were estimated for years 2015 to 2020 with use of methods in the 2006 IPCC Guidelines and its 2019 Refinement. Reliable data for 2000 to 2014 were not available, so were not estimated as there is no sufficient basis for extrapolating into the past. The HFC emission trend is as shown in figure 1 below.

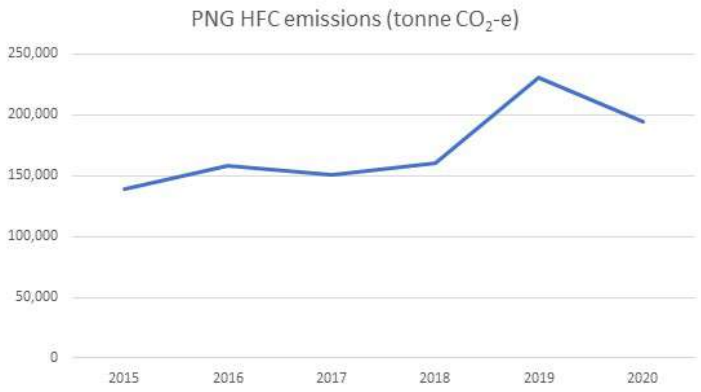

Figure 1 HFC emissions trend (2015-2020)

Notwithstanding the likely uncertainty in derived GHG emission estimates, guidance and direction provided by key stakeholders has provided a degree of confidence in the HFC emission estimates. Stakeholders have provided expert judgement on import sources and quantities and assumptions to enable the use of the preferred methodology to estimate GHG emissions. These stakeholders also provided direction on PNG's transition to a trajectory necessary for its commitments under the UNFCCC and the

Montreal Protocol including the Kigali Amendment.

Finalizing estimations (Activity 1.7 and 1.8)

The JICA Project experts completed the estimation files for the BUR2 GHG inventory. The new structure of the estimation files automatically calculates GHG emissions for the energy, IPPU, and waste sectors once activity data and emission factors have been updated in the raw data sheets. In addition, a separate inventory estimation system has been developed with a structure like the software by the IPCC for validation purposes and in case PNG shifts to using a software to estimate emissions in the future.

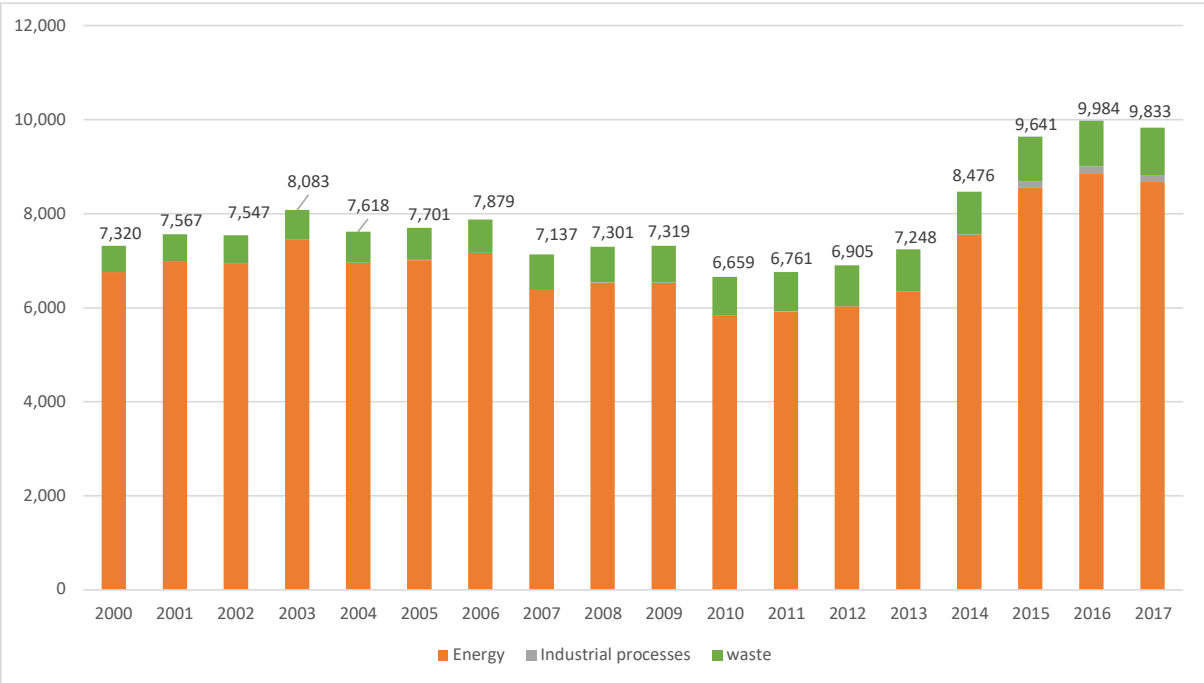

Figure 2 Emission trend for Energy, IPPU, and waste sectors

The total GHG emissions of the non AFOLU sectors, namely, energy, IPPU, and waste sectors for the year 2017 was 9,833 kt CO_2 equivalent as shown in figure 2. The level of emissions fluctuates from 2000 to 2013, but after 2014, the emissions have an increasing trend. Compared to year 2000, there is a 34% increase in year 2017. Of these emissions, the energy sector comprises approximately 90% of GHG emissions.

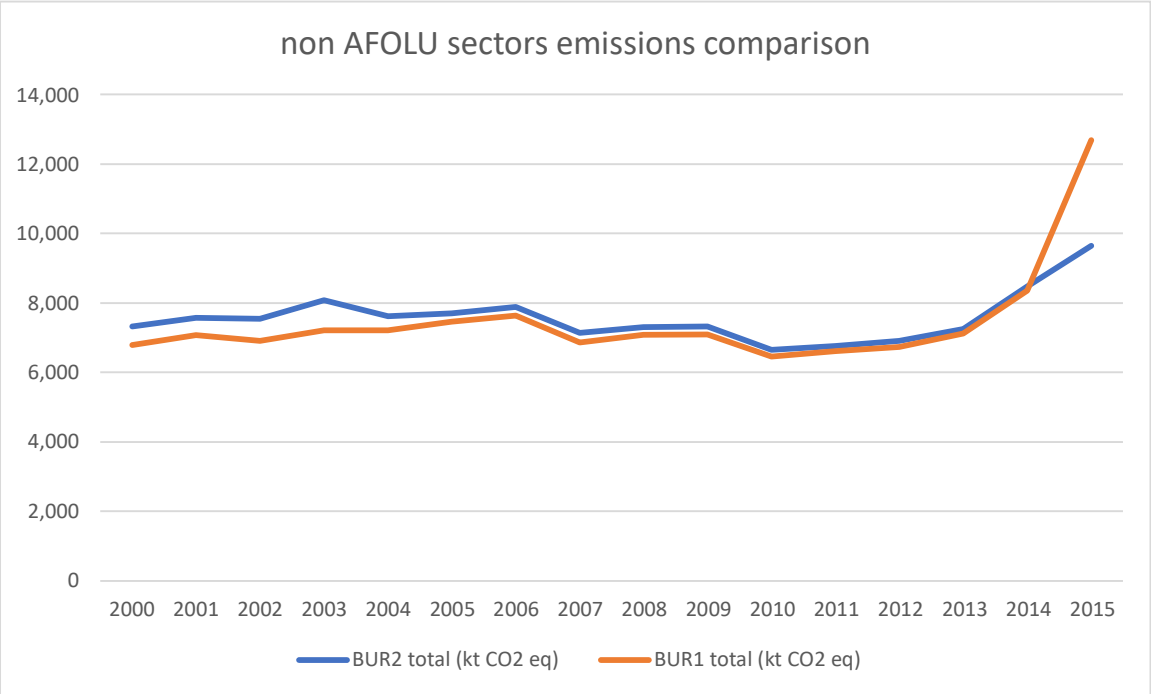

Figure 3 non AFOLU sector emission trend comparison between BUR1 and BUR2

Comparing the BUR1 GHG inventory and the BUR2 GHG inventory, the non AFOLU emissions for BUR2 is generally higher than that of BUR1 by 2.5% to 12% except for 2015, where the emissions reported in BUR1 is higher than BUR2 by 24%. The major reason for the large difference in 2015 is the recalculations performed in the energy sector, where there has been a revision in the energy balance table data, resulting in a change of fuel consumption by the subsectors the energy industries and the manufacturing industry and construction subsectors. As described above, there was also a significant improvement in the IPPU sector, where the HFC emissions were included in the GHG inventory for the first time for the years 2015 onwards. Other minor technical improvements have been made in the three sectors for BUR2 throughout the time series, improving the accuracy and completeness of the GHG inventory. Improvements such as these will need to be made in future inventories as this is fundamental principle of the Enhanced Transparency Framework under the Paris Agreement.

Preparation of draft of inventory report (Activity 1.9)

For the BUR2, a GHG inventory report has been drafted in addition to the summary document which will be the GHG inventory chapter of the BUR2. The inventory report includes estimation methods, used data, results, and improvements for each category, as well as inventory preparation structure, a preparation timeline, an overview of results. The

report is expected to be used as a preparation and update manual of the inventory for CCDA staff in the future. This is a critical tool to sustain the GHG inventory preparation capacity of CCDA in the future. In addition, this format will be the basis for PNG's GHG inventory submissions under the Paris Agreement, as it encompasses most components required for the Enhanced Transparency Framework reporting for GHG inventories.

c. Output 2 activities

No workshops were held during the reporting term.

d. Output 3 activities

i. Overview

The JICA Project expert used carried out the uncertainty analysis for the completed categories in the energy, IPPU, and waste sectors. Also, a file was developed to enable CCDA to carry out a key category analysis when they conclude their work on the AFOLU sectors. The results of the uncertainty analysis and the complete key category assessment will be included in the GHG inventory report. Although these are not mandatory reporting elements under the BUR, they are critical activities to continuously improve the GHG inventory, which is a fundamental principle of the enhanced transparency framework under the Paris Agreement.

ii. Detail

<u>key category analysis (activity 3.2)</u>

The JICA Project experts and CCDA developed a key category analysis file which lists all categories with its GHG emissions and removals so that a key category analysis can be carried out as described in the IPCC Guidelines. A complete analysis can only be carried out with the AFOLU sector categories, which are still under preparation by CCDA and its supporting partners. Below is an excerpt of the key category analysis for year 2017. Manufacturing industries and construction is the largest emitter in the GHG inventory due to the aggregated activity data of all industries in PNG. This is followed by CO_2 from road transportation, and fugitive CH_4 emissions the production of oil and gas.

Table 3 Excerpt of the key category analysis for year 2017

		category	Gas	most recent year emissions	% of total	cumulative %
1	1.A.2.	2. Manufacturing industries and construction	CO2	3764.012749	38.28%	38.28%
2	1.A.3.b	b. Road transportation	CO2	1519.163633	15.45%	53.73%
3	1.B.2.a.2	2. Production	CH4	855.5723379	8.70%	62.43%
4	1.A.1.c	c. Manufacture of solid fuels and other energy industries	CO2	575.454726	5.85%	68.28%
5	5.D.1	1. Domestic wastewater	CH4	503.4042898	5.12%	73.40%
6	1.A.3.a	a. Domestic aviation	CO2	398.143746	4.05%	77.45%
7	1.B.2.a.2	2. Production	CH4	394.8749716	4.02%	81.46%
8	1.A.4.c	c. Agriculture/forestry/fishing	CO2	313.2033432	3.19%	84.65%
9	5.A.1	2. Unmanaged waste disposal sites	CH4	272.5548186	2.77%	87.42%
10	5.D.1	1. Domestic wastewater	N2O	167.8259528	1.71%	89.13%
11	2.F.1	1. Refrigeration and air conditioning	HFC	150.6160175	1.53%	90.66%
12	1.A.1.a	a. Public electricity and heat production	CO2	131.5325088	1.34%	92.00%
13	1.A.1.b	b. Petroleum refining	CO2	122.4597132	1.25%	93.24%
14	1.A.4.b	b. Residential	CO2	89.5305312	0.91%	94.15%
15	1.A.4.b	b. Residential	N2O	69.26934996	0.70%	94.86%
16	1.A.4.a	a. Commercial/institutional	CO2	59.8098336	0.61%	95.47%
17	1.B.2.b.3	3. Processing	CH4	55.4472639	0.56%	96.03%
18	1.B.2.b.4	4. Transmission and storage	CH4	47.34073355	0.48%	96.51%
19	1.A.4.c	c. Agriculture/forestry/fishing	N2O	37.49137049	0.38%	96.89%
20	1.A.4.b	b. Residential	CH4	35.15681081	0.36%	97.25%
21	5.C.2	2. Open burning of waste	CO2	34.98955987	0.36%	97.61%
22	1.B.2.c.i	i. Oil	CO2	30.398345	0.31%	97.92%
23	1.A.3.d	d. Domestic navigation	CO2	29.1526884	0.30%	98.21%
24	1.B.2.c.ii	ii. Gas	CH4	27.51307272	0.28%	98.49%
25	1.A.3.b	b. Road transportation	N2O	24.06321432	0.24%	98.74%
26	1.B.2.b.5	5. Distribution	CH4	19.006974	0.19%	98.93%
27	5.C.2	2. Open burning of waste	CH4	17.67653093	0.18%	99.11%
28	1.A.4.a	a. Commercial/institutional	N2O	12.2976783	0.13%	99.23%
29	1.A.2.	2. Manufacturing industries and construction	N2O	12.03160716	0.12%	99.36%
30	1.B.2.c.ii	ii. Gas	CO2	11.8648455	0.12%	99.48%

※ the top 95% cumulative categories will be considered the key categories

Uncertainty assessment (activity 3.2)

An uncertainty assessment was carried out for all categories of the Energy, IPPU, and waste sector categories according to the IPCC Guidelines. All uncertainty figures for both activity data and emission factors are default figures as provided in the IPCC Guidelines. When uncertainty assessment for all AFOLU categories is complete, the CCDA can combine the uncertainty to derive the uncertainty of the entire GHG inventory. Below are the uncertainty figures for the energy sector categories.

Table 4 uncertainty assessment of the energy sector

	category	Gas	most recent year emissions	activity data uncertainty	Emission factor/estimation parameter uncertainty	combined uncertainty
			input data	input data	input data	$\sqrt{E^2+F^2}$
			kt CO2 eq	%	%	%
1.A.1.a	a. Public electricity and heat production	CO2	132	2%	4%	3.9%
1.A.1.b	b. Petroleum refining	CO2	122	13%	2%	12.6%
1.A.1.c	c. Manufacture of solid fuels and other en	CO2	575	13%	4%	13.0%
1.A.2.	2. Manufacturing industries and constructic	CO2	3,764	3%	1%	2.8%
1.A.3.a	a. Domestic aviation	CO2	398	13%	3%	12.9%
1.A.3.b	b. Road transportation	CO2	1,519	13%	1%	12.6%
1.A.3.d	d. Domestic navigation	CO2	29	13%	2%	12.7%
1.A.4.a	a. Commercial/institutional	CO2	60	13%	2%	12.7%
1.A.4.b	b. Residential	CO2	90	13%	2%	12.6%
1.A.4.c	c. Agriculture/forestry/fishing	CO2	313	13%	1%	12.6%
1.B.2.a.2	2. Production	CO2	1	12.5%	100%	100.8%
1.B.2.a.3	3. Transport	CO2	0.001	12.5%	100%	100.8%
1.B.2.b.2	2. Production	CO2	0.3	12.5%	100%	100.8%
1.B.2.b.3	3. Processing	CO2	0.8	12.5%	100%	100.8%
1.B.2.b.4	4. Transmission and storage	CO2	0.01	12.5%	105%	106.1%
1.B.2.b.4	Transmission	CO2	0.005	12.5%	100%	100.8%
1.B.2.b.4	Storage	CO2	0.001	12.5%	500%	500.2%
1.B.2.b.5	5. Distribution	CO2	0.05	12.5%	500%	500.2%
1.B.2.c.i	i. Oil	CO2	0.1	12.5%	50%	51.5%
1.B.2.c.ii	ii. Gas	CO2	0.02	12.5%	75%	76.0%
1.B.2.c.i	i. Oil	CO2	30	12.5%	50%	51.5%
1.B.2.c.ii	ii. Gas	CO2	12	12.5%	25%	28.0%

1-3 Achievement of Output

a.　Output 1

The set of databases/spread sheet files for the GHG inventory for the BUR2 for the energy, IPPU, and waste sectors have been completed. The GHG inventory report for the same sectors have been finalized.

b.　Output 2

No workshop was held during this reporting period.

c.　Output 3

The draft of the national GHG inventory report for the BUR2 was finalized.

1-4 Achievement of the Project Purpose

The national GHG inventory report for the BUR2 has been finalized.

The following is a summary of an assessment of the Project by CCDA and the JICA Project experts, under the five DAC evaluation criteria, namely relevance, effectiveness, efficiency, impact and sustainability. For each criterion, the Project was evaluated on a scale of “highly satisfactory”, “satisfactory”, “partially unsatisfactory”, and “unsatisfactory”.

Relevance is highly satisfactory. GHG inventories are the core component of the national communications and the BURs which allow policymakers to assess the GHG emission/removal trend of the country to help plan mitigation actions and monitor those actions. This is why GHG inventories will be a core reporting element of the Biennial Transparency Report (BTR), to be submitted by all Parties to the Paris Agreement, from 2024. The Project purpose is not only in line with the current reporting under the UNFCCC, but also in line with the reporting requirement under the Enhanced Transparency Framework under the Paris Agreement. Papua New Guinea has a number of policy frameworks, strategies, and policies to address climate change. Most recently, United Nations Paris Agreement (Implementation) Act (2016) addresses climate change issues and how to implement the country's obligations under the Paris Agreement. Climate change and the agreements under the UNFCCC such as the Kyoto Protocol or Paris Agreement is a priority issue for PNG. GHG inventories are the policy tool used in climate change policy and in the UNFCCC context, therefore, the relevance of this Project to PNG is extremely high.

Effectiveness is highly satisfactory. The means of verification of each output have been developed by the CCDA and JICA Project experts. Two sets of work plans, databases, and inventory reports have been developed, the second set an improvement from the first. These improvements in the deliverable products will make inventory compilation easier in future cycles. User friendliness has been a key consideration in developing the workplan, database, and inventory reports so that in case a new CCDA staff takes over the sector the following cycle, he/she can still update the material with even little to no expertise.

Efficiency is partly unsatisfactory. The JICA Project was planned as an efficient project, but due to some unforeseen circumstances and other challenges, such as COVID-19 pandemic and delays by CCDA in preparing the BUR1, the implementation of the Project was not as efficient as planned. The JICA Project scope of the inventory was all sectors, but as there were other donors that were supporting the CCDA with the AFOLU sector, the JICA Project focused on the non AFOLU sectors. Coordinating the work by the AFOLU team and the JICA Project expert team was a challenge as CCDA was not able to sufficiently manage the process or lead the coordination with donors. For the first cycle, the JICA Project team actively managed the inventory process for all sector to compile a complete national GHG inventory, but for the second, the JICA Project

experts focused on the non AFOLU sectors and allowed CCDA to coordinate with its donors to produce the AFOLU inventory. Improved coordination may have allowed the complete GHG inventory to be completed by the end of the JICA Project.

Impact is satisfactory. Regardless of the level of engagement by the CCDA staff in the second cycle, the staff have undergone two cycles of GHG inventory preparation and have a better understanding of the steps and the necessary approaches to prepare and compile an inventory. This learning by doing approach has installed some confidence in the staff and some ownership of their sector of the inventory. The Project has had a positive impact on other relevant stakeholders as well, the level of understanding of GHG inventories and the UNFCCC by relevant authorities has enhanced, and even actors who hadn't been identified by the Project have approached CCDA with questions on the GHG inventory. This improved presence of CCDA and the GHG inventory work has had a positive impact on PNG.

Sustainability is satisfactory. The GHG inventory and the BTR will need to be compiled and submitted under the Paris agreement. This international agreement will continue and PNG's commitment to the UNFCCC requirements is expected to continue in the future. As PNG develops and fleshes out the Paris Agreement Implementation Act and the NDC Regulation, institutions in PNG will be required to regularly support CCDA in preparing the GHG inventory and the BTR. In terms of the institutional arrangements, these are expected to be sustained as the Paris Agreement EFT begins its cycles starting with the submission of updated NDCs, monitoring progress with the BTRs, and the global stocktake under the UNFCCC. PNG has in place arrangements which will consider NDC implementation and GHG inventory preparation such as the Sub Technical Working Committees and any new institutions to be formed as part of the NDC Regulation. Therefore, sustainability from the policy and institutional aspect is very satisfactory.

The CCDA structure has weakened since the initiation of the Project. The manager position of the NC and MRV division was vacated at the start of the Project and two staff members left the CCDA in 2018, but no replacements were hired. The General Manager of CCDA was tasked to be both the overseer of the Project and the day-to-day manager, with five staff members each tasked with a sector of the GHG inventory. This structure changed some in 2020 with a promotion to the generalist/compiler/energy expert becoming the leader of the GHG inventory. While this structure within CCDA is more than seen in most developing countries where one or two staff are charged with overseeing the GHG inventory process, the CCDA staff are relatively young and are not closely supervised by a middle manager. Without the Project, the planning of work and monitoring of progress is a concern even though some staff have risen to the occasion to actively manage the process. Therefore, sustainability from an organizational aspect is partially

unsatisfactory.

PNG has an advantage over many other developing countries as it has a team of staff dedicated to the preparation of NCs and BURs. Staff has decreased since the JICA Project began, but there is no reason to believe that the budget for the division will be taken away in the future, taking into consideration the importance of climate change and the Paris Agreement to PNG. At the same time, the CCDA does rely on the GEF and donors to support the budget for some activities, and this dynamic is unlikely to change in the future. Therefore, sustainability from a financial aspect is satisfactory.

Through on the job training of the CCDA staff, they were able to grow as their respective sector leads and understand the process of the GHG inventory preparation. The level of growth by CCDA staff depends on the staff members, as the level of commitment was different between staff, and decreased while the JICA Project experts were no on the ground. Furthermore, due to COVID-19 restrictions, the level of training was limited during the second cycle of the GHG inventory project. However, inventory preparation tools were developed through the Project such as the GHG inventory TACCC review tool, the estimation files, and the national inventory report are fundamental tools serve as manuals for CCDA staff and should support the sustainability of the bottom-line technical competence of the GHG inventory compilers at CCDA. Therefore, sustainability from the technical aspect is partially unsatisfactory.

1-5 Changes of Risks and Actions for Mitigation

No changes to the risks and actions for mitigation. PNG has restricted entry of foreign nationals since January 2020 due to Covid-19 pandemic, resulting that the JICA Project expert has not been able to visit PNG since March 2020. Though the JICA Project expert has remotely prepared the GHG inventory for the BUR2, on-site personnel cannot adequately proceed with the work due to lockdown measures. Thus, an agreement was made at the 3rd JCC to estimate GHG emissions based on the BUR1 data for items which were not able to be newly collected.

1-6 Progress of Actions undertaken by JICA

N/A

1-7 Progress of Actions undertaken by Gov. of PNG

N/A

1-8 Progress of Environmental and Social Considerations (if applicable)

N/A

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

N/A

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

N/A

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail/Cause

The operation plan until completion of the project agreed at the 3rd JCC was mainly on schedule.

The JICA Project experts were expecting CCDA to complete its AFOLU estimations to be completed by October so that the JICA Project experts and CCDA could incorporate the emission files and report into the inventory estimation file system and GHG inventory report, in addition to completing the key category analysis, uncertainty assessment, and estimating the total national GHG emissions and removals. However, due to delays in this regard, the final steps and the finalization will be carried out by CCDA after the Project duration.

2-2 Action to be taken

N/A

2-3 Roles of Responsible Persons/Organization (JICA, Gov. of PNG, etc.)

N/A

3 Modification of the Project Implementation Plan

3.1 Plan of Operation

No changes have been made to the Plan of Operation.

3-2 Other modifications on detailed implementation plan

The modified implementation plan agreed at the 3rd JCC is shown below.

		4				5				6				7			
1.1: Examine the arrangements and assess capacity of CCDA and other relevant parties.	JICA Project experts carry out a review of the capacity by the end of the Project. CCDA members will review the assessment results, and revisions will be made as necessary.																
1.2: Consider and recommend ways to improve the national GHG inventory arrangements.	JICA Project experts will develop a detailed improvement plan by the end of the Project. CCDA members will review the assessment results, and revisions will be made as necessary.																
1.3: Draft/Update workplan/guidebook/ checklist for preparing GHG inventories including QA/QC activities (part of NIR).	JICA Project experts will finalize draft QA/QC Plan in March. CCDA members will review the assessment results, and revisions will be made as necessary.																
1.4: Draft/Update a MoU for data provision.	MoU for data provision and for the Energy Sub-Technical Working Committee has been drafted and updated.																
1.5: Collect data necessary for national GHG inventories from relevant parties.	The energy sector has all data for BUR2, but CCDA will continue to work with the Energy Sub-Technical Working Committee members on a monthly basis, to plan the national energy balance table development, with the support of the JICA Project experts. CCDA will continue data collection for the other sectors.																
1.6: Develop/Update a database/data platform for estimating GHG emission/removals.	Database for energy sector complete. The JICA Project experts will develop a new database for IPPU and waste sectors and test using available data in March. CCDA members will review the assessment results, and revisions will be made as necessary.																
1.7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate emissions/removals.	Estimation file system for energy sector mostly done. JICA Project experts will develop similar estimation file system for IPPU and waste sectors in April. CCDA members will review the assessment results, and revisions will be made as necessary.																
1.8: Compile national GHG inventories with time series consistency.	JICA Project experts and CCDA will compile inventory using energy data and BUR1 IPPU/waste data.																
1.9: Draft/Update technical document of NIR.	CCDA will fill out NIR template for energy, IPPU and waste sectors with support from JICA Project experts.																
2.1: Conduct workshops on national GHG inventories.	The Inception workshop was held in 2017																
2.2: Conduct workshops on preparation for the national GHG inventories, methods, and their improvement.	The consultation workshop for the BUR1 was held in 2018, and the F gases workshop held in 2020.																
3.1: Study IPCC methods.	JICA Project experts can provide technical support to sectors as needed.																
3.2: Conduct key category analysis and uncertainty assessment.	Template for key category analysis and uncertainty assessment will be prepared by JICA Project experts. The JICA Project experts will conduct lectures on the two files.																
3.3: Collect and compile information and identify country/region emission factors and other relevant parameters	JICA Project experts will draft short paper on how to look for country specific parameters and will conduct lectures on the approach and the need for improving the accuracy of the inventory.																
3.4: Consider whether/how mitigation actions can be reflected in the GHG inventory to track the progress of targets.	JICA Project experts will work with CCDA to support mitigation chapter of BUR2 and carry out analysis of how actions could be reflected in the inventory																
3.5: Prepare guidebook/FAQ for ICA process and prepare document for the FSV process.	A guidebook for preparing for the ICA process including the FSV was developed in 2019.																
3.6: Draft and improve a national GHG inventory improvement plan (part of NIR).	JICA Project experts will develop a detailed improvement plan and will conduct lectures on the approach and the need for improving the accuracy of the inventory.																
3.7 Review summary of GHG inventory to be prepared by CCDA be included in the BUR/NC.	JICA Project experts will support BUR2 draft for sectors that are complete. CCDA will finalize the draft when estimations are complete.																

4 Current Activities of Gov. of PNG to Secure Project Sustainability after its Completion

N/A

II. Project Monitoring Sheet I & II *as Attached*

Monitoring Sheet I

Project Monitoring Sheet I （Revision of Project Design Matrix）

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Version 9

Implementing Agency: CCDA

Dated October 4, 2021

Target Group: CCDA

Period of Project: October 5 2017- October 4 2021

Project Site: Port Moresby, PNG　　**Model Site:**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories are prepared periodically.	1) A national GHG inventory is prepared every 2 years. 2) Items on TACCC checklist	･National GHG inventory report. ･TACCC assessment results of the checklist		none	none
Project Purpose The basic capacity of CCDA to periodically prepare TACCC (Transparent, accurate, consistent, comparable, complete) GHG inventories is strengthened.	1) A national GHG inventory report is developed for 2015 and 2017. 2) Items on TACCC checklist	･Reports of national GHG inventory (2015 and 2017) ･TACCC assessment results of the checklist	･Relevant agencies cooperate with CCDA.	A GHG inventory for 2000-2015 summary report was included in the BUR1. The inventory for 2000-2017 will be completed October 2021.	none
Outputs Output1：Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is enhanced.	1-1) General inventory compilation procedure(work plan) is documented. 1-2) Data for national GHG inventories are collected, archived and maintained. 1-3) Technical document on procedures of inventory compilation is drafted.	1-1) Work plan 1-2) Set of databases/spread sheet files for national GHG inventories 1-3) National GHG inventory report		GHG estimation files and summary report completed for the BUR1. The report for 2017 will be completed October 2021	none
Output2: Capacity to promote understanding of national GHG inventories is enhanced.	2-1) The average level of understanding of workshops: 70% or above.	2-1) Results of questionnaire			none
Output3. Capacity to technically assess the GHG inventory and to make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)	3-1) Results of key category analysis and uncertainty assessment are documented. 3-2) Improvements made and necessary improvements for the future are documented.	3-1) National GHG inventory report		A GHG inventory summary report was included in the BUR1. The report for 2017 will be completed October 2021	none

Activities	Inputs		Important Assumption
	The Japanese Side	The PNG Side	
1-1 : Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation. 1-2: Consider and recommend ways to improve the national GHG inventory arrangements. 1-3 : Draft/Update a work plan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]). 1-4: Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision. 1-5 : Collect data necessary for national GHG inventories from relevant parties. 1-6 : Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation. 1-7: Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors. 1-8 : Compile national GHG inventories with time series consistency. 1-9 : Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR). 2-1 : Conduct workshops for acquiring general knowledge on preparation of national GHG inventories. 2-2 : Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders. 3-1 : Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories. 3-2 : Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory. 3-3 : Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories). 3-4: Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets. 3-5: Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC. 3-6 : Draft and improve a national GHG inventory improvement plan (to be included in NIR). 3-7: Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	1) Short term experts ・GHG inventory (General) ・GHG inventory (Energy) ・GHG inventory (Industrial Processes and Product use) ・GHG inventory (Agriculture) ・GHG inventory (Land use, Land use change and Forestry) ・GHG inventory (Waste) 2) Workshops 3) Training in Japan/third country 4) Equipment ・PC for data management	1) Counterpart personnel CCDA 2) Office space for the sector expert teams to work 3) Meeting space for group progress report meetings/seminars 4) Necessary operation costs	
			Pre-Conditions
			<Issues and countermeasures>
			none

Monitoring Sheet II

Project Monitoring Sheet II (Plan of Operation)

Version 9

Dated October 4, 2021

Project Title: The Project for enhancing capacity to develop a sustainable GHG inventory system for PNG

Inputs	Year	2017		2018				2019				2020				2021			Remarks	Monitoring: Issue	Monitoring: Solution
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III			
Expert																					
GHG inventory (General)	Plan																		approximately 1 week to 2 weeks a quarter/expert	Due to the coronavirus situation, Japanese experts have not been to PNG since December 2019	JICA Project experts and CCDA used remote meeting applications in addition to the regular emails to make progress during the COVID-19 restrictions
	Actual																				
GHG inventory (Energy)	Plan																				
	Actual																				
GHG inventory (Industrial Processes and Product use)	Plan																				
	Actual																				
GHG inventory (Agriculture, Land use change and Forestry)	Plan																				
	Actual																				
GHG inventory (Waste)	Plan																				
	Actual																				
Project administrative coordination / coordinator for training	Plan																		support from Japan		
	Actual																				
Equipment																					
PC for data management	Plan																		All purchased in October 2017	none	none
	Actual																				
Training in Japan																					
Training for Counterpart on GHG inventories in Japan	Plan																		1 week training, to be conducted in Japan as necessary. Deemed not necessary	none	none
	Actual																				
In-country/Third country Training																					
Training for Counterpart on GHG inventories in developing country	Plan																		Not carried out as facilitative sharing of views workshop was held remotely.	none	none
	Actual																				

Duration / Phasing																					
	Plan																				
	Actual																				

Monitoring Plan	Year	2017		2018				2019				2020				2021			Remarks	Issue	Solution
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III			
Monitoring																					
Joint Coordinating Committee	Plan																			none	none
	Actual																				
Set-up the Detailed Plan of Operation	Plan																			none	none
	Actual																				
Submission of Monitoring Sheet	Plan																			none	none
	Actual																				
Reports/Documents																					
Work Plan	Plan																			none	none
	Actual																				
National GHG inventory Report	Plan																			none	none
	Actual																				
Project Progress Report	Plan																			none	none
	Actual																				
Project Brief Note	Plan																			none	none
	Actual																				
Project Completion Report	Plan																			none	none
	Actual																				
Public Relations																					
Establishment and operation of JICA TC website	Plan																				
	Actual																				

Activities / Sub-Activities	Year	2017		2018				2019				2020				2021			Responsible Organization		Achievements	Issue & Countermeasures
		Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅰ	Ⅱ	Ⅲ	Japan	GOPNG		
Output 1: Capacity to periodically and systematically prepare the national GHG inventories including implementation of QA/QC procedures is																						
1.1 Examine the existing arrangements for preparing national GHG inventories in PNG and assess current capacity of CCDA and other relevant parties involved in the preparation.	Plan																		JICA	CCDA	none	none
	Actual																					
1.2 Consider and recommend ways to improve the national GHG inventory arrangements.	Plan																		JICA	CCDA	none	none
	Actual																					
1.3 Draft/Update a workplan/guidebook/checklist for preparing national GHG inventories including cross cutting QA/QC activities (to be part of the national GHG inventory report [NIR]).	Plan																		JICA	CCDA	completed QA/QC Plan	none
	Actual																					
1.4 Draft/Update a Memorandum of Understanding between CCDA and data providers to clarify the roles and responsibilities in addition to the general schedule of data provision.	Plan																		JICA	CCDA	none	none
	Actual																					
1.5 Collect data necessary for national GHG inventories from relevant parties.	Plan																		JICA	CCDA	none	none
	Actual																					
1.6 Develop/Update a database/data platform, consisting of parameters used in the GHG emission/removal estimation.	Plan																		JICA	CCDA	none	none
	Actual																					
1.7 Use 2006 IPCC Guidelines software and/or spreadsheets to estimate GHG emissions/removals from each of the sectors.	Plan																		JICA	CCDA	none	none
	Actual																					
1.8 Compile national GHG inventories with time series consistency.	Plan																		JICA	CCDA	none	none
	Actual																					
1.9 Draft/update technical document on procedures of inventory compilation and each sector's QA/QC activities (to be part of the NIR).	Plan																		JICA	CCDA	none	none
	Actual																					
Output 2:Capacity to promote understanding of national GHG inventories is enhanced.																						
2.1 Conduct workshops for acquiring general knowledge on preparation of national GHG inventories.	Plan																		JICA	CCDA	none	none
	Actual																					
2.2 Conduct workshops on preparation for the national GHG inventories, methods, and their improvement in addition to presentation on the progress of inventory preparation to the appropriate stakeholders.	Plan																		JICA	CCDA	none	none
	Actual																					
Output 3: Capacity to technically assess the GHG inventory and make improvements is enhanced for each sector (energy, industrial processes, agriculture, land use, land-use change and forestry, waste)																						
3.1 Study IPCC methods for preparing activity data and emission factors and for implementing data compilation and QA/QC for each sector of the national GHG inventories.	Plan																		JICA	CCDA	none	none
	Actual																					
3.2 Conduct key category analysis and uncertainty assessment to identify categories which should be given priority in improving the inventory.	Plan																		JICA	CCDA	none	none
	Actual																					
3.3 Collect and compile information and identify emission factors and other relevant parameters that better reflect national or regional circumstances (in prioritized key categories).	Plan																		JICA	CCDA	none	none
	Actual																					
3.4 Consider whether/how mitigation actions including NAMAs can be reflected in the GHG inventory to track the progress of PNG in achieving its NDC targets.	Plan																		JICA	CCDA	completed mitigation actions reporting format for BUR2	none
	Actual																					
3.5 Prepare a guidebook/FAQ for the international consultation and analysis process and prepare document for the facilitative sharing of views process under the UNFCCC.	Plan																		JICA	CCDA	Guidebook/FAQ for ICA process completed.FSV presentation support	none
	Actual																					
3.6 Draft and improve a national GHG inventory improvement plan (to be included in NIR).	Plan																		JICA	CCDA	none	none
	Actual																					
3.7 Review summary of the GHG inventory to be prepared by CCDA be included in the BUR/NC.	Plan																		JICA	CCDA	none	none
	Actual																					