

VERIFICATION REPORT

Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation



Document prepared by AENOR CONFÍA S.A.U.

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ER Program Name	Emission Reduction Report for the Indonesia-Norway Partnership
Baseline Reference Period Covered in this Report	1 st July 2006 to 30 th June 2016 (2006/2007 to 2015/2016)
Reporting Period Covered in this Report	4 th Monitoring Period: 1 st July 2019 to 30 th June 2020 (2019/2020 period)
Number of ERs	(1) 237,605,595 tCO ₂ e before double claiming discounting (2) 204,709,490 tCO ₂ e after double claiming discounting (3) 133,061,169 tCO ₂ e after 35% deduction due to uncertainty risk and Indonesia's ambition to reduce GHG emissions
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VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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TABLE OF CONTENTS

1. Introduction.....	5
1.1. Objective.....	5
1.2. Scope.....	6
1.3. Criteria.....	6
1.4. Level of assurance and materiality.....	7
2. Audit process.....	8
2.1. Audit team.....	8
2.2. Method and considerations.....	9
2.3. Document review.....	12
2.4. In-country visit	12
2.5. Resolution of clarifications	13
2.6. Internal quality control	13
3. Verification findings	14
3.1. Area and geographical boundaries	14
3.2. Activities covered, carbon pools and GHG	14
3.3. Forest, deforestation and forest degradation definitions.....	14
3.4. Baseline for RBP/C definition	15
3.5. Data (Activity Data and Emission Factors)	15
3.6. Methodology and Procedures.....	17
3.7. Baseline Construction Results.....	17
3.8. Constructed and Projected RBP/C Baseline and results	18
3.9. National Forest Monitoring System (NFMS)	20

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
---------------------	--

3.10. Uncertainty	21
3.11. Emissions from peat decomposition and peat fires	23
3.12. Double accounting	25
3.13. Results-Based Payment/Contribution	26
4. Verification conclusion	28
Annexes	29
Annex 1: Recommendations for improvements in MRV system	29
Annex 2: Analysis of the Plan of improvement	30
Annex 3: List of evidence provided	31
Annex 4: Reference documentation	32
Annex 5: Findings	33
Annex 6: Emission estimates differences between versions of the Emission Reduction Report for the Indonesia-Norway Partnership	52
Annex 7: Comments on the draft of the Verification Report	53

1. INTRODUCTION

1.1. Objective

In verifying the results available, the process of verification has considered the content of Indonesia's results report based on all elements of MRV Protocol /2/ and its Annex /3/, referring to the MoU and Contribution Agreement. AENOR's audit team has ensured that the agreed use of methods, processes, and consistencies as established by the MRV Protocol /2/ are the guiding criteria for the verification. The verification ensures that the reported results are based on consistent use of appropriate methodologies in line with the MRV Protocol /2/.

As such, the objective of the verification is the independent evaluation of the results in reducing emissions from deforestation and forest degradation in Indonesia at national level, reported in the document "Emission Reduction Report for the Indonesia – Norway Partnership" or ERR /1/. The following monitoring period has been taken into account:

- 4th Monitoring Period 1st July 2019 to 30th June 2020 (2019/2020 period)

For clarifying purposes, in a previous assessment that happened between 2019 and 2020, AENOR assessed the following period:

- 1st Monitoring Period: 1st July 2016 to 30th June 2017 (2016/2017 period).

Moreover, in a previous assessment carried out in 2023, AENOR assessed the following periods:

- 2nd Monitoring Period: 1st July 2017 to 30th June 2018 (2017/2018 period).
- 3rd Monitoring Period: 1st July 2018 to 30th June 2019 (2018/2019 period).

The three monitoring periods (for this verification process, only 2019/2020 has been considered) were assessed in comparison to the following results-based payment (RBP/C) baseline, as reported in the document "*Print_2024 ERR Indonesia-Norway report as per 14 Oct 2024*" /1/ (from now on, "ERR"):

- 1st July 2006 to 30th June 2016 (2006/2007 to 2015/2016).

This RBP/C baseline is valid up to 2019/2020, in accordance with the MRV Protocol /2/ most updated version, Section 2.2.

Moreover, as per required by the Framework Contract between the Royal Norwegian Ministry of Climate and Environment and AENOR CONFÍA S.A.U, there are some general verification objectives:

- Ensure an independent, credible, and high-quality verification, aligned with UNFCCC decisions and considering international standards and practice for results-based payments.
- Validate the consistency of the methodology used to estimate emissions reductions in relation to the methodology established by the Forest Partner Country in the development of its Reference Level and in accordance with the relevant MRV protocol.
- Allow reconstruction of reported emission reductions.
- Verify the results on estimated emission reductions in order to avoid errors, omissions or misrepresentations that could influence the overall results, and thereby decisions related to results-based payments.
- Analysis and propose options for strengthening MRV systems, where applicable.

1.2. Scope

The scope of the verification was limited to the following indicators:

- Emissions from gross deforestation at the national level 2006/2007-2015/2016 used as RBP/C baseline for the 2019/2020 monitoring period.
- Emissions from gross forest degradation at the national level 2006/2007-2015/2016 used as RBP/C baseline for the 2019/2020 monitoring period.
- Emission reductions measured as tonnes CO₂e, including all sources of emissions included in the RBP/C.

The ERR for the Indonesia – Norway Partnership verification process has been carried out in accordance with the requirements established in the ISO 14065:2020 and ISO 14064-3:2019 “Greenhouse Gases. Part 3: Specification with guidance for validation and verification on greenhouse gases”.

1.3. Criteria

The criteria for assessing the reported results were the correct application of the methodology used for the definition of the First Indonesia Forest Reference Emission Level (FREL), applied to the periods 2006/2007-2015/2016 for constructing the RBP/C baseline reference period and 2019/2020 monitoring period to quantify the emission reductions against it, under the framework outlined by the bilateral agreements of the Indonesia-Norway partnership, the MRV Protocol.

These criteria are specified in the following documents:

- National Forest Reference Emission Level (FREL) for Deforestation and Forest Degradation: In the Context of Decision 1/CP.16 para 70 UNFCCC (Encourages developing country Parties to contribute to mitigation actions in the forest sector). (2016).
- MRV protocol for the Indonesia-Norway partnership on climate, forests and peat /2/.
- Annex: Detailed steps for calculating results-based payments under the Indonesia-Norway forest partnership /3/.

Moreover, other relevant documents can be found within Annex 4: Reference documentation, within this verification report. Some of them are quoted below as guidance:

- Report on the technical assessment of the proposed forest reference emission level of Indonesia submitted in 2016. (2016).
- Indonesia Second Biennial Update Report Under the United Nations Framework Convention on Climate Change. (2018).
- Technical report on the technical analysis of the technical annex to the second biennial update report of Indonesia submitted in accordance with decision 14/CP.19, paragraph 7, on 21 December 2018. (2018).
- Indonesia Third Biennial Update Report Under the United Nations Framework Convention on Climate Change.

- Technical report on the technical analysis of the technical annex to the third biennial update report of Indonesia submitted in accordance with decision 14/CP.19, paragraph 7, in December 2021.
- 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands.
- 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- Good Practice Guidance for Land Use Land-Use Change and Forestry. (2003).
- Good Practice Guidance and Uncertainty Management in National GHG Inventories. (2000).
- Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) REDD+ Source Book. (2015).
- GFOI Methods and Guidance Documents (2013&2016) and supplementary modules.
- ISO 14064-3:2019 Part 3: Specification with guidance for the verification and validation of greenhouse gas statements (2019).

1.4. Level of assurance and materiality

The assessment was conducted to provide a reasonable level of assurance of conformance against the defined audit criteria and materiality thresholds within the audit scope. Based on the audit findings, a positive evaluation statement reasonably assures that the greenhouse gas (GHG) assertion is materially correct and credible.

The threshold for materiality with respect to the aggregate of errors, omissions and misrepresentations relative to the total reported GHG emission reductions was five percent (5%).

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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2. AUDIT PROCESS

2.1. Audit team

The audit team consisted of the following members:

Role	Name
Team Leader 1	Daniel Bermejo Vesga
Team Leader 2	Javier Cócera Cañas
Support Verifier 1	Adrián Vidal de Prados
Support Verifier 2	Pablo Moreno
Support Verifier 3	Claudia Polindara
Support Verifier 4	Joao Pedro Barata
Project Manager and Technical Reviewer	Jose Luis Fuentes

Daniel Bermejo is a Forest Engineer with a MSc in Sustainable Finance. He began his career in private consulting, specializing in climate risk analysis and TCFD risks, forestry development, agriculture and forestry banking standards, environmental footprint projects and others. Since 2022 he participates as an auditor in several AFOLU projects in different carbon schemes, such as VCS, CCB, GS, FCPF, ART-TREES, Cercarbono and BCR. Daniel has a professional Certificate Program in Sustainable & Inclusive Landscapes, compiling topics regarding Landscape Leadership, Governance, Finance and Climate Action (Wageningen). He has participated in several ISO lead auditor courses. He has received advanced training in REDD+ (UN CC:Learn), Monte Carlo analysis and Collect Earth (FAO). He has also received formal education in Community Development recently (Devimpact Institute). He is an expert in Climate, Community and Biodiversity aspects and has worked in LATAM, Africa, Asia, and Europe countries. He speaks Spanish, English and French fluently.

Javier Cócera is a Forest Engineer with a MSc in Forest Management. He has developed his career focused on forest management. Mainly he has been working through sustainability in two ways: the main one as forestry consultancy, developing forest management plans, working with GIS and LiDAR both in the field and the office and getting experience of the forest resources. The second one was developing environmental footprint projects and sustainability reports. Currently Javier is working in AENOR as auditor focused in AFOLU projects. Javier participated in courses about ISO lead auditing and have performed audits in projects in Europe, LATAM, Africa and Asia. He speaks Spanish and English fluently.

Adrián Vidal holds a master's degree in Forest Engineering from the Technical University on Madrid, and a Postgraduate Diploma in Climate Change from the National University of Quilmes and the National University of Jujuy, with the support of UNEP. Adrián works at the Climate Change Unit in AENOR and has more than 5 years of professional experience in forestry and sustainability. Prior to joining AENOR, he worked at the Basque Center for Climate Change (BC3) in carrying research in global governance, national policies, and modelling of Agriculture, Forestry and other Land Use (AFOLU) mitigation

measures. He worked as an intern at the AFOLU Unit of the Transparency division of UNFCCC, providing support to the intergovernmental climate change process on issues related to land-use, land-use change and forestry (LULUCF), agriculture and REDD+. He also worked in urban forestry, landscape forest restoration and environmental consultancy, and collaborated in the Global Forest Survey project of FAO.

Pablo Moreno is a Forest Engineer with a Master's in Forest management. Pablo joined AENOR in 2023 and has more than four years of experience in forestry and sustainability. Since finishing his master's degree, Pablo has worked in forest management, operations management, technical analysis, working with GIS and fieldwork, as well as quality assessment and R&D development in forestry production-related topics in search of efficiency and process optimization. His other career path has focused on sustainability consultancy, research, and climate change. He has worked in different countries: Spain, U.S.A., and Australia. In AENOR works with international projects, mainly in Africa and South America. He is a native Spanish speaker proficient in English and holds a basic level of French.

Claudia Polindara is a forest engineer from Universidad Distrital Francisco José de Caldas, specialist in Environmental Law and master's in environmental law and management from Universidad del Rosario. She has 12 years of experience in Environmental and Forestry Management, and in the last 3 years has been dedicated as an auditor of projects for climate change mitigation activities under different carbon standards, such as: CERCARBONO, BioCarbon Registry, VCS and CCB, CDM, among others.

Joao Barata is an environmental engineer from the Forestry School of the Technical University of Madrid. He is a native Portuguese and Spanish speaker with a high English level who has worked in several projects from different standards such as VCS, CCB, GS and others. He has received trainings and participated in projects working with GIS and currently, he works at the Climate Change Unit in AENOR and is a validator/verifier under the ISO-14000 family requirements.

José Luis Fuentes is the manager of the Climate Change Unit of AENOR. He is a Forestry Engineer with a master's in business administration and a Post-Graduate in Environmental Management. He is fluent in Spanish and English. He has over 20 years of experience in auditing, consulting and training activities related to environmental and carbon management projects. Jose Luis has actively participated in the audit of international sustainable development projects in several carbon schemes, such as the Clean Development Mechanisms (CDM), Verified Carbon Standard (VCS), Climate, Community and Biodiversity Standards (CCB), Gold Standard (GS) and carbon footprints (ISO 14067 and ISO 14064). Jose Luis has extensive technical knowledge about the regulatory framework, policies and technical provisions emanating from the Paris Agreement, the Kyoto Protocol and the Conferences of the Parties.

2.2. Method and considerations

The verification was performed through a combination of document review and technical sessions with relevant personnel of the MoEF. The conformity of the determination of emission reductions was evaluated against the criteria set forth in Section 1.3 and Appendix 5. As described below, findings were issued to ensure that all requirements were met.

The audit team carried out a risk-based assessment for the assurance of gross deforestation, gross forest degradation and the estimated emissions reductions. In accordance with ISO 14064-3:2019, the risk assessment is based on:

- The inherent risks of discrepancies for each variable used to estimate emission source and the GHG reporting system.
- The risk that controls are insufficient to detect and prevent each inherent risk from causing a discrepancy in the GHG assertion.
- The potential magnitude of each inherent and control risk described above resulting from the contribution of the associated emission source.

This information was used to develop an appropriate verification procedure for each identified risk. Each procedure was designed to reduce the probability that the verification would not detect a discrepancy that has not been corrected by the technical team responsible for the control.

Although there may be a level of risk inherently related to remote estimation processes and the development of the deforestation and forest degradation emission factors used in the estimation, the audit team did not focus on this since this risk has already been defined with the use of the 1st FREL as a guide and main criterion for verification. For this reason, the following elements included in the ERR /1/ constitute a risk classified as low, where it is not expected to have further findings or discrepancies regarding the procedures followed since these simply must comply with the established in the 1st FREL:

- Area and geographical boundaries.
- Carbon pools and types of GHG included.
- Forest, deforestation and forest degradation definition.
- Emission factors.

The next aspects were considered of medium risk. Therefore, they were assessed more thoroughly:

- Gross deforestation calculation.
- Gross forest degradation calculation.
- Emissions from deforestation and forest degradation calculation.

The following aspects have been considered of medium-high risk, being assessed with as much reviewing intensity as statistically feasible:

- Land use and land use change maps elaboration and activity data for the baseline period and monitoring period.

In AENOR's opinion, the verification has turned out to be of medium risk taking into account that: 1) the Indonesia-Norway partnership on climate, forests and peat has standardized processes for cartographic management and calculation, under the responsibility of the National Forest Monitoring System (NFMS), 2) that the Ministry of Environment and Forestry (MoEF) technical team involved in the MRV and the elaboration of the report have the appropriate knowledge, and 3) that the elaboration of Indonesia's 1st FREL and 3rd BUR, prior to this process, have allowed the learning and improvement of the processes, protocols, etc. Therefore, the risk of errors, discrepancies or omissions is considered low-medium.

The audit team focused its activity during the verification process on ensuring that the procedures carried out for the calculation of gross deforestation, gross forest degradation and the reduction of deforestation and forest degradation emissions have been carried out following the same methodology as the used in Indonesia's 1st FREL, as agreed by the parties of the Indonesia-Norway partnership in the MRV Protocol.

AENOR reproduced and verified 100% of the calculations in the calculation spreadsheet Spreadsheet_REDD Norway_2006-2020_20192020_20241014/8/ (from now on, "REDD calculation spreadsheet") for the estimation of emissions from deforestation and forest degradation for the period

2006/2007-2015/2016 and emissions reductions from reduced deforestation and forest degradation for the monitoring period 2019/2020. It was verified that the data necessary to calculate GHG emission reductions were adequately provided and reproducible.

The geographical boundaries and the deforested and degraded areas during the monitoring period were verified using the land cover maps from 2006/2007-2015/2016 and 2019/2020 monitoring period by the NFMS through the analysis of the data obtained by remote sensing. The accuracy assessment of the land cover maps was reviewed to determine their level of accuracy, in accordance with the determined MRV Protocol requirements.

However, AENOR has acknowledged the potential risk of underestimating gross deforestation and forest degradation during the monitoring period (2019/2020). This concern also encompasses the possibility of overestimating gross deforestation and forest degradation during the baseline period due to interpretation techniques and procedures carried out by MoEF in the context of REDD+. MoEF was informed about observations made by AENOR's audit team in the context of the MRV Protocol and this verification, and as such, recommendations for improvement have been included in this verification report (see Annex 1).

Carbon pools and forest classes were 100% verified and checked against Indonesia's 1st FREL and the *Annex: Detailed steps for calculating results-based payments under the Indonesia-Norway forest partnership /3/*.

Some errors were identified and subsequently corrected. These findings are detailed in Annex 5. All clarifications have been successfully closed.

No country visit was made as the previous verification event was made less than a year ago and included a site visit. Instead, a remote technical session was held on 2nd October 2024, in which members of the audit team interviewed relevant staff of the MoEF responsible for the monitoring and reporting of the reduced emissions from deforestation and forest degradation.

Based on the assessment carried out, AENOR confirms with a reasonable level of assurance that the claimed GHG emission for the period 2006/2007-2015/2016 and the claimed GHG emissions reductions for the monitoring period 2019/2020 is free from material errors, omissions or misstatements, in accordance with the MRV Protocol requirements.

In addition, AENOR confirms that sufficient evidence was presented and that there is a clear audit trail that contains the evidence and records that confirm the stated figures in this Verification Report since:

- The evidence available and presented to AENOR is sufficient. 100% of the data used in the calculations have been provided to achieve the final amount of GHG emissions and GHG emissions reduction reported.
- The nature of the evidence is adequate. The raw data were collected from reliable sources. They are detailed in the *ERR /1/* and have been provided to the verification team. The most relevant are appropriately detailed in Annex 3.
- Evidence was cross-checked. AENOR verified the information provided and reproduced the calculations.

Hence, AENOR confirms that the stated figures in the *ERR /1/* are correct and confirms that is able to verify the deforestation and forest degradation emissions reductions based on verifiable and reliable evidence.

2.3. Document review

AENOR carried out a thorough review of the documentation provided by the Directorate General of Climate Change of the MoEF to verify compliance with the verification criteria. The reviewed documentation includes, among others:

- Emission Reduction Report for the Indonesia-Norway Partnership /1/.
- National Forest Reference Emission Level for Deforestation and Forest Degradation: In the Context of Decision 1/CP.16 para 70 UNFCCC (Encourages developing country Parties to contribute to mitigation actions in the forest sector).
- Report on the technical assessment of the proposed forest reference emission level of Indonesia submitted in 2016.
- Indonesia Second Biennial Update Report Under the United Nations Framework Convention on Climate Change.
- Technical report on the technical analysis of the technical annex to the second biennial update report of Indonesia submitted in accordance with decision 14/CP.19, paragraph 7, on 21 December 2018.
- Indonesia Third Biennial Update Report Under the United Nations Framework Convention on Climate Change.
- Technical report on the technical analysis of the technical annex to the third biennial update report of Indonesia submitted in accordance with decision 14/CP.19, paragraph 7, in December 2021.
- Land cover maps: 1990, 1996, 2000, 2003, 2006, 2009, 2011, 2012, 2013, 2015, 2016, 2017, 2018, 2019 and 2020.
- Land cover changes database Pivot_PL1990_2020_RBC4.xlsx ..
- Spreadsheet_REDD Norway_2006-2020_20192020_20241014 /8/.
- Indonesia Report on REDD+ Performance.

Annex 3 contains the complete list of the documentation reviewed during the verification process.

2.4. In-country visit

No country visit was made as the previous verification visit was made a year ago during October 4th and 6th, 2023. Instead, a remote technical session was held on 2nd October 2024. The main objectives of the remote technical session were to:

- Understand in practice the estimation of gross deforestation and gross forest degradation at the national level: choice satellite images and pre-processing, image processing, accuracy assessments and activity data reporting.
- Understand the methodological steps for the determination of emissions from deforestation and forest degradation, the emissions reductions and the results reported under the RBP/C system.
- Understand the uncertainty estimation methods and the QA/QC procedures used.

- Understand the institutional arrangements put in place for the monitoring and reporting of the reduced emissions from deforestation and forest degradation.
- Understand how MoEF has considered the risk of double claiming in the conservativeness of the emission reductions calculations due to deforestation and forest degradation.

During the remote technical session, the audit team had the opportunity to listen and raise their questions to the technical team responsible for processing and preparing the land cover maps and for the calculation of emission and emissions reductions.

2.5. Resolution of clarifications

As a result of the verification process, the audit team identified several findings, raised as clarifications (CLs). A Clarification Request (CL) shall be raised if the information is insufficient or not clear enough to determine whether the applicable finding-specific requirements have been met.

The findings raised during the verification process, and the responses for their closure, are described in Annex 5.

All findings issued by the AENOR audit team during the verification process have been closed.

2.6. Internal quality control

The Verification Report has undergone an internal quality control process through a technical review, once the assigned verification team issued its final opinion. The technical reviewer is a qualified member of AENOR, independent of the team that carried out the verification. The technical reviewer or the team assigned for such review are qualified in the relevant technical areas.

3. VERIFICATION FINDINGS

3.1. Area and geographical boundaries

The geographical boundary and area covered by RBP/C under the Indonesia-Norway partnership on climate, forests and peat is clearly defined in the *Emission Reduction Report* as the whole natural forest (primary and secondary) in the territory of the Republic of Indonesia, including dryland, mangrove and swamp forest. Only areas with forest classes existing in the year 1990 that were not deforested up to 2006 were considered.

The audit team verified that the definition of boundaries is consistent with the *MRV protocol /2/* and its *Annex: Detailed steps for calculating results-based payments under the Indonesia-Norway forest partnership /3/*.

Moreover, the area of all-natural forest in 2006 (start RBP/C period) is 96,454,143 ha.

AENOR's audit team verified, through the land cover maps, that boundaries and areas considered for the determination of the RBP/C baseline, and the emissions reductions are correct.

3.2. Activities covered, carbon pools and GHG

The REDD+ activities considered for the RBP/C were those related to deforestation and forest degradation, as stated within Section 2.2.2 of the *ERR /1/*, in accordance with the *MRV Protocol /2/* and the agreed ToRs. Other REDD+ activities found in the 2nd Indonesian FREL have been excluded.

The only carbon pool included as part of the RBP/C baseline and reductions is aboveground biomass (AGB) and the only considers changes in carbon stocks, reported as CO_{2e}.

AENOR verified that the activities, carbon pools and GHGs considered are in accordance with the *Annex: Detailed steps for calculating results-based payments under the Indonesia-Norway forest partnership /3/*.

Emissions from peat decomposition and peat fires are included in the *ERR /1/* as an annex and, for the applicable monitoring period, excluded from the RBP/C, in conformity with the *Annex: Detailed steps for calculating results-based payments under the Indonesia-Norway forest partnership /3/*.

3.3. Forest, deforestation and forest degradation definitions

The AENOR team verified that the definitions used for forest, deforestation and forest degradation are consistent with those used in Indonesia's 1st FREL.

Forest

Land area of more than 6.25 hectares with trees higher than 5 meters at maturity and a canopy cover of more than 30 percent. Six classes of natural forest are considered in the RBP/C, in line with Indonesia's 1st FREL:

- Primary dryland forest
- Secondary dryland forest
- Primary mangrove forest
- Secondary mangrove forest
- Primary swamp forest

- Secondary swamp forest

Only the existing natural forest in 1990 are considered. Plantation forests are excluded.

Deforestation

One-time conversion of natural forest cover to other land-cover categories that occurred in the same area. Deforestation occurred in regenerated forest, that previously deforested, is not considered.

Forest degradation

Forest degradation refers to the process of transforming from primary to secondary forest classes. This transition leads to a reduction in the amount of carbon stocks within the forest due to human activities. The secondary forests that result from these transitions have undergone selective logging or experienced other disturbance events, such as fires and encroachment.

3.4. Baseline for RBP/C definition

AENOR's audit team verified that the definition used for Results-Based Payment/Contribution (RBP/C) is consistent with the requirements of the MRV Protocol. Specifically, it refers to the projection of CO₂ gross emissions that is used as a reference to compare against actual emissions at a given point in time in the future. Although Indonesia has complied with the requirements of updating the FREL after 5 years, the first FREL still applies to this verification as the reference period has not changed from previous verifications.

3.5. Data (Activity Data and Emission Factors)

3.5.1. Activity Data

According to the information crosschecked from the ERR Section 2.3.1, the activity data used comes from land cover maps created by the MoEF as part of the National Forest Monitoring System (NFMS). The maps from 2006, 2009, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 were analyzed for historical land cover changes and emissions estimates. Additional datasets from 1990, 1996, 2000, and 2003 were also included to ensure consistency.

AENOR's audit team reviewed the NFMS and the online map services and compared it with the information disclosed within the REDD+ Spreadsheet calculations /8/. The audit team has made sure that the reporting included accurate activity data and the description of data sources and coverage in accordance with determined MRV Protocol requirements.

However, AENOR has acknowledged the potential risk of underestimating gross deforestation and forest degradation during the monitoring period (2019/2020). This concern also encompasses the possibility of overestimating gross deforestation and forest degradation during the baseline period due to interpretation techniques and procedures carried out by MoEF in the context of REDD+. MoEF was informed about observations made by AENOR's audit team in the context of the MRV Protocol and this verification, and as such, recommendations for improvement have been included in this verification report (see Annex 1).

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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3.5.2. Emission Factors

According to the information crosschecked from the ERR Section 2.3.2, the RBP/C baseline calculation for Indonesian forest degradation (FREL) uses emission factors (EFs) derived from data from the National Forest Inventory (NFI), a national program initiated by the Ministry of Forestry in 1989.

The analysis uses Tier-2 EFs for deforestation and forest degradation (local activity data, with conversion factors sourced from relevant sources of information of Indonesia), with over 3,900 clusters of sample plots developed from 1989 to 2013.

The AGB of individual trees in the plots is estimated using an allometric model developed for tropical forests, but the generalized allometric model of Chave et al. (2005) was selected due to its performance in Indonesian tropical forests.

The emission factors for deforestation and forest degradation are calculated using the losses of carbon stock from the deforested forest and the difference in carbon stock between primary and secondary forests. The conversion factor from C to CO₂ is calculated using the 44/12 conversion factor, as recommended by the IPCC. More information on forest carbon stock can be found within Annex 3 of Indonesia's FREL, as has been assessed by AENOR's audit team.

Moreover, within this same Section, Tables 3 and 4 refer to the deforestation and forest degradation emission factors by forest classes and regions, respectively. As such, Table 3 reports information about the different six forest classes, in accordance with the FREL, for seven (7) different regions: Jawa, Kalimantan, Maluku, Bali-Nusa Tenggara, Papua, Sulawesi and Sumatera.

The same principle applies for Table 4, but only for the three primary forest classes: Primary Dryland Forest, Mangrove Forest and Swamp Forest, as there is no forest degradation identified in Secondary Dryland Forest, Mangrove Forest and Secondary Swamp Forest.

The audit team verified that the emission factors for deforestation and forest degradation used were the same of Indonesia's 1st FREL, which were derived from the NFI, and consider only AGB.

Forest Classes	Emission factors of deforestation (tCO ₂ e/ha)						
	JAWA	KALIMANTAN	MALUKU	NUSA BALI	PAPUA	SULAWESI	SUMATERA
Primary Dryland Forest	458.8	464.7	519.9	473.3	412.4	474.7	463.3
Secondary Dryland Forest	294.1	350.7	383.1	280.6	311.2	356.2	314.3
Primary Mangrove Forest	455.2	455.2	455.2	455.2	455.2	455.2	455.2
Secondary Mangrove Forest	347.9	347.9	347.9	347.9	347.9	347.9	347.9
Primary Swamp Forest	332.4	474.0	332.4	332.4	308.4	369.8	380.9
Secondary Swamp Forest	274.8	294.1	274.8	274.8	251.3	221.3	261.1

Forest Classes	Emission factors of forest degradation (tCO ₂ e/ha)						
	JAWA	KALIMANTAN	MALUKU	NUSA BALI	PAPUA	SULAWESI	SUMATERA
Primary Dryland Forest	164.7	114.0	136.8	192.7	101.3	118.5	149.0
Primary Mangrove Forest	107.3	107.3	107.3	107.3	107.3	107.3	107.3
Primary Swamp Forest	57.6	179.9	57.6	57.6	57.1	148.5	119.7

Finally, the audit team has assessed that MoEF updated national emission factors for constructing calculations in the second FREL, but to maintain consistency with the RBP/C/RBC Baseline, and complying with the MRV Protocol, the same EFs used in the 3rd BUR and Technical Annex of the 1st FREL have been considered for this ERR /1/. However, the updated FREL is intended to be used as a reference to measure the Indonesia REDD+ performance for the period 2021-2030.

AENOR's audit team has made sure that reporting has covered all the emission factors, rationale and data sources for estimating them. Proper description of methodological details has been disclosed for allowing the audit team reviewing and assessing that data is built on transparency, accuracy, completeness and consistency. Accessibility and proper identification of types of evidence has allowed the audit team to reconstruct the reported emission reductions.

The audit team has accessed the National Forest Inventory and crosschecked the information with reported data from the first Indonesian FREL. The information has been consistent with the reported data from the third BUR. The audit team has assessed the rationale on the use of Chave et al, 2005 for quantifying aboveground biomass (AGB).

3.6. Methodology and Procedures

3.6.1. Forest Cover Change Analysis

In accordance with Section 2.4.1 of the ERR /1/, the annual forest cover change analysis from 1990 to 2020 identified deforestation as the transformation of natural forests into other land cover classes, occurring once at any location. Forest degradation refers to the transformation of primary forests into secondary forests in the subsequent year. Degraded forests were identified by comparing the Land Cover (LC) dataset of T_n (primary forests in the first period) to T_{n+1} (secondary forests in the consecutive period).

More information about the calculation process has been disclosed within Annex 1 of the ERR.

3.6.2. Reference Period

AENOR verified that the reference period considered for the elaboration of the RBP/C baseline was 1st July 2006 to 30th June 2016 (2006/2007 to 2015/2016) as agreed in the Annex: *Detailed steps for calculating results-based payments under the Indonesia-Norway forest partnership /3/*.

Moreover, the selection of the RBP/C baseline interval period in Indonesia was based on transparent, accurate, and consistent land-cover data, a reflection of the forest transition, and the length of time that could account for national circumstances, policy dynamics, and carbon emissions under the Indonesia-Norway forest partnership.

3.7. Baseline Construction Results

3.7.1. Emission estimates from Deforestation

Section 2.5.1 of the ERR /1/ provides the average annual historical emissions from deforestation in MtCO_{2e}, from 2006/2007 to 2015/2016, in accordance with the reference period. Conclusions reported refer to an average annual emission from deforestation of 236.9 MtCO_{2e}, providing the baseline definitive value for deforestation.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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3.7.2. Emission estimates from Forest Degradation

Section 2.5.2 of the ERR /1/ provides the average annual historical emissions from forest degradation in MtCO₂e, from 2006/2007 to 2015/2016, in accordance with the reference period. Conclusions reported refer to an average annual emission from forest degradation of 41 MtCO₂e, providing the baseline definitive value for forest degradation.

3.8. Constructed and Projected RBP/C Baseline and results

Thus, the total annual emissions from deforestation and forest degradation amounted 277.9 MtCO₂e for the 2006/2007 to 2015/2016 baseline period, as highlighted within Section 2.6 of the ERR /1/.

Below can be found the calculation of the historical and projected annual emissions from deforestation and forest degradation, using historical data of 2006/2007 to 2015/2016. The same information has been reported within the REDD+ spreadsheet calculations /8/ and has been properly calculated.

Year	Deforestation	Forest Degradation	Total annual emission	
2006-2007	286,399,781	59,051,617	286,399,781	Historical
2007-2008	286,399,781	59,051,617	286,399,781	
2008-2009	286,399,781	59,051,617	286,399,781	
2009-2010	173,890,857	18,510,520	173,890,857	
2010-2011	173,890,857	18,510,520	173,890,857	
2011-2012	248,936,401	5,805,289	248,936,401	
2012-2013	285,586,539	19,833,885	285,586,539	
2013-2014	116,066,230	9,515,931	116,066,230	
2014-2015	232,677,053	85,190,736	232,677,053	
2015-2016	279,220,589	75,225,065	279,220,589	
2016-2017	236,946,787	40,974,680	277,921,466	Baseline
2017-2018	236,946,787	40,974,680	277,921,466	
2018-2019	236,946,787	40,974,680	277,921,466	
2019-2020	236,946,787	40,974,680	277,921,466	

After deducting baseline emissions from actual annual emissions, emissions reductions from deforestation and forest degradation for periods of 2019/2020 are obtained, as reported in table 5 of Section 3 of the ERR /1/. See results below.

RBP/C baseline (tCO ₂ e/year)	
Deforestation	236,946,787
Forest degradation	40,974,680

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Total RBP/C baseline	277,921,466
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Result Period	RBP/C Baseline (Million tCO2)		Actual Emissions (Million tCO2)		Result (Million tCO2)		Total (million tCO2e)
	Deforestation	Degradation	Deforestation	Degradation	Deforestation	Degradation	
2019/2020	236.95	40.97	32.49	7.82	204.45	33.15	237.61
Total	236.95	40.97	32.49	7.82	204.45	33.15	237.61

AENOR verified that the methodology used for the quantification of the gross deforestation and gross forest degradation for the periods 2006/2007-2015/2016 and 2019/2020 monitoring period has been consistent with the methodology used for in Indonesia’s 1st FREL. This was based in annual cover change analysis, overlaying land cover maps developed by the NFMS, for the period 1990-2020. As mentioned above, only forest areas existing in 1990 and not altered until 2006 were considered.

During the audit process, the audit team was able to follow in an exhaustive manner, together with the responsible technicians, the process of preparing the land cover maps. Detailed explanations of each of the steps were made and examples of the process were shown.

Deforestation and forest degradation emissions were calculated using the same methodology used in for Indonesia’s 1st FREL, as explained in Annex 1 of the ERR /1/. The deforested or degraded areas (Activity Data or AD) are multiplied by the relevant deforestation or degradation emission factor (EFs) per forest class. In accordance with IPCC literature, the simplest and most conservative method was used to calculate the emissions, which involves the oxidation of 100% of the carbon stock immediately after deforestation/degradation.

The equations used were:

$$GE_{ij} = A_{ij} \times EF_i$$

Where:

- GE_{ij} emissions from deforested or forest degraded area-i at forest change class-j; tCO₂e.
- A_{ij} deforested or forest degradation area-i in forest change class j; ha.
- EF_i emission factor from the loss of carbon stock due to change of forest class-j, owing to deforestation or forest degradation; tCO₂e/ha.

$$GE_t = \sum_{i=1}^N \sum_{j=1}^P GE_{ij}$$

Where:

- GE_t emission from deforestation and forest degradation at period t; tCO₂e.
- GE_{ij} emissions from deforested or forest degraded area-i at forest change class-j; tCO₂e.
- N number of deforested or degraded forest area unit at period t (from t₀ to t₁)

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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P number of forest classes, which meet natural forest criterion.

AENOR reviewed the methodology for the quantification of the emissions from deforestation and forest degradation for the period 2006/2009-2015/2016 and 2019/2020 monitoring period and found that it is used is in compliance with the criteria set in Section 1.3. AENOR reproduced all the calculations and obtained the same results, so it is considered that they are clearly and correctly represented in the spreadsheet and in the results report provided.

3.9. National Forest Monitoring System (NFMS)

The National Land Cover Map (NFMS) was established in 1989 by the MoEF in collaboration with the Government of Indonesia (GOI) and FAO. Its primary purpose is forest resources monitoring, using satellite imagery, mainly from Landsat data, to create land cover maps. The NFMS generates land cover maps of Indonesia regularly, covering 23 land cover classes, including cloud cover and no-data. The main data sources for the NFMS in Indonesia are the Landsat 5 Thematic Mapper (TM) and Landsat 7 Enhanced Thematic Mapper Plus (ETM+).

In 2008, the USGS changed its Landsat data policy, making it freely available over the internet. This has increased the availability of data for the NFMS, with approximately 218 scenes of Landsat data used to cover Indonesia within selected year intervals. In 2014, the NFMS established an MoU with the Indonesian National Space Agency (LAPAN) to ensure data sustainability.

The 23 land cover classes in the NFMS are generated based on the physiognomy or appearance of bio-physical covers, which can be visually distinguished using Landsat remote sensing data at a 30-meter spatial resolution. The classification process focuses on the visual appearance of the land cover, rather than probable land uses or covers. The minimum polygon unit size is 6.25 hectares, equivalent to 2.5 cm x 2.5 cm at a zoom screen of 1:50,000.

Figure 5 of the Section 4 of the ERR /1/ represents the general Indonesian Land Cover map workflow.

The National Forest Management System (NFMS) in Indonesia uses ground-truth points and reference data from Landsat satellite image pixels from 1990 to 2019. Quality control and quality assurance (QC/QA) processes are implemented for land-cover data, carbon stock data, and GHG emission calculation processes. QC is carried out at the regional office level at BPKH and the Forest Resources Inventory and Monitoring Directorate of MoEF.

QA is carried out at the plot level (PSP) by the regional office, involving forest biometric experts from the University and the National Research and Innovation Agency Indonesia. For GHG emission calculation, QC is carried out by the GHG Inventory & MRV Directorate and the Forest Resources Inventory and Monitoring Directorate, with at least three people or personnel independently involved.

External experts from MRV specialist practitioners, academics, and the National Research and Innovation Agency Indonesia are involved in QA. Reference points are selected using random sampling techniques and correlated with other data sources, such as SPOT 6 and 7 satellite imagery from 2013 to 2016.

The NFMS portal integrates internet and forest resource information systems to promote good forest governance through transparency. It maintains up-to-date, complete information and encourages public participation by providing a platform for access and benefit from shared information. The system assesses error matrix and user and producer accuracy.

AENOR verified that the personnel responsible for deforestation and forest degradation monitoring activities are fully trained and that the quality control and quality assurance (QA/QC) procedures to identify, review and manage the inconsistencies found are comprehensive and properly implemented.

The audit team cross-checked the land cover data contained in the spreadsheet *Pivot_PL1990_2020_RBC4/9/* (data retrieved from the land cover maps for the years 1990, 1996, 2000, 2003, 2006, 2009, 2011-2020) with the activity data (deforested and degraded area) reported in the *ERR/1/* and used in the REDD+ Spreadsheet Calculation */8/*. No discrepancy was found after assessing it against the defined MRV Protocol requirements.

However, AENOR has acknowledged the potential risk of underestimating gross deforestation and forest degradation during the monitoring period (2019/2020). This concern also encompasses the possibility of overestimating gross deforestation and forest degradation during the baseline period due to interpretation techniques and procedures carried out by MoEF in the context of REDD+. MoEF was informed about observations made by AENOR's audit team in the context of the MRV Protocol and this verification, and as such, recommendations for improvement have been included in this verification report (see Annex 1).

AENOR's audit team confirms that the report considers guidance from UNFCCC Decisions on REDD+ and MRV decisions, on National Forest Monitoring Systems and includes a clear description of the NFMS, how it builds on existing systems and a description of the respective roles and responsibilities of institutions included in the national forest monitoring system. Moreover, AENOR's audit team has reviewed that there is a broad QA/QC activities description.

The audit team, during the remote technical session, requested relevant sources of evidence that demonstrate the applicability of QA/QC activities. As such, several documents were shown and discussed. As soon as the technical session finished, those SOPs were shared with the audit team. A sample of them are shown below:

1. akurasi-data-penutupan-lahan-nasional-tahun-1990-2016.pdf /18/
2. Definition_Method_Landcover.pdf /18/
3. Juknis Penafsiran Update Data PL 2020 Final.pdf /19/
4. Land Cover Process.pdf /20/
5. petunjuk-teknis-penafsiran-citra-satelit-resolusi-sedang.pdf /21/
6. petunjuk-teknis-pengecekan-lapangan-hasil-penafsiran-csrs.pdf /22/
7. potensi-sdh-indonesia-dari-plot-ihn.pdf /23/

These same documents referred to the (1) Accuracy National Land Cover Data, (2) the Definition and Method of Land Cover, (3) and (5) Technical Instructions, interpretation of medium resolution satellite images to update national land cover data, (4) Land Cover Data, (6) Technical Instructions, field check of interpretation results medium resolution satellite imagery to produce land cover data and (7) Potential of Indonesian Forest Resources from National Forest Inventory Plots.

3.10. Uncertainty

3.10.1. Uncertainty analysis

Uncertainty (U) was determined in accordance with the IPCC 2006 Guidelines, specifically outlined in volume 1, Chapter 3. To calculate the combined uncertainty (U_j) for activity j , which takes into account the uncertainties from Activity Data (AD) and the emission factor (EF), Equation 1 is used:

$$U_j = \sqrt{EA_j^2 + EE_j^2}$$

Uncertainty related to Activity Data (AD)

Uncertainties related to deforestation and forest degradation activity data were obtained from the overall accuracy assessment of the land cover map.

The proportion of accuracy contribution (C_j) for activity j was calculated using Equation 2, which involves the uncertainty (U_j) associated with activity j , the total emissions that occurred in the corresponding activities (E_j), and the total emissions from the corresponding year (E):

$$C_j = (E_j * U_j)^2 / E$$

The total uncertainty of each year (TU) was obtained by taking the square root of the sum of the proportion of accuracy contribution (C_j) for all activities using Equation 3:

$$TU = \sqrt{\sum C_j}$$

The uncertainty for the parameter “activity data” (land cover) was improved significantly from 8.1% to 5.3% as compared to the previous calculation. The accuracy assessment of land cover maps was performed based on randomly distributed reference points and the reference data for validating the land cover maps. The reference data sources used in this analysis were satellite images with a higher resolution than the satellite imagery used as a data source for land cover mapping, or better temporal resolution with multiple acquisitions. The total number of reference points used in the analysis for the period 1990-2016 were 10,000 sample points, randomly and proportionally distributed to all islands in Indonesia. Afterward, an accuracy assessment conduct yearly and reported in the recalculation of Indonesia’s Land Cover Data Report /4/, as assessed by AENOR’s audit team.

Over the period from 2006 to 2016, the uncertainties in the emissions estimation showed improvement, declining from 16.9% in 2006 to 15.6% in 2019-2020. This improvement can be attributed to enhancements in the accuracy of activity data used in the estimation process. The uncertainties stemming from the activity data are often a result of potential misinterpretation of satellite imageries by the operators responsible for delineating the forest and land cover maps. However, efforts have been made to minimize these errors through various measures, including regular training and coordination, as well as the implementation of a robust QA/QC process encompassing specific SOPs for data collection, processing, and mapping standardization.

However, AENOR has acknowledged the potential risk of underestimating gross deforestation and forest degradation during the monitoring period (2019/2020). This concern also encompasses the possibility of overestimating gross deforestation and forest degradation during the baseline period due to interpretation techniques and procedures carried out by MoEF in the context of REDD+. MoEF was informed about observations made by AENOR’s audit team in the context of the MRV Protocol and this verification, and as such, recommendations for improvement have been included in this verification report (see Annex 1).

Uncertainty related to Emission Factors (EF)

The uncertainties of emission factor used in estimating carbon emissions were generated based on the standard error of carbon stock values from different forest types or classes in each major island or group of islands in Indonesia.

The carbon stock values were estimated from NFI plots that have been established in seven major islands/groups of islands in the country.

The uncertainty for the parameter “emission factor” varies between 4% to 42% depending on the specific island/group of islands and land cover classes considered. The uncertainty of emission factors related to deforestation and forest degradation is determined from the sampling errors of the NFI from each forest cover class within each island/group of islands.

The uncertainties from the emission factors remained constant over time because all available NFI plot data from 1990 to 2014 were used for estimating carbon stocks for all periods. The uncertainty from emission factors was generated from the sampling errors of the NFI data. It's important to note that the uncertainty analysis for the emission factors did not incorporate the errors associated with the allometric equation used for converting NFI measurement data into carbon stock values.

AENOR reviewed the evaluation of the accuracy assessment of the land cover maps for the years 1990, 1996, 2000, 2003, 2006, 2009, 2011-2020.

AENOR's audit team has reviewed relevant evidence regarding the QA/QC procedures applied by Indonesia, as can be seen within Section 3.9 of this verification report.

Thus, AENOR's confirms that the ERR includes a description of methodologies and data references used to analyse the uncertainty of the estimates. The audit team confirms the efforts made by Indonesia to comply with IPCC good practice requirements, regarding applying conservative approaches.

Moreover, AENOR confirms that the ERR provides accurate, precise and confidence levels for activity data and emission factors that are reasonable, and discuss key uncertainties, their sources and impacts.

3.11. Emissions from peat decomposition and peat fires

Annex 2 and Annex 3 of the ERR /1/ includes estimation of calculation of emissions from peat decomposition and peat fires, as the first one was reported and explained in the technical annex of the Biennial Update Report (BUR) until 2020, and the second one was not included in Indonesia's first FREL calculation. However, it is relevant to highlight that, in accordance with the Annex of the MRV Protocol /3/:

“Emissions from decomposition of deforested peatlands, and emissions from peat fires, will be **measured and reported** on using the best available methods and data, and the goal is to **phase also these performance indicators into the bilateral RBP/C** model over time.

Improvements to data and methodology, as well as the inclusion of additional activities, pools and gases (e.g., emissions from peat decomposition of peatlands outside of forests), are encouraged over time provided that these improve completeness, comprehensiveness, and accuracy. Such **improvements should be specified in an MRV improvement plan** that prepares for RBP/C baseline updates in line with point 2.6 of the MRV protocol.”

Moreover, the same Annex of the MRV Protocol /3/ states that: “Peat decomposition and emissions from peat fire shall be measured and reported, but **not included as a performance indicator in the first reporting period under the partnership**. Plans shall be made to include peat decomposition and peat fire emissions in the RBP/C model over time. Even though peat fire emissions are not part of the RBP/C model from the start, a proxy approach for measuring reduced emissions from peat fires will be piloted and reported on”.

As such, as stated alongside this verification report, the only two performance indicators taking into account by the ERR /1/ are emissions from deforestation and forest degradation, but Indonesia, in compliance with the Annex of the MRV Protocol /3/, decided to estimate and disclose both emissions from peat decomposition and peat fires.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Following the reported information, within Annex 2 and Annex 3 emissions from decomposition of deforested peatlands have been measured, explained and reported, using the best available methods and data, as has been reviewed by AENOR's audit team in the Peat spreadsheet calculation /11/. During the remote technical session, different topics were conversed, maps were shown, and statistical treatment was broadly discussed.

All the procedures have been reported and crosschecked by the audit team. Relevant information, such as Land Cover Transition Matrix of Peatlands in 2012-2013, Matrix of CO₂ EFs from Peat Decomposition, estimates of burnt area from peat and mineral soils between 2006 and 2020, Procedures for estimating the burnt peat area have been included as an example, among other relevant items.

To compute historical emissions from peat decomposition, the ERR /1/ states that peat decomposition emissions are a result of inherited emissions from degraded peatlands, which will not decrease unless they are converted back into forests. The first FREL document used regression analysis to develop linear equations for annual peat emissions. However, multi-year land cover maps were not available in certain years, so annual emissions were generated from average values of mapping periods.

The reference emission level for 2017-2020 was constructed using linear projection, with a coefficient of determination (R²) of 0.97, indicating a strong correlation. The reference period for this analysis was from 2006/2007 to 2015/2016. The conversion of degraded peatlands back into forests is unlikely to occur during the assessment period. Conclusions of emissions from Peat Decomposition can be found below:

Year	Peat Decomposition	Actual Emission	Result
2007	200,067,598		
2008	200,067,598		
2009	200,067,598		
2010	215,742,080		
2011	215,742,080		
2012	226,109,789		
2013	234,152,020		
2014	240,799,350		
2015	248,530,578		
2016	255,413,778		
2017	260,556,280	256,741,233	3,815,047
2018	267,263,024	270,321,401	-3,058,377
2019	273,969,768	280,910,820	-6,941,052
2020	280,676,512	281,437,790	-761,278

To conclude about peat decomposition estimates:

- In 2019/2020, actual peat decomposition emissions were measured at 281,437,790 tCO₂e. Based on historical emissions in the reference emission level for the period 2006-2016, the 2019/2020 emissions were projected to be 280,676,512 tCO₂e. As such, the emission reduction for this period amounted to -761,278 tCO₂e.

Regarding historical emissions from peat fires, they were calculated for the period 2006-2016. Significant variation was found in the annual estimated burnt peat areas from 2006 to 2016. The highest rate of burnt peatland occurred in 2006, amounting to 1,140,438 ha, while the lowest rate was in 2008, with only 71,321 ha of burnt peat areas. Using this historical data set, the average value of burnt peat areas used as activity data was determined to be 374,948 ha.

As such, the results of the calculation of emissions from burnt peat areas have been presented in Figure Annex 3.4 of the ERR /1/. The peat fire average emissions from extreme years from 2006 to 2016 were 711,277,540 tCO₂e/y, whereas for normal years they were 137,424,802 tCO₂e/y.

As such, the ER from peat fires in 2020 amounted to 693,127,294.57 tCO₂e.

3.12. Double accounting

1. Section 2.8 of the MRV Protocol /2/ states that:
 - A national system of accounting will be in place, to provide transparency and certainty that no double counting to emission reductions delivered under other agreements or partnerships occurs.
 - Rewarded emissions reductions should be registered in the Lima Info Hub to ensure transparency and certainty that no double counting to emission reductions delivered under other agreements or partnerships occurs.
2. Moreover, Section 3.2 of the MRV Protocol /2/ states that:
 - To ensure consistent, complete, transparent and accurate reporting of emission reductions resulting from reduced deforestation and other performance indicators, as agreed, in Indonesia.
3. Regarding REDD+ decisions, double counting has been mentioned on several occasions during COP meetings, including Cancun COP16 and Durban COP17. Closer to this moment, Article 6.4 of the Paris Agreement (COP26) provides guidance on how to ensure environmental integrity, and avoidance of double counting, considering also corresponding adjustment.
4. Finally, it is relevant to consider the importance of using best practice available for proceeding with emission reduction claims. As such, double accounting is a very sensitive topic that has raised importance as one of the most important aspects that provides transparency and accuracy.

Thus, to ensure consistent, complete, transparent, and accurate reporting of emission reductions resulting from reduced deforestation, Indonesia takes into account emission reductions that have been claimed at the same time as this reporting period (2019/2020). Based on the search and analysis that has been carried out (see Annex 5 of the ERR for more information about jurisdictional and voluntary carbon projects with potential of double claim with ERR), there are some indications of overlapping calculation areas in the ERR with several project proponents who have claimed emission reductions in the voluntary scheme. Those potential double-claimed areas in the period 2019/2020 are 13,353,918 ha. Thus, the potential of double claim is 32,896,105 tCO₂e.

The scope of those voluntary schemes varies among projects, in terms of carbon pools, gases, activity, and methodologies. Concerning those variations, the Emission Reductions on those voluntary schemes becomes high, particularly in the peat soil calculation. Activities in the voluntary schemes generally were created to avoid deforestation and forest degradation, not as in the ERR calculation. This ERR only measures deforestation and forest degradation activities with the carbon pool only from AGB.

Based on that situation, and considering the conservative principle, Indonesia has used the proportion of the wide area covered by the voluntary projects with the area measured for the ERR accounting. This wide proportional approach is conservative due to considering the biggest proportion of emission reduction that could be gained inside the project area with the same size as the ERR calculation. The

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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proportion of potentially double-claimed area is obtained from the area that has made ER claims compared to the total area covered in the ER calculation, which is the national natural forest area in 2006 (the beginning of the reference period). Next, the wide proportion is calculated by multiplying the proportion of the area that has the potential to double claim with Total ER in ERR.

Based on the explanation above, double claim indications for the 2019/2020 period amounted to 32.896.105 tCO₂e. Considering the possibility of double claims, the total ER calculation results will be 204.709.490 tCO₂e for the 2019/2020 period. The emission reduction results later deducted 35%. Therefore, the total net emission reductions that could potentially be awarded would be 133.061.169 tCO₂e.

Area Overlap (ha)	2019/2020	13,353,918
Area ERR (All-Natural Forest 2006) (ha)		96,454,143
Emission Reduction (tCO ₂ e)	2019/2020	237,605,595
Overlap by area (%)	2019/2020	13.84%
Potential of Doble Claim (tCO ₂ e)	2019/2020	32,896,105
Total ER minus Double Claim (tCO ₂ e)	2019/2020	204,709,490
Total (tCO ₂ e)		204,709,490

The emission reduction results later deducted 35% (more information in the following Section of this report, 3.13).

All these numbers have been assessed. Conservative procedures applied by Indonesia are accepted by the audit team, as per the complexities of separating voluntary ER claimed from peat and SOC with respect to only AGB, in the same applicable circumstances that the ones referred in the ERR /1/.

3.13. Results-Based Payment/Contribution

According to Section 8 of the ERR /1/, RBP/C baseline for this report was established using the annual historical average level of each of the two performance indicators: emissions from deforestation and forest degradation. The baseline was developed based on data from the reference period covering the years 2006/2007 to 2015/2016 and remains valid up to the year 2019/2020.

Based on the MRV Protocol of Norway and Indonesia Partnership /2/, as assessed by the audit team, both Parties have agreed terms to treat statistical uncertainty, reversal risk, and possibly other risk factors inclusion of Indonesia's ambition. This treatment term later simplifies called set-asides/deductions as has been stated in the Annex of MRV Protocol /3/ that was agreed by both parties Indonesia – Norway. From the REDD spreadsheet calculations /8/, the following set-asides/deductions are used to determine the maximum number of emission reductions Indonesia can be rewarded for by Norway. The term of set-asides/deductions consist of the following details:

- a. From the reported emission reduction results, set-aside/deduction of 20% to reflect the risk of uncertainty in estimates;
- b. In terms of deduction to reflect the risk of leakage, Indonesia – Norway agreed to not include this deduction due to the baseline and performance of REDD+ in the Indonesia – Norway partnership being counted in the national-level accounting. Therefore, 0% deduction to reflect the risk of leakage is set. The 0% deduction from leakage was also consistently used in Indonesia's national FREL and REDD+ Performance in the 2nd BUR (Biennial Update Report)

that was submitted to UNFCCC as Indonesia's approach for REDD+ implementation in the national level;

- c. In terms of reflecting Indonesia's ambition to reduce national GHG emissions, Indonesia and Norway agreed to deduct 15%.

AENOR's audit team can confirm that the three items described above have been obtained through the MRV Protocol Annex /3/.

As systems are developed over time, and policies and strategies are put in place to reduce uncertainty risk, risk of leakage, and reflection of Indonesia's ambition, the set-aside factor can be reduced. Based on the first reporting period under the Indonesia – Norway partnership, the total set aside factor of 35% will be applied.

After applying double claiming deductions (see Section 3.12 above), double claim indications for the 2019/2020 period amounted to 32,896,105 tCO₂e. The total ER calculation results will be 237,605,595 tCO₂e.

The emission reduction results later deducted 35%. Therefore, the total net emission reductions that could potentially be awarded would be 133.061.169 tCO₂e.

The audit team reproduced the calculations to achieve the same results and deems they are clearly and correctly depicted in the REDD Spreadsheet Calculations /8/ and the ERR /1/. AENOR considers that the formula is used in compliance with the criteria defined in Section 1.3.

Therefore, AENOR deems that the calculated emission reduction, after applying risk of double claiming and set asides, consisting of net emission reductions is correct.

AENOR verified the parameters used in the calculation and references to documents where they are used or explained, through the review, reproduction and cross-checking of the evidence provided by the MoEF. AENOR checked that the values of these parameters are appropriate and are used correctly in the equations.

AENOR found no inconsistencies between the information reported in the ERR /1/ and the REDD spreadsheet calculations /8/.

After a thorough and comprehensive review and replication of calculations, AENOR considers that the monitored parameters available are correct, credible and consistent. Therefore, AENOR deems that the reported results are credible, consistent and accurate.

4. VERIFICATION CONCLUSION

AENOR has verified that the estimation of the emissions from gross deforestation and from gross forest degradation at national level for the period 2006/2007-2015/2016 and 2019/2020 monitoring period and the emission reduction from reduced deforestation and reduced forest degradation for the monitoring period 2019/2020 have been carried out in compliance with the criteria set in Section 1.3.

Therefore, AENOR is able to confirm that the RBP/C baseline and 2019/2020 emission reduction have been determined in a consistent, transparent and reproducible way and that are correct, credible and free from material errors, omissions and/or false statements.

The verification process was carried out in the following phases: i) a documentary review of all the material provided by the MoEF; ii) in-country interviews with the team responsible for monitoring and reporting; iii) reproduction of the calculations; iv) the resolution of pending issues and v) the issuance of the report and final verification opinion. In the course of the verification process, clarifications were found and properly closed.

AENOR is able to issue a positive verification opinion for the **RBP/C baseline of 277,921,466 tCO₂e/year** (236,946,787 tCO₂e/year from deforestation and 40,974,680 tCO₂e/year from forest degradation) and for the **2019/2020 monitoring period emission reductions of 133,061,169 tCO₂e**, after applying the discount for risk of double claiming, as reported in the *Emission Reduction Report for the Indonesia–Norway Partnership /1/*.

In accordance with the *MRV protocol for the Indonesia-Norway partnership on climate, forests and peat /2/* and the *Annex: Detailed steps for calculating results based payments under the Indonesia-Norway forest partnership /3/* and the application a 35% set-asides/deductions, AENOR is able to issue a positive verification opinion with a reasonable level of assurance for the Indonesia proposed net results of **133,061,169 tCO₂e for the 2019/2020 monitoring period**.

Madrid, October 18th, 2024.



Daniel Bermejo Vesga
Team Leader 1



Jose Luis Fuentes
Project Manager

ANNEXES

Annex 1: Recommendations for improvements in MRV system

During the verification process several improvement opportunities were identified for Indonesia-Norway MRV system by the audit team. These improvement options are to be considered additional to those stated in the Plan of the improvement of the *Emission Reduction Report for the Indonesia-Norway Partnership /1/*. The recommendations are listed according to the suggested implementation priority in opinion of the audit team:

1. Enforce the registration of both public and private REDD+ initiatives in the National Registry System on Climate Change and integrate the double-counting preventive measures into the MRV system. Although significant progresses have been made within the National Registry System as reported in Section 7.2 of the ERR /1/, AENOR's audit team raised concerns alongside the verification process of possible double accounting that was not identified preliminary by the MoEF, and corrective measures were implemented to properly it considered. Would it be appropriate to have a direct access to projects that have issued VERs, VCU, carbon credits and/or others, within Indonesia in the same and different monitoring periods that applies to this RBP/C.
2. Include the carbon pools of below-ground biomass (BGB) and dead organic matter (dead wood and litter) in deforestation and forest degradation emissions calculation on future RBP/C. As part of the release of Indonesian 2nd FREL, deforestation, forest degradation and enhancement of forest carbon stock, decomposition of peat, fires (peat and minerals) in areas experiencing deforestation or forest degradation, and emissions from conversion of mangrove forests into cultivated areas have been considered. Moreover, new carbon pools are included, such as AGB, BGB, deadwood, litter, and soils. This information has been already gathered.
3. Consider including peat decomposition and peat fire emission estimates in future RBP/C, as they have been reported in two RBP/C ERRs in accordance with the MRV Protocol, even though results might provide in a case-by-case basis negative ERs.
4. Compile and translate to English the procedures followed for the elaboration of the land cover maps, land forest cover change analysis and QA/QC. Providing public access in English to the procedures and methodologies followed would facilitate future verification process and would improve transparency towards third parties.
5. Provide a clear procedure in English to access all relevant items necessary to reproduce procedures and calculations, so that all stakeholders interested can access public data, not only third parties involved in audit processes. Public information means accessibility must be granted in a reasonable way.
6. Enforce procedures to reduce the potential risk of underestimating gross deforestation and forest degradation during the monitoring period. This concern also encompasses the possibility of overestimating gross deforestation and forest degradation during the baseline period due to interpretation techniques and procedures carried out by MoEF in the context of REDD+. Strengthen remote sensing sampling techniques according to best practice available (i.e., stratified random sampling using Collect Earth using the support of FAO or the World Bank).

Annex 2: Analysis of the Plan of improvement

The auditor team has analysed the Plan of improvement for the Indonesia-Norway partnership MRV, included in the *Emission Reduction Report for the Indonesia-Norway Partnership /1/*.

Several relevant topics have been discussed, such as the following:

- Significant strengthening of the national MRV system over the years, as shown in the UNFCCC's Technical Assessment and Technical Analysis for Indonesia's BUR (Biennial Update Report) 3 document (Nov 2022).
- Plans for future technical improvements include AD, EFs, methodologies used, and estimated uncertainty accuracy.
- Continuous use of remote sensing technology for coverage and updating of emission factors.
- Development of a national registry system to prevent double counting and reporting of emission reductions.
- Construction of a web-based emission calculation monitoring system for robust, comprehensive, and consistent monitoring.
- Proposed integrated information system to prevent repetitive data entry and facilitate easy tracking of climate action efforts.
- Plan of improvement for the next ERR, referencing the agreed or updated MRV protocol.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Annex 3: List of evidence provided

No.	Evidence
1	Print_2024 ERR Indonesia-Norway report as per 14 Oct 2024.docx
2	MRV protocol for the Indonesia-Norway partnership on climate, forests and peat
3	Annex: Detailed steps for calculating results-based payments under the Indonesia-Norway forest partnership
4	National Forest Reference Emission Level for Deforestation and Forest Degradation In the Context of Decision 1/CP.16 para 70 UNFCCC
5	Report on the technical assessment of the proposed forest reference emission level of Indonesia submitted in 2016
6	Indonesia Third Biennial Update Report
7	Technical report on the technical analysis of the technical annex to the third biennial update report of Indonesia submitted in accordance with decision 14/CP.19, paragraph 7, in December 2021
8	Spreadsheet_REDD Norway_2006-2020_20192020_20241014.xlsx
9	Pivot_PL1990_2020_RBC4.xlsx
11	DB_Fire_Peat_Norway_II.xlsx
12	Land cover maps at the NFMS webGIS (online)
13	Indonesia Report on REDD+ Performance
14	Indonesia National Registry System on Climate Change
15	National Forest Monitoring System (NFMS) for Land Based Sector
16	Margono, B.A., et al. (2016). Indonesia's Forest Resource Monitoring
17	akurasi-data-penutupan-lahan-nasional-tahun-1990-2016.pdf
18	Definition_Method_Landcover.pdf
19	Juknis Penafsiran Update Data PL 2020 Final.pdf
20	Land Cover Process.pdf
21	petunjuk-teknis-penafsiran-citra-satelit-resolusi-sedang.pdf
22	petunjuk-teknis-pengecekan-lapangan-hasil-penafsiran-csrs.pdf
23	potensi-sdh-indonesia-dari-plot-ihn.pdf
24	5. SK TIM PENAFSIR BPKH V BANJAR BARU.pdf
25	Prosedur Perbaikan QC Data Penutupan Lahan.pdf
26	QC_QA_Update Landcover.pdf
27	SK.11 Tim Supervisor 2023.pdf
28	Technical Guide_Medium Resolution Satellite Image Interpretation.pdf

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Annex 4: Reference documentation

No.	Document
1	ISO 14064-3:2019 Part 3: Specification with guidance for the verification and validation of greenhouse gas statements (2019)
2	ISO 14065:2020 General principles and requirements for organizations that carry out the validation and verification of environmental information
3	ISO 17029 Conformity assessment — General principles and requirements for validation and verification bodies
4	2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006)
5	2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (2013)
6	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006)
7	IPCC Good Practice Guidance and Uncertainty Management in National GHG Inventories (2000)
8	GFOI 2016 Methods and Guidance Document (2013 and 2016) and supplementary modules
9	REDD decisions and MRV decisions under the UNFCCC, including the Enhanced Transparency Framework of the Paris Agreement
10	GOFC-GOLD REDD Source Book (2015)
11	GFOI Integrating remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests: Methods and Guidance from the Global Forest Observations Initiative (2014)
12	The Technical Assessment of the FREL presented to the UNFCCC
13	The reference level submitted to the UNFCCC, including the historical average deforestation level and the results-based payment/contribution baseline of the Indonesia-Norway Bilateral Agreement
14	The Third Biennial Updated Report under the UNFCCC (2021)
15	MRV protocol as agreed under the MoU and Contribution Agreement between Indonesia and Norway and reporting requirements and agreed format for reporting (see ToR), as agreed in the MRV-protocol and its annex.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Annex 5: Findings

Clarifications (CLs)

CL ID	01	Date: 04/10/2024
CL description		
<p>According to section 2.8 of the MRV protocol clarify the following items:</p> <ol style="list-style-type: none"> 1. The FCPF ER Reporting Period is from 01/07/2019 to 31/12/2020, clarify why the potential of double area is 8,489,795 ha instead of the total area accounted 12,734,692 ha. Moreover, clarify also for the rest of projects such as: <ol style="list-style-type: none"> a) VCS- ID 1477, Katingan Peatland Restoration and Conservation Project b) VCD ID- 674 Rimba Raya Biodiversity Reserve Project c) VCS ID - 1899 Sumatra Merang Peatland Project (SMPP) d) VCS ID - 1493 Mangrove Restoration and Coastal Greenbelt Protection in the East Coast of Aceh and North Sumatra Province, Indonesia. 2. Clarify why the VCS project- ID 2403, Riau Ecosystem Restoration Carbon Project (RER-CP) is not accounted in the provided evidence (i.e. Spreadsheet_REDD Norway_2006-2020_per Mei 2024(20192020)) 3. Clarify why the analysis of double claim is performed through project areas rather than reduced emissions from projects. 		
Project proponent's response		Date: 07/10/2024
<ol style="list-style-type: none"> 1. Thanks for the finding. Previously we applied pro rata for the total overlapped areas that have been claimed for 1.5 years (01/07/2019 to 31/12/2020) for the FCPF program with the total area of 12,734,692 ha. Then we estimated the overlapped claims for 1 year only, multiplied with 1/1.5 and resulted in 8,489,795 ha. However we agree that the approach we made is incorrect and we revise the calculation. We revise the calculation in the spreadsheet and in the annex 5 of the ER report. Similar issues also found for the other projects (point a - d) and we revised accordingly <p>In the same way, for other projects that claim the 2019/2020 period, we revised using the total project area. So that the overlap area for projects a) VCS- ID 1477, Katingan Peatland Restoration and Conservation Project is 149800 ha; b) VCD ID- 674 Rimba Raya Biodiversity Reserve Project, there is no claim (Quantity Issued) for the period July 2019 - June 2020 so that the possible overlap area is 0 ha; c) VCS ID - 1899 Sumatra Merang Peatland Project (SMPP) covering 22922 ha; d) VCS ID - 1493 Mangrove Restoration and Coastal Greenbelt Protection in the East Coast of Aceh and North Sumatra Province, Indonesia covering 1000 ha.</p>		

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Total area with double claim potential is 12,908,414 ha.

2. The Riau Ecosystem Restoration Carbon Project (RER-CP) (VCS ID 2403) was not included in the provided evidence for the following reason. According to our desktop assessment of potential double claims as per **May 2024, we found that the RER's Verified Carbon Units (VCUs) are still in a verified status, not an issued status during the 2019/2020 reporting period.** The project has not yet reached the stage of the issuance of their VCUs. The project was registered in Verra on 20 October 2021, and the validation process was finalised on 11 July 2023 (https://registry.verra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=95670&IDKEY=fkjalskjf098234kj28098sfkjl098098kl32lasjdfk909s131928930). **There is no record of the issued VCUs from RER in the list of Verra's issued VCUs from 2017 to 2020** (see the list of issued VCUs at <https://registry.verra.org/app/search/VCS/All%20Projects>). We concluded that this project doesn't have any record of issued VCUs that can lead to double claim of Indonesia ER claim from 2017 to 2020. Only projects within Indonesia jurisdiction that have issued emission reductions credits for the relevant timeframe are taken into account in the current double claim reporting.

3. The analysis of potential double-claiming is performed through project areas rather than reduced emissions because the emission activities and baseline scenarios of each carbon project vary and are not directly comparable to those used in the ERR.

The area approach is more conservative and ensures that the maximum possible overlap is accounted for, avoiding differences in baseline calculations, activities and resulting emission reductions over multiple claimed areas. This method calculates the potential overlap by considering the geographical area covered by the carbon project in the claim period July 2019 - June 2020.

Further clarification for explaining this approach on the conservative estimate of double-claimed emissions has been added to the ERR document, to ensure a transparent approach and align with the MRV protocol.

Documentation provided by the project proponent

1. The text has been revised in Chapter 8, explaining the total amount of indicative **double claim:** "Based on the explanation above, double claim indications for the 2019/2020 period amounted to 32,255,177 tCO₂e. Considering the possibility of double claims, the total ER calculation results will be 205,350,419 tCO₂e for the 2019/2020 period. The emission reduction results later deducted 35%. Therefore, the total net emission reductions that could potentially be awarded would be 133,477,772 tCO₂e.
2. **RER's Verified Carbon Units (VCUs) are still in the verified status and have not moved to issuance during the 2019/2020 reporting period.** The project has yet to reach the VCU issuance stage. The verification report can be found in

VCS_VER_REP_2403_06AUG2016_31JUL2020.pdf and with a screenshot provided below.

Based on the information the VVB have seen and evaluated, confirms the following statement:

Reporting period VCS: From 06 August 2016 to 31 July 2020 (06 August 2016 to 31 July 2020 for WRC and 1 January 2017 – 31st July 2020 for APD).

• Verified GHG removals in the above reporting period:

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)	Buffer pool allocation	VCUs eligible for issuance
2016	270,004	237,748	0	32,257	3,226	29,031
2017	3,345,358	393,444	0	2,951,914	295,191	2,656,723
2018	4,066,125	119,661	0	3,946,464	394,646	3,551,818
2019	4,786,892	-161,690	0	4,948,582	494,858	4,453,724
2020	3,198,969	-186,213	0	3,385,182	338,518	3,046,664

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VCS Verification Report: VCS Version 4.0

Total	15,667,348	402,949	0	15,264,400	1,526,440	13,737,960
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Approved by
 Dr. Kaviraj Singh

 Managing Director
 Earthood Services Private Limited

Date: 11 July 2023
 Place: Gurugram, Haryana

- The following text has been added in the Annex 5 of ER report : "Analysis of potential double claims was carried out based on the desktop study. We explored jurisdictional subnational REDD+ projects and voluntary carbon market projects that potentially overlap with the national ER program. Two subnational REDD+ projects have been identified, including East Kalimantan FCPF and Jambi BioCF-ISFL. However, only East Kalimantan FCPF has already verified emission reduction. To assess double claims from voluntary carbon standards projects in Indonesia, we explored 3 different platforms, including Markit (<https://mer.markit.com>), Gold Standard (<https://registry.goldstandard.org>) and Verra standard (<https://registry.verra.org>). Only projects located in Indonesia within the same timeframe are included in the double claim analysis (see table below).

VVB's evaluation

Date: 11/10/2024

- AENOR's audit team has reviewed the updated spreadsheet from Indonesia's Government, acknowledging the update on how the area of the jurisdictional program has been calculated, now accounting for more "double accounting". Moreover, AENOR's

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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audit team has reviewed the Verra Registry, specifically Rimba Raya Biodiversity Reserve Project VCS ID - 674, and has not found any verification report with a temporal overlapping with the ERR monitoring period. Thus, this sub-clarification is closed.

- 2) **AENOR’s audit team has identified an issue** for ID - 2403 Riau Ecosystem Restoration Carbon Project. The Government of Indonesia stated there is no claim (Quantity Issued) for the period July 2019 - June 2020, indicating that the possible overlap area is 0 ha. However, unless in regulatory or legal terms the PP of Riau Ecosystem Restoration Carbon Project is excluded from issuing VCUs to the market for that verified period (2019-2020) and inform Verra, the Government of Indonesia shall discount the overlapping area as per high risk of double accounting. As long as the project can issue VCUs for that verified period (2019-2020) whenever they would like to, the Government of Indonesia is failing on demonstrating there is no risk of double accounting for that specific period. The lack of issued credits does not demonstrate that, starting tomorrow, the PP of ID 2403 might request VCUs to Verra, as long as they (probably) have the right to do so.

AENOR is attaching the verified results below (gross values apply):

Reporting period VCS: From 06 August 2016 to 31 July 2020 (06 August 2016 to 31 July 2020 for WRC and 1 January 2017 – 31st July 2020 for APD).

• Verified GHG removals in the above reporting period:

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)	Buffer pool allocation	VCUs eligible for issuance
2016	270,004	237,748	0	32,257	3,226	29,031
2017	3,345,358	393,444	0	2,951,914	295,191	2,656,723
2018	4,066,125	119,661	0	3,946,464	394,646	3,551,818
2019	4,786,892	-161,690	0	4,948,582	494,858	4,453,724
2020	3,198,969	-186,213	0	3,385,182	338,518	3,046,664

- 3) The clarification is accepted.

Thus, CL01 is not closed.

Project proponent’s response	Date: 14/10/2024
<p>We acknowledge the concern raised regarding potential overlap and the high risk of double accounting. However, we would like to clarify that in Indonesia, following the issuance of the Presidential Regulation No. 98 in 2021 concerning the carbon economic value, all carbon projects, including the Riau Ecosystem Restoration (RER), must be registered in the National Registry System (SRN). As of now, the RER project is still in the phase of "account registration" not yet registered for Indonesia Certificate of Emission Reduction (Sertifikat Pengurangan Emisi GRK- SPE GRK)</p>	

However, we agree with the auditor’s assessment of the potentially high risk of overlap and the need to prevent double accounting in the RER area. Therefore, we concluded that the RER area should not be included in the calculation. Indonesia government had discount the overlapping area as per high risk of double accounting. The total area of potential overlap is now recognized as 130,090 hectares, and in this regard we have updated the spreadsheet.

Documentation provided by the project proponent

We revised the spreadsheet (“Recap_Jurisdiction_V20192020” and “RBP Baseline + ER” sheets) and the Annex 5 accommodating the suggestion from the auditor especially the inclusion of RER claim.

The screenshot shows a detailed spreadsheet with multiple columns and rows. It appears to be a data table with various categories and numerical values. The interface includes a menu bar at the top and a status bar at the bottom.

Risk Analysis of Double Claim		
Area Overlap (Ha)	2019/2020	13.353.918
Area ER (All Natural Forest 2006)		96.454.143
Emission Reduction	2019/2020	237.605.595
Percentage of overlap by area	2019/2020	13,84%
Potential of Double Claim (tCO2e)	2019/2020	32.896.105
Total ER minus Double Claim	2019/2020	204.709.490
Total		204.709.490

We revised the text in the last paragraph of section “8. Potential Results-Based Payment/Contribution” from the ER Report following the revised calculation of the spreadsheet as shown below screenshot.

Based on the explanation above, double claim indications for the 2019/2020 period amounted to 32.896.105 tCO₂-eq. Considering the possibility of double claims, the total ER calculation results will be 204.709.490 tCO₂-eq for the 2019/2020 period. The emission reduction results later deducted 35%. Therefore, the total net emission reductions that could potentially be awarded would be **133.061.169 tCO₂-eq**.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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AENOR's audit team has reviewed the updated ERR and spreadsheet calculations and deem the modifications as in accordance with the MRV Protocol.
Thus, CL01 is closed.

CL ID	02	Date: 04/10/2024
CL description		
<p>According to the MRV protocol AENOR has to verify the results on estimated emissions reductions from reduced deforestation in order to avoid errors, omissions or misrepresentations that could influence the overall results. Therefore, by reviewing the submitted shapefiles of deforestation and degradation for 2019/2020 period, AENOR has identified a number of issues related to the activity data displayed in the spreadsheet according to the shapefiles provided that need to be clarified.</p> <p>These cases are attached in a separate document named "VISUAL INTERPRETATION INDONESIA"</p> <p>The sampling carried out by the audit team during the visual interpretations observed in the above-mentioned document is not representative of the 95 million hectares of the country. There may be more cases with the same result obtained by the audit team that are not found in the mentioned document. Therefore, AENOR formally requests that the Indonesian Government provide explanations.</p>		
Project proponent's response		Date: 07/10/2024
<p>The database and the shapefile we shared previously is not aligned due to the filter we applied for the spreadsheet. We account only deforestation occurring in the areas that have not been deforested since 1990. This criterion was developed based on the assumption that the deforested areas will not be forested in a short period. The deforestation areas from the shapefiles are solely deforestation areas from 2019-2020, without filtering the deforestation areas that occur previously. Therefore, the size of the deforestation in the shapefile data is larger than the spreadsheet.</p> <p>The definition of deforestation is converting natural forests to non-forest, where it only occurs once in the same place. The different area of deforestation between the spreadsheet and spatial data sent on the 1st meeting is caused by the spatial data that have not filtered yet with previous deforestation period. Deforestation from spatial data also covered previous deforestation in the same place.</p> <p>Deforestation and forest degradation maps were generated based on the changes from the annual land cover data series. Landsat imagery mosaic is the main data for producing land cover on a national scale. Mosaic data was composed using the best data approach with periodic 1 July - 31 June. It means Landsat imageries that have minimum cloud cover in 1 period will be chosen to establish the mosaic data annually. Therefore, mosaic data consists of variance data acquisition of Landsat in one year periodic. The deforestation polygon was checked by AENOR possibility has a different date of data source. On the other hand, the difference of spatial resolution between Landsat and Planet data provides the detail of the</p>		

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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deforestation polygon. The wall-to-wall mapping method using visual interpretation still has a human error, mainly due to cloud cover in some areas in Indonesia that caused misinterpretation of some polygons of forest cover changes. However, misclassification was counted in the uncertainty of land cover changes.

Documentation provided by the project proponent

VVB's evaluation

Date: 11/10/2024

AENOR's audit team has assessed the explanations provided by the Indonesian Government and after reviewing the MRV Protocol scope and requirements, decided to close this clarification. However, the following comments apply for a better understanding:

1/ The Indonesian Government asserted that they only consider deforestation in areas untouched since 1990. This implies that previously deforested areas will not be reforested **quickly. AENOR's audit team, with their expertise and thorough analysis, believes that a 30-year period (1990 to 2020) could be adequate** for an area to regenerate with a significant carbon stock. While there is a possibility of underestimating the risk of deforestation or forest degradation, our team's diligence guarantees a comprehensive understanding of the situation. As AENOR has not received evidence of any of these areas to be converted during that 30-year period, the audit team does not have evidence of double accounting deforested areas. An opportunity for improvement might apply.

2/ The Indonesian Government, in this context, would be eligible to share evidence that the areas identified as deforested or degraded were not subject to these activities between 1990 and 2019. There might also be the need to demonstrate that any deforestation or degradation took place during the monitoring period of 2019-2020. Although the MRV team will still need to locate and measure these areas, it is the responsibility of the Indonesian Government, not AENOR's, to prove that the identified areas fall outside the monitoring period. Another opportunity for improvement might apply.

3/ The Indonesian Government pointed out that the variations in deforestation areas between the spreadsheet and spatial data provided at the 1st meeting are because the spatial data has yet to be filtered with the previous deforestation period. According to this interpretation, the Indonesian Government might be eligible to share the shapefiles containing deforested and degraded areas for previous monitoring periods, as well as for the complete reference period (2006/2007 to 2015/2016), to determine if any of the polygons identified by AENOR's audit team as "deforestation" or "degradation" have already been admitted by the Indonesian Government in different periods. As per future assessments, another opportunity for improvement might apply.

Fourth, the Indonesian Government states that the difference of spatial resolution between Landsat and Planet data provides the detail of the deforestation polygon. However, in **AENOR's experience, Landsat interpretation should be similar as the one obtained by Planet**, acknowledging a risk of deforestation and forest degradation underestimation that should be considered as an opportunity of improvement in the context of estimating activity data.

AENOR will include this information in the verification report.

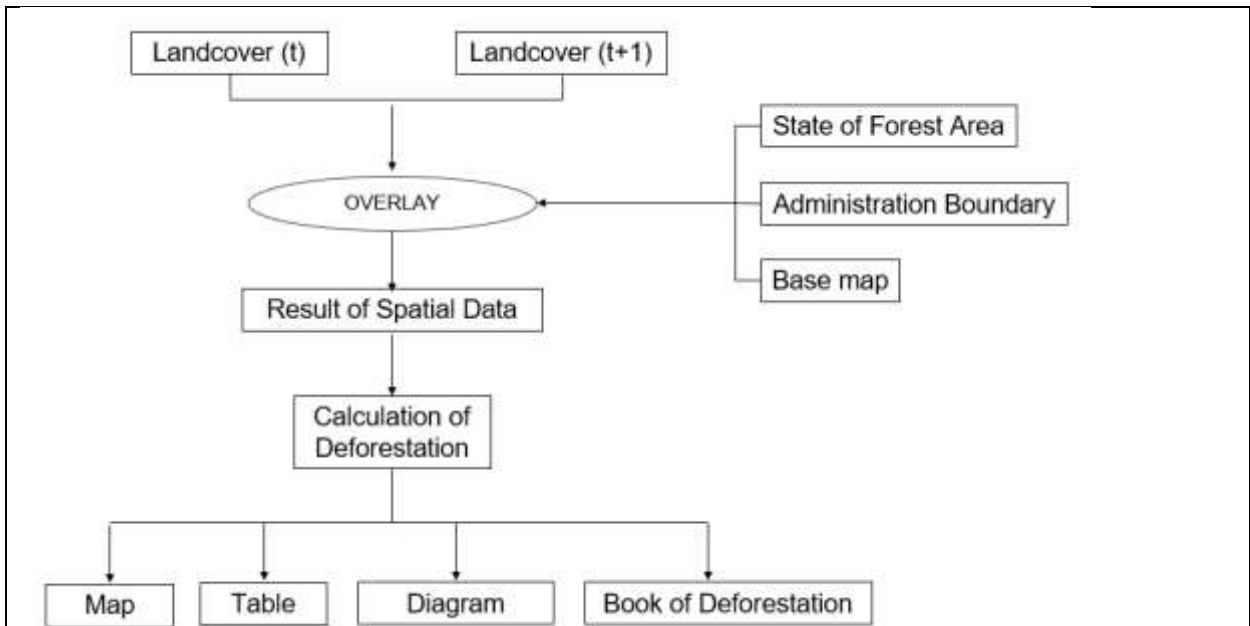
Thus, CLO2 is closed.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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CL ID	03	Date: 04/10/2024
CL description		
Clarify the use of Emission Factors from FREL of 2016 instead of the most updated FREL.		
Project proponent's response		Date: 07/10/2024
According to the Norway MRV Protocol, the current RBP/C baseline is developed using reference period from 2006/2007 -2015/2016 and valid up to 2019/2020 (paragraph 2.2) and the baseline will be updated indicatively every five years (paragraph 2.6). The current baseline will be used for estimating the emission reduction for at least a five-year result-based period, i.e. from 2017 to 2020. Therefore we still used the same baseline for this report as well as the previous reports. The RBP/C baseline should be updated for the next result-based claims (post-2020), incorporating the updated emission factors from the national 2 nd FRL.		
Documentation provided by the project proponent		
No text revision required on the ER report document		
VVB's evaluation		Date: 11/10/2024
Clarification accepted. CLO3 is closed.		

CL ID	04	Date: 04/10/2024
CL description		
Provide the information related to the key to interpreting section 2.4.1 Forest Cover Change Analysis, model training information, inputs and queries.		
Project proponent's response		Date: DD/MM/YYYY
Workflow for deforestation is showing below.		

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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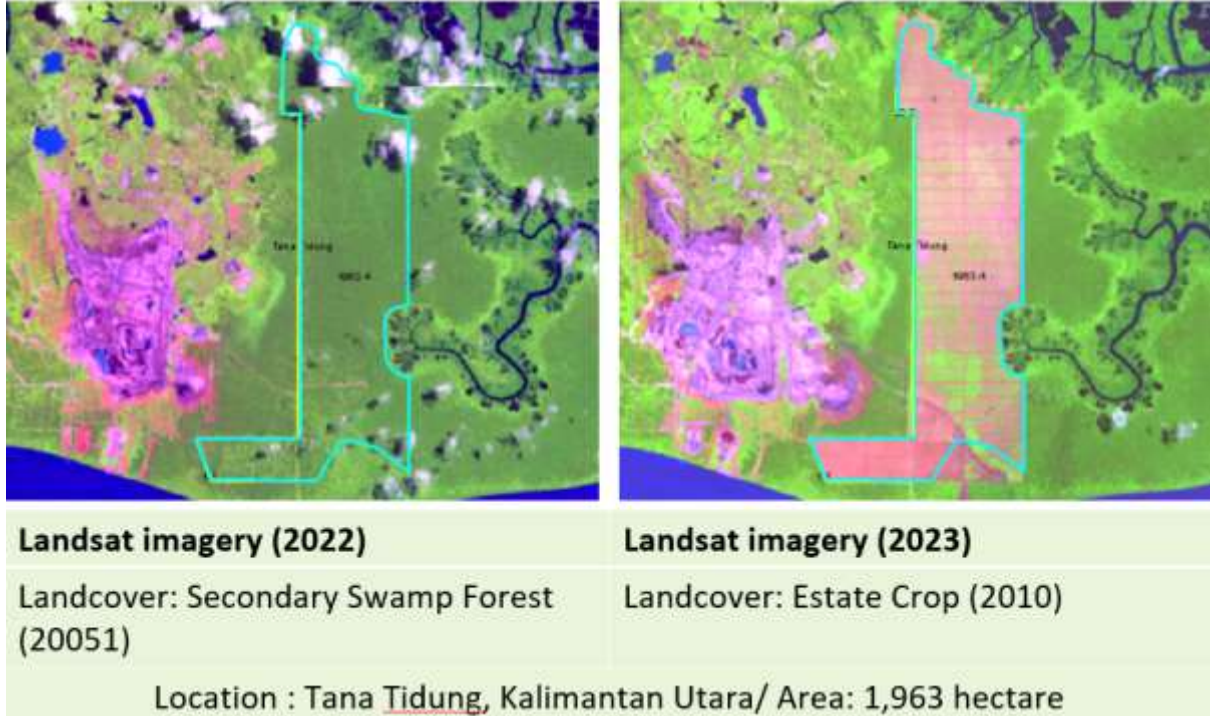


The interpretation of satellite imageries is conducted during the process of annual land cover mapping. Identification of deforestation or forest changes takes place by comparing the forest cover maps from year t and year t+1. The forest and land cover are produced using visual interpretation and applying interdependency approach, which consider previous forest cover map when generating the next period forest cover map.

A model or example for deforestation map production is shown in the figure below. In 2022, the polygon was classified as a secondary swamp forest (20051) and from Landsat (2023) was identified as land clearing for estate crops. Using a band composite of SWIR, NIR, and Red, secondary swamp forests can be identified based on the color (green), tone (dark), and texture (coarse) as well as the location close to the mangrove ecosystem. On Landsat (2023), some areas change to objects with pink color mixed with a light green that identifies as young plantation

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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(palm oil), and part of the polygon just clearing (red color and smooth texture).



Documentation provided by the project proponent

No text revision required on the ER report document

VVB's evaluation

Date: 11/10/2024

Thank you for the information, However, the audit team is requesting further evidence of a document providing guidance for the interpreters (i.e., interpretation key) on doing the visual interpretation, if any.

Thus, CL04 is not closed.

Project proponent's response

Date: 14/10/2024

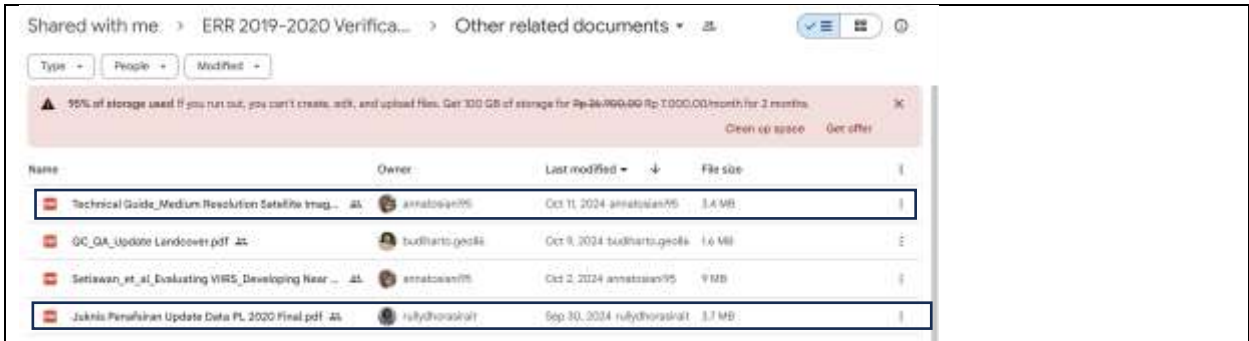
Thank you for your review.

Please kindly find the requested guidance document available in google drive in Bahasa and English version.

Documentation provided by the project proponent

The title of the documents as highlighted below

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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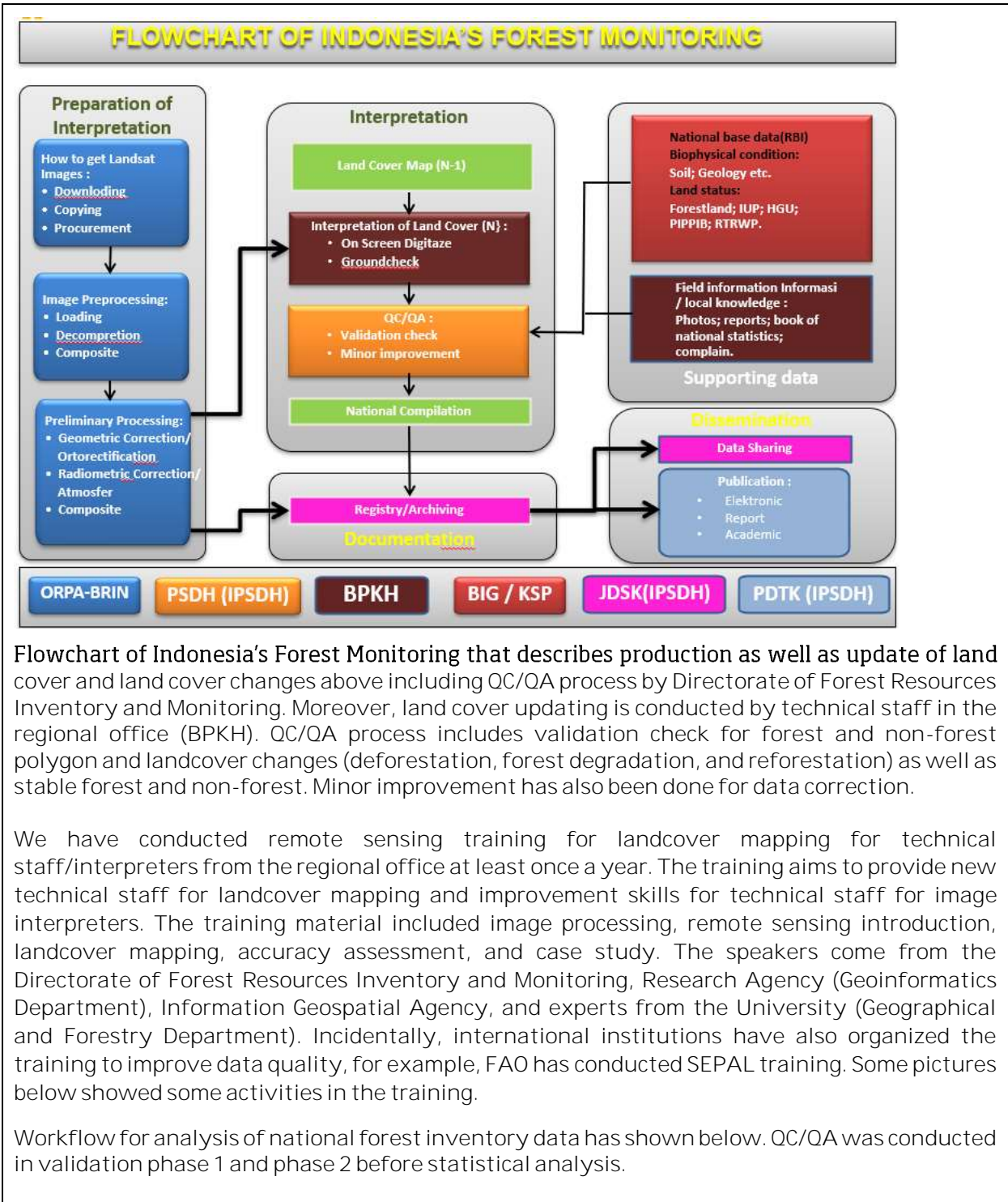


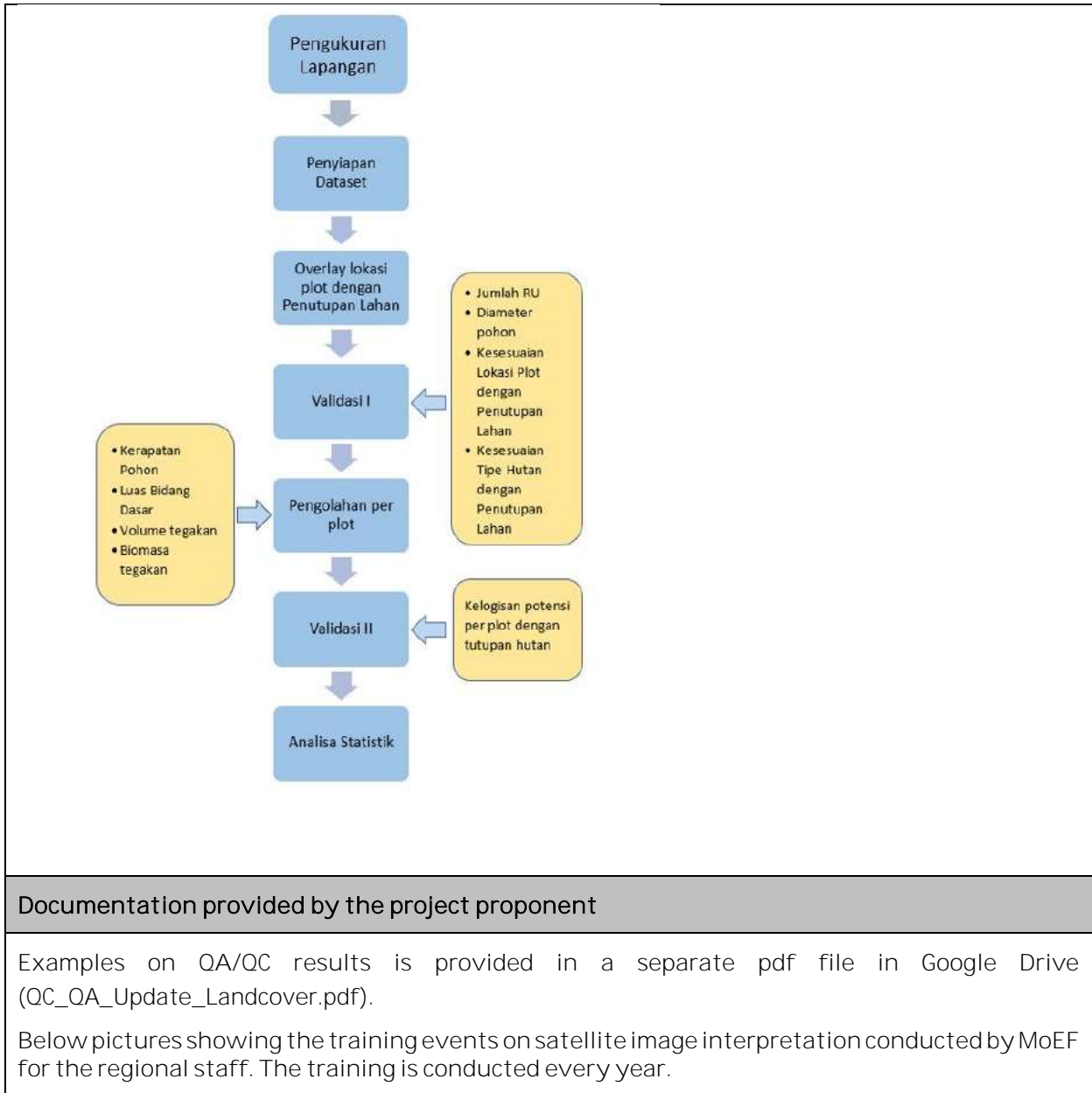
No text revision required on the ER report document

VVB's evaluation	Date: 15/10/2024
<p>The interpretation key (technical guidance) for medium resolution satellite image interpretation has been properly provided.</p> <p>Thus, CL04 is closed.</p>	

CL ID	05	Date: 04/10/2024
CL description		
<p>According to the description of section 4 of the ERR, it is described that the QA/QC are carried out on the processes of producing land cover data, carbon stock data, and the GHG emission calculation process. Provide the complete QA/QC process and evidence of its implementation.</p> <p>Moreover, for the conducted visual interpretation of the satellite imageries, provide the training of the people that carried out these activities as well as evidence of the QA/QC process and results.</p>		
Project proponent's response		Date: 07/10/2024

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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VVB's evaluation	Date: 11/10/2024
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Evidence of trainings reviewed and accepted.

As described in the answer in this finding, the Indonesian Government confirms the result and changes applied due to the QA/QC process which has been provided as a flowchart. The audit team is requesting evidence in form of internal documents, specific findings and any tracking of the changes performed from this process. This evidence shall include, among other things:

- Person responsible for initial measuring
- Person responsible for the QA/QC process
- Dates of the events
- Results and internal communication of them
- Etc.

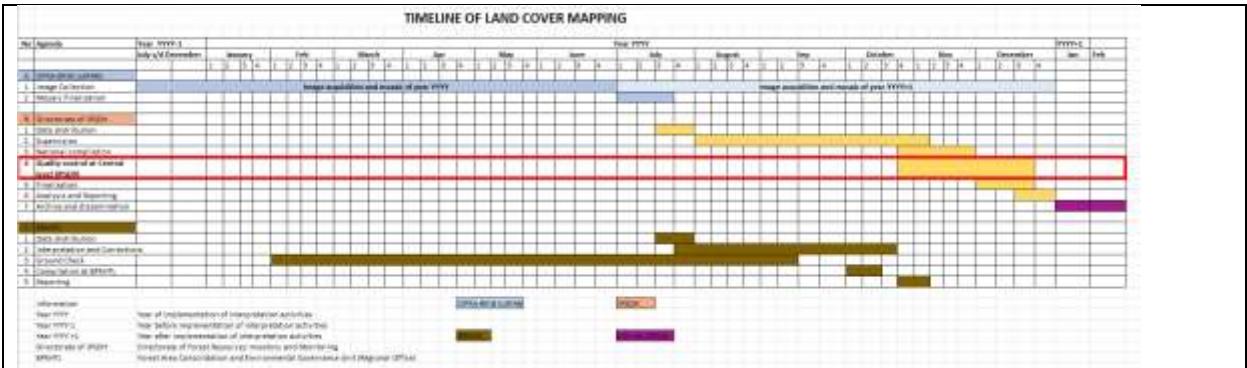
Thus, CL05 is not closed.

Project proponent's response	Date: 14/10/2024
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Thank you for receiving and accepting the document we provided.

As requested, we provide additional document on QA/QC process. Related the evidence on the persons who are responsible for initial measuring we attach a designation letter from BPKHTL V Banjar Baru, South Kalimantan as an example and the designation letter from the Directorate Forest Resources Inventory and Monitoring (IPSDH) for the QA/QC process. The process for initial measuring and QA/QC are conducted annually following the timeline below provided by IPSDH. For instance, the interpretation of satellite imageries is conducted from July to October and the QA/QC process is conducted from the end of October to December.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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The QA/QC has been done based on the QA/QC SOP. Some examples of the specific findings related to the QA/QC process can be found in the QA/QC result document.

Documentation provided by the project proponent	
No text revision required on the ER report document	
VVB's evaluation	Date: 15/10/2024
Requested documents have been provided. These have been reviewed and sampled by AENOR's audit team, which are deemed in accordance with the MRV Protocol.	
Thus, CL05 is closed.	

CL ID	06	Date: 04/10/2024
CL description		
Although, it was mentioned during the technical meeting carried out on October the 2 nd . In section 1, page 2, it is stated that "emissions reductions from peat decomposition included in FREL are not incorporated in the RBP/C baseline" however, no information about the inclusion or exclusion of peat fire is given.		
Project proponent's response	Date: 07/10/2024	
In the Annex to MRV Protocol stated that "Peat decomposition and emissions from peat fire shall be measured and reported, but not included as a performance indicator in the first reporting period under the partnership."		
We include the estimation of peat fires and peat decomposition in the Annex of the ER Report.		
Documentation provided by the project proponent		
We revised the text in the section 2.2.2 of ER Report: "Additionally, emissions from peat decomposition and peat fires are excluded in the calculation, in line with the Annex of MRV		

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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<p>Protocol for the Indonesia-Norway Partnership on climate, forests and peat RBP/C baseline calculation includes activities related to deforestation and forest degradation. However, other REDD+ activities such as sustainable management of forests, role of conservation, and enhancement of forest carbon stock are not considered in the calculation. Additionally, emissions from peat decomposition and peat fires are excluded in the calculation, in line with the Annex of MRV Protocol for the Indonesia-Norway Partnership on climate, forests and peat (see section "Activities, pools and gases included in the results-based payment/contribution")."</p>	
VVB's evaluation	Date: 11/10/2024
<p>Section 2.2.2 has been updated to clarify the exclusion of peat fires complying with the MRV protocol.</p> <p>Therefore, CL 06 is closed.</p>	

CL ID	07	Date: 04/10/2024
CL description		
<p>In section 2.3.2 of the ERR it is stated that: "additional forest research data especially for mangrove forests in Indonesia had to be used since the amount of PSP records for this forest type was statistically not sufficient". Indicate and provide the source of the evidence available for the mangrove forests.</p>		
Project proponent's response		Date: 07/10/2024
<p>Table 3 in Section 4.1.3 of the 1st FREL depicted the total number of NFI plots representing mangrove forest. Only 8 NFI plots of mangrove forest were measured in Kalimantan. Therefore, additional data sources is required to fill the gap. The existing studies of mangrove in Indonesia, from which the plot measurement data are compiled for this ER report, are listed below:</p> <p>Donato, Daniel C., Kauffman, J. Boone, Mardiarso, D., Kurnianto, S., Stidham, M., Kanninen, M., (2011). Mangroves Among the Most Carbon Rich Forest In The Tropics. Nature Geoscience Letter.</p> <p>Krisnawati, H., Adinugroho, W. C., Imanuddin, R., & Hutabarat, S. (2014). Estimation of forest biomass for quantifying CO2 emissions in Central Kalimantan: A comprehensive approach in determining forest carbon emissions factors. Research and Development Center for Conservation and Rehabilitation, Forestry Research and Development Agency, Bogor, Indonesia.</p> <p>Murdiyarto, D., Donato, D., Kauffmann, J.B., Kurnianto, S., Stidham, M. and Kanninen, M. (2009). Carbon Storage in Mangrove And Peat Land Ecosystems: A Preliminary Accounts From Plots in Indonesia. Working Paper 48: CIFOR. Bogor - Indonesia.</p>		
Documentation provided by the project proponent		

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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No text revision required on the ER Report document.	
VVB's evaluation	Date: 11/10/2024
<p>Explanations are deemed correct with the supporting evidence. Therefore, CL 07 is closed.</p>	

CL ID	08	Date: 04/10/2024
CL description		
<p>Clarify why the risk of double claim analysis performed in the provided spreadsheet "Spreadsheet_REDD Norway_2006-2020_per Mei 2024(20192020)" is blank.</p>		
Project proponent's response		Date: 07/10/2024
<p>The data in the "double claim analysis" sheet has been moved to the "RBP Baseline+ER" sheet, cells A111:C117. Thus the "double claim analysis" sheet should be deleted.</p>		
Documentation provided by the project proponent		
<p>The "double claim analysis" sheet has been deleted from the new file named: Spreadsheet_REDD Norway_2006-2020_20192020_per 9 Oct 2024.xls</p>		
VVB's evaluation		Date: 11/10/2024
<p>Spreadsheet provided has been updated and is deemed correct. Therefore, CL 08 is closed.</p>		

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Annex 6: Emission estimates differences between versions of the Emission Reduction Report for the Indonesia-Norway Partnership

As a consequence of the verification process, the emissions estimates have changed from the first version of the ERR (05. Print_2024 ERR Indonesia-Norway report as per 31 Mei 2024_clean ver.pdf), delivered to the audit team in September 2024, to the last verified version (Print_2024 ERR Indonesia-Norway report as per 14 Oct 2024docx), delivered to the audit team the 14th of October 2024. Those changes were caused by clarification number O1 (CL01):

1. For the calculation of ER from reduced deforestation and forest degradation, Indonesia did not disclose the possible risk of double claiming by the VCS project - ID 2403, Riau Ecosystem Restoration Carbon Project (RER-CP) for the ERR monitoring period, 2019/2020.

The response to this CL01 had an impact on the estimation of emission from deforestation resulting in a potential overlap of 130,090 ha. The following table summarises the changes of the estimates between the first and the last version of the *Emission Reduction Report*:

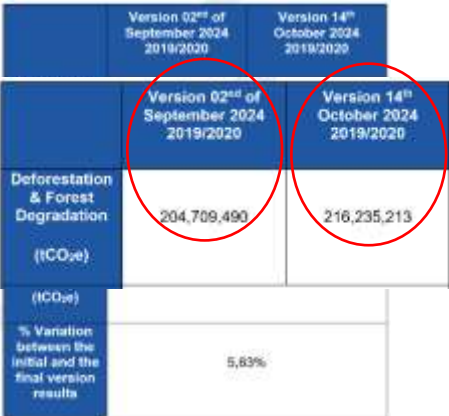
	Version 02 nd of September 2024 2019/2020	Version 14 th October 2024 2019/2020
Deforestation & Forest Degradation (tCO₂e)	216,235,213	204,709,490
Total Difference between initial and final version results (tCO₂e)	- 11,525,723	
% Variation between the initial and the final version results	5,63%	

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Annex 7: Comments on the draft of the Verification Report

Nº	MoEF Indonesia comments (17/10/2024)	AENOR response (17/10/2024)	MoEF Indonesia comments (18/10/2024)
	General comments on the entire document		
1	<p>Overall, we found that the report complied with the results from the verification process. The data and the information in the report are accurate and comprehensive. We believe the report will serve as an excellent reference and evidence for Indonesia's effort to reduce emissions from deforestation and forest degradation.</p> <p>However, there are some minor errors or inconsistencies in the report that need to be revised; see the specific comments below.</p>	Thank you for your review and comments in order to improve the quality of the document and the results of the verification. The errors found have been corrected	Thank you.
	Specific items in the document		
2	<p>In the Section 2.3 Document Review, bullet no 8 is written as: "Land cover maps: 1990, 1996, 2000, 2003, 2006, 2009, 2011, 2012, 2013, 2015, 2016, 2017, 2018 and 2019"</p> <p>The land cover maps are supposed to be until the year 2020, thus the text in the report should be revised to "Land cover maps: 1990, 1996, 2000, 2003, 2006, 2009, 2011, 2012, 2013, 2015, 2016, 2017, 2018, 2019 and 2020"</p>	Section 2.3 has been updated.	Thank you.
3	<p>In the Section 2.3 Document Review, bullet no 9 is written: "Land cover changes database <i>"PIVOTDB"</i>.</p> <p>For consistency with the table in Annex 3, we propose to write down the title of the document: Pivot_PL1990_2020_RBC4.xlsx</p>	Section 2.3 has been updated to ensure consistency with the list of evidence.	Thank you.

VERIFICATION REPORT	Indonesia - Norway Verification of reduced emissions from deforestation and forest degradation
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Nº	MoEF Indonesia comments (17/10/2024)	AENOR response (17/10/2024)	MoEF Indonesia comments (18/10/2024)									
4	<p>There are some inconsistencies in the use of CO₂ unit (highlighted in the report), for example, in the section 3.13 (para 5 and 6) the units are written as CO₂e, CO₂-e or CO₂-eq.</p> <p>Please use the same unit format as in the summary report on page 2 (i.e., CO₂e)</p>	Report has been revised and all the CO ₂ units have been updated for consistency.	Thank you.									
5	<p>In Annex 6, the emission numbers in the first row of the summary table are misplaced. The number from the first column should be placed in the second column, and vice versa.</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="background-color: #0056b3; color: white;">Version 02nd of September 2024 2019/2020</th> <th style="background-color: #0056b3; color: white;">Version 14th October 2024 2019/2020</th> </tr> </thead> <tbody> <tr> <td style="background-color: #0056b3; color: white;">Deforestation & Forest Degradation (tCO₂e)</td> <td style="text-align: center;">204,709,490</td> <td style="text-align: center;">216,235,213</td> </tr> <tr> <td style="background-color: #0056b3; color: white;">% Variation between the initial and the final version results</td> <td colspan="2" style="text-align: center;">5,63%</td> </tr> </tbody> </table>		Version 02 nd of September 2024 2019/2020	Version 14 th October 2024 2019/2020	Deforestation & Forest Degradation (tCO ₂ e)	204,709,490	216,235,213	% Variation between the initial and the final version results	5,63%		Annex 6 has been updated.	Thank you.
	Version 02 nd of September 2024 2019/2020	Version 14 th October 2024 2019/2020										
Deforestation & Forest Degradation (tCO ₂ e)	204,709,490	216,235,213										
% Variation between the initial and the final version results	5,63%											

No comments have been provided by Norway's Embassy.