MY_BESGRADE_Q1/24

Document prepared by Carbon Vault Sdn Bhd

Name of the project	MY_BESGRADE_Q1/24
Project holder	Carbon Vault Sdn Bhd
Project holder's contact information	Email Address: sharifah@co2bank.asia Contact Number: (+6)018 299 0070, Address: No. 11A, Lorong Kurau, Bangsar, 59100 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur.
Project participants	Project Activity 1 : Homebase Plantation Sdn Bhd Project Activity 2 : Homebase Plantation Sdn Bhd Project Activity 3 : Greenton Plantation Sdn Bhd Project Activity 4 : Greenton Plantation Sdn Bhd Project Holder : Carbon Vault Sdn Bhd
Version	Version 1.0
Date	14 March 2024
Project type	**Project Activity 1 : Homebase Plantation Sdn Bhd** - Activities in the AFOLU sector, other than REDD+ **Project Activity 2 : Homebase Plantation Sdn Bhd** - Activities in the AFOLU sector, other than REDD+ **Project Activity 3 : Greenton Plantation Sdn Bhd** - Activities in the AFOLU sector, other than REDD+ **Project Activity 4 : Forest Reserve Greenton Plantation Sdn Bhd** - Activities in the AFOLU sector, other than REDD+

Grouped project	Yes, this project articulates the classification of the MY_BESGRADE_Q1/24 as a grouped initiative, diverging from the model of independent GHG projects. Despite its grouped nature, the project maintains a well-defined and transparent scope, a robust and conservative baseline, and a rigorous and dependable sampling strategy.
Applied Methodology	**Project Activity 1 : Homebase Plantation Sdn Bhd, Johor** BCR0001: Quantification of GHG Removal - ARR, Version 4.0 **Project Activity 2: Homebase Plantation Sdn Bhd, Perak** BCR0001: Quantification of GHG Removal - ARR, Version 4.0 **Project Activity 3 and 4: Greenton Plantation Sdn Bhd** BCR0001: Quantification of GHG Removal - ARR, Version 4.0 *(all project refers to AR-ACM0003 methodologies)*
Project location (City, Region, Country)	**Project Activity 1 : Homebase Plantation Sdn Bhd** - Kluang, Johor, Malaysia - 2°04'30"N, 103°21'58E - 275 km from central office in Bangsar, Kuala Lumpur **Project Activity 2: Homebase Plantation Sdn Bhd** - Mukim Chegar Galah, Kuala Kangsar, Perak - 4°58'43.8"N 100°56'21.4"E - 260 km from central office in Bangsar, Kuala Lumpur **Project Activity 3 and 4: Greenton Plantation Sdn Bhd** - Kuala Muda, Gurun, Kedah, Malaysia - 5°48'35"N 100°28'15"E - 340 km from central office in Bangsar, Kuala Lumpur
Starting date	- **Project Activity 1**: January 1997

	- **Project Activity 2**: May 2015 - **Project Activity 3** : 15 May 2017 - **Project Activity 4**: 8 Disember 2005
Quantification period of GHG emissions reduction	**Project Activity 1 : Homebase Plantation Sdn Bhd, Johor** - 20 years **Project Activity 2: Homebase Plantation Sdn Bhd, Perak** - 20 years **Project Activity 3 and 4: Greenton Plantation Sdn Bhd** - 20 years
Estimated total and average annual GHG emission reduction amount	Total estimated of GHG emissions reductions (during the quantification period): - **Project Activity 1:** 122,727.25 tCO2e - **Project Activity 2:** 9,407.54 tCO2e - **Project Activity 3:** 72,352.20tCO2e - **Project Activity 4:** 11,691.02 tCO2e Estimated average annual amount of GHG emission reductions: - **Project Activity 1:** 6,229.81 tCO2e/year - **Project Activity 2**: 477.54 tCO2e/year - **Project Activity 3**: 3,672.70 tCO2e/year - **Project Activity 4**: 593.25 tCO2e/year

Sustainable Development Goals	The project complies with several Sustainable Development Goals (SDGs), including: SDG 8 : Decent Work and Economic Growth – Projects contribute to economic growth and employment opportunities. SDG 13 - Climate Action: The project contributes to carbon offset initiatives, demonstrating its commitment to addressing the global challenge of climate change. SDG 15 - Life on Land: The project has implemented sustainable practices in its operations, including responsible land management and reforestation efforts, which help protect, restore, and promote sustainable use of terrestrial ecosystems. SDG 17 - Partnerships for the Goals: The project has shown a commitment to engaging with local communities, ensuring transparent communication and active participation in local development initiatives.
Special category, related to co-benefits	Non-Applicable

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1 Project type and eligibility

1.1 Scope in the BCR Standard

The scope of the BCR Standard is limited to:	
The following greenhouse gases, included in the Kyoto Protocol: Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O).	*X*
GHG projects using a methodology developed or approved by BioCarbon Registry, applicable to GHG removal activities and REDD+ activities (AFOLU Sector).	*X*
Quantifiable GHG emission reductions and/or removals generated by the implementation of GHG removal activities and/or REDD+ activities (AFOLU Sector).	*X*
GHG projects using a methodology developed or approved by BioCarbon Registry, applicable to activities in the energy, transportation and waste sectors.	
Quantifiable GHG emission reductions generated by the implementation of activities in the energy, transportation and waste sectors.	

The Project within MY_BESGRADE_Q1/24 aligns with the BCR0001 standard, rigorously adhering to approved methodologies by the BioCarbon Registry and actively participating in the mitigation of greenhouse gases or the prevention of GHGs emissions. Embracing BCR0001 underscores our dedication to environmental stewardship, prioritising ecological integrity over profit-centric motives.

Compliance with BCR0001 indicates a joint commitment to environmental responsibility, emphasising the conservation of ecosystems, biodiversity, and a sustainable future. These efforts gain recognition within the carbon market and environmental sectors, highlighting their shared dedication to sustainable and eco-friendly practices. Adherence to an established standard enhances the environmental value of the carbon credits produced, accentuating the collective positive impact of the projects on the planet.

Furthermore, BCR0001 compliance transcends financial gains, focusing on authentic contributions to environmental preservation. The projects become more appealing to a diverse array of stakeholders who prioritise sustainability and environmental well-being. By upholding this standard, the projects attract socially responsible investors, fostering a

collective dedication to environmental preservation. The emphasis on environmental responsibility ensures that both projects meaningfully contribute to a sustainable and ecologically balanced future, amplifying their positive environmental impact.

1.2 Project type

Activities in the AFOLU sector, other than REDD+	*X*
REDD+ Activities	
Activities in the energy sector	
Activities in the transportation sector	
Activities related to Handling and disposing of waste	

1.3 Project scale

Following the assessment utilising the AR-ACM0003 methodologies, it is determined that the MY_BESGRADE_Q1/24 project does not qualify as a small-scale A/R project activity for the following reasons:

1. Net anthropogenic GHG removals by sinks surpass the specified limit.

As per the AR-ACM0003 methodologies, a project can be categorised as small-scale if its annual net anthropogenic greenhouse gas (GHG) removals by sinks are below 16,000 tons of CO_2. Consequently, the project's total CO_2 emissions are required to fall beneath this threshold.

Table 1 : The total CO_2 emissions for each project activity.

Project Name	Amount of GHG emission reductions (tCO_2e/year)
Project Activity 1	6,229.81
Project Activity 2	477.54
Project Activity 3	3,672.70
Project Activity 4	593.25

Total	3,670.02

1. **Development by established company**

Given that the project is led by a well-established corporation, it raises concerns regarding its eligibility to fulfil the criterion of being developed or implemented by low-income communities and individuals as mandated by the host Party. This stipulation is pivotal for qualifying as a small-scale A/R project activity.

As the project fails to meet the prerequisites for a small-scale A/R project, there exists an opportunity to transition towards an A/R large-scale methodology. This transition involves embracing guidelines and procedures tailored for large-scale A/R projects, which encompass more extensive requirements for project design, monitoring, and reporting. Additionally, it underscores the imperative for the project developer to ensure complete adherence to all pertinent regulations and procedures outlined by the Clean Development Mechanism (CDM) Executive Board and the authorities of the host country for large-scale A/R projects.

2 General description of the project

Project Activity 1:

Situated in Kluang, Johor, spanning an extensive area of 317.80 hectares across four distinct titles acquired over different years, Project activity 1 presents a diverse and sustainable oil palm plantation. This sprawling plantation, located at coordinates 2°04'30"N, 103°21'58E, approximately 275 km from the central office in Bangsar, Kuala Lumpur, goes beyond conventional practices by incorporating designated areas for cultivating fruit trees like Durian and Honey Jackfruit. Furthermore, specific sections are dedicated to Kelampayan trees, contributing to plywood production.

One notable aspect of this project is the exceptional condition of the plantation road, ensuring smooth accessibility across the vast site. The well-maintained road infrastructure facilitates the use of 4X4 vehicles, enhancing efficiency and safety for all activities within the plantation.

Within the project's boundaries lie diverse components, including a TNB track area, durian orchard, Kelampayan's logging area, Kelampayan's planting area, workers' rest house, and pump house. Each element plays a vital role in the project's ecosystem, from

offering essential services and amenities to workers to ensuring seamless integration of agricultural activities with the local environment and community.

Project Activity 1 signifies more than just a plantation; it embodies innovative agricultural practices, environmental stewardship, and community integration. With its holistic approach to sustainable palm oil production, this project serves as a model of progress in the region, aiming to establish new standards for efficiency, sustainability, and social responsibility in the industry.

Project Activity 2:

Situated in Sauk, Kuala Kangsar, Perak, spanning a 24.36 hectare area, our project, Project Activity 2, encompasses various features vital to its operations and sustainability. The plantation site, located at coordinates 4°58'43.8"N 100°56'21.4"E and approximately 264 km from our operational office in Kuala Lumpur, was in generally good condition prior to our project's commencement. However, our initial plantation survey revealed a notable issue with the infrastructure, particularly the condition of the field's road.

Following heavy rainfall, the road showed signs of deterioration, becoming slick and uneven. This specific challenge raised concerns regarding safety and accessibility within the plantation, potentially hindering operational efficiency and safety compliance. While the road condition posed a significant challenge, it was the only difficulty encountered during our evaluation process.

Efforts to address and rectify this issue are crucial to ensuring the safety and well-being of all stakeholders involved in our operations at the plantation site. Additionally, the project area includes features such as a pumpkin cash crop cultivated to prepare the soil before palm oil planting and a private fish pond, contributing to the site's biodiversity and sustainability.

Project Activity 3 :

Project Activity 3 represents a significant initiative in the heart of Bandar Gurun, Kuala Muda, Kedah, covering an expansive area of 124.52 hectares. This palm oil plantation is strategically located to optimise both accessibility and productivity, benefiting from well-maintained and organised road networks that facilitate easy access to and from the site. Despite the convenience of the main roads, the plantation is also characterised by its challenging terrain, including steep and hazardous hill paths, which add a layer of complexity to its operations.

Encompassed within the project's boundaries are diverse components that contribute to its multifaceted nature: a TNB track area, forest reserve, a durian orchard, a temple, a rest house for plantation workers, a weighing scale area, and the palm oil plantation itself, divided into 11 distinct blocks. Each element plays a crucial role in the project's ecosystem, from providing essential services and amenities to the workers to ensuring the seamless integration of agricultural activities with the local environment and community.

This project is not just a plantation; it's a testament to innovative agricultural practices, environmental stewardship, and community integration. With its comprehensive approach to sustainable palm oil production, this project stands as a beacon of progress in the region, aiming to set new benchmarks for efficiency, sustainability, and social responsibility in the industry.

Project Activity 4:

Project Activity 4 represents a significant initiative in the heart of Bandar Gurun, Kuala Muda, Kedah, covering an expansive area of 31.31 hectares. This forest reserve is established to protect and conserve the diverse range of plant and animal species that inhabit the forest ecosystems. It also provides essential ecosystem services such as clean air and water, soil conservation, climate regulation, and carbon sequestration which helps in maintaining these services by preventing deforestation and promoting sustainable land use practices.

Encompassed within the project's boundaries are diverse components that contribute to its multifaceted nature: a TNB track area, palm oil plantation area,, a durian orchard, a temple, a rest house for plantation workers, a weighing scale area, and the forest reserve itself.

Project Activity 4 is a forest reserve to serve as a sustainable timber source for Greenton Plantation Sdn Bhd while prioritising environmental preservation and resilience through the use of sustainable management practices that aim to balance resource extraction with the long-term health and integrity of the forest ecosystems.

For MY_BESGRADE_Q1/24, the project implements strategic measures aimed at achieving significant reductions in greenhouse gas (GHG) emissions.

<u>Project Activities 1, 2, and 3:</u>

1. Carbon Sequestration through Growth:

The primary approach to reducing carbon emissions involves the cultivation and growth of palm trees. As palm trees mature, they actively absorb carbon dioxide from the atmosphere through photosynthesis and store it within their biomass. This natural process enables the extraction of carbon, serving as an effective means of reducing overall greenhouse gas emissions.

2. Deforestation Avoidance:

The project effectively mitigates the release of stored carbon in existing ecosystems by prioritising sustainable palm oil farming practices and preventing deforestation. Through this proactive stance, carbon reserves within the plantation area are conserved, thereby reducing potential emissions that would result from clearing natural habitats for palm oil cultivation.

3. Efficient Management Practices:

By adopting optimal strategies in plantation management, including improved fertilisation and water management techniques, the efficiency of palm oil production is enhanced. This heightened level of efficiency translates to reduced resource requirements and, consequently, a decreased carbon footprint per unit of palm oil produced.

Project Activity 4:

1. **Carbon Sequestration in Tree Growth:**

Forests, integral to a carbon offset project, play a crucial role in mitigating greenhouse gas (GHG) emissions through carbon sequestration. Acting as carbon sinks, forests store carbon dioxide (CO_2) in the soil and biomass, including trees, roots, and other plant materials, absorbed from the atmosphere via photosynthesis. By planting trees in areas designated for economic, social, and environmental benefits, the project aims to enhance carbon sequestration. This process effectively removes CO_2 from the atmosphere, mitigating the greenhouse effect and reducing overall greenhouse gas concentrations. Additionally, it may alleviate deforestation pressures, leading to improved carbon management practices.

2. **Reduction of Deforestation Emissions:**

Project activities contribute to offsetting emissions resulting from deforestation. As trees mature, they capture carbon, helping to counterbalance emissions from human activities that release CO2. Moreover, by safeguarding existing forests from clearance, illegal logging, and other activities that release stored carbon, the project preserves carbon stocks within these ecosystems, thereby further reducing emissions.

3. Practices of Sustainable Management:

Incorporating sustainable forest management practices into agroforestry projects ensures that activities such as clear-cutting do not release stored carbon from soil and trees. These sustainable practices uphold the long-term viability of carbon sinks. Project Activity 4 utilises silvicultural methods to uphold ecosystem services and environmental integrity, such as improving water quality, regulating climate, and providing habitats for diverse flora and fauna. These services indirectly contribute to mitigating the impacts of climate change.

After thorough assessment, it has been ascertained that special categories are not applicable to MY_BESGRADE_Q1/24. This conclusion is based on two primary factors:

1. **Absence of Nearby Living Community:** The project area lacks a surrounding community, rendering community-focused benefits or impacts irrelevant.

2. **Limited Wildlife Interaction**: Wildlife presence is minimal, indicating that the project's operations have little to no impact on local wildlife.

Considering these factors, project activity 1,2 3 and 4 does not involve the special categories of Biodiversity Conservation and Community Benefit. This determination recognizes the unique context of the project and ensures that its compliance and sustainability efforts are tailored appropriately to its specific environmental and social landscape.

The project's activities significantly advance several Sustainable Development Goals (SDGs), notably emphasising SDG 8 (Decent Work and Economic Growth), SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 17 (Partnerships for the Goals).

- **SDG 8: Decent Work and Economic Growth**

Agroforestry generates employment opportunities, particularly in rural areas, through activities such as sustainable logging, planting management, and tree planting, providing jobs for local communities. This aligns with SDG 8's aim of promoting full and productive employment. Sustainable plantation management ensures the long-term availability of timber and non-timber forest products, fostering economic growth while safeguarding ecosystems.

- **SDG 13: Climate Action**

The project substantially contributes to SDG 13 by actively mitigating climate change impacts. Sustainable palm oil production practices, carbon sequestration, and emissions reduction strategies align with the goal of mitigating climate change effects. Commitment to climate resilience is demonstrated through strategies like preventing deforestation, improving waste management efficiency, and integrating renewable energy sources.

- **SDG 15: Life on Land**

The project focuses on terrestrial ecosystems and biodiversity, aligning with SDG 15's objective. It preserves terrestrial habitats and promotes sustainable land use through sustainable land management methods, deforestation minimization, and biodiversity conservation within the plantation area. This commitment supports the goal of halting biodiversity decline and preserving ecosystem integrity.

- **SDG 17: Partnerships for the Goals**

The project actively fosters partnerships and collaboration in accordance with SDG 17. Engaging local communities, collaborating with stakeholders, and adhering to global standards like the BioCarbon Registry demonstrate the significance of partnerships in achieving sustainable development. Collaboration ensures a comprehensive approach to addressing environmental and social issues associated with palm oil cultivation.

In essence, the project's actions directly contribute to SDG 13 by mitigating climate change impacts, SDG 15 by promoting sustainable land use and biodiversity conservation, and SDG 17 by fostering partnerships to achieve sustainable development goals collectively. Utilising a multi-dimensional strategy reflects a commitment to addressing global challenges comprehensively and actively contributing to the overarching objective of sustainable development.

Estimated average annual amount of GHG emission reductions:

- **Project Activity 1 :** 6,229.81tCO2e/year
- **Project Activity 2 :** 477.54 tCO2e/year
- **Project Activity 3 :** 3,672.70 tCO2e/year
- **Project Activity 4 :** 593.25 tCO2e/year

Total estimated of GHG emissions reductions (during the quantification period):

- **Project Activity 1** : (5,295.33 x 2 years) +(6,229.81 x 18 years) = 122,727.25 tCO2e
- **Project Activity 2 :** (405.91 x 2 years) +(477.54 x 18 years) = 9,407.54 tCO2e
- **Project Activity 3** : (1,937.18 x 2 years) +(3,672.70 x 18 years) = 72,352.20tCO2e
- **Project Activity 4 :** (504.26 x 2 years) + (593.25 x 18 years) = 11,691.02 tCO2e

2.1 GHG project name

The GHG project shall consistently be referred to as "**MY_BESGRADE_Q1/24**" throughout all documentation and registration procedures.

2.2 Objectives

The comprehensive goals of MY_BESGRADE_Q1/24 align with the suggested activities and anticipated outcomes for greenhouse gas (GHG) mitigation. These goals are formulated to ensure the well-being of local communities, address environmental sustainability, and mitigate the effects of climate change.

Objectives for Project Activities 1, 2, and 3:

1. Promote Carbon Sequestration through Sustainable Palm Cultivation:

Establish and effectively manage a palm oil plantation with a primary focus on long-term carbon storage. This involves nurturing and cultivating palm trees to harness their

capacity to absorb carbon dioxide from the atmosphere while ensuring the overall health and resilience of the plantation ecosystem.

2. Avoid Deforestation and Preserve Biodiversity:

Implement measures to mitigate deforestation within the plantation area, preserving existing natural habitats and biodiversity. The initiative is committed to implementing a no-deforestation policy, aiming to establish a harmonious relationship between agricultural activities and surrounding ecosystems.

3. Enhance Community Welfare and Engagement:

Foster active engagement with nearby communities and prioritise their well-being by creating employment opportunities and valuing indigenous knowledge. The initiative seeks to ensure that its activities positively impact the social and economic welfare of communities residing near the plantation.

4. Biodiversity Conservation and Habitat Protection:

Implement policies to conserve biodiversity by protecting and enhancing the plantation's natural ecosystem. This involves employing water and soil conservation measures to reduce erosion and maintain water availability, preserving indigenous flora and fauna, establishing wildlife corridors, and designating protection zones to minimise ecological disturbances.

5. Align with Sustainable Development Goals (SDGs):

Align with the Sustainable Development Goals (SDGs) by promoting a holistic and integrated approach to sustainable development. This entails incorporating environmental, social, and economic considerations into the planning and implementation phases to maximise positive impacts on the environment, society, and economy while adhering to SDG principles of sustainable development.

<u>Objectives Project Activity 4:</u>

1. **Mitigate Climate Change:**

Contribute to reducing climate change by decreasing or offsetting emissions of greenhouse gases, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). This aligns with international agreements like the Paris Agreement, which aims to limit global temperature increases.

2. Assessment of Carbon Sequestration Impact:

Quantify and verify the actual carbon sequestration impact of the project by preserving the forest reserve and plantation. This objective aims to provide a precise measurement of the project's contribution to carbon offsetting. It involves evaluating the efficiency of rubber forest plantation in capturing and storing atmospheric carbon dioxide, thereby balancing the carbon footprint effectively.

3. Promote Sustainable Land Use Practices:

Promote and ensure land use practices consistent with international sustainability standards. This goal underscores the importance of responsible and sustainable land use, ensuring not only the reduction of carbon emissions but also the active promotion of biodiversity conservation, soil health, and ecosystem resilience.

4. Community Engagement and Socio-economic Impact Assessment:

Assess community engagement levels and evaluate the socio-economic impact of the project within the local community. This objective acknowledges the social dimension of sustainability beyond environmental considerations. It involves evaluating the project's creation of local employment opportunities, enhancement of economic resilience, and engagement with the community to promote environmental awareness and sustainable practices.

5. Biodiversity Conservation and Habitat Protection:

Conserve biodiversity by implementing policies to protect and enhance the plantation's natural ecosystem. This includes employing water and soil conservation measures to reduce erosion and preserve water availability, preserving indigenous flora and fauna, establishing wildlife corridors, and designating protection zones to minimise ecological disruptions.

6. Align with Sustainable Development Goals (SDGs):

Align with the sustainable development goals by promoting a holistic and integrated approach to sustainable development, encompassing environmental, social, and economic concerns in the planning and implementation phases. Both projects have the

potential to maximise beneficial impacts on the environment, society, and the economy while adhering to the principles of sustainable development outlined in the SDGs.

2.3 Project activities

MY_BESGRADE_Q1/24 projects aim to mitigate greenhouse gas (GHG) emissions by enhancing forests' capacity to absorb and sequester CO2. These project activities yield GHG emission reductions, emphasising the technologies and strategies deployed, which field supervisors initially surveyed for:

1. **Site Selection and Planning:**

The initial survey is vital for evaluating potential sites for Forest reserves and palm oil plantations. It assesses soil quality, climate, and terrain to identify optimal locations for growing oil palm trees. This ensures optimal growth and high oil yield. The survey examines soil quality, considering factors like texture and nutrient content. It also evaluates climate conditions such as rainfall and temperature, which impact palm growth. Terrain features like slope and proximity to water sources are also taken into account. Overall, the survey aids in selecting the right locations for oil palm plantations, maximising their success and carbon sequestration potential.

2. **Identification of Tree Species & High-Impact Areas:**

Select tree species that thrive in the local climate and soil conditions, prioritising fast-growing, long-lived species with high carbon storage capacity. This helps pinpoint areas with optimal potential for carbon sequestration, ensuring that the project targets tree planting where it can have the greatest impact on reducing greenhouse gas emissions.

3. **Biodiversity and Ecological Considerations:**

A comprehensive initial survey includes evaluations of local biodiversity and ecological conditions. This knowledge is crucial for selecting tree species that are well-adapted to the ecosystem while minimising negative impacts on local flora and fauna. It enhances the overall sustainability of the reforestation project.

4. **Identification of Risk Assessment:**

The survey enables the identification and evaluation of potential risks and challenges that could affect the success of the palm oil plantation project and the forest reserve site in project activity 4. This includes assessing factors such as the presence of invasive species, susceptibility to diseases, and sensitivity to extreme weather events. Understanding these risks allows for the integration of mitigation strategies into the project plan to address them effectively. This proactive approach minimises potential disruptions and ensures the project's resilience and long-term success.

5. **Community Engagement and Stakeholder Involvement:**

Incorporating local community and stakeholder engagement during the initial survey phase of forest reserve and palm oil plantation development is crucial for fostering positive relationships and gaining valuable insights. Active involvement of local communities allows for understanding their perspectives, needs, and concerns, ensuring that the project aligns with community goals and contributes to sustainable development. This inclusive approach promotes transparency, builds trust, and facilitates cooperation, ultimately leading to more successful and socially responsible palm oil plantation projects.

6. **Legal and Regulatory Compliance:**

The initial survey aids in identifying and navigating legal and regulatory requirements related to land use and reforestation. Compliance with local laws and regulations is essential for obtaining necessary permits and ensuring the project's long-term viability.

The initial survey represents a pivotal milestone in the carbon offset project lifecycle, providing crucial data and insights that enhance the reforestation initiative's strategy, implementation, and overall success. By conducting a thorough survey, valuable information is gathered, enabling better decision-making throughout the project. This process significantly enhances the project's ability to effectively reduce greenhouse gas emissions, maximising its positive environmental impact and contributing to broader sustainability goals.

2.4 Project location

Project Activity 1: Homebase Plantation Sdn Bhd, Johor

The project is strategically situated in Malaysia, specifically within the state of Johor Darul Takzim in the southern part of the peninsula. Situated in Kluang, Johore, the plantation is easily accessible through 4-by-4 vehicles, ensuring efficient transportation within the site. The project's geographical coordinates are 2°04'30"N, 103°21'58E. The distance from our central office in Bangsar, Kuala Lumpur, to the plantation is approximately 265 kilometres to the south. This location provides an ideal setting for sustainable palm oil cultivation, combining accessibility with strategic positioning within the northern region of Johor.

Project Activity 2: Homebase Plantation Sdn Bhd, Perak

This project is situated in Malaysia, within the state of Perak Darul Ridzuan in the northern part of the peninsula. The plantation, located Sauk, Perak, is accessible via 4-by-4 vehicles. This project site has coordinates 4°58'43.8"N 100°56'21.4"E and the distance from our central office which is located in Bangsar, Kuala Lumpur to the plantation is approximately 264 kilometres (to the north).

Project Activity 3 & 4: Greenton Plantation Sdn Bhd, Kedah

The project is situated in Malaysia, within the state of Kedah Darul Aman in the northern part of the peninsula. The plantation, located Bandar Gurun, Kuala Muda, Kedah, is accessible via 4-by-4 vehicles. This project site has coordinates 5°48'35"N 100°28'15"E and the distance from our central office which is located in Bangsar, Kuala Lumpur to the plantation is approximately 400 kilometres (to the north).

2.5 Additional information about the GHG Project

Non-applicable

3 Quantification of GHG emissions reduction

3.1 Quantification methodology.

All Project Activities 1, 2, 3 and 4 adhere to the same methodology which is:

Title of the Methodology: BCR0001 Quantification of GHG Removal - Afforestation, Reforestation and Revegetation (ARR), Version 4.0

Reference of the Methodology: CDM Methodology, AR-ACM0003. A/R Large-scale Consolidated Methodology. Afforestation and reforestation of lands except wetlands. (Version 3.0)

3.1.1 Applicability conditions of the methodology

The MY_BESGRADE_Q1/24 projects satisfy the applicability conditions of the methodology utilized to quantify the project's emission reductions by adhering to the criteria and procedures of the Clean Development Mechanism (CDM). The CDM, established under the Kyoto Protocol, enables developing countries to execute emission-reduction projects and generate certified emission reductions (CERs). These CERs can be traded and utilized by industrialized countries to fulfill their emission reduction commitments.

Project Activity 1, 2 and 3: (Palm Oil Projects)

No	Applicability Criteria	Applicability to the Project
The project uses the **BCR0001 Quantification of GHG Removal - ARR, Version 4.0** to estimate the net greenhouse gas removals by sinks from the establishment of the rubber plantation. The following conditions apply:		
1	The areas in the project boundary shall not correspond to the forest category, nor natural vegetation different to a forest, at the beginning of project activities and not five years before the project start date.	Not Applicable. Even though palm oil plantations do not belong to natural vegetation cover, nor to the forest category, the project activity began 5 years before the project start date and it is still ongoing.

2	The areas in the project boundary do not fall in the wetland category.	Applicable. All palm oil plantations within the project boundary do not exhibit the permanent water saturation and unique ecological characteristics of wetlands, and therefore are not classified as wetlands.
3	The areas in the project boundary do not contain organic soils.	Applicable. The absence of organic soils within the project boundary of a palm oil plantation may result from a combination of land preparation, soil type, management practices, and historical land use factors that have influenced soil composition and suitability for palm oil cultivation.
4	Carbon stocks in soil organic matter, litter, and deadwood decrease or remain stable, in the absence of project activities, that is, relative to the baseline scenario.	Applicable. The projects contribute to long-term viability and potential augmentation of the carbon storage by preventing land-use changes from the environment that might deplete or maintain carbon stocks, aligning with the methodology's focus on activities that remove greenhouse gases.
5	Flood irrigation is not used.	Applicable. Flood irrigation is not used in palm oil plantations to maintain ideal soil moisture levels, conserve water resources, minimise soil erosion, and promote uniform growth and yield of rubber trees.
6	The effects of drainage are negligible, so GHG emissions, other than CO_2, can be omitted.	Applicable. Oil palm plantations and forest are not drained. Therefore, GHG emissions/removals from these practices are not estimated.

7	Soil disturbances due to project activities are carried out following appropriate soil conservation practices and have not been repeated for less than 20 years.	Applicable. Soil disturbance in palm oil plantations is used to facilitate land preparation, soil aeration, nutrient management, and pest/disease management through proper sustainable soil management practices, minimising negative impacts on soil health and environmental quality while promoting long-term productivity and resilience of rubber plantations.

Project Activity 4: (Forested Area)

No	Applicability Criteria	Applicability to the Project
The project uses the **BCR0001 Quantification of GHG Removal - ARR, Version 4.0** to estimate the net greenhouse gas removals by sinks from the establishment of the forest reserve. The following conditions apply:		
1	The areas in the project boundary shall not correspond to the forest category, nor natural vegetation different to a forest, at the beginning of project activities and not five years before the project start date.	Not Applicable. The project areas belong to natural plantation cover, or to the forest category.
2	The areas in the project boundary do not fall in the wetland category.	Applicable. The forest reserve within the project boundary does not exhibit the permanent water saturation and unique ecological characteristics of wetlands, and therefore are not classified as wetlands.
3	The areas in the project boundary do not contain organic soils.	Applicable. The absence of organic soils within the project boundary of a forest reserve may result from a soil type, management practices, and historical land use factors that have influenced soil composition.

4	Carbon stocks in soil organic matter, litter, and deadwood decrease or remain stable, in the absence of project activities, that is, relative to the baseline scenario.	Applicable. The project contributes to long-term viability and potential augmentation of the carbon storage by preventing land-use changes from the environment that might deplete or maintain carbon stocks, aligning with the methodology's focus on activities that remove greenhouse gases.
5	Flood irrigation is not used.	Applicable. Flood irrigation is not used in the project to maintain ideal soil moisture levels, conserve water resources, minimise soil erosion, and promote uniform growth of trees.
6	The effects of drainage are negligible, so GHG emissions, other than CO_2, can be omitted.	Applicable. Since forests are not drained, GHG emissions/removals from these practices are not estimated.
7	Soil disturbances due to project activities are carried out following appropriate soil conservation practices and have not been repeated for less than 20 years.	Applicable. Soil disturbance in forest reserves could happen because of natural events such as landslides, windstorms, flooding, and soil erosion due to precipitation and timber extraction activities through proper sustainable soil management practices.

3.1.2 Methodology deviations (if applicable)

There are no deviations from the selected methodology.

3.2 Project boundaries, sources and GHGs

In the MY_BESGRADE_Q1/24 carbon offset initiative project, project boundaries refer to the specific limits or constraints that define the scope and extent of the project.

The project delimitation for **project activity 1** is as follows:

1. This project is operated by Homebase Properties Sdn Bhd, owned by Besgrade Plywood Sdn Bhd. Located in Kluang, Johor, the project area is focuses on palm oil cultivation and production
2. The project operates with a licence from the Malaysian Palm Oil Board (PELESENAN 2005), allowing the sale and movement of palm oil fruits within legal standards.
3. The project covers a total area of 317.80 hectares allocated for palm oil plantations.
4. The palm oil plantation comprises several plantation blocks with crops planted in various years, including 1997, 1998, 2002, 2005, 2006, 2008, 2009, and 2017. This diverse range of planting years results in a varied age distribution among the trees, with the oldest trees being 27 years old and the youngest ones being 7 years old.
5. The project's objective is to contribute to the supply chain of Homebase Properties Sdn Bhd by providing a reliable source of palm oil for various industries.
6. The project area is surrounded by palm oil plantation, durian orchard and a kelampayan forested area which provide habitats for various plant and animal species, contributing to biodiversity conservation.
7. The plantation is easily accessible via existing dirt roads and within the project border, there are additional features such as orchards, forest reserve, TNB cable tracks, and some areas provided for the plantation workers.

DEC'23

Field	Land Acreage	2022 Actual Standing palms and Acreage	Material	Year Planting	Age	Dec.'2023	To date tonnage	Total Dec. Bunches	Bunches per ton	Ton per acre	To date ton per acre	TNB Rentice (acres)	Orchard (acres)	Linesite (acres)
1	122	5898 107.00	Pamol	2002	21yrs	80.75	1002.46	3550	43.96	0.755	9.368			
2	65	3111 57.00	Pamol	2002	21 yrs	40.09	548.44	1657	41.33	0.703	9.619	8		2
3	105	4974 90.00	Pamol	2005	18 yrs	82.06	879.08	3871	47.17	0.912	9.766	8		
4	65	3377 61.00	Pamol + Guthrie	2006	17 yrs	48.94	605.29	2213	45.22	0.802	9.920			
5	89	4825 88.00	Guthrie	2008	15 yrs	79.44	776.54	4173	52.53	0.902	8.821	6		
6	132	6999 127.00	Guthrie	2009	14 yrs	100.19	1190.02	5575	55.64	0.789	9.370	3		
10	122	6245 114.00	Chemara	1997	26yrs	84.54	923.55	3538	41.85	0.742	8.101	15		
13	40	1291 24.00	Chemara	1998	25 yrs	29.38	230.74	1183	40.26	1.224	9.613		7	
14	55	2855 52.00	YAM GAMBI	2017	6 yrs	26.40	510.12	2582	97.80	0.508	9.809			
Total	**795**	**39575 720.00**				**571.79**	**6666.24**	**28342**			**9.259**	**40**	**7**	**2**

Figure 1 : Plantation Management Document issued by the Plantation Manager (*latest revision: December 2023*)

The project delimitation for **project activity 2** is as follows:

1. This project is operated by Homebase Properties Sdn Bhd, owned by Besgrade Plywood Sdn Bhd. Located in Sauk, Kuala Kangsar Perak the project area is focused on palm oil cultivation and production.
2. The project covers a total area of 28.00 hectares allocated for palm oil plantations and pumpkin cash crop cultivation with an estimated palm oil tree count of 2607 trees.
3. The project's objective is to contribute to the supply chain of Homebase Properties Sdn Bhd by providing a reliable source of palm oil for various industries.
4. The palm oil plantation comprises several plantation blocks with crops planted with diverse range of planting years results in a varied age distribution among the trees, with the oldest trees being 18 years old and the youngest ones being 11 years old
5. The project operates with a licence from the Malaysian Palm Oil Board (PELESENAN 2005), allowing the sale and movement of palm oil fruits within legal standards.
6. The project area consists of palm oil plantation, pumpkin cash crop and a private fish pond which provide habitats for various plant and animal species, contributing to biodiversity conservation.
7. The plantation is easily accessible via existing dirt roads and logging roads, eliminating the need for new road construction or drainage systems.

Figure 2: Project Boundary in Sauk, Kuala Kangsar, Perak.

The project delimitation for **project activity 3 and 4** is as follows:

1. Both project activity 3 and 4 are operated by Greenton Plantation Sdn Bhd, owned by Besgrade Plywood Sdn Bhd. Located in Gurun, Kedah, the project area, known as Hock Kim Division, focuses on palm oil cultivation and production
2. The project operates with a licence from the Malaysian Palm Oil Board (PELESENAN 2005), allowing the sale and movement of palm oil fruits within legal standards.
3. Given a use permit issued by the Kedah State Forestry Department (KSFD) under Chapter 4 of Part IV National Forestry Act 1984 (NFA) (Amend.1993).
4. The project activity 3 covers a total area of 124.52 hectares allocated for palm oil plantations.
5. The project activity 4 covers a total area of 31.13 hectares of forest reserve area.

6. The project's objective is to contribute to the supply chain of Greenton Plantation Sdn Bhd by providing a reliable source of palm oil for various industries.
7. The project area is surrounded by palm oil plantation, durian orchard and a forested area which provide habitats for various plant and animal species, contributing to biodiversity conservation.
8. The plantation is easily accessible via existing dirt roads and within the project border, there are additional features such as orchards, forest reserve, TNB cable tracks, and some areas provided for the plantation workers.
9. The forest reserve is easily accessible via existing dirt roads and within the project border, there are additional features such as orchards, forest reserve, TNB cable tracks, and some areas provided for the plantation workers.

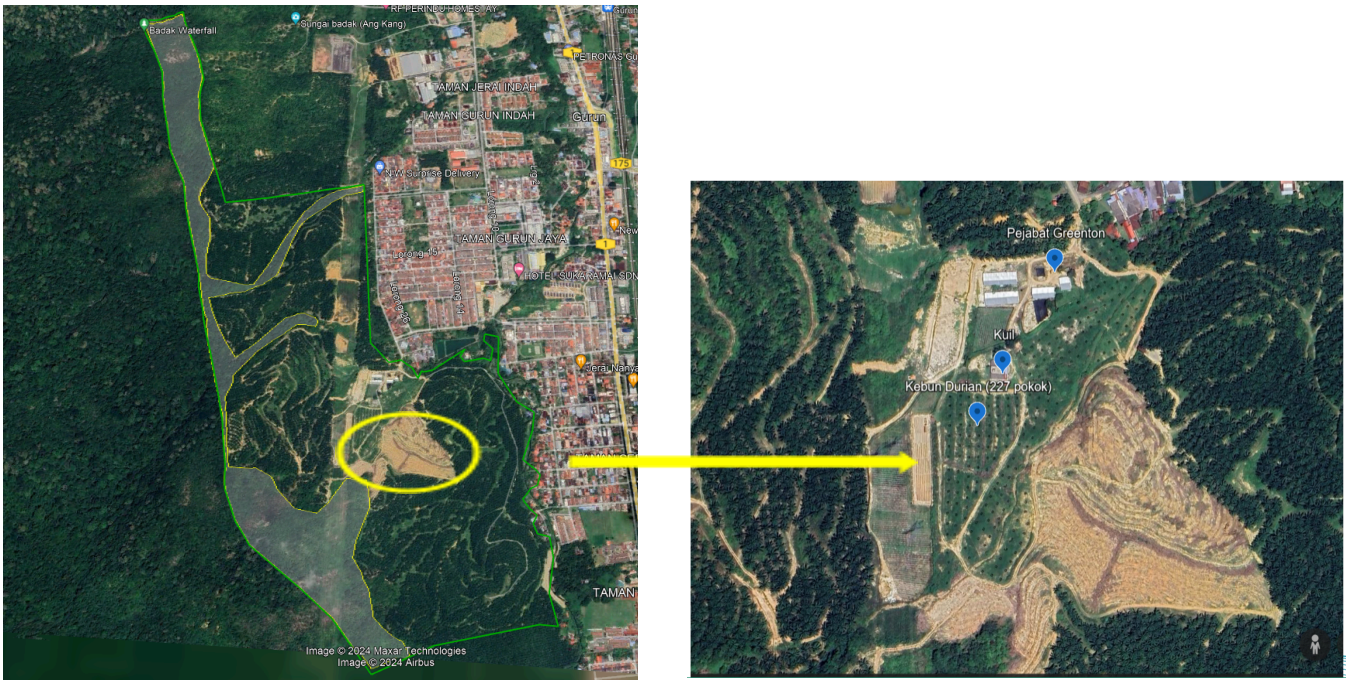


Figure 3: Project boundary and additional features within the project area.

3.2.1 *Spatial limits of the project*

Project Activity 1

Geographical Overview:

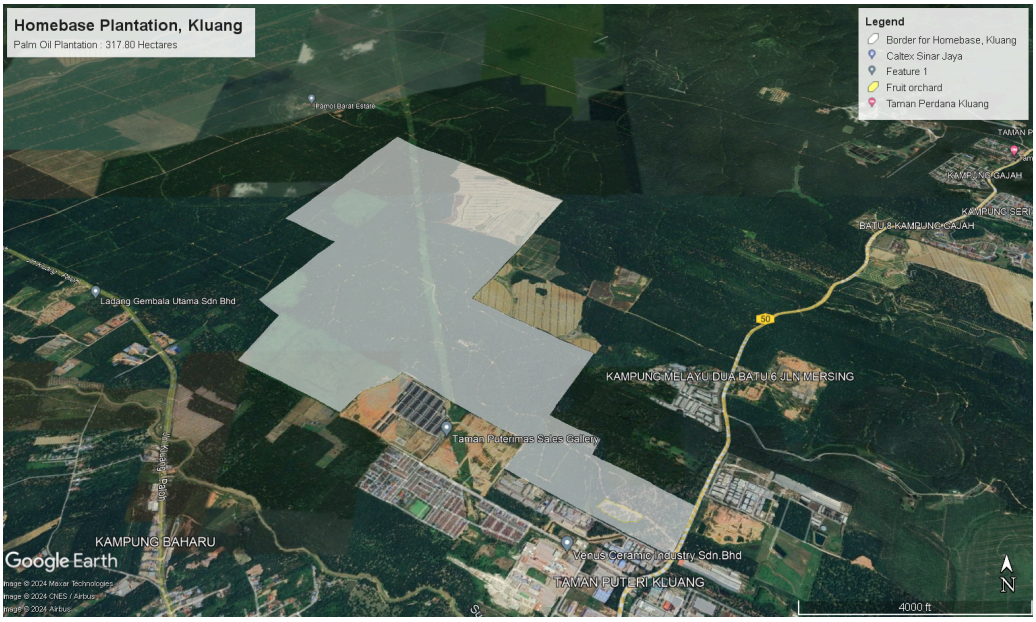


Figure 4: Project boundary for Homebase Palm Oil plantation in Kluang, Johor

Site-Specific Information:

Coordinates: 2°04'30"N, 103°21'58

Area: 321.73 hectares

Description: The entire area is planted with mature oil palm trees and immature oil palm trees that have held 4 distinct titles acquired in different years.

Project Activity 2

Figure 5: Project boundary for Palm Oil and Pumpkin Cash Crop in Sauk, Kuala Kangsar, Perak (referred to as 'Other Crop').

Site-Specific Information:

Coordinates: 4°58'43.8"N, 100°56'21.4"E

Area: 24.36 hectares

Description: The entire area is planted with mature oil palm trees that have produced and average age of the trees is 15 years and older.

Project Activity 3

Geographical Overview:

Figure 6 : Greenton Palm Oil Plantation area (unshaded area) within the project boundary of the KMZ image.

Site-Specific Information:

Coordinates : 4°58'43.8"N, 100°56'21.4"E

Area : 28 hectares

Description : The entire palm oil plantation is planted with mature oil palm trees that have produced an average age of the trees is 15 years and older and there is forest reserve area with a size of 31.13 hectare as well as durian orchard allocated in the middle of palm oil plantation.

Project Activity 4

Geographical Overview:

Figure 7 : Greenton forest reserve area (shaded area) within the project boundary of KMZ image.

Site-Specific Information:

Coordinates : 4°58'43.8"N, 100°56'21.4"E

Area : 31.13 hectares

Description : There is a forest reserve area in the shaded area with a size of 31.13 hectare. While there were also entire palm oil plantations in the area planted with mature oil palm trees that have produced an average age of the trees is 15 years and older, as well as a durian orchard allocated in the middle of palm oil plantation.

3.2.2 *Carbon reservoirs and GHG sources*

Project Activity 1,2,3 (Palm Oil Plantation):

The selection of carbon reservoirs to quantify changes in carbon stocks at the project boundaries are shown below:

Source or reservoir	Included (Yes/No/Optional)	Justification
Above-ground biomass	Yes	Carbon stock in this reservoir is expected to increase due to the implementation of the project activity.
Below-ground biomass	Yes	Carbon stock in this reservoir is expected to increase due to the implementation of the project activity.
Deadwood and litter	Optional	Carbon stock in this pool may increase due to the implementation of the project activity.
Soil organic carbon	Optional	Carbon stock in this pool may increase due to the implementation of the project activity.

The emission sources and associated GHGs selected for accounting are shown below:

Carbon reservoir	GHG	Included (Yes/No/Optional)	Justification
Burning of woody biomass	CO_2	No	CO2 emissions due to the burning of biomass are not accounted for as a change in carbon stock to adhere to the zero burning policy from project participants.
	CH_4	No	CH_4 emissions due to the burning of biomass are not accounted for as a change in carbon stock to adhere to the zero burning policy from project participants.

	N_2O	No	N_2O emissions due to the burning of biomass are not accounted for as a change in carbon stock to adhere to the zero burning policy from project participants.
Fertiliser application	CO_2	No	Carbon dioxide is not directly released during typical fertiliser application in palm oil plantations. However, indirect emissions may occur if land-use change or deforestation is associated with plantation establishment.
	CH_4	No	Methane is not directly linked to fertiliser application in plantations. Its production is more associated with anaerobic conditions.
	N_2O	Optional	The application of nitrogen-based fertilisers in plantations can lead to the release of nitrous oxide.

Project Activity 4:

The selection of carbon reservoirs to quantify changes in carbon stocks at the project boundaries are shown below:

Carbon reservoir	Included (Yes/No/Optional)	Justification
Above-ground biomass	Yes	Carbon stock in this reservoir is expected to increase due to the implementation of the project activity.
Below-ground biomass	Yes	Carbon stock in this reservoir is expected to increase due to the implementation of the project activity.
Deadwood and litter	Optional	Carbon stock in this pool may increase due to the implementation of the project activity.

Soil organic carbon	Optional	Carbon stock in this pool may increase due to the implementation of the project activity.

The emission sources and associated GHGs selected for accounting are shown below:

Carbon reservoir	GHG	Included (Yes/No/Optional)	Justification
Burning of woody biomass	CO_2	No	CO2 emissions due to the burning of biomass are not accounted for as a change in carbon stock to adhere to the zero burning policy from project participants.
	CH_4	No	CH_4 emissions due to the burning of biomass are not accounted for as a change in carbon stock to adhere to the zero burning policy from project participants.
	N_2O	No	N_2O emissions due to the burning of biomass are not accounted for as a change in carbon stock to adhere to the zero burning policy from project participants.

3.2.3 Time limits and analysis periods

The quantification periods are determined by the project proponent and must align with the selected methodology, relevant standards, and regulations. These timeframes are tailored to the type and attributes of the project, as well as the targeted standard and market. Generally, project timeframes encompass the following components:

1. Project Start Date

In the MY_BESGRADE_Q1/24 project, the project start date signifies the commencement of implementation, construction, or actual action of the GHG project. This date holds significance in determining the project's eligibility, additionality, and for calculating emission reductions or removals.

- Project Activity 1 start date : 1997

- Project Activity 2 start date : 2015
- Project Activity 3 start date : 2017
- Project Activity 4 start date : 8 Disember 2005

2. Project Lifetime

The project lifetime for MY_BESGRADE_Q1/24 denotes the period within which the project is expected to produce greenhouse gas (GHG) emission reductions or removals. This duration is established by the project proponent and should be both realistic and credible, taking into account various technical, economic, social, and environmental factors that could influence project performance and sustainability. Furthermore, the project lifetime must align with the guidelines and standards outlined by the selected methodology and pertinent regulations to ensure compliance and credibility.

- Project Activity 1 : 20 years
- Project Activity 2 : 20 years
- Project Activity 3 : 20 years
- Project Activity 4 : 20 years

3. MonitoringPeriod

The monitoring period for MY_BESGRADE_Q1/24 encompasses the timeframe during which the project's emission reductions or removals are systematically observed, documented, and reported. This duration is determined by the project proponent in alignment with the specified procedures and frequency delineated by the selected methodology, as well as pertinent standards and regulations. The monitoring period is structured to guarantee the accuracy, completeness, consistency, transparency, and verifiability of the project's data and records. Depending on the project's specific characteristics, the monitoring period may occur annually or at shorter intervals.

- Project Activity 1 : 6 - 8 months
- Project Activity 2 : 6 - 8 months
- Project Activity 3 : 6 - 8 months
- Project Activity 4 : 12 - 24 months

4. Verification Period

The verification period for MY_BESGRADE_Q1/24 denotes the duration during which the project's emission reductions or removals are subjected to validation and certification by an independent, qualified third-party verifier. This timeframe, established by the verifier, spans the entirety of the monitoring period and complies with the principles and criteria specified in the ISO 14064-3 standard for validating and verifying greenhouse gas assertions. While the length of the verification period may vary based on the project's type and characteristics, it typically mirrors the monitoring period, which may occur annually or at shorter intervals.

- Project Activity 1 : 2 months
- Project Activity 2 : 2 months
- Project Activity 3 : 2 months
- Project Activity 4 : 2 months

5. Crediting Period

The crediting period for MY_BESGRADE_Q1/24 represents the timeframe during which the project can produce certified emission reductions (CERs) or verified emission reductions (VERs) eligible for trading and utilization by other entities to meet their emission reduction obligations. This period is established by the project proponent and necessitates approval from the pertinent regulatory authority or body. It must conform to the guidelines and prerequisites outlined in the selected methodology, as well as relevant standards and regulations. The duration of the crediting period may vary based on the project's characteristics and can be either fixed or renewable.

- Project Activity 1 : 20 years
- Project Activity 2 : 20 years
- Project Activity 3 : 20 years
- Project Activity 4 : 20 years

This streamlined overview provides key insights into the temporal aspects of managing and verifying GHG emissions in the context of oil palm plantation projects.

3.2.3.1 Project start date

The project start date for a palm oil plantation marks the initiation of activities related to project implementation, construction, or any significant action. It holds pivotal importance in assessing eligibility, additionality, and quantifying emission reductions or removals. The specific start date may vary depending on the project's nature, characteristics, and applicable standards and market considerations. For GHG removal projects, like afforestation and reforestation, the start date typically coincides with the initiation of GHG project activities such as land acquisition, site preparation, planting, or monitoring.

Project Activities 1 and 2 commenced in 1997 and 2015, respectively, while Project Activities 3 and 4 began in 2016 and December 8, 2005, for forested areas. The offset project aims to establish a palm oil plantation on existing forests for Project Activities 1, 2, and 3, while protecting the forest reserve in Project Activity 4. The project holder signed the agreement and then conducted an initial survey. The goals of the initial survey are as follows:

1. To assess and gather significant details about the project area, laying the groundwork for effective planning and implementation.

2. To identify essential variables such as land use, existing vegetation, soil conditions, and potential carbon reserves.

3. To facilitate the calculation of baseline carbon levels and estimate the potential for carbon sequestration through reforestation or afforestation activities.

4. To select appropriate tree species, establish suitable monitoring and verification processes, and understand the socioeconomic background of the involved community.

5. To provide a comprehensive overview of the project area, enabling the development of a specific and sustainable carbon offset strategy aligned with environmental, social, and economic goals.

6. To develop the Project Design Document (PDD), a comprehensive document outlining the project's design, methodology, baseline emissions, and anticipated emissions reductions for successful project implementation.

3.2.3.2 Quantification period of GHG emission reductions

The crediting period denotes the duration for quantifying GHG emission removals and/or reductions, varying based on the project type. It represents the period during which the project can generate certified emission reductions (CERs) or verified emission reductions (VERs), tradable and usable by other entities to fulfil their emission reduction targets or obligations. Determined by the project proponent, the crediting period requires approval from the responsible authority or organisation, while also adhering to the guidelines and requirements of the selected methodology, as well as relevant standards and regulations.

According to section 10.5 of the BCR Standard, activities in the AFOLU sector, specifically MY_BESGRADE_Q1/24, have a quantification period of GHG emission removals/reductions of 20 years for all project activities. The starting and ending dates for each activity vary, as indicated in the table below:

Table 1: The starting and ending date of quantification of GHG emission removals/reductions for all projects.

Project Name	Commencement Date	Final Date
Project Activity 1	1 November 2023	1 November 2043
Project Activity 2	1 November 2023	1 November 2043
Project Activity 3	1 November 2023	1 November 2043
Project Activity 4	1 November 2023	1 November 2043

3.2.3.3 Monitoring periods

In MY_BESGRADE_Q1/24, the monitoring period plays a crucial role in ensuring the continuous success and efficacy of the palm oil plantation project. Periodic monitoring activities are conducted to assess and validate various parameters, including carbon sequestration, biodiversity conservation, and overall project performance. It's essential to acknowledge that the monitoring period may vary based on factors such as project size, location, and duration.

In the context of MY_BESGRADE_Q1/24, the monitoring period is tailored to suit the specific requirements of a palm oil plantation. Given the project's nature, monitoring

activities are initially more frequent during the plantation's establishment phase and subsequently carried out at regular intervals to track progress and evaluate environmental impacts.

As per the proposed project timeline, the monitoring period for Project Activities 1, 2, and 3 typically ranges from **6 to 8 months** for organised plantation areas. This time frame allows for a comprehensive assessment and verification of carbon sequestration efforts, biodiversity conservation measures, and overall project performance within the plantation areas. Regular monitoring activities enable the prompt identification and resolution of any potential issues, ensuring the project's ongoing efficacy and compliance with environmental standards.

- **Project Activity 1, 2 and 3:**

1. **Baseline Monitoring Period**

- Purpose : Establish the baseline emissions or removals scenario.
- Duration : Data collection and analysis over a specific historical period are required prior to project implementation, which takes approximately 1 month.
- Activities :

- Assess historical land use, carbon stocks, and emissions data to determine the baseline against which the project's performance will be measured.

2. **Implementation Monitoring Period**

- Purpose : Observe and document the actual implementation of project activities.
- Duration : Starts at the commencement of reforestation or afforestation activities and continues throughout the implementation phase, which takes approximately 2 months.
- Activities :

- Monitor tree planting, maintenance, and other relevant activities.
- Collect data on survival rates, growth, and any unexpected events that may affect project outcomes.

3. **Growth and Sequestration Monitoring Period**

- Purpose : Track the growth of planted trees and the sequestration of carbon.
- Duration : Typically takes approximately 2 months, depending on the chosen accounting period and project lifespan.
- Activities :

- Regular measurement of tree growth, biomass, and carbon sequestration. This may involve periodic field measurements, remote sensing, or other monitoring techniques.

4. **Verification Monitoring Period**

- Purpose : Prepare for and conduct third-party verification.
- Duration : Occurs periodically in preparation for verification, which takes approximately 2 months.
- Activities :
  - Ensure that all required data is collected and maintained according to the chosen methodology and project requirements.
  - Prepare documentation for verification.

5. **Verification Period**

- Purpose : Independent assessment of the project's adherence to standards and methodologies.
- Duration : Occurs at defined intervals, often takes approximately 2 months.
- Activities :
  - Third-party auditors assess project documentation, conduct site visits, and verify that the project is meeting the requirements set by the chosen standard.

6. **Reporting Period**

- Purpose : Report the project performance and outcomes.
- Duration : Typically aligned with verification periods, which takes approximately 2 months.
- Activities :
  - Compile and submit comprehensive reports that detail the project's performance, emissions reductions, and other relevant information.

However, timeline for project activity 4 will undergo **12-24 months** for forested areas for organised plantation according to the:

- **Project Activity 4:**

1. **Baseline Monitoring Period**

- Purpose : Establish the baseline emissions or removals scenario.

- Duration : Data collection and analysis over a specific historical period are required prior to project implementation, which takes approximately 3 months.
- Activities :
    - Assess historical land use, carbon stocks, and emissions data to determine the baseline against which the project's performance will be measured.

2. **Implementation Monitoring Period**
    - Purpose : Observe and document the actual implementation of project activities.
    - Duration : Starts at the commencement of reforestation or afforestation activities and continues throughout the implementation phase, which takes approximately 6 months.
    - Activities :
        - Monitor tree planting, maintenance, and other relevant activities.
        - Collect data on survival rates, growth, and any unexpected events that may affect project outcomes.

3. **Growth and Sequestration Monitoring Period**
    - Purpose : Track the growth of planted trees and the sequestration of carbon.
    - Duration : Typically takes approximately 6 months, depending on the chosen accounting period and project lifespan.
    - Activities :
        - Regular measurement of tree growth, biomass, and carbon sequestration. This may involve periodic field measurements, remote sensing, or other monitoring techniques.

4. **Verification Monitoring Period**
    - Purpose : Prepare for and conduct third-party verification.
    - Duration : Occurs periodically in preparation for verification, which takes approximately 2 months.
    - Activities :
        - Ensure that all required data is collected and maintained according to the chosen methodology and project requirements.
        - Prepare documentation for verification.

5. **Verification Period**
    - Purpose : Independent assessment of the project's adherence to standards and methodologies.

- Duration : Occurs at defined intervals, often takes approximately 2 months.
- Activities :
    - Third-party auditors assess project documentation, conduct site visits, and verify that the project is meeting the requirements set by the chosen standard.

6. Reporting Period

- Purpose : Report the project performance and outcomes.
- Duration : Typically aligned with verification periods, which takes approximately 2 months.
- Activities :
    - Compile and submit comprehensive reports that detail the project's performance, emissions reductions, and other relevant information.

3.3 Identification and description of the baseline or reference scenario

The project baseline for MY_BESGRADE_Q1/24 is a forested area. Establishing a palm oil plantation within MY_BESGRADE_Q1/24 necessitates formulating a baseline scenario accurately depicting greenhouse gas (GHG) emissions and environmental impacts associated with the initial forested area. This scenario serves as a crucial benchmark, illustrating the GHG emissions persisting in the absence of the palm oil project, facilitating evaluation of the project's overall GHG emission impact.

Step 1: Identification of alternative land use scenarios

<u>Project Activities 1, 2 & 3</u>

Transitioning from a forest reserve to a palm oil plantation in MY_BESGRADE_Q1/24 could significantly impact the environment and local communities. Without sustainable management practices, this conversion could lead to biodiversity loss, soil degradation, and water resource depletion due to intensive agricultural activities and chemical usage. Such changes may disrupt the local ecosystem and escalate GHG emissions, particularly if involving clearing high carbon areas like peatlands.

Moreover, this transformation could affect local livelihoods and trigger conflicts over land rights. However, adopting sustainable practices and adhering to standards like the Malaysia Sustainable Palm Oil (MSPO) certification can help mitigate these challenges. By implementing methods such as agroforestry and environmentally friendly farming

techniques, the project can safeguard biodiversity, support local communities, and contribute to the long-term well-being of the region.

Project Activity 4

An alternative land-use scenario involves expanding forested areas into palm oil plantation areas. This transformation could lead to rampant deforestation due to unmanaged forested areas and unsustainable human activities. Clear-cutting for agricultural purposes or logging may become prevalent, resulting in the loss of valuable biodiversity, disruption of crucial ecosystem services, and degradation of soil and water quality. The absence of proper conservation measures and regulatory oversight might foster exploitation of the forest's resources without consideration for long-term sustainability. Such a scenario could significantly contribute to increased carbon emissions, exacerbating climate change and negatively impacting local communities reliant on the forest for their livelihoods, further diminishing the overall well-being of the region. However, by designating the forested area within the palm oil plantation project boundary as a buffer zone, the project aims to mitigate these adverse effects and promote sustainable land use practices.

Step 2: Investment Analysis

Investing in short-term activities like logging or intensive agriculture may yield immediate financial gains but can result in significant long-term disadvantages. These practices pose risks of depleting natural resources and harming ecosystems. Environmental degradation may escalate costs associated with soil rehabilitation, water treatment, and loss of vital ecosystem services. Furthermore, biodiversity deterioration and disruption of climate regulation can have broader economic repercussions, including increased healthcare expenses due to environmental degradation.

Step 3: Barrier Analysis

Barrier analysis for transitioning from a forest reserve to palm oil cultivation reveals several challenges. Key obstacles include inadequate enforcement of land use and agricultural regulations, permitting unsustainable practices detrimental to the environment. Moreover, insufficient engagement of local communities and stakeholders in the transition process can hinder adoption of sustainable methods. A lack of awareness and understanding about the advantages of sustainable palm oil production among both the local population and policymakers may also impede efforts to implement effective conservation and sustainable farming practices.

Step 4: Impact of Project Registration

Barrier analysis for transitioning from a forested area to palm oil cultivation underscores several challenges. Chief among these is inadequate enforcement of land use and agricultural regulations, allowing unsustainable practices posing environmental risks. Furthermore, limited engagement of local communities and stakeholders in the transition process may hinder uptake of sustainable methods. Additionally, a lack of awareness and understanding regarding the advantages of sustainable palm oil production among both the local populace and policymakers could further hinder efforts to promote effective conservation and sustainable farming practices..

3.4 Additionality

To demonstrate the additionality of the MY_BESGRADE_Q1/24 project following the "Baseline and Additionality Guidance" from the BioCarbon Registry, we initially construct a baseline scenario imagining the absence of the project's implementation. This baseline typically reflects non-sustainable land use practices, lacking advanced sustainable land management approaches.

In our additionality assessment, we meticulously evaluate the project's specific conditions and market dynamics to ensure that the emission reductions are genuinely additional to what would occur without our intervention. This entails analysing the economic viability of sustainable practices, understanding regulatory frameworks, and assessing alternative land use options. By comparing the project's emission reductions with the baseline scenario, we verify that our project delivers substantial incremental environmental benefits.

Our assessment is underpinned by comprehensive documentation, including project planning records and stakeholder consultations, ensuring transparency and robust justification for our additionality claims. We thoroughly document our assumptions and methodologies, providing clear evidence of our project's role in surpassing baseline emission levels.

Furthermore, we confirm that the project's emission reductions do not result from mandatory legal actions or regulations, affirming that our activities exceed mere compliance and genuinely contribute to environmental sustainability.

In addition to environmental impacts, the project fosters economic benefits by embracing sustainable land management practices, enhancing land productivity and resilience, thereby ensuring long-term profitability for landowners and stakeholders. By establishing additionality, we mitigate carbon credit risks associated with the unmanaged approach of the baseline scenario, presenting MY_BESGRADE_Q1/24 as an appealing and viable opportunity for investors.

3.5 Uncertainty management

The principle of conservative attitude, as outlined in the ISO 14064-1 standard, guides the quantification and reporting of greenhouse gas emissions and removals. It emphasises selecting assumptions, values, and procedures that prevent the overestimation of the climate impact of the project.

In alignment with this principle, the project adopts conservative approaches to ensure accurate estimation of emission reductions and increases in GHG removals. Examples of how the project applies this principle include:

1. Utilising default values and parameters from the IPCC Guidelines for National Greenhouse Gas Inventories and the IPCC Good Practice Guidance for Land Use, Land-Use Change, and Forestry (LULUCF) to estimate carbon stocks and emission factors in the project area.

2. Accounting for leakage resulting from the displacement of pre-project activities and fossil fuel use for transportation and machinery. The project employs procedures and equations from the selected methodology to calculate leakage, subtracting it from the achieved emission reductions or removals. Conservative assumptions and values are employed to estimate leakage, preventing underestimation of emissions occurring beyond the project boundary.

3. Establishing mechanisms to manage uncertainty in baseline and mitigation results quantification. Uncertainty, representing doubt or variability in emission reductions or removals estimation, is addressed through the following measures:

- Applying a 15% discount factor to national data for above-ground and below-ground biomass, based on default values and parameters from the selected methodology. This discount factor reduces claimed emission reductions or removals, considering uncertainty levels and confidence intervals. It ensures accurate reporting without overestimation, thereby demonstrating a net positive climate impact.

3.6 Leakage and non-permanence

Applying the principles of AR-ACM0003 with AR-Tool15 A/R Methodological Tool, Version 2.0, potential leakage is identified as unintended environmental impacts displaced to other areas due to the implementation of the project. For MY_BESGRADE_Q1/24, which involves the kelampayan logging area nearby the project boundary, leakage could manifest through several pathways:

1. Indirect Land Use Change:

The expansion of palm oil plantations for project activities 1, 2, and 3 may result in the conversion of other land types, such as forests or natural habitats, into agricultural land. This could potentially increase deforestation or habitat loss in those areas.

2. Infrastructure Development:

The development of roads and processing facilities for palm oil projects can lead to the utilisation of more land for farming or other activities nearby. This may have adverse environmental impacts on those areas.

Project Activity 1:

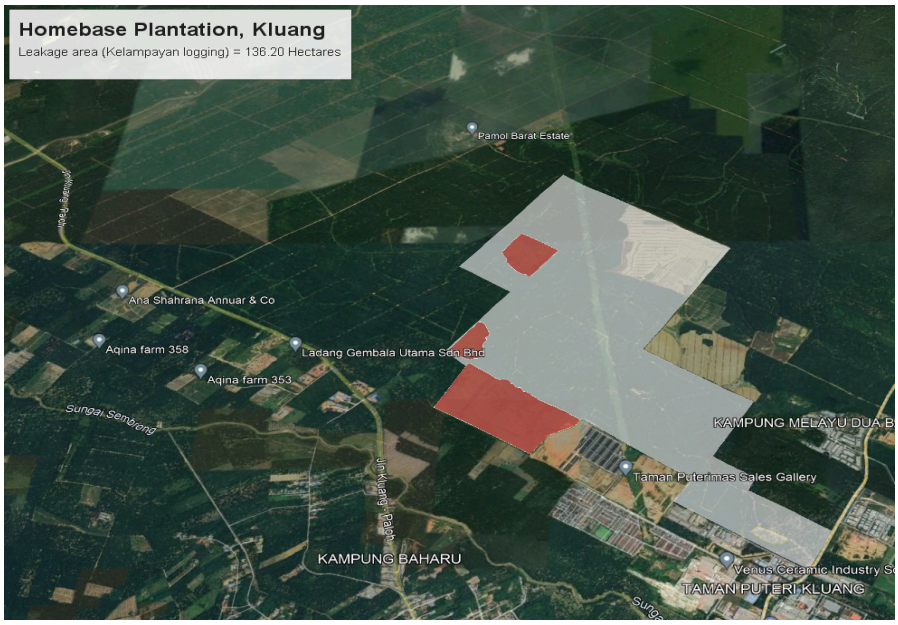


Figure 8: The figure depicts the plantation area's leakage area in Kluang, Johor.

Project Activity 3:

Figure 9 : The palm oil plantation has a potential leakage area (shaded in red) in Gurun, Kedah.

Risks of Potential Leakage in Palm Oil Plantation:

1. Economic Impacts:

Leakage could undermine sustainable development efforts by encouraging unsustainable land uses, thereby affecting ecosystem services vital for local economies and livelihoods.

2. Environmental Impacts:

Potential leakage may lead to increased deforestation, loss of biodiversity, and environmental degradation outside the project area, thereby undermining conservation efforts.

3. Social Impacts:

Leakage could result in displacement, loss of traditional land rights, and conflicts over land use if it alters land management practices in neighbouring communities.

Addressing these leakage risks requires meticulous planning and the implementation of mitigation strategies. These may include establishing buffer zones, adopting sustainable land management practices, and engaging stakeholders. These measures ensure that the MY_BESGRADE_Q1/24 project contributes positively to local sustainability and conservation goals.

The leakage emission resulting from the activities displacement is estimated as follows:

$$LK_t = LK_{AGRIC,t}$$

$$LK_{AGRIC,t} = \frac{44}{12} \times (\Delta C_{BIoMASS,t} + \Delta SOC_{LUC,t}) \quad \text{E (1)}$$

$$\Delta C_{BIoMASS,t} = [1.1 \times b_{TREE} \times (1 + R_{TREE}) + b_{SHRUB} \times (1 + RS)] \times CF \times A_{DISP,t} \quad \text{E (2)}$$

$$\Delta SOC_{LUC,t} = SOC_{REF} \times (f_{LUP} \times f_{MGP} \times f_{INP} - f_{LUD} \times f_{MGD} \times f_{IND}) \times A_{DISP,t} \quad \text{E (3)}$$

Where,

LK_t = Leakages t; tCO2-e

$LK_{AGRIC,t}$ = Leakage emission result from agricultural activities displacement in year t; tCO2-e

$\Delta C_{BIoMASS,t}$ = Decrease in carbon stock in the carbon pools of the land receiving the activity displaced in year t; t d.m.

Note. The factor of 1.1 is used to account for the carbon stock in the dead wood and litter pools as a fixed percentage of the carbon stock in living trees.

CF = Carbon fraction of woody biomass; dimensionless.

A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.

$A_{DISP,t}$ = Area of land from which agricultural activity is being displaced in year t; ha

b_{TREE} = Mean above-ground tree biomass in land receiving the displaced activity; t d.m. ha-1

The value of this parameter is obtained by applying one of the applicable methods from the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" to the land receiving the displaced activity.

Where the land receiving the displaced activity is unidentified, value of *bTREE* is set equal to the applicable value of mean above- ground biomass in forest in the region or country where the A/R CDM project activity is located, as obtained from Table 3A.1.4 of the IPCC

Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC GPG-LULUCF 2003) unless transparent and verifiable information can be provided to justify a different value.

R_{TREE} = Root-shoot ratio for trees in the land receiving the displaced activity; dimensionless.

A default value of 0.25 is used unless transparent and verifiable information can be provided to justify a different value.

b_{SHRUB} = Mean above-ground shrub biomass in land receiving the displaced activity; t d.m. ha-1.

The value of this parameter is obtained by applying one of the applicable methods from the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" to the land receiving the displaced activity.

R_s = Root-shoot ratio for shrubs in the land receiving the displaced activity; dimensionless.

The default value of 0.40 is used unless transparent and verifiable information can be provided to justify a different value.

$\Delta SOC_{LUC,t}$ = Change in soil organic carbon (SOC) stock due to land-use change in the land receiving the displaced activity in year t; tC ha-1.

The value of this parameter may be set to zero if:

(a) The only displaced activity being received in the land is grazing activity; or
(b) The value of the parameter as estimated from Equation (3) is less than zero (i.e. negative)

SOC_{REF}	=	SOC stock corresponds to the reference condition in native lands by climate region and soil type applicable to the land receiving the displaced activity; t C ha-1. The value of this parameter is taken from Table 3 of the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities".
$f_{LUP}, f_{MGP}, f_{INP}$	=	Relative SOC stock change factors for land-use, management practices, and inputs respectively, applicable to the receiving land before the displaced activity is received; dimensionless. The value of these parameters is taken from Tables 4, 5, and 6 of the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities".
$f_{LUD}, f_{MGD}, f_{IND}$	=	Relative SOC stock change factors for land-use, management practices, and inputs respectively, applicable to the receiving land after the displaced activity has been received; dimensionless. The value of these parameters is taken from Tables 4, 5, and 6 of the "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities".
t	=	1, 2, 3, …years elapsed since the start of the A/R CDM project activity

The leakage is calculated as:

$$LK_{AGRIC,t} = \frac{44}{12} \times (\Delta C_{BIoMASS,t} + \Delta SOC_{LUC,t})$$

$$\Delta C_{BIoMASS,t} = [1.1 \times b_{TREE} \times (1 + R_{TREE}) + b_{SHRUB} \times (1 + RS)] \times CF \times A_{DISP,t}$$

$$\Delta SOC_{LUC,t} = SOC_{REF} \times (f_{LUP} \times f_{MGP} \times f_{INP} - f_{LUD} \times f_{MGD} \times f_{IND}) \times A_{DISP,t}$$

However, the plantation land reserve near the forest reserve area would generally not be considered leakage for project activity 3 and 4, where it does not lead to unintended negative environmental impacts. This is because the land reserve area is well- managed with a proper agricultural practice which can enhance agricultural productivity, it also when the establishment of a land reserve within a forest reserve area leads to increased deforestation that enhances carbon sequestration through increased biomass production and soil carbon storage. In addition, it would contribute positively to carbon sequestration and biodiversity conservation efforts.

3.7 Mitigation results

ISO 14064-3:2019 is a standard that specifies how to verify and validate greenhouse gas (GHG) statements, especially those relating to climate change mitigation efforts. Some significant points to justify and demonstrate the verifiability of mitigation results within the framework of ISO 14064-3:2019 based on MY_BESGRADE_Q1/24 are:

1. **Project Design and Planning (ISO 14064-3:2019, Section 5.1):**
   - Provide a detailed project design and planning documentation that includes a clear description of the reforestation or afforestation activities.
   - Clearly define the project boundary, scope, and the baseline scenario against which the emission reductions or removals will be measured.
2. **Monitoring and Measurement (ISO 14064-3:2019, Section 5.2):**
   - Implement a robust monitoring and measurement plan that includes both direct and indirect measurements of GHG emissions or removals associated with the project.
   - Use appropriate and accurate measurement techniques, tools, and methodologies to ensure the reliability of data collected.

3. **Data Management (ISO 14064-3:2019, Section 5.3):**
   - Establish a comprehensive data management system to store and manage all relevant data related to the project.
   - Ensure transparency and traceability of data, allowing for independent verification and validation.
4. **Uncertainty and Quality Management (ISO 14064-3:2019, Section 5.4):**
   - Address and quantify uncertainties associated with data, measurement methods, and assumptions in the project.
   - Implement quality management procedures to ensure the accuracy and reliability of data.
5. **Completeness and Consistency (ISO 14064-3:2019, Section 5.5):**
   - Ensure that the project's emissions or removals are complete by including all relevant sources and sinks within the defined project boundary.
   - Verify consistency in data and calculations to avoid errors or discrepancies.
6. **Verification (ISO 14064-3:2019, Section 5.6):**
   - Engage an independent third-party verifier to assess the project's adherence to the standard and the accuracy of the reported data.
   - Provide the verifier with access to all necessary documentation, data, and information required for a thorough evaluation.

7. **Validation (ISO 14064-3:2019, Section 5.7):**
   - Demonstrate that the project activities have achieved the anticipated emission reductions or removals by comparing the actual performance against the baseline scenario.
   - Ensure that any deviations from the expected outcomes are properly documented and explained.
8. **Reporting (ISO 14064-3:2019, Section 5.8):**
   - Develop a comprehensive and transparent report that communicates the project's results, methodologies, and any relevant findings from the verification process.
   - Comply with the reporting requirements outlined in the standard.

By following the guidelines outlined in ISO 14064-3:2019, project activities can demonstrate the verifiability of mitigation results achieved through reforestation and afforestation projects based on MY_BESGRADE_Q1/24, thereby providing a strong framework for assessing and validating the environmental benefits of these activities.

3.7.1 Eligible areas within GHG project boundaries (AFOLU sector projects)

The MY_BESGRADE_Q1/24 project strictly conforms to the specified geographical boundaries defined by the "BCR0001: Quantification of GHG Removal - ARR, Version 4.0" methodology. To demonstrate compliance with the land cover/land use categories delineated in the methodology and relevant definitions within the country, we conducted an extensive analysis of land cover/land use across various time periods.

1. **Ensuring Compliance with Land Use Categories:**

Our analysis aligns with the precise definitions and classifications of land use established in the nation where the project operates. Collaboration with local authorities and experts has ensured that our recognized land cover/land use categories precisely adhere to the methodology's standards. This compliance is crucial for accurately quantifying the reductions in greenhouse gas emissions associated with our GHG removal activities.

2. **Adherence to Land Cover Presence/Absence Condition:**

We meticulously adhere to the land cover presence/absence condition outlined by the BioCarbon Registry (BCR) Standard's reference data set and the relevant methodology. Through thorough analysis of satellite data and ground truthing, we have confirmed the presence of specific land covers within our project boundaries, ensuring compliance with both the methodology and BCR Standard standards.

3. **Identification Based on Applicable Classifications:**

To demonstrate adherence to country-specific land use and land cover classifications, we apply globally accepted criteria established by organisations such as ISO. Our handling of geographic data fully complies with these standards, ensuring interoperability, accuracy, and reliability in the analysis and presentation of land cover/land use information.

3.7.2 Stratification (Projects in the AFOLU sector)

In the case of MY_BESGRADE_Q1/24, stratification in project activities 1, 2, and 3 for palm oil cultivation is essential for refining the accuracy of carbon stock change assessments. This method involves dividing the project land into distinct strata or segments, each with unique attributes and carbon storage capacities. By stratifying the land, we aim to improve the precision of estimating greenhouse gas reductions and

carbon removals, capturing the nuances present across different sections of the plantation.

1. **Strategic Layout Planning for Palm Oil Plantations:**

Transitioning from a forest reserve to palm oil cultivation requires careful planning to ensure effective and sustainable production. Categorising the land based on palm tree species, growth stages, and soil attributes is crucial for optimising palm growth, increasing yields, and maximising land use efficiency. This approach facilitates the implementation of precise farming practices, such as targeted fertilisation and pest control, to enhance productivity while maintaining environmental standards. Considering the land's historical association with being a forest reserve, it's essential to evaluate past conditions and impacts on soil health and landscape to mitigate environmental impacts effectively.

2. **Baseline Scenario and With-Project Stratification:**

The baseline scenario considers the land's natural conditions and past non-agricultural uses, focusing on areas adjacent to the kelampayan area and local orchards such as durian and jackfruits. Our goal is to convert these areas into productive palm oil plantations by implementing advanced and environmentally friendly farming methods, ensuring both high productivity and environmental protection. The project progresses in planned phases in collaboration with local environmental authorities, tailoring each section for optimal palm oil cultivation. By locating near forest reserves and durian orchards, we demonstrate our commitment to conserving biodiversity and ecosystem services, emphasising sustainable practices to minimise the impact on surrounding natural areas and communities.

3. **Optimising Accuracy in Palm Oil Plantations:**

Accuracy sampling involves on-site assessments of palm oil tree parameters, such as tree count and general condition. Quantitative models integrate satellite data and on-site measurements obtained through extensive surveys, drone flying, and mapping during the initial survey to capture rubber growth dynamics. Continuous monitoring responds to the specific features of a rubber plantation, ensuring accuracy in analysing carbon stock changes over time.

4. Tailoring the Approach:

Integrating field surveys with drone technology and mapping techniques creates a synergistic approach for optimising accuracy in estimating GHG reductions/removals in palm oil plantations. This combination allows for a more thorough and reliable assessment of carbon dynamics, supporting sustainable forest management practices and contributing to effective climate change mitigation strategies. Our project aims to precisely analyse and increase carbon sequestration activities within plantations by focusing on tree features, land use, and sustainable practices, ensuring the success of the palm oil plantation in project activities 1, 2, and 3, 4.

3.7.3 GHG emissions reduction/removal in the baseline scenario

In order to ensure precise and transparent quantification, the MY_BESGRADE_Q1/24 projects fully follow the requirements provided in "BCR0001: Quantification of GHG Removal - ARR, Version 4.0." To ensure accuracy and clarity, our measurement and calculation methods use extensive approaches that include key data, parameters, equations, and other elements.

The baseline scenario can be calculated as follows:

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t} \quad \text{E(1)}$$

Where:

$\Delta C_{BSL,t}$ = Baseline net GHG removals by sinks in year t; t CO_2-e

$\Delta C_{TREE\_BSL,t}$ = Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e

$\Delta C_{SHRUB\_BSL,t}$ = Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon

stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e

$\Delta C_{DW\_BSL,t}$ = Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in deadwood and litter in A/R CDM project activities"; t CO2-e

$\Delta C_{LI\_BSL,t}$ = Change in carbon stock in baseline litter biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in deadwood and litter in A/R CDM project activities"; t CO2-e

Change in carbon stock in tree biomass within the project boundary at the baseline:

$$\Delta C_{TREE\_BSL,t} = \sum_{i=1}^{M} \Delta C_{TREE\_BSL,i} \qquad E(2)$$

$$\Delta C_{TREE\_BSL,i} = \frac{44}{12} \times CF_{TREE} \times \Delta b_{FOREST} \times (1 + R_{TREE}) \times CC_{TREE\_BSL,i} \times A_i \qquad E(3)$$

Where:

$\Delta C_{TREE\_BSL,t}$ = Mean annual change in carbon stock in trees in the baseline; tCO2e yr-1

$\Delta C_{TREE\_BSL,i}$ = Mean annual change in carbon stock in trees in the baseline, in baseline stratum i; t CO2e yr-1

CF_{TREE} = Carbon fraction of tree biomass; t C (t.d.m.)-1.

A default value of 0.47 t C (t.d.m.)-1 is used unless transparent and verifiable information can be provided to justify a different value.

Δb_{FOREST} = Default means annual increment of above-ground biomass in forest in the region or country where the A/R CDM project activity is located; t d.m. ha-1 yr-1.

Values of ΔbF_{OREST} are taken from Table 3A.1.5 of the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC GPG-LULUCF 2003) unless transparent and verifiable information can be provided to justify different values.

Note. Tree biomass may reach a steady state in which biomass growth becomes zero or insignificant, either because of biological maturity of trees or because the rate of anthropogenic biomass extraction from the area is equal to the rate of biomass growth. Therefore, this parameter should be taken to be zero after the year in which tree biomass in the baseline reaches a steady state. The year in which tree biomass in the baseline reaches a steady-state is taken to be the 20th year from the start of the CDM project activity, unless transparent and verifiable information can be provided to justify a different year.

R_{TREE} = Root-shoot ratio for the trees in the baseline; dimensionless.

A default value of 0.25 is used unless transparent and verifiable information can be provided to justify a different value.

$CC_{TREE\_BSL,i}$ = Crown cover of trees in the baseline, in baseline stratum i, at the start of the A/R CDM project activity, expressed as a fraction(e.g. 10 percent crown cover implies $CCTREE\_BSL,i$ = 0.10); dimensionless.

A_i = Area of baseline stratum i, delineated on the basis of tree crown cover at the start of the A/R CDM project activity; ha

Change in carbon stock in shrub biomass within the project boundary at the baseline:

$$C_{SHRUB,t} = \frac{44}{12} \times CF_S \times (1 + R_S) \times \sum_{i=1} A_{SHRUB,i} \times b_{SHRUB,i} \quad \text{E(4)}$$

$$b_{SHRUB,i} = BDR_{SF} \times b_{FoREST} \times CC_{SHRUB,i} \quad \text{E(5)}$$

$$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1} \quad \text{E(6)}$$

Where,

$C_{SHRUB,t}$ = Carbon stock in shrubs within the project boundary at a given point of time in year t; t CO2-e

CF_S = Carbon fraction of shrub biomass; t C (t.d.m.)-1.

A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.

R_s = Root-shoot ratio for shrubs; dimensionless.

The default value of 0.40 is used unless transparent and verifiable information can be provided to justify a different value.

$A_{SHRUB,i}$ = Area of shrub biomass estimation stratum i; ha

$b_{SHRUB,i}$ = Shrub biomass per hectare in shrub biomass estimation stratum i; t d.m. ha-1

BDR_{SF} = Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 (i.e. 100 per cent) and the default above-ground biomass content per hectare in forest in the region/country where the A/R CDM project activity is located; dimensionless.

A default value of 0.10 should be used unless transparent and verifiable information can be provided to justify a different value.

b_{FOREST} = Default above-ground biomass content in forest in the region/country where the A/R CDM project activity is located; t d.m. ha-1.

Values from Table 3A.1.4 of IPCC GPG-LULUCF 2003 are used unless transparent and verifiable information can be provided to justify different values.

$CC_{SHRUB,i}$ = Crown cover of shrubs in shrub biomass estimation stratum i at the time of estimation, expressed as a fraction (e.g. 10 percent crown cover implies $CCSHRUB,i$ = 0.10); dimensionless

Change in carbon stock in deadwood within the project boundary at the baseline:

$$C_{DW,i,t} = C_{TREE,i,t} \times DF_{Dw} \quad \text{E(7)}$$

$$dC_{DW,(t_1,t_2)} = \frac{C_{DW,t_2} - C_{DW,t_1}}{T} \quad \text{E(8)}$$

$$\Delta C_{DW,t} = dC_{DW,(t_1,t_2)} \times 1 \text{ year for } t_1 \le t \le t_2 \quad \text{E(9)}$$

Where:

$C_{DW,i,t}$	=	Carbon stock in deadwood in stratum i at a given point of time in year t; t CO2e
$C_{TREE,i,t}$	=	Carbon stock in trees biomass in stratum i at a point of time in year t, as calculated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2e
DF_{DW}	=	Conservative default factor expressing carbon stock in deadwood as a percentage of carbon stock in tree biomass, percent A default value of 0.37 t C t-1 d.m. may be used unless transparent and verifiable information can be provided to justify a different value
i	=	1, 2, 3. … biomass estimation strata within the project boundary
v	=	1, 2, 3. … years elapsed since the start of the project activity
$dC_{DW,(t1,t2)}$	=	Rate of change in carbon stock in dead wood within the project boundary during the period between a point of time in year t1 and a point of time in year t2; t CO2e yr-1
$C_{DW,t2}$	=	Carbon stock in dead wood within the project boundary at a point of time in year t2; t CO2e
$C_{DW,t1}$	=	Carbon stock in dead wood within the project boundary at a point of time in year t1; t CO2e
T	=	Time elapsed between two successive estimations (T=t2 – t1); yr

$\Delta C_{DW,t}$ = Change in carbon stock in dead wood within the project boundary in year t; t CO2e

Change in carbon stock in a litter within the project boundary at the baseline:

$$C_{LI,i,t} = C_{TREE,i,t} \, x \, DF_{LI} \quad \text{E(10)}$$

$$C_{LI,(t_1,t_2)} = \frac{C_{LI,t_2} - C_{LI,t_1}}{T} \quad \text{E(11)}$$

$$\Delta C_{DW,t} = dC_{LI,(t_1,t_2)} \times 1 \text{ year for } t_1 \leq t \leq t_2 \quad \text{E(12)}$$

Where:

$C_{DW,i,t}$ = Carbon stock in deadwood in stratum i at a given point of time in year t; t CO2e

$C_{LI,i,t}$ = Carbon stock in trees biomass in stratum i at a point of time in year t, as calculated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2e

$C_{TREE,i,t}$ = Conservative default factor expressing carbon stock in deadwood as a percentage of carbon stock in tree biomass, percent

A default value of 0.37 t C t-1 d.m. may be used unless transparent and verifiable information can be provided to justify a different value

DF_{LI}	=	Conservative default factor expressing carbon stock in the litter as a percentage of carbon stock in tree biomass, percent A default value of 0.37 t C t-1 d.m. may be used unless transparent and verifiable information can be provided to justify a different value.
i	=	1, 2, 3. … biomass estimation strata within the project boundary
t	=	1, 2, 3. … years elapsed since the start of the project activity
$dC_{LI,(t1,t2)}$	=	Rate of change in carbon stock in litter within the project boundary during the period between a point of time in year t1 and a point of time in year t2; t CO2e yr-1
$C_{LI,,t2}$	=	Carbon stock in litter within the project boundary at a point of time in year t2; t CO2e
$C_{LI,,t1}$	=	Carbon stock in litter within the project boundary at a point of time in year t1; t CO2e
T	=	Time elapsed between two successive estimations (T=t2 – t1); yr
$\Delta C_{LI,t}$	=	Change in carbon stock in litter within the project boundary in year t; t CO2e

This rigorous method ensures that our quantification practices are consistent with industry standards, providing a solid foundation for accurately assessing greenhouse gas emission reductions in this project.

The baseline emissions in year y (B*E*) are calculated as:

CF_{TREE}	t C (t.d.m.)-1	0.47
Δb_{FOREST}	t d.m. ha-1 yr-1.	13.0 (≤20 years)
R_{TREE}	-	0.25
$CC_{TREE\_BSL,i}$	-	Plantation : 0.1 Forest : 0.5
A_i	ha	Project Activity 1 : 317.80 Project Activity 2 : 24.36 Project Activity 3 : 124.52 Project Activity 4 : 31.31

$$\Delta C_{TREE\_BSL,t} = \sum_{i=1}^{M} \Delta C_{TREE\_BSL,i}$$

$$\Delta C_{TREE\_BSL,i} = \frac{44}{12} \times CF_{TREE} \times \Delta b_{FOREST} \times (1 + R_{TREE}) \times CC_{TREE\_BSL,i} \times A_i$$

Project activity 1:

$\Delta C_{TREE\_BSL,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 0.1 \times 317.80 = 889.97$ t CO2-e

Project activity 2:

$\Delta C_{TREE\_BSL,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 0.1 \times 24.36 = 68.22$ t CO2-e

Project activity 3:

$\Delta C_{TREE\_BSL,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 0.1 \times 124.52 = 348.71$ t CO2-e

Project activity 4:

$\Delta C_{TREE\_BSL,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 0.5 \times 31.31 = 438.41$ t CO2-e

CF_S	t C (t.d.m.)-1	0.47

R_S	-	0.40
$A_{SHRUB,i}$	ha	Project Activity 1 : 317.80 Project Activity 2 : 24.36 Project Activity 3 : 124.52 Project Activity 4 : 31.31
$b_{SHRUB,i}$	t d.m. ha-1	Project Activity 1, 2 and 3: $b_{SHRUB,t1}$ = 2.05 $b_{SHRUB,t2}$ = 6.15 Project Activity 4: $b_{SHRUB,t1}$ = 6.15 $b_{SHRUB,t2}$ = 10.25

$$C_{SHRUB,t} = \frac{44}{12} \times CF_S \times (1 + R_S) \times \sum_{i=1} A_{SHRUB,i} \times b_{SHRUB,i}$$

$$b_{SHRUB,i} = BDR_{SF} \times b_{FoREST} \times CC_{SHRUB,i}$$

Project Activity 1, 2 and 3:

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.1 = 2.05

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.3 = 6.15

Project Activity 4:

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.3 = 6.15

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.5 = 10.25

Project activity 1:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 317.80 \times 2.05 = 1{,}571.83$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 317.80 \times 6.15 = 4{,}715.48$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

=4,715.48 - 1,571.82 = 3,143.66 t CO2-e

Project activity 2:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 24.36 \times 2.05 = 120.48$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 24.36 \times 6.15 = 361.45$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

$= 361.45 - 120.48 = 240.97$ t CO2-e

Project activity 3:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 124.52 \times 2.05 = 615.87$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 124.52 \times 6.15 = 1,847.61$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

$= 1,847.61 - 615.87 = 1,231.74$ t CO2-e

Project activity 4:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 31.31 \times 6.15 = 464.57$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 31.31 \times 10.25 = 774.29$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

$= 774.29 - 464.57 = 309.72$ t CO2-e

Project Activity 1:

$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t}$

$= 889.97 + 3,143.66 + 0 + 0 = 4,033.63$ t CO2-e

Project Activity 2:

$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t}$

$= 68.22 + 240.97 + 0 + 0 = 309.19$ t CO2-e

Project Activity 3:

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t}$$

$$= 348.71 + 1{,}231.74 + 0 + 0 = 1{,}580.45 \text{ t CO2-e}$$

Project Activity 4:

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t}$$

$$= 438.41 + 309.72 + 0 + 0 = 748.13 \text{ t CO2-e}$$

3.7.4 GHG emissions reduction/removal in the project scenario

In order to ensure precise and transparent quantification, the MY_BESGRADE_Q1/24 projects fully follow the requirements provided in "BCR0001: Quantification of GHG Removal - ARR, Version 4.0". To ensure accuracy and clarity, our measurement and calculation methods use extensive approaches that include key data, parameters, equations, and other elements.

The actual net GHG removals for project scenario can be calculated as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_t - GHG_{E,t} \qquad \text{E(13)}$$

Where:

$\Delta C_{ACTUAL,t}$ = Actual net GHG removals by sinks, in year t; t CO2-e

ΔC_t = Change in the carbon stocks in Project, occurring in the selected carbon pools, in year t; t CO2-e

$GHG_{E,t}$ = Increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool "Estimation of non-CO2 GHG

emissions resulting from burning of biomass attributable to an A/R CDM project activity"; tCO2-e

Change in the carbon stocks in Project, occurring in the selected carbon pools in year t shall be calculated as follows:

$$\Delta C_{P,t} = \Delta C_{\text{TREE\_PROJ},t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta \text{SOC}_{A,t} \quad \text{E(14)}$$

Where:

$\Delta C_{P,t}$ = Change in the carbon stocks in Project, occurring in the selected carbon pools, in year t; t CO2-e

$\Delta C_{\text{TREE\_PROJ},t}$ = Change in carbon stock in tree biomass in Project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; tCO2-e

$\Delta C_{DW\_PROJ,t}$ = Change in carbon stock in deadwood in Project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in deadwood and litter in A/R CDM project activities"; tCO2-e

$\Delta C_{LI\_PROJ,t}$ = Change in carbon stock in litter in Project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in deadwood and litter in A/R CDM project activities"; tCO2-e

$\Delta \text{SOC}_{AL,t}$ = Change in carbon stock in SOC in Project, in year t, in areas of land meeting the applicability conditions of the tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities,"as estimated in the same tool; t CO2-e

Change in carbon stock in tree biomass within the project boundary for project scenario:

$$\Delta C_{TREE\_PROJ,t} = \sum_{i=1}^{M} \Delta C_{TREE\_PROJ,i} \quad \text{E(15)}$$

$$\Delta C_{TREE\_PROJ,i} = \frac{44}{12} \times CF_{TREE} \times \Delta b_{FOREST} \times (1 + R_{TREE}) \times CC_{TREE\_PROJ,i} \times A_i \quad \text{E(16)}$$

Where:

$\Delta C_{TREE\_PROJ,t}$	=	Mean annual change in carbon stock in trees in the project; tCO2e yr-1
CF_{TREE} =		Carbon fraction of tree biomass; t C (t.d.m.)-1. A default value of 0.47 t C (t.d.m.)-1 is used unless transparent and verifiable information can be provided to justify a different value.

Δb_{FOREST} = Default means annual increment of above-ground biomass in forest in the region or country where the A/R CDM project activity is located; t d.m. ha-1 yr-1.

Values of ΔbF_{OREST} are taken from Table 3A.1.5 of the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC GPG-LULUCF 2003) unless transparent and verifiable information can be provided to justify different values.

Note. Tree biomass may reach a steady state in which biomass growth becomes zero or insignificant, either because of biological maturity of trees or because the rate of anthropogenic biomass extraction from the area is equal to the rate of biomass growth. Therefore, this parameter should be taken to be zero after the year in which tree biomass in the baseline reaches a steady state. The year in which tree biomass in the baseline reaches a steady-state is taken to be the 20th year from the start of the CDM project activity, unless transparent and verifiable information can be provided to justify a different year.

R_{TREE} = Root-shoot ratio for the trees in the project; dimensionless.

A default value of 0.25 is used unless transparent and verifiable information can be provided to justify a different value.

$CC_{TREE\_PROJ,i}$ = Crown cover of trees in the project, in project stratum i, at the start of the A/R CDM project activity, expressed as a fraction(e.g. 10 percent crown cover implies $CCTREE\_BSL,i$ = 0.10); dimensionless

A_i = Area of project stratum i, delineated on the basis of tree crown cover at the start of the A/R CDM project activity; ha

Change in carbon stock in shrub biomass within the project boundary for project scenario:

$$C_{SHRUB,t} = \frac{44}{12} \times CF_S \times (1 + R_S) \times \sum_{i=1} A_{SHRUB,i} \times b_{SHRUB,i} \quad \text{E(17)}$$

$$b_{SHRUB,i} = BDR_{SF} \times b_{FoREST} \times CC_{SHRUB,i} \quad \text{E(18)}$$

$$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1} \quad \text{E(19)}$$

Where:

$C_{SHRUB,t}$	=	Carbon stock in shrubs within the project boundary at a given point of time in year t; t CO2-e
CF_S	=	Carbon fraction of shrub biomass; t C (t.d.m.)-1. A default value of 0.47 t C (t.d.m.)-1 is used unless transparent and verifiable information can be provided to justify a different value.
R_s	=	Root-shoot ratio for shrubs; dimensionless. The default value of 0.40 is used unless transparent and verifiable information can be provided to justify a different value.
$A_{SHRUB,i}$	=	Area of shrub biomass estimation stratum i; ha
$b_{SHRUB,i}$	=	Shrub biomass per hectare in shrub biomass estimation stratum i; t d.m. ha-1
BDR_{SF}	=	Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 (i.e. 100 per cent) and the default above-ground biomass

content per hectare in forest in the region/country where the A/R CDM project activity is located; dimensionless.

A default value of 0.10 should be used unless transparent and verifiable information can be provided to justify a different value.

b_{FOREST} = Default above-ground biomass content in forest in the region/country where the A/R CDM project activity is located; t d.m. ha-1.

Values from Table 3A.1.4 of IPCC GPG-LULUCF 2003 are used unless transparent and verifiable information can be provided to justify different values.

$CC_{SHRUB,i}$ = Crown cover of shrubs in shrub biomass estimation stratum i at the time of estimation, expressed as a fraction (e.g. 10 percent crown cover implies $CCSHRUB,i$ = 0.10); dimensionless

Change in carbon stock in deadwood within the project boundary for project scenario:

$$C_{DW,i,t} = C_{TREE,i,t} \times DF_{Dw} \quad \text{E(20)}$$

$$dC_{DW,(t_1,t_2)} = \frac{C_{DW,t_2} - C_{DW,t_1}}{T} \quad \text{E(21)}$$

$$\Delta C_{DW,t} = dC_{DW,(t_1,t_2)} \times 1 \text{ year for } t_1 \le t \le t_2 \quad \text{E(22)}$$

Where:

$C_{DW,i,t}$ = Carbon stock in deadwood in stratum i at a given point of time in year t; t CO2e

$C_{TREE,i,t}$	=	Carbon stock in trees biomass in stratum i at a point of time in year t, as calculated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2e
DF_{DW}	=	Conservative default factor expressing carbon stock in deadwood as a percentage of carbon stock in tree biomass, percent A default value of 0.37 t C t-1 d.m. may be used unless transparent and verifiable information can be provided to justify a different value
i	=	1, 2, 3. … biomass estimation strata within the project boundary
t_i	=	1, 2, 3. … years elapsed since the start of the project activity
$dC_{DW,(t1,t2)}$	=	Rate of change in carbon stock in dead wood within the project boundary during the period between a point of time in year t1 and a point of time in year t2; t CO2e yr-1
$C_{DW,t2}$	=	Carbon stock in dead wood within the project boundary at a point of time in year t2; t CO2e
$C_{DW,t1}$	=	Carbon stock in dead wood within the project boundary at a point of time in year t1; t CO2e
T	=	Time elapsed between two successive estimations (T=t2 – t1); yr
$\Delta C_{DW,t}$	=	Change in carbon stock in dead wood within the project boundary in year t; t CO2e

Change in carbon stock in a litter within the project boundary for the project scenario:

$$C_{LI,i,t} = C_{TREE,i,t} \times DF_{LI} \quad \text{E(23)}$$

$$C_{LI,(t_1,t_2)} = \frac{C_{LI,t_2} - C_{LI,t_1}}{T} \quad \text{E(24)}$$

$$\Delta C_{DW,t} = dC_{LI,(t_1,t_2)} \times 1 \text{ year for } t_1 \leq t \leq t_2 \quad \text{E(25)}$$

Where:

$C_{LI,i,t}$ = Carbon stock in deadwood in stratum i at a given point of time in year t; t CO2e

$C_{TREE,i,t}$ = Carbon stock in trees biomass in stratum i at a point of time in year t, as calculated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2e

DF_{LI} = Conservative default factor expressing carbon stock in the litter as a percentage of carbon stock in tree biomass, percent

A default value of 0.37 t C t-1 d.m. may be used unless transparent and verifiable information can be provided to justify a different value.

i = 1, 2, 3. ... biomass estimation strata within the project boundary

t_i = 1, 2, 3. ... years elapsed since the start of the project activity

$dC_{LI,(t_1,t_2)}$	=	Rate of change in carbon stock in litter within the project boundary during the period between a point of time in year t1 and a point of time in year t2; t CO2e yr-1
C_{LI,t_2}	=	Carbon stock in litter within the project boundary at a point of time in year t2; t CO2e
C_{LI,t_1}	=	Carbon stock in litter within the project boundary at a point of time in year t1; t CO2e
T	=	Time elapsed between two successive estimations (T=t2 – t1); yr
$\Delta C_{LI,t}$	=	Change in carbon stock in litter within the project boundary in year t; t CO2e

This rigorous method ensures that our quantification practices are consistent with industry standards, providing a solid foundation for accurately assessing greenhouse gas emission reductions in both project activity 1 and project activity 2.

The project emissions in year y (*PE*) are calculated as:

CF_{TREE}	t C (t.d.m.)-1	0.47
Δb_{FOREST}	t d.m. ha-1 yr-1.	13.0 (≤20 years)
R_{TREE}	-	0.25
$CC_{TREE\_PROJ,i}$	-	Plantation : 0.8 Forest : 1.0
A_i	ha	Project Activity 1 : 317.80 Project Activity 2 : 24.36 Project Activity 3 : 124.52 Project Activity 4 : 31.31

$$\Delta C_{TREE\_PROJ,t} = \sum_{i=1}^{M} \Delta C_{TREE\_PROJ,i}$$

$$\Delta C_{TREE\_PROJ,i} = \frac{44}{12} \times CF_{TREE} \times \Delta b_{FOREST} \times (1 + R_{TREE}) \times CC_{TREE\_PROJ,i} \times A_i$$

Project activity 1:

$\Delta C_{TREE\_PROJ,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 0.8 \times 317.80 = 7,119.78$ t CO2-e

Project activity 2:

$\Delta C_{TREE\_PROJ,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 0.8 \times 24.36 = 545.75$ t CO2-e

Project activity 3:

$\Delta C_{TREE\_PROJ,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 0.8 \times 124.52 = 2,789.66$ t CO2-e

Project activity 4:

$\Delta C_{TREE\_PROJ,i} = \frac{44}{12} \times 0.47 \times 13.0 \times (1 + 0.25) \times 1.0 \times 31.31 = 876.81$ t CO2-e

CF_S	t C (t.d.m.)-1	0.47
R_S	-	0.40
$A_{SHRUB,i}$	ha	Project Activity 1 : 317.80 Project Activity 2 : 24.36 Project Activity 3 : 124.52 Project Activity 4 : 31.31
$b_{SHRUB,i}$	t d.m. ha-1	Project Activity 1 : $b_{SHRUB,t1}$ = 12.3 $b_{SHRUB,t2}$ = 16.4 Project Activity 2 :

		$b_{SHRUB,t1}$ = 10.25 $b_{SHRUB,t2}$ = 14.35 Project Activity 3 : $b_{SHRUB,t1}$ = 12.3 $b_{SHRUB,t2}$ = 20.5 Project Activity 4 : $b_{SHRUB,t1}$ = 14.35 $b_{SHRUB,t2}$ = 20.5

$$C_{SHRUB,t} = \frac{44}{12} \times CF_S \times (1 + R_S) \times \sum_{i=1} A_{SHRUB,i} \times b_{SHRUB,i}$$

$$b_{SHRUB,i} = BDR_{SF} \times b_{FoREST} \times CC_{SHRUB,i}$$

$$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$$

Project activity 1:

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.6 = 12.3

$b_{SHRUB,t2}$ = 0.10 × 205 × 0.8 = 16.4

Project activity 2:

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.5 = 10.25

$b_{SHRUB,t2}$ = 0.10 × 205 × 0.7 = 14.35

Project activity 3:

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.6 = 12.3

$b_{SHRUB,t2}$ = 0.10 × 205 × 1.0 = 20.5

Project activity 4:

$b_{SHRUB,t1}$ = 0.10 × 205 × 0.7 = 14.35

$b_{SHRUB,t2}$ = 0.10 × 205 × 1.0 = 20.5

Project activity 1:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 317.80 \times 12.3 = 9{,}430.97$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 317.80 \times 16.4 = 12,574.63$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

$= 9,430.97 - 12,574.63 = 3,143.66$ t CO2-e

Project activity 2:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 24.36 \times 10.25 = 602.42$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 24.36 \times 14.35 = 843.39$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

$= 843.39 - 602.41 = 240.98$ t CO2-e

Project activity 3:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 124.52 \times 12.3 = 3,695.23$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 124.52 \times 20.5 = 6,158.72$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

$= 6,158.72 - 3,695.23 = 2,463.49$ t CO2-e

Project activity 4:

$C_{SHRUB,t1} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 31.31 \times 14.35 = 1,084.01$ t CO2-e

$C_{SHRUB,t2} = \frac{44}{12} \times 0.47 \times (1 + 0.40) \times 31.31 \times 20.5 = 1,548.58$ t CO2-e

$\Delta C_{SHRUB} = C_{SHRUB,t2} - C_{SHRUB,t1}$

$= 1,548.58 - 1,084.01 = 464.57$ t CO2-e

Project Activity 1:

$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta SOC_{A,t}$

$= 7,119.78 + 3,143.66 + 0 + 0 + 0 = 10,263.44$ t CO2-e

Project Activity 2:

$$\Delta C_{P,t} = \Delta C_{\text{TREE\_PROJ},t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta \text{SOC}_{A,t}$$

$$= 545.75 + 240.98 + 0 + 0 + 0 = 786.73 \text{ t CO2-e}$$

Project Activity 3:

$$\Delta C_{P,t} = \Delta C_{\text{TREE\_PROJ},t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta \text{SOC}_{A,t}$$

$$= 2{,}789.66 + 2{,}463.49 + 0 + 0 + 0 = 5{,}253.15 \text{ t CO2-e}$$

Project Activity 4:

$$\Delta C_{P,t} = \Delta C_{\text{TREE\_PROJ},t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta \text{SOC}_{A,t}$$

$$= 876.81 + 464.57 + 0 + 0 + 0 = 1,341.38$$

Project Activity 1:

Year	GHG emission reductions in the baseline scenario (tCO2e)	GHG emission reductions in the project scenario (tCO_{2e})	GHG emissions attributable to leakages (tCO_{2e})	Estimated Net GHG Reduction (tCO_{2e})
Year 1	3,428.59	8,723.924	0	5,295.33
Year 2	3,428.59	8,723.924	0	5,295.33
Year 3	4,033.63	10,263.44	0	6,229.81
Year...	4,033.63	10,263.44	0	6,229.81
Total	79,462.52	202,189.77	0	122,727.25

Project Activity 2:

Year	GHG emission reductions in the baseline scenario (tCO2e)	GHG emission reductions in the project scenario (tCO_{2e})	GHG emissions attributable to leakages (tCO_{2e})	Estimated Net GHG Reduction (tCO_{2e})
Year 1	262.81	668.72	0	405.91
Year 2	262.81	668.72	0	405.91
Year 3	309.19	786.73	0	477.54
Year...	309.19	786.73	0	477.54
Total	6,091.04	15,498.58	0	9,407.54

Project Activity 3:

Year	GHG emission reductions in the baseline scenario (tCO2e)	GHG emission reductions in the project scenario (tCO_{2e})	GHG emissions attributable to leakages (tCO_{2e})	Estimated Net GHG Reduction (tCO_{2e})
Year 1	1,343.38	4,465.18	0	3,121.8
Year 2	1,343.38	4,465.18	0	3,121.8
Year 3	1,580.45	5,253.15	0	3,672.7
Year...	1,580.45	5,253.15	0	3,672.7
Total	31,134.86	103,487.06	0	72,352.20

Project Activity 4:

Year	GHG emission reductions in the baseline scenario (tCO2e)	GHG emission reductions in the project scenario (tCO_{2e})	GHG emissions attributable to leakages (tCO_{2e})	Estimated Net GHG Reduction (tCO_{2e})
Year 1	635.91	1,140.17	0	504.26
Year 2	635.91	1,140.17	0	504.26
Year 3	748.13	1341.38	0	593.25
Year...	748.13	1341.38	0	593.25
Total	14,738.16	26,425.18	0	11,691.02

Total estimated of GHG emissions reductions (during the quantification period):

Project Activity 1 : (5,295.33 x 2 years) +(6,229.81 x 18 years) = 122,727.25 tCO2e

Project Activity 2 : (405.91 x 2 years) +(477.54 x 18 years) = 9,407.54 tCO2e

Project Activity 3: (3,121.80 x 2 years) +(3,672.7 x 18 years) = 72,352.20 tCO2e

Project Activity 4: (504.26 x 2 years) + (593.25 x 18 years) = 11,691.02 tCO2e

Estimated average annual amount of GHG emission reductions:

Project Activity 1 : 6,229.81 tCO2e/year

Project Activity 2 : 477.54 tCO2e/year

Project Activity 3 : 3,672.70 tCO2e/year

Project Activity 4 : 593.25 tCO2e/year

4 Compliance with applicable legislation

Project activities 1, 2, and 3 prioritise strict legal compliance through a meticulously documented process that continuously identifies and adheres to relevant laws and regulations, particularly those pertaining to environmental conservation and sustainable agriculture. This commitment is demonstrated by obtaining certification under the Malaysian Sustainable Palm Oil (MSPO) standards and securing permits from the Malaysian Palm Oil Board (MPOB). These certifications underscore the project's dedication to sustainable practices and regulatory compliance, ensuring that all activities are conducted with environmental responsibility and legal integrity.

Compliance with the MSPO standards and MPOB regulations highlights the project's commitment to sustainable and ethical palm oil production. This entails meeting stringent criteria that cover various aspects of production, including environmental preservation, social welfare, and economic viability. As a result, the project not only contributes positively to the palm oil industry but also aligns with broader objectives of sustainability and environmental stewardship.

All relevant Malaysian laws and regulations applicable to project activities 1, 2, and 3 are as follows:

1. **Land Acquisition and Land Use:**
- National Land Code 1965
- State Land Rules
2. **Biodiversity Conservation:**
- Biodiversity Conservation Act 2010
3. **Labour Laws:**
- Employment Act 1955
- Occupational Safety and Health Act 1994
4. **Malaysian Palm Oil Board (MPOB)**
- research, regulation, and support for palm oil producers to adhere to best practices and sustainability standards
5. **Malaysian Sustainable Palm Oil (MSPO)**
- Sustainable management, aiming to bring positive social, environmental, and economic impacts while minimising negative ones, particularly on people and the environment.

For project activity 4, which encompasses forested areas, a Document Management System (DMS) has been implemented to systematically organize and manage all

pertinent legal documents, including Malaysian laws and international regulations governing forest reserves. The project conducts regular legal audits to identify and update applicable laws and regulations, encompassing a comprehensive review of local and national legal frameworks that may impact the project. Documents are categorised based on topics such as land use, environmental regulations, labour laws, indigenous rights, and human rights.

All relevant Malaysian laws and regulations applicable to MY_BESGRADE_Q1/24 projects are as follows:

1. **Land Acquisition and Land Use:**
    - National Land Code 1965
    - State Land Rules
2. **Environmental Regulations:**
    - Environmental Quality Act 1974
    - Environmental Impact Assessment (EIA) Order 1987
    - Wildlife Conservation Act 2010
3. **Forestry Laws:**
    - National Forestry Act 1984
    - Johor Forest Rules
4. **Biodiversity Conservation:**
    - Biodiversity Conservation Act 2010
5. **Labour Laws:**
    - Employment Act 1955
    - Occupational Safety and Health Act 1994
6. **Indigenous Peoples:**
    - Indigenous Peoples Act 2016
    - United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

To ensure legal compliance, especially in relation to the protection of human and indigenous peoples' rights in a MY_BESGRADE_Q1/24 project, specific measures have be implemented, which can align with relevant laws and international regulations:

1. **Labor Rights and Safety:**

Description: The project ensures compliance with Malaysian labour laws and international standards.

Implementation: Employment practices adhere to the Employment Act 1955, and occupational safety measures follow the Occupational Safety and Health Act 1994, protecting workers' rights and well-being.

2. **Social Impact Assessments:**

Description: Social impact assessments are conducted to identify potential impacts on local communities, with a particular focus on indigenous peoples.

Implementation: The assessments are comprehensive, covering aspects such as land tenure, cultural practices, and social structures to find guide project planning and mitigation strategies.

3. **Community Engagement and Free, Prior, and Informed Consent (FPIC):**

Description: The project engages with local communities, especially indigenous groups, in a meaningful way. FPIC is obtained before implementing any activities that may affect their land, resources, or cultural heritage.

Implementation: Regular consultations, community meetings, and the establishment of grievance mechanisms ensure that the project respects the rights and decisions of indigenous communities.

5 Carbon ownership and rights

5.1 Project holder

Individual or organisation	Carbon Vault Sdn Bhd
Contact person	1. Sharifah Nur Farah Shakirah Binti Tuan Zam-Zam 2. Nuralya Zulaikha Mohamad Haini
Job position	1. Program Executive 2. Operations Executive
Address	No. 11A, Lorong Kurau, Bangsar, 59100 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur.
Phone number	1. +60 18 299 0070

	2. +60 17 369 7419
Email	1. sharifah@co2bank.asia 2. nuralya@co2bank.asia

5.2 Other project participants

Individual or organisation	Homebase Plantation Sdn Bhd
Contact person	Ng Chong Chang
Job position	Manager
Address	Batu 5, Jalan Mersing, 86000 Kluang, Johor, Malaysia
Phone number	(+6) 019 726 6023
Email	botakng@live.com.my

Individual or organisation	Homebase Plantation Sdn Bhd
Contact person	Ng Boon Siong
Job position	Officer
Address	A33, Kebun 500, Mukim Jabi, 06400 Pokok Sena, Kedah
Phone number	(+6) 017 467 6168
Email	mohd.rizuan@besgrade.com

Individual or organisation	Greenton Plantation Sdn Bhd
Contact person	Mohd Rizuan Bin Yusof
Job position	Manager

Address	Batu 10, Jalan Pokok Sena, Mukim Jabi, 06400 Pokok Sena, Kedah
Phone number	(+6) 019-421 0823
Email	mohd.rizuan@besgrade.com

5.3 Agreements related to carbon rights

The MY_BESGRADE_Q1/24 has demonstrated carbon rights based on agreements and documents that ensure that the requirement is met, with at least the following information:

(a) Parties signing the agreement(s):

Project Owner : Carbon Vault Sdn Bhd

Parent Company : Besgrade Plywood Sdn Bhd

(b) Purpose of the agreement:

The purpose of the agreement is to define and transfer the carbon rights from the landowners and the local communities to the project participants, and to establish the terms and conditions for the sharing of the benefits from the carbon credits generated by the project. The agreement also specifies the roles and responsibilities of each party, and the mechanisms for monitoring, reporting, verification, and dispute resolution.

(c) Date of the agreement:

Project Activity	Date of Agreement
Project Activity 1	1 November 2023
Project Activity 2	1 November 2023
Project Activity 3	1 November 2023

Project Activity 4	1 November 2023

(d) Name of the GHG project:

The name of the GHG project is MY_BESGRADE_Q1/24 which aims to combat climate change by engaging in activities that result in measured and verifiable reductions in greenhouse gas emissions in Johor, Perak and Kedah, Malaysia.

(e) Period of quantification of GHG emission removals/reductions:

The period of quantification of GHG emission removals/reductions is 10 years, starting from 10/11/2023 and ending on 01/11/2024. This typically covers the entire duration of the project, from its initiation to its completion.

(f) Responsibilities, obligations, and rights of each of the signatory parties are as follows:

- The landowners consent to grant carbon rights to project participants and permit project activities on their land. They commit to preserving and safeguarding the land and trees, refraining from any actions that could diminish carbon stocks. In return, they are entitled to receive a fair share of benefits from carbon credits, commensurate with their land's area and quality.
- Local communities pledge to support and collaborate with project activities, respecting the carbon rights of project participants. They agree to engage in monitoring and reporting project performance, offering feedback and suggestions for enhancement. In exchange, they deserve a fair share of benefits from carbon credits, reflecting their contributions and involvement.
- Project participants commit to executing and overseeing project activities in accordance with the chosen methodology, standards, and regulations. They undertake to monitor, report, verify, and certify emission reductions or removals. Project participants have the right to own and trade carbon credits generated by the project, retaining a reasonable portion of benefits based on their investment and risk.

5.4 Land tenure (Projects in the AFOLU sector)

In this MY_BESGRADE_Q1/24 project, Besgrade Plywood Sdn Bhd, Homebase Plantation Sdn Bhd and Greenton Plantation Sdn Bhd are the project participants.

Project Activity	Project Participants
Project Activity 1	Homebase Plantation Sdn Bhd
Project Activity 2	Homebase Plantation Sdn Bhd
Project Activity 3	Greenton Plantation Sdn Bhd
Project Activity 4	Greenton Plantation Sdn Bhd

The project participants can demonstrate their land ownership by providing evidence and information that support their legal rights and claims to the land or land parcels. The evidence and information may include:

- Land titles, deeds, or certificates that show the name, location, area, and boundaries of the land or land parcels, and the date and terms of acquisition, transfer, or lease.
- Land contracts, agreements, or leases that show the name, role, and responsibilities of the parties involved in the land or land parcels, and the duration and conditions of the land use or management.
- Land maps, surveys, or records that show the geospatial data and characteristics of the land or land parcels, and the land use or cover types and changes over time.
- Land permits, licences, or approvals that show the authorization and compliance of the project activities with the relevant laws, regulations, and policies of the national or local authorities.
- Land registries, databases, or systems that show the official and updated information and documentation of the land or land parcels, and the verification and validation of the land ownership and the project activities.

6 Climate change adaptation

In adherence to the BioCarbon Registry (BCR) Standard, adapting to climate change is crucial, especially considering its transition from a forest reserve to a palm oil plantation. The project's climate change adaptation activities. With the aim to enhance resilience

and minimise the adverse effects of climate change on the plantation. Here are three suggested points on how to adapt to the climate change challenge:

	Criteria	Indicator
Integration of Climate Resilience in Sustainable Practices	Integration of climate-resilient practices within palm oil plantation management.	Adoption of sustainable agroforestry practices, including intercropping with shade-providing tree species to enhance ecosystem resilience to climate variability and reduce the vulnerability of palm oil crops.
Identification and Mitigation of Climate Risks	Identification and proactive mitigation of climate-related risks specific to palm oil cultivation.	Conducting risk assessments to assess potential impacts of climate change on palm oil production and implementing strategies to mitigate risks, such as improved water management practices and pest control measures.
Biodiversity Conservation for Climate Resilience	Promoting biodiversity conservation within and around the palm oil plantation.	Establishing buffer zones with diverse vegetation to enhance biodiversity, providing habitats for beneficial species that contribute to ecosystem resilience and pest control.

Thorough documentation, encompassing climate risk assessments, community engagement records, and progress reports, serves as evidence of compliance with the BCR Standard's requirements and indicators. This documentation highlights tangible efforts made by the palm oil plantation operation to adapt to climate change.

The adaptation measures integrated into the palm oil plantation project signify a commitment to bolstering climate resilience and advancing sustainability. By adhering to the BCR Standard's criteria and indicators for climate change adaptation, the project contributes to the overarching goal of fortifying resilience in palm oil farming against climate-related challenges.

7 Risk management

The projects conducted risk assessment and management to identify and address environmental, financial, and social risks associated with project implementation. Measures were designed to ensure consistent GHG emission reductions and/or removals throughout the project quantification period. Adherence to ISO 31000 for risk management and ISO 14091 for climate change adaptation standards was observed. Web search results were utilised to gather pertinent information and data on potential risks and mitigation strategies.

For **project activities 1, 2, and 3 involving oil palm plantation**, the following risks were identified across environmental, financial, and social dimensions, along with proposed mitigation measures:

(a) Environmental risks:

1) Proactive measures have been implemented to mitigate identified risks across environmental, financial, and social dimensions.
2) A comprehensive silvicultural management plan has been put in place, covering various activities such as site preparation, planting, pruning, thinning, harvesting, and replanting of trees. This approach aims to optimise plantation productivity and resilience.
3) A robust fire prevention and control system has been established, including the creation and maintenance of firebreaks, provision and training of fire-fighting personnel, and coordination with local fire authorities and communities.
4) Efforts to enhance the project area's resilience to climate change-induced challenges, such as droughts, floods, and pest outbreaks, have been undertaken to ensure consistent crop yields and long-term viability.
5) To address pests and diseases, a monitoring and control system has been instituted, involving regular tree inspections, application of treatments as needed, and removal of infected trees.
6) Legal ownership and tenure of land and carbon rights have been secured, along with necessary permits and approvals from authorities, to mitigate the risk of land use change or illegal logging.
7) Afforestation initiatives and the establishment of protected zones around and within project operations have been proposed to protect indigenous fauna and enhance ecosystem functions, including carbon storage and soil preservation. The creation of buffers near aquatic ecosystems and biodiversity-rich areas further ensures the protection of vital natural resources..

(b) Financial risks

1) The palm oil plantation project faces several risks, including market price volatility, delays in sustainability certifications like MSPO, and ongoing operational and maintenance expenses. These risks could impact the project's profitability, long-term sustainability, and stakeholder engagement.
2) To mitigate these risks, the project employs forward selling and futures contracts to hedge against palm oil price fluctuations, reducing the financial impact of market volatility. Furthermore, dedicated funding supports a specialised certification team to ensure timely compliance with certification requirements and stay updated on any standard changes.
3) Investments in efficient technologies and practices, such as precision agriculture, aim to optimise resource utilisation and control operational costs associated with palm oil production. Regular staff training programs enhance efficiency and minimise waste.
4) Adherence to selected methodologies and relevant standards and regulations, including BCR0001 for GHG emission reductions quantification and CDM A/R Large-Scale Consolidated Methodology ACM0003, ensures the credibility of emission reductions or removals and facilitates validation, verification, and certification by competent authorities.
5) A comprehensive risk management plan covers the identification, assessment, treatment, monitoring, and reporting of financial risks. By implementing suitable risk mitigation measures, the project aims to minimise adverse impacts and maximise positive outcomes, ensuring overall success.

(c) Social Risks

The project faces potential social risks, including disputes over land use and carbon rights, impacts on local livelihoods, and varying expectations about benefits and costs. Addressing these concerns is crucial for garnering community support, ensuring collaboration, and maintaining sustainability and legitimacy. To mitigate these risks, targeted strategies have been implemented:

1) Conducted stakeholder analysis and social impact assessment to identify and map relevant stakeholders, evaluating potential positive and negative impacts on their rights, interests, and needs.
2) Established a monitoring and evaluation system to collect, analyse, and disclose data on the project's social performance and impacts, ensuring accuracy and reliability.

3) Implemented strategies to overcome short-term disruptions to local economies and traditional practices, preserving economic stability and cultural practices.
4) Engaged and consulted with local communities and stakeholders using principles of free, prior, and informed consent (FPIC), informing them about project objectives, activities, and benefits, and seeking their feedback for improvement.

For project activity 4 in the forest reserve area, the following risks have been identified across environmental, financial, and social dimensions, along with proposed mitigation measures:

a) Environmental Risks:

1) The GHG mitigation activities face potential natural and anthropogenic risks, including storms, fire, pests, diseases, land use change, and illegal logging, which may impact tree survival, growth, and carbon sequestration potential. To mitigate these risks, the project has implemented the following measures:
2) Conservation of native tree species adapted to local climate and soil conditions, resistant to common pests and diseases.
3) Implementation of a forest management plan with specific goals for biodiversity conservation, timber production, and watershed protection, including silvicultural practices and monitoring protocols.
4) Establishment of a fire prevention and control system, including firebreaks, trained personnel, and collaboration with local fire authorities.
5) Implementation of a pest and disease monitoring and control system, involving regular inspection, diagnosis, and treatment of trees.
6) Securing legal ownership and tenure of land and carbon rights, obtaining necessary permits and approvals to prevent land use change or illegal logging.
7) Establishment of buffer zones and contingency reserves to compensate for potential losses or reversals of carbon stocks due to environmental risks.

These measures aim to enhance the resilience of the project area and ensure the effectiveness of GHG mitigation activities despite potential risks.

b) Financial Risks:

1) The project conducted a comprehensive financial and sensitivity analysis, encompassing cost and revenue estimation, net present value evaluation, internal rate of return calculation, and break-even point assessment to gauge financial feasibility and attractiveness.

2) Diversification of income sources was prioritised, encompassing not only carbon credit sales but also revenue from rubber and timber products, and other ecosystem services. This strategy mitigates dependence on the volatile carbon market.
3) Funding and financing were secured through a blend of equity, debt, and grant contributions from project participants, including the project proponent, developer, manager, financier, and the BioCarbon Fund, covering both upfront and ongoing project costs.
4) Adherence to selected methodology, including the BCR001 for GHG emission reductions, referencing standards such as CDM Afforestation and Reforestation (A/R) Large-Scale Consolidated Methodology ACM0003 and the BioCarbon standard, ensures emission quality and credibility, facilitating validation, verification, and certification by relevant authorities.
5) A robust risk management plan was implemented, encompassing identification, assessment, treatment, monitoring, and reporting of financial risks, alongside the application of appropriate risk mitigation strategies.

(c) Social Risks:

1) The project conducted stakeholder analysis and social impact assessment, identifying and mapping relevant stakeholders like landowners, local communities, and environmental authorities. This included evaluating potential positive and negative impacts on their rights, interests, and needs.
2) A monitoring and evaluation system was established, involving the collection, analysis, and disclosure of relevant social performance data. Quality assurance and control procedures were applied to ensure data accuracy and reliability.
3) To mitigate short-term disruptions to local economies and traditions, the project implemented strategies ensuring sustainable integration into the local context while preserving economic stability and cultural practices.
4) Engagement and consultation with local communities and stakeholders followed principles of free, prior, and informed consent (FPIC). This included informing them about project objectives, activities, and benefits, and soliciting feedback and suggestions for improvement.

These measures aim to effectively address social risks, fostering positive community relationships, enhancing project acceptance, and promoting long-term sustainability.

7.1 Reversal Risk

For MY_BESGRADE_Q1/24, ensuring long-term viability entails a comprehensive risk management and permanence approach. Utilising BCR website tools, key measures taken to safeguard project longevity include:

1. Legal Agreements and Contracts:

- Establishing clear, legally binding land use agreements designating project areas for specific activities, preventing land use conversion.
- Drafting contracts with stakeholders outlining terms, responsibilities, and duration to ensure commitment and accountability.

2. Monitoring and Verification:

- Implementing regular monitoring and verification mechanisms, including third-party audits, to track carbon sequestration levels and project performance.
- Utilising remote sensing technologies and on-the-ground surveys for accurate data collection.

3. Management Plan:

- Developing a detailed management strategy outlining project objectives, achievements, and measures to maintain and enhance carbon sequestration.
- Identifying and mitigating potential risks, such as reversion, through adaptive management strategies.

4. Financial Mechanisms:

- Securing long-term financing commitments or endowments to cover ongoing maintenance costs, possibly through escrow accounts with disbursement tied to milestones.
- Implementing insurance policies to mitigate financial risks associated with unforeseen events.

5. Long-Term Contracts:

- Establishing contracts with carbon offset purchasers to ensure sustained commitment to the project, with clearly defined pricing terms and consequences for noncompliance.

- Including provisions for financial guarantees or insurance to cover reversion risks.

6. Community Engagement and Benefit Sharing:

- Forming agreements with local communities to foster cooperation and participation, potentially through revenue-sharing arrangements or job opportunities.

In summary, MY_BESGRADE_Q1/24 success relies on proactive risk mitigation strategies addressing both direct (natural disasters, pest infestations, unauthorised land use) and indirect risks (policy changes, market fluctuations). Adaptive management practices, including diverse tree planting and regular monitoring, ensure flexibility and resilience to evolving challenges, contributing to the project's long-term sustainability.

8 Environmental Aspects

The project has undergone a thorough environmental assessment, meticulously analysing potential impacts on biodiversity and ecosystems within its designated boundaries. Supported by reliable and current references, this assessment ensures accuracy and credibility in the evaluation process.

Findings indicate that the project activities predominantly yield **positive impacts** on biodiversity and ecosystems, including:

- The project initiates a transformation of land formerly designated as a forest reserve into a palm oil plantation, integrating practices to optimize carbon capture and storage. This shift from forest conservation to agriculture aims to bolster carbon sequestration, contributing to environmental sustainability and proactive climate change mitigation.

- While repurposing land once restricted under the Kedah State Forestry Department, the project focuses on preserving forested areas while enhancing their carbon storage capacity.

- Within the project vicinity, a palm oil plantation is established, tailored to local climate and soil conditions, and offering diverse ecosystem services and advantages.

- The project enhances habitat quality and connectivity for native flora and fauna, aiding the conservation of endangered and endemic species, including various bird species.

- Implementation of a silvicultural management plan ensures proper site preparation, tree planting, pruning, thinning, harvesting, and replanting, thereby improving plantation productivity and resilience.

- By transitioning from non-renewable biomass to renewable biomass for thermal energy generation, the project reduces emissions and pollution from fossil fuels.

The environmental assessment has also identified some potential **negative impacts** of the project activities, such as:

- The project could potentially induce soil erosion, nutrient depletion, or water contamination arising from activities such as site preparation, tree planting, harvesting, or replanting, as well as the application of fertilizers, pesticides, or herbicides.

- Alterations in land use or cover, as well as water consumption by the trees, may impact the hydrological cycle, water availability, or water quality.

- Construction, operation, or maintenance of project facilities or equipment may result in waste generation, noise, or dust emissions.

The project has proposed the following **actions and corrective measures** to manage and minimise the impacts resulting from the development of the GHG project activities, such as:

- The project will execute a silvicultural management plan, encompassing meticulous site preparation, tree planting, pruning, thinning, harvesting, and replanting, alongside the application of organic or low-toxicity fertilizers, pesticides, or herbicides. These measures aim to mitigate soil erosion, nutrient depletion, or water contamination.

- A hydrological assessment will be conducted to estimate and monitor the water balance, demand, and quality in the project area and its surroundings. Water conservation and protection measures, such as rainwater harvesting, drip irrigation, or buffer strips, will be implemented to alleviate impacts on the hydrological cycle, water availability, or water quality.

- A waste management plan will be instituted to reduce, reuse, recycle, or dispose of project-generated waste. Adherence to noise and dust control regulations and standards will be ensured to minimise waste, noise, or dust pollution.

To guarantee that project activities uphold environmental integrity, the project holder has adopted a No Net Harm tool developed by the BioCarbon Registry. This tool, presented as a spreadsheet, provides a systematic framework and checklist to assess environmental impacts and risks linked with project activities. It facilitates the development and implementation of environmental safeguards and mitigation measures. Furthermore, the tool offers guidance and practical examples for its effective utilization, as well as for reporting and verifying the project's environmental performance and outcomes.

9 Socio-economic aspects

The project has undertaken a comprehensive analysis of the potential socio-economic impacts of its activities, delineating the scope and outlining the underlying assumptions while substantiating the results with appropriate documentation and evidence.

The analysis has found that the project activities have mostly **positive impacts** on the socio-economic aspects, such as:

- The project fosters employment opportunities for both local communities and non-residents, engaging them in various roles such as workers, technicians, or managers across project activities.

- Moreover, the project enhances the local communities' quality of life by providing access to clean, renewable energy sources, healthcare services, educational programs, and capacity-building initiatives.

- Furthermore, the project aligns with national development objectives and sustainable development goals by adhering to pertinent policies, regulations, and standards. It addresses critical regional challenges such as poverty alleviation, climate change mitigation and adaptation, and biodiversity preservation.

The analysis has also identified some potential **negative impacts** of the project activities, such as:

- The project's activities could exacerbate inequality or vulnerability within local communities, particularly among marginalized groups such as women, youth, or

ethnic minorities, who may encounter obstacles or discrimination in accessing project resources or benefits.

- Additionally, there's a risk that the project's activities and benefits may foster dependency within local communities, potentially leading to unsustainable reliance or displacement of other livelihood sources over the long term.

The project has proposed the following **actions and corrective measures** to prevent and/or reduce the socio-economic impacts resulting from the development of the GHG project activities, such as:

- The project will conduct a stakeholder analysis and a conflict analysis, which include the identification and mapping of the relevant and affected stakeholders, such as the landowners, the local communities, and the environmental authorities, and the assessment and management of the potential or actual conflicts or disputes related to the project activities and impacts.

- The project will implement a grievance redress mechanism, which includes the provision and facilitation of a transparent and accessible process for the local communities and stakeholders to raise and resolve any complaints or concerns related to the project activities and impacts, and to seek and obtain remedies or compensation when appropriate.

- The project will implement a monitoring and evaluation system, which includes the collection, analysis, and disclosure of the relevant data and information on the socio-economic performance and impacts of the project, and the application of the quality assurance and quality control procedures.

In order to demonstrate that the project activities do not cause net harm to local communities and society, the project holder has used a No Net Harm tool developed by the BioCarbon Registry.

10 Consultation with interested parties (stakeholders)

The project has engaged in thorough stakeholder consultations, involving landowners, local communities, indigenous peoples, environmental authorities, and civil society organizations. This inclusive approach aims to educate stakeholders about project objectives, operations, and potential benefits while gathering feedback and

recommendations for improvement. Through collaborative dialogue, the project fosters transparent communication and cooperation, ensuring all stakeholders' viewpoints and concerns are acknowledged and addressed. This commitment to inclusivity enhances accountability, builds trust, and promotes social acceptance of the project.

The stakeholder consultation process meets the relevant requirements, as follows:

a) The scope of stakeholder consultations

The stakeholder consultations are comprehensive, spanning all phases of the project lifecycle from design and implementation to ongoing monitoring, verification, benefit-sharing, and grievance redressal. These consultations address critical project issues such as additionality assessment, baseline determination, leakage prevention, emissions reduction permanence, and environmental and social impact evaluation. By embracing this holistic approach, the project actively involves stakeholders in decision-making processes and effectively addresses their concerns. This inclusive engagement promotes collaboration, builds trust, and ultimately enhances the project's success and long-term sustainability.

b) The number of stakeholders consulted

The projects have actively engaged approximately 50 stakeholders, aiming for a diverse and inclusive representation of relevant and affected groups. These consultations have emphasized inclusivity and active participation, ensuring that the viewpoints and insights of marginalized or vulnerable groups, including women, youth, and ethnic minorities, are carefully considered and valued. Prioritizing inclusivity has strengthened the transparency, credibility, and impact of stakeholder engagement efforts, ultimately fostering stronger project outcomes that align with the needs and aspirations of all stakeholders involved.

c) The means used to invite interested parties to participate in the consultations

The projects have employed a variety of communication channels to encourage interested parties to join the consultations, including email, phone calls, and social media platforms. Partnerships with local businesses and chambers of commerce have been formed to utilize their networks in raising awareness about the consultations among their members and employees. Moreover, invitations have been disseminated in local languages and through widely used media channels, ensuring accessibility and inclusivity in the engagement process. By adopting this multi-faceted outreach approach, the

projects aim to enhance participation and ensure that a diverse range of voices is represented and heard during the consultation period.

d) The information that was made available to stakeholders during the consultation process

Throughout the consultation process, the projects have ensured that stakeholders have access to pertinent information and documentation, including the project design document, monitoring reports, validation and verification reports, environmental and social impact assessments, and benefit-sharing and grievance redress mechanisms. To enhance accessibility and transparency, this information has been presented in local languages, diverse formats, and through multiple media channels, enabling stakeholders to comprehend and engage with the content easily. This commitment to transparency fosters trust and encourages meaningful participation from all stakeholders involved.

e) The meetings, workshops and other processes developed in the framework of the stakeholder consultation

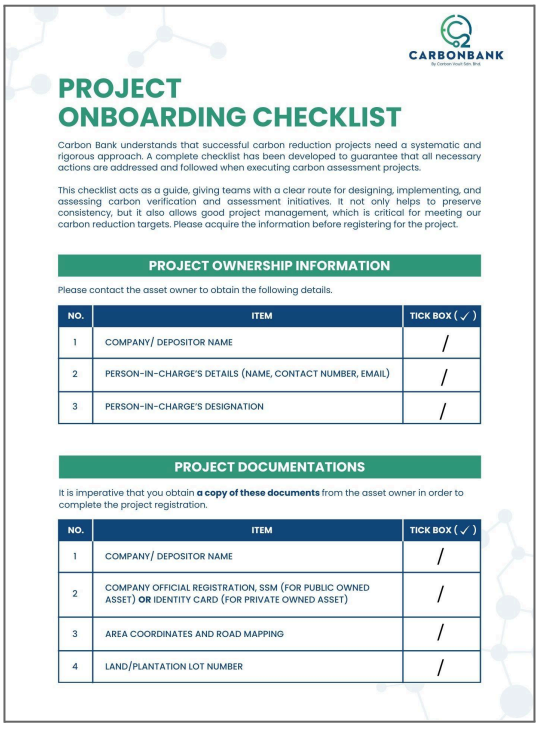
As part of the stakeholder consultation process, the projects have organised various informational meetings to effectively engage stakeholders. These meetings encompass focus group discussions, surveys, interviews, field visits, and feedback sessions, offering ample opportunities for stakeholders to voice their opinions and provide input. The projects have prioritised conducting these meetings in a timely, respectful, and culturally appropriate manner, ensuring that all stakeholders feel valued and heard. Furthermore, the outcomes and recommendations from these meetings are meticulously recorded and reported, ensuring transparency and accountability throughout the consultation process.

The project has provided documentary evidence to demonstrate that invitations were sent to relevant stakeholders. This evidence includes:

Figure 10 : A field supervisor from Carbon Vault Sdn Bhd is surveying plantation (Project Activity 1)

Figure 11: Initial Survey with stakeholder (Project Activity 2)

Figure 12: Initial Survey done by Carbon Vault's Field Supervisor and Plantation Worker (Project Activity 3&4)



CARBONBANK

PROJECT ONBOARDING CHECKLIST

Carbon Bank understands that successful carbon reduction projects need a systematic and rigorous approach. A complete checklist has been developed to guarantee that all necessary actions are addressed and followed when executing carbon assessment projects.

This checklist acts as a guide, giving teams with a clear route for designing, implementing, and assessing carbon verification and assessment initiatives. It not only helps to preserve consistency, but it also allows good project management, which is critical for meeting our carbon reduction targets. Please acquire the information before registering for the project.

PROJECT OWNERSHIP INFORMATION

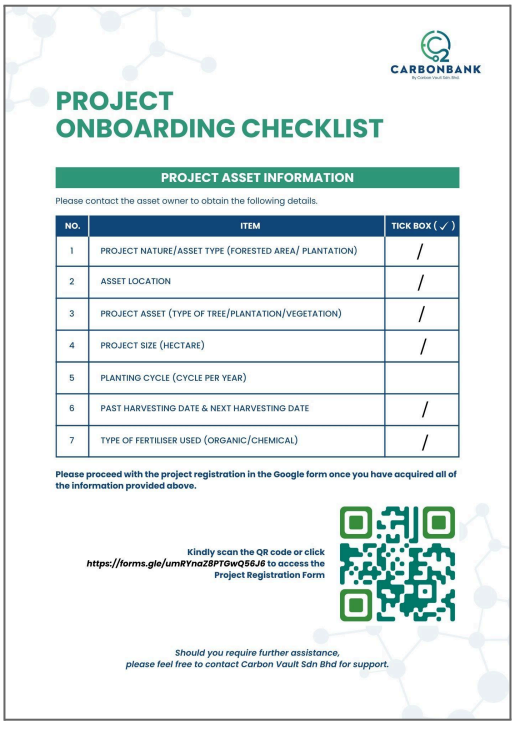
Please contact the asset owner to obtain the following details.

NO.	ITEM	TICK BOX (✓)
1	COMPANY/ DEPOSITOR NAME	/
2	PERSON-IN-CHARGE'S DETAILS (NAME, CONTACT NUMBER, EMAIL)	/
3	PERSON-IN-CHARGE'S DESIGNATION	/

PROJECT DOCUMENTATIONS

It is imperative that you obtain **a copy of these documents** from the asset owner in order to complete the project registration.

NO.	ITEM	TICK BOX (✓)
1	COMPANY/ DEPOSITOR NAME	/
2	COMPANY OFFICIAL REGISTRATION, SSM (FOR PUBLIC OWNED ASSET) **OR** IDENTITY CARD (FOR PRIVATE OWNED ASSET)	/
3	AREA COORDINATES AND ROAD MAPPING	/
4	LAND/PLANTATION LOT NUMBER	/



CARBONBANK

PROJECT ONBOARDING CHECKLIST

PROJECT ASSET INFORMATION

Please contact the asset owner to obtain the following details.

NO.	ITEM	TICK BOX (✓)
1	PROJECT NATURE/ASSET TYPE (FORESTED AREA/ PLANTATION)	/
2	ASSET LOCATION	/
3	PROJECT ASSET (TYPE OF TREE/PLANTATION/VEGETATION)	/
4	PROJECT SIZE (HECTARE)	/
5	PLANTING CYCLE (CYCLE PER YEAR)	
6	PAST HARVESTING DATE & NEXT HARVESTING DATE	/
7	TYPE OF FERTILISER USED (ORGANIC/CHEMICAL)	/

Please proceed with the project registration in the Google form once you have acquired all of the information provided above.

Kindly scan the QR code or click *https://forms.gle/umRYnaZ8PTGwQ56J6* to access the Project Registration Form

Should you require further assistance, please feel free to contact Carbon Vault Sdn Bhd for support.

Figure 13 : Documentation of the Project Onboarding Checklist, specifically for information on ownership, plantation assets, and other associated documentation.

10.2 Summary of comments received

Non-applicable

10.3 Consideration of comments received

Non-applicable

11 Sustainable Development Goals (SDGs)

This section provides a tailored demonstration of how the MY_BESGRADE_Q1/24 contributes to the Sustainable Development Goals (SDGs) applicable to the proposed project activities. The assessment is conducted using the Tool for Determining the Contributions of GHG Projects to Achieving the SDGs, developed by the BioCarbon Registry.

SDG Goal	Criteria and Indicator	Project's Contribution
SDG 8: Decent Work and Economic Growth Projects contribute to economic growth and employment opportunities.	Gross Domestic Product (GDP) growth to local economic growth. Job creation and decent work opportunities	Establishing job possibilities at various phases and generating income for local people through sustainable forest management methods including non-timber forest product collection. Increased employment rates include providing fair wages, safe working conditions, and skill development for workers that are involved.

SDG 13: Climate Action Projects contribute to climate change mitigation and enhancing carbon sequestration.	Adoption of sustainable forest practices to reduce the carbon footprint. Implementation of climate-resilient measures in plantation cultivation	Implementation of optimal methods for sustainable forest management, minimising deforestation and fostering carbon sequestration. Introducing climate-resilient rubber types and Kelampayan trees to improve their ability to adapt to changing climate conditions.
SDG 15: Life on Land Projects contribute to protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation.	Implementation of practices to avoid negative impacts on biodiversity and ecosystems. Conservation of natural habitats within and around the plantation.	Strict adherence to optimal management strategies to minimise negative effects on the local biodiversity and ecosystems. Implementation of conservation zones within the plantation to enhance biodiversity and preserve habitats.
SDG 17: Partnerships for the Goals Projects collaborate among stakeholders for successful	Collaboration with local communities and stakeholders for sustainable timber and non-timber production.	Conducting open and honest discussions with local communities to address their concerns and collect their input.

forest conservation and sustainable management.	Contribution to local economic development and capacity-building.	Executing community development endeavours, such as educational programmes and vocational training, to augment the local capability and foster economic advancement.

Using the BioCarbon Registry's SDG Tool, it reveals that MY_BESGRADE_Q1/24 exceeds the given criteria and indicators for SDGs 8, 13, 15, and 17. The tool provides insights into the project's positive contributions to sustainable development goals through sustainable palm oil cultivation. It supports sustainable methods in the palm oil industry, conserves biodiversity, and engages with local communities. This aligns with the larger worldwide goal for sustainable development and illustrates the BioCarbon Registry's commitment to ensuring that greenhouse gas projects have beneficial impacts.

12 REDD+ Safeguards (For REDD+ projects)

Non-applicable

13 Special categories, related to co-benefits (optional)

For the MY_BESGRADE_Q1/24 project, where biodiversity conservation and community benefits are not applicable due to minimal wildlife threats and limited interaction with local communities, the emphasis shifts towards enhancing sustainability through alternative avenues. Given the project's transition from a rubber plantation to a palm oil plantation, the focus is on promoting sustainable agricultural practices and environmental stewardship as primary co-benefits:

- **Environmental Stewardship:**

The project prioritises sustainable agriculture in palm oil production, aiming to mitigate environmental impacts and preserve soil health. Through meticulous plantation management, MY_BESGRADE_Q1/24 seeks to minimise adverse effects on the ecosystem. Key practices include cover cropping, judicious use of agrochemicals, and

efficient water management. These strategies safeguard soil fertility, mitigate erosion, and ensure sustained productivity without specific wildlife conservation measures.

- **Economic Sustainability:**

In the absence of direct initiatives for community benefits or wildlife conservation, the project contributes to economic sustainability by generating employment opportunities within the palm oil sector. It prioritises skill development through training in sustainable palm oil cultivation techniques, thereby improving livelihoods and bolstering the local economy. This approach aligns with sustainable development goals, promoting economic growth and fostering decent work opportunities for all stakeholders.

14 Grouped projects (if applicable)

The MY_BESGRADE_Q1/24 project tailors its compliance, risk management, and stakeholder engagement strategies to suit its specific operational model as a stand-alone palm oil plantation, distinct from grouped project configurations. It adheres to the following individual project best practices:

- **Defined Project Boundaries:**

The project meticulously delineates its operational boundaries, ensuring clear demarcation from adjacent land uses. This entails precise mapping and comprehensive documentation to establish a definitive scope for palm oil cultivation and associated activities.

- **Transparent Accounting and Reporting:**

Utilising a transparent and robust accounting system, the project accurately tracks greenhouse gas emissions to report its environmental footprint. This system adheres to established methodologies and reporting standards, facilitating precise measurement of emission reductions and sequestration achievements.

- **Risk Assessment and Management:**

A comprehensive risk assessment evaluates environmental, financial, and social threats specific to palm oil plantation operations. Tailored risk mitigation strategies address factors such as market volatility, climate change impacts, and community engagements.

By prioritising these core elements, the MY_BESGRADE_Q1/24 project underscores its dedication to sustainable palm oil production, environmental integrity, and positive community engagement within the context of a stand-alone project structure, distinct from the complexities associated with grouped project frameworks.

15 Other GHG program

Non-applicable

16 Double counting avoidance

This section provides a comprehensive overview of MY_BESGRADE_Q1/24's approach to preventing double counting, focusing on the principles outlined in the BioCarbon Registry's "Avoiding Double Counting (ADC)" tool. The aim is to ensure that the accounting, issuance, and retirement of GHG reduction outcomes adhere to stringent criteria, eliminating any potential instances of duplicative counting.

Double Counting Avoidance Requirements:

1. Prohibition on Accounting:

MY_BESGRADE_Q1/24 strictly adheres to the prohibition of double-counting GHG mitigation outcomes. This involves precise reporting of emissions, ensuring that each metric tonne of reduction or removal is accurately recorded without duplication.

2. Prohibition on Issuance:

Carbon credit allocation undergoes thorough scrutiny to prevent duplication. Each issued credit signifies a distinct and verified decrease or removal of emissions, following the guidelines established by the ADC tool.

3. Prohibition on Retirement:

The retirement of carbon credits is meticulously managed by MY_BESGRADE_Q1/24. It ensures that retired credits align precisely with verifiable emission reductions or removals and prohibits their use for any form of compensation or assertion.

Application of BCR Tool "Avoiding Double Counting (ADC)":

1. Transparent Documentation:

MY_BESGRADE_Q1/24 prioritises the maintenance of clear and comprehensive documentation throughout the project lifecycle. This includes thorough documentation of verified emissions reductions or removals, issuance of credits, and retirement of credits. All documentation is made available for independent third-party verification purposes.

2. Verification Process:

The principles of the ADC tool are integrated into the verification process. Independent third-party verifiers utilise the tool to assess the project's adherence to double counting avoidance standards. Any discrepancies are carefully identified and rectified before carbon credits are issued.

Continuous Monitoring and Improvement:

1. Regular Audits:

Frequent internal and external audits are conducted to assess the effectiveness of measures implemented to prevent double counting. Identified weaknesses are promptly addressed to enhance the project's integrity.

2. Stakeholder Awareness:

Stakeholders, including project participants, local communities, and investors, are educated on the importance of preventing double counting. This awareness fosters a culture of accountability and ensures that all involved parties understand their role in avoiding duplicate tallying.

MY_BESGRADE_Q1/24 remains steadfast in upholding the highest standards of integrity in its GHG mitigation endeavours. Through the rigorous application of the BCR Tool "Avoiding Double Counting (ADC)," the project guarantees that each ton of emission reduction or removal is accurately recorded, issued, and retired only once. This

commitment enhances the credibility and transparency of the BioCarbon Registry Program.

17 Monitoring plan

The project MY_BESGRADE_Q1/24 has developed a comprehensive monitoring plan in accordance with the BCR Standard and relevant methodology. This plan comprises the following components:

a) Project boundary monitoring:

- The project employs a combination of a Global Positioning System (GPS) device and Google Earth Pro software to accurately delineate and demarcate the project's boundary, ensuring precise mapping of coordinates and area coverage. These tools undergo regular updates to promptly capture any changes in land use or land cover within the project area.
- Drones equipped with cameras and sensors are utilised to capture high-resolution images and data within the project boundary. This data is essential for verifying and validating land use or cover types, comparing them with the baseline scenario, and identifying any changes over time.
- Field surveys and ground truthing:
- To ensure accuracy, the project conducts field surveys and ground truthing to collect and confirm data on land use or cover types within the project boundary. This information is utilised to calibrate and correct satellite imagery and aerial photography, resulting in a more reliable assessment of project impacts.
- By implementing these monitoring techniques, MY_BESGRADE_Q1/24 ensures effective oversight of GHG emission reductions or removals within the project area, enhancing transparency and accountability in its environmental endeavours.

b) Monitoring the execution of project activities involves overseeing and reporting on progress and outcomes to ensure alignment with established objectives, timelines, and standards. Key components of this process include:

Compliance review: Regular reviews of project activities are conducted to confirm compliance with relevant laws, regulations, and standards governing carbon offset initiatives. This includes assessing adherence to emissions reduction methodologies and accounting standards.

Objective alignment: Auditors rigorously assess whether project execution aligns with the initial plans and objectives. This involves scrutinising project documentation, timelines, milestones, and identifying any deviations from the original plan.

- **Risk management evaluation:** Auditors meticulously evaluate the effectiveness of risk management processes, which includes assessing the identification, assessment, and mitigation of risks associated with the project. They carefully review the adequacy of implemented risk mitigation strategies.
- **Internal controls assessment:** Auditors examine the robustness of internal controls, which includes tracking financial expenditures and verifying the legitimacy and verifiability of carbon offset credits generated.

Through internal audits, the project upholds transparency, accountability, and adherence to regulatory requirements across all activities.

c) The monitoring of the quantification of project emission reduction/removals involves the following steps:

- Methodology selection: The projects rely on established methodologies such as BCR0001 Quantification of GHG Emission Reductions - GHG Removal Activities, Version 3.2, and ACM0003 Afforestation and Reforestation (A/R) Large-Scale Consolidated Methodology. These methodologies provide clear parameters, equations, and procedures necessary for accurately quantifying emission reductions or removals relative to the baseline scenario.
- MRV Tool utilisation: The projects utilise the BCR Tool: Monitoring, Reporting, and Verification (MRV), a spreadsheet tool that offers a framework and checklist for monitoring, reporting, and verifying emission reduction/removals. Additionally, the MRV tool assists in developing and implementing environmental and social safeguards and mitigation measures.
- Risk and Permanence Tool application: The projects employ the BCR Tool: Risk and Permanence, another spreadsheet tool that guides non-permanence risk analysis. This analysis determines the number of buffer credits required for deposit into the AFOLU Pooled Buffer Account, ensuring mitigation of non-permanence risks.

By following these steps and utilising the appropriate tools and methodologies, the projects ensure accurate and reliable quantification of GHG emission reductions or removals achieved through project activities.

d) Quality control and quality assurance procedures are essential for ensuring the accuracy, completeness, consistency, transparency, and verifiability of the collected and reported data, as well as the estimated emission reductions or removals.

- Regular monitoring: Projects uphold continuous monitoring of data collection, emissions measurements, and project implementation to ensure adherence to industry standards and best practices.
- High documentation standards: Clear and comprehensive protocols are established for data collection, measurement methodologies, and reporting to uphold high standards for project documentation.
- Audits: Audits of the entire project process, from data collection to reporting, are undertaken to identify any systemic issues or gaps that may affect the accuracy and reliability of project outcomes.

e) **Verification of field data**: Verification of field data involves confirming the accuracy and reliability of collected data from the field.

- On-site inspections: The projects conduct regular visits to verify the implementation of emission reduction measures or carbon sequestration activities. These visits entail inspecting equipment, facilities, and natural ecosystems to confirm alignment with project documentation.
- Documentation scrutiny: All relevant project documentation, including monitoring reports and maintenance records, undergoes meticulous examination. This rigorous review process ensures transparency and accountability in the project's operations.
- Third-party verification: Accredited and approved independent third-party verifiers, qualified by the BioCarbon Technical Committee, conduct the verification process. They issue verification reports and statements to validate the field data, ensuring its accuracy and reliability.

f) **Review of information processing**: This process ensures the quality and consistency of data processing and reporting, including data entry, analysis, and estimation of emission reductions.

- Google Sheets: Projects use Google Sheets to store and organise collected data, ensuring its security, integrity, and accessibility.
- Data quality assessment and control: This includes applying data quality indicators like accuracy, precision, completeness, consistency, transparency, and

verifiability. Procedures such as calibration, validation, correction, and documentation are used to ensure and enhance data quality and consistency.

- Feedback mechanism: Google Forms are utilised as a feedback mechanism, allowing project participants and stakeholders to provide information, data, comments, and suggestions, which are then incorporated into the project.

g) **Data recording and archiving system**: This is the system of recording and archiving the data and information collected and reported by the project, and of the emission reductions or removals estimated and calculated by the project, for the purpose of verification, certification, and transparency. The data recording and archiving system includes the following:

- The project uses a data recording and archiving software and a database to record and archive the data and information collected and reported by the project, and of the emission reductions or removals estimated and calculated by the project, in a consistent, transparent, and verifiable format and manner.
- The project uses the BCR Registry, which is an online platform that registers and tracks the emission reductions or removals generated and transferred by the project, and that provides access and information to the project participants, stakeholders, and the public.
- The project uses the BCR Tool. Data Recording and Archiving, which is a spreadsheet that provides a framework and a checklist for the data recording and archiving of the project, and for the compliance with the BCR Registry rules and requirements.

The BCR Tool functions as a comprehensive framework for monitoring, reporting, and verifying emissions, reductions, and removals from carbon dioxide removal (CDR) projects under Article 6 of the Paris Agreement. It guides the adaptation of existing Clean Development Mechanism (CDM) methodologies to meet criteria outlined in Article 6.2 and 6.4, along with the enhanced transparency framework. The tool encompasses the following aspects of MRV (Monitoring, Reporting, and Verification):

1. Monitoring Plan Specification: The monitoring plan delineates data and information necessary for estimating GHG emission removals or reductions during the project quantification period. It outlines parameters for monitoring, sources and methods of data collection, monitoring frequency and duration, quality assurance and control procedures, and data management systems.

2. Baseline Establishment: Data and additional information for establishing the baseline or reference scenario are specified in the monitoring plan, following the same principles as for the project scenario. The baseline scenario represents the hypothetical situation in the absence of the CDR project and is determined using baseline approaches defined in CDM methodology.

3. Leakage Identification: The monitoring plan includes specifications on potential emissions occurring outside the project boundary as a result of GHG project activities (leakage). It defines leakage sources, estimation methods, and leakage deduction factors, adhering to CDM methodology.

4. Environmental Impact Assessment: The Project Design Document (PDD) provides information on environmental impact assessment of GHG project activities, including changes in land use, water quality, biodiversity, and social aspects, along with mitigation measures and stakeholder consultations.

5. Quality Control and Assurance: Established procedures for managing GHG emission reductions or removals and associated quality control for monitoring activities are described in the PDD and monitoring plan. This includes roles and responsibilities, audits, and record-keeping systems.

6. Calculation Procedures: Procedures for periodic calculation of GHG emission reductions or removals and leakage are detailed in the PDD and monitoring plan, including methods and formulas for calculating net GHG emission reductions.

7. Stakeholder Roles and Responsibilities: Assignment of roles and responsibilities for monitoring and reporting relevant variables is specified in the PDD and monitoring plan, involving project participants, designated operational entities (DOEs), host country, buyer country, and supervisory body.

8. SDG Impact Assessment: Procedures for assessing the project's contribution to Sustainable Development Goals (SDGs) are outlined in the PDD and monitoring plan, following guidance from the SDG Tool. This includes identifying relevant SDGs, setting indicators and targets, collecting and reporting data, and verifying outcomes.

9. Co-Benefits and Special Category Monitoring: Procedures for co-benefits and special category monitoring, when applicable, are included in the PDD and monitoring plan, following CDM methodologies and the tool's guidance. This entails identification, quantification, verification, and reporting of co-benefits and special category aspects.

The BCR Tool ensures rigorous MRV processes that meet high accuracy standards and strict data collection and archiving, consistent with Article 6 of the Paris Agreement and the enhanced transparency framework. It also ensures consistency, comparability, completeness, transparency, and verifiability of the MRV process by applying methodologies and metrics assessed by the Intergovernmental Panel on Climate Change. Additionally, the tool promotes cost-effectiveness and harmonisation by leveraging existing CDM methodologies and providing guidance, templates, examples, and additional tools for project participants and DOEs..

NOTE: This Project Document (PD) shall be completed following the instructions included. However, it is important to highlight that these instructions are complementary to the BCR Standard, and the Methodology applied by the project holder, in which more information on each section can be found.