



Reforestation Guide

**Australian Government –
Reforestation Method 2019**

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Abbreviations:

ACCU – Australian Carbon Credit Unit

ANREU – Australian National Registry of Emissions Units

CER – Clean Energy Regulator

CEA – Carbon Estimation Area

ERF – Emissions Reduction Fund

GIS – Geographic Information System

FullCAM – Full Carbon Accounting Model

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Table of Contents

Introduction to reforestation	4
What is a reforestation carbon project?	4
The Methodology.....	4
Earning carbon credits on your project	4
Permanence periods	5
Farm benefits.....	6
Steps to a reforestation carbon project.....	6
Project Eligibility Checklist	7
Project Implementation	9
Project timeline	9
Feasibility.....	9
Design and planning.....	10
Implementation	13
Ongoing management.....	13
Management activities.....	14
Key Risk and Success Factors	15
What happens if a bushfire goes through my forest?	16
Co-Benefit Opportunities	17
What are co-benefits?	17
Co-benefit Programs	17
Other opportunities.....	18

Introduction to reforestation

We're here to simplify the process of understanding and managing a carbon project. This guide will introduce you to the basics of a reforestation carbon project to prepare you to start your own project.

How to use this guide

Think of reading through this guide as step 1 on your project scoping journey. It provides all the necessary contextual information to interpret and understand our feasibility reports, plus sets you up to ensure your native tree project plays by the rules.

What is a reforestation carbon project?

Participating in a reforestation project involves planting, growing, and maintaining a permanent forest of native trees on land that has been clear of forest for at least five years. By building carbon stocks in your trees, shrubs, and debris across a 25-year crediting period, you are removing it from the atmosphere. This removal - and resulting increase in your carbon stocks - earns you carbon credits.

The Methodology

A reforestation project needs to have its own 'methodology', which in simple terms is a rulebook that sets out the guidelines you must follow to receive credits according to the regulator (in this case the Clean Energy Regulator – Australian Government). The methodology outlines project requirements and the approaches that can be taken to measure the increase in carbon through planting trees on your property.

Under the *Reforestation by Environmental or Mallee Plantings FullCAM Methodology* (the methodology), there is no real-time carbon measurement¹. Instead, the projected carbon stock that will be stored in your project's trees, shrubs, and debris across a 25-year crediting period is calculated in advance using the government's computer modelling tool known as full carbon accounting (FullCAM). FullCAM considers a range of datasets to produce a modelled carbon yield (tons C per Ha) from a given latitude and longitude, which is then converted into Carbon Dioxide Equivalent (CO₂e), and in turn into carbon credits.

Earning carbon credits on your project

The amount of carbon you're able to store within your trees is calculated in 'tons of carbon dioxide equivalent' (tCO₂e). This is a standard unit for counting greenhouse gas emissions regardless of whether they're from carbon dioxide or another gas, such as methane. Importantly, this unit is what you receive payment for.

1ton CO₂e = 1 ACCU

Your tree growth is then checked and verified in reporting cycles that take place at least every five years, as well as through regular audits. This ensures you're managing your project properly, and you are paid for credits correctly. Submitting each Offset Report is what triggers the creation and issuance of ACCU's. ACCU's are registered financial products and will be issued in your name into an account within the Government Ledger. This is called an ANREU account, it is similar to having shares held in your name on a share trading account.

¹ The methodology allows for you to opt for a *direct measurement approach* if you believe your reforestation project is yielding better results than modelled by FullCAM. However, this approach involves costly sampling and should your yield be lower than the FullCAM modelled yield, you are not able to switch back to the modelled method. For the large majority of projects we recommend the FullCAM approach, but we are happy to discuss your project and the options available to you.

Carbon yield curve

The number of credits you earn each reporting cycle will mirror the growth in your carbon stocks as your trees grow. The carbon yield curve in figure 1 below shows the first few years of growth are modest, by year 4 and 5 you can expect peak annual yields, trailing off over for the remainder of the crediting term. This means that 60% of your carbon credits will be issued within the first 10-year period.

We recommend a discounted cashflow model is used to determine the net benefit of this cashflow distribution.

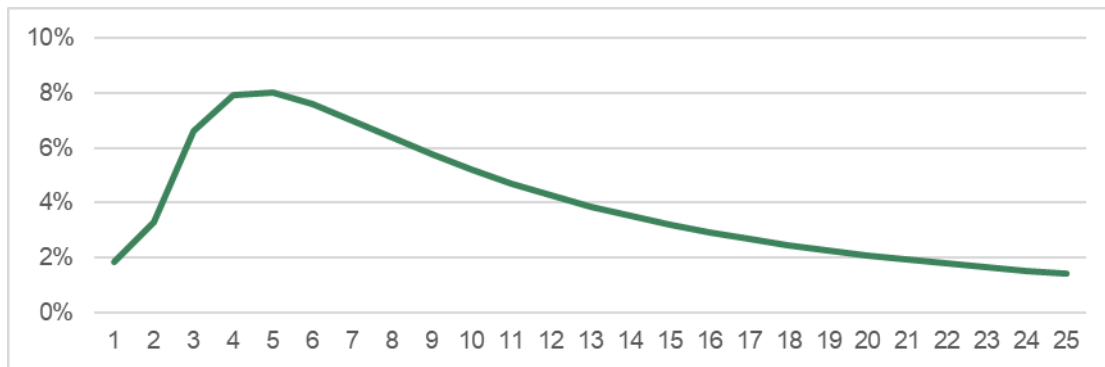


Figure 1: Annual carbon yield curve

Permanence periods

To ensure the carbon you've stored remains in your trees and doesn't re-enter the atmosphere, committing to a reforestation project means you will need to maintain your carbon stocks and keep your trees in the ground for a period of 25 or 100 years after your first round of carbon credits are issued. This is called your permanence obligation.

For either option, your crediting period will always be 25 years – so, you will only be credited for any carbon your trees sequester over a 25-year period.

For a 100-year permanence obligation, the Government subtracts 5% of these credits as a non-refundable security buffer. Essentially, they keep some credits as insurance in case of project failures, and you keep 95% of the carbon credits you generate during your 25-year crediting period. You need to continue to maintain your trees and carbon stocks throughout the 100-year permanence period.

For a 25-year permanence obligation, you will have an additional 20% of your carbon credits deducted as the carbon storage is considered less permanent (because you aren't required to keep your trees in the ground beyond 25 years). So, you only keep 75% of the carbon credits you generate during your 25-year crediting period.

This is a long-term commitment. It is important that you can confidently establish and maintain a reforestation project which aligns with both your long-term commercial and on-farm objectives.

More information and advice on how to make sure that your project timing is right is provided in this [resource produced by the Clean Energy Regulator](#).

Farm benefits

Beyond simply earning carbon credits, when done well, tree carbon projects can contribute to the development of a healthier and more resilient farm landscape. Not only is this beneficial to the broader ecosystem, but can boost farm productivity and function, examples include:

- Mitigate salinity prone soils
- Reduce wind erosion
- Improve biodiversity
- Reduce pressure from environmental factors such as climate change
- Create shade and shelterbelts for livestock

Steps to a reforestation carbon project

The figure below illustrates a generic flow for undertaking a reforestation carbon project.

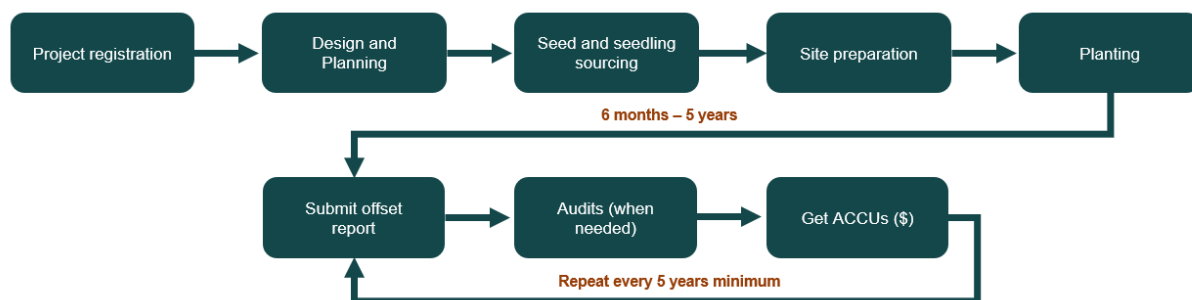


Figure 2: Indicative project stages and timeline

Project Eligibility Checklist

To participate in a project activity using the *Reforestation by Environmental or Mallee Plantings FullCAM* method, applicants must demonstrate eligibility under the method's requirements.

We have provided a checklist below to assist you in understanding these requirements.

Table 1: Eligibility requirements

Requirement	Explanation	
Forest Cover	Trees can be planted in a variety of ways – either as seeds or tube stock (seedlings), in rows or randomly, and in areas that are either linear belts or as blocks. However, all projects must be planted at a density that will achieve “forest cover”. In other words, your trees must grow to a height of at least 2 metres with a canopy area that covers at least 20% of the land – like a sparse woodland.	<input type="checkbox"/>
No-clearing period	The area selected for reforestation project has not been cleared of forest cover within the last 5 years, nor does it contain remnant vegetation such as woody biomass (woody stems). If there are patches of existing vegetation on your land, that's fine, these just need to be excluded from your project area.	<input type="checkbox"/>
Ownership	You can demonstrate a legal right to run a reforestation project and claim carbon credits (either as landowner, lease holders, or a signed authority with other landowners).	<input type="checkbox"/>
Native title	The land is not subject to a Native Title determination or claim. If it is subject to a determination or claim, the proponent is prepared to ensure native title holder interests can be satisfied before proceeding. More information is available at: http://www.cleanenergyregulator.gov.au/ERF/Want-to-participate-in-the-Emissions-Reduction-Fund/Planning-a-project/native-title	<input type="checkbox"/>
Eligible Interest Holder Consent	You can obtain consent to proceed with the activity from any persons or organisations who are interest holders (banks, lenders etc). If this is not obtained before registration, the approval will be considered 'conditional'.	<input type="checkbox"/>
Newness	You have not commenced any site activities (include site preparation) prior to registering the project with the ERF.	<input type="checkbox"/>
Rainfall	The project area must receive less than 600mm of long-term rainfall for mallee plantings. Where this is exceeded, a specific mixed native environmental species planting calibration must be used in your modelling.	<input type="checkbox"/>
Legislative additionality	The activity isn't currently or in future required to be carried out under a commonwealth or state law, and you are not receiving funding or incentives through another government program.	<input type="checkbox"/>
Clearing	The project area doesn't have any remnant vegetation that requires clearing prior to planting, including woody biomass or invasive native scrub.	<input type="checkbox"/>
Permanence	You are able (and have relevant permission) to have the plantings remain on site for either 25 or 100 years from the date of your first ACCUs are issued. This should be considered in the long-term context of your farm planning strategy.	<input type="checkbox"/>

In addition, it is also important that the ‘on-ground’ practical obligations of a reforestation project are considered.

Table 2: Practical obligations of a reforestation project

Obligation	Explanation	
Grazing management	Ensuring that any grazing does not affect the achievement or maintenance of forest cover.	<input type="checkbox"/>
Fire management	Removing debris from the project area for solely the purposes of fire management, as well as maintaining firebreaks in accordance with a fire management plan.	<input type="checkbox"/>
Pest and weed management	Ensure you have a consistent strategy to minimise the impacts of any pests or weeds across your project.	<input type="checkbox"/>
Local shire approvals	Consult your local Shire to determine whether the project requires any planning approvals.	<input type="checkbox"/>
Drought management	Ensure your region receives enough rainfall for the species of trees you’re planting (i.e. less than 600mm yearly on average for mallee plantings). It also helps to select drought tolerant species if your area is prone to long periods of minimal rainfall.	<input type="checkbox"/>

Project Implementation

Project timeline

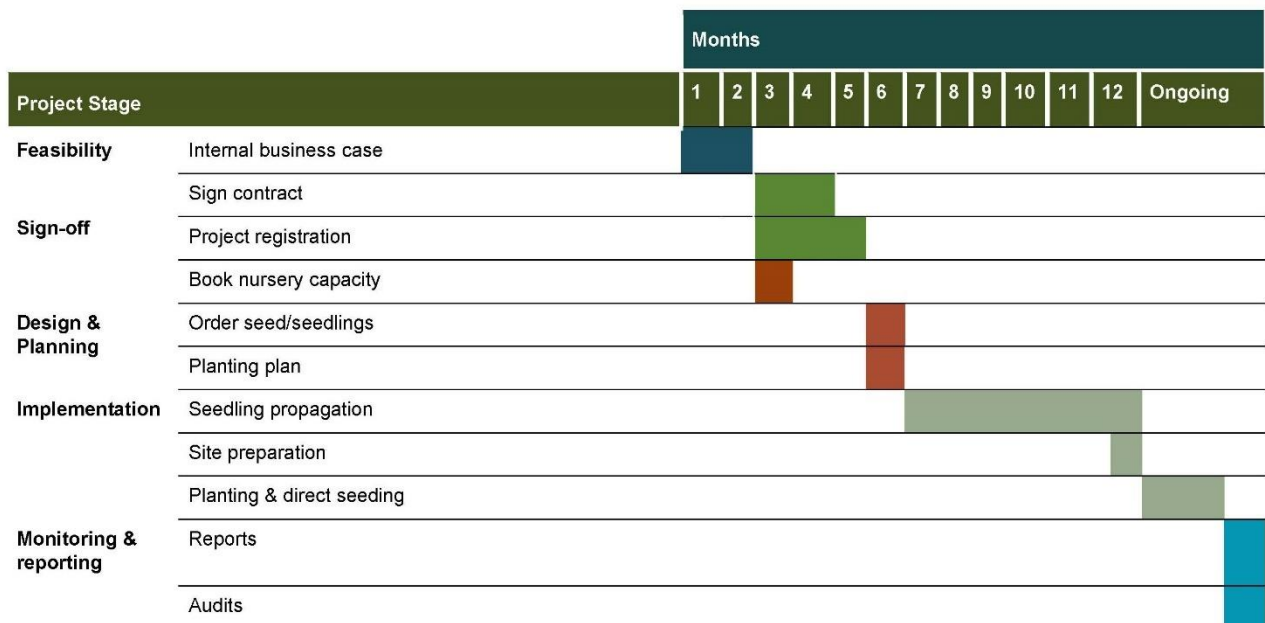
Below are the key project stages which influence the planting (implementation) start date. The stages highlighted have a clear critical path to enable planting in any given year. It is best to work backwards from your regions planting window, which will give your plants the best chance of survival. There are some important milestones which must be achieved before you can move to the next step. Some considerations to keep in mind include:

- One of your first steps is to get your project registered with the ERF. There are often long delays with the processing of your application so it's best to get this in as soon as possible so you don't miss your planting window.
- You must have full project approval prior to commencing any activities associated with your project (e.g., site preparation, ordering seedlings or seed, etc).
- Organise a forester inspection to understand the local conditions of your site and inform your budget.
- Demand for seed and seedlings could impact your ability to secure enough in time for your planting window. We recommend ordering these as soon as possible after you've received project approval.

Table 3: Indicative project timeline (exact timeline to be confirmed in detail within the design stage)

Native Tree Carbon Project

Key Project Timings



Feasibility

During this phase you will need to identify suitable and viable planting areas on your property. In doing this you should consider carbon yields, ecological value, expert advice, ease of establishment and any additional benefits to your ongoing farm operation. You may, for example, choose to plant shelter belts along your existing paddock lines where you are likely to get high carbon yields. Make sure these areas are eligible (refer to eligibility checklist on page 7).

We recommend avoiding particularly rocky, salty, or otherwise problematic conditions for your planting areas as it can be difficult to properly prepare the site or successfully establish your trees. We would suggest engaging a forester to help identify the best areas for planting trees and provide a greater understanding of the that will have an impact on your revegetation carbon project.

Design and planning

We'll provide you with simple guides and checklists when you get to this phase to make sure you're well informed and able to start your project on the right foot. This stage includes your final plot selection, species selection, planting design, work planning and any project mapping.

Register your project

Your project must be registered with the Emission Reduction Fund (ERF) to enable the project to claim carbon credits. Details of your project must be submitted along with key documents including:

- Geographic information of the project (including a geospatial map),
- Details about the project proponent and their experience,
- Evidence of your land's eligibility,
- A forward abatement estimate (i.e., how much carbon you estimate to store).
- A plan on how you intend to manage and monitor your trees for your permanence period.

We can help you generate this information using toolkits and software that help make this as simple as possible.

Planning your project areas

Deciding where you will plant your trees and mapping out your project is an important step to ensure you are optimising the integration of the project into your existing operations. There are three key areas to define across your property:

- 1) Project area** – This is the total area of your reforestation carbon project. It may cover your whole property, or a specific area within your property.
- 2) Carbon Estimation Area (CEA)** – This is where you will plant your trees and measure the sequestration of carbon.
- 3) Exclusion areas** – Areas within your project that are not eligible or cannot have trees planted and will therefore not contribute towards your project. For example, small areas of remnant vegetation.



Figure 3: Example of project mapping

Plot shortlisting

A detailed inspection by an experienced forester is recommended during the Design Stage to clearly define the plots and assess the practicality of each for a reforestation project.

To get the most out of the inspection it is worth shortlisting the possible options beforehand, using your on-ground knowledge of the land and the context of other farming operations and land uses. When considering areas of your farm to plant for carbon, consider the checklists below.

Plot selection considerations:

- **Yield:** Use your FullCAM carbon heatmap to prioritise viable areas.
- **Soil conditions:** assess the practical suitability of the land for tree planting, including:
 - Soil conditions and the suitability for tree establishment and survival (e.g., avoid soils that could be difficult for tree roots to penetrate).
 - Rocky country which may not be able to be deep ripped or machine planted.
 - Known compaction or hard pan issues which are likely to require deep ripping.
 - Gradients and slopes and their impact on machinery and water.
- **Woody Biomass:** you cannot plant eligible carbon plantations into areas that need to be cleared of woody biomass prior to planting.
- **Conservation significant species:** undertake a search of the Department of Agriculture, Water and the Environment's [Protected Matters Search Tool](#) to identify any conservation species of significance (e.g. Threatened Ecological Communities), which may be present on or nearby your property.
- **Cultural awareness:** undertake a search of the relevant government databases to ensure there are no cultural heritage sites on your property. If you come across a potential heritage site during your project, it is important to notify your state authority body.
- **Belts:** identify any areas for belt plantings on your property which provide a higher carbon yield reading on FullCAM. These areas must be capable of having a 40m exclusion zone around them which do not include other trees.
- **Salinity:** generally, avoid salty country unless you wish to consider experimenting with salt tolerant trees and shrubs.
- **Co-benefits:** Identify potential co-benefit opportunities such as:
 - Connecting to remnant vegetation.
 - Creation of wildlife corridors.
 - Proximity to threatened ecological communities (flora and fauna)
- **Integration:** How best can the proposed planting provide value to the overall farm business? Such as by providing:
 - shade and shelter for livestock,

- wind breaks to reduce evapotranspiration, or
- pollinator strips etc.
- **Pragmatism:** Are there obvious practical opportunities to create cost efficiencies? Such as:
 - Rounding off the corners of cropped paddocks (eliminating headlands).
 - Planting against existing fencing (minimizing new fencing required).

Belt and block plantings

Depending on your project objectives and your property layout, you can choose to have either *belt* or *block* plantings. These are modelled slightly differently in FullCAM, with belts attracting a 30-40% increase in yield. There are however exclusion zones and certain requirements for a planting area to be defined as a 'belt' - we can help you explore this as you progress along the design of your planting plan.

Planting Layouts

Selecting the optimal layout for each area of your carbon project is essential to optimise biodiversity, tree survival and carbon revenue outcomes. When you're designing your project, you need to think about the optimal layout and species mix for you.

There are a range of variables you can adjust when designing your tree plantation. These should be influenced by your goals for biodiversity (species richness), budget and how you plan to layout the overstory and understory tree species (shrubs etc.).

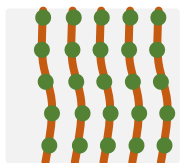
These different layouts can vary based on seedling density (referred to as 'stems' per hectare), seedling spacing (also known as 'stem' spacing), species diversity and site conditions. Examples are provided to the left whereby:

- Green dots represent seedlings
- 🔴 Brown lines represent direct seeding rows.

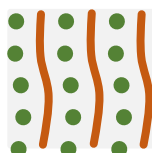
Some common examples of planting layouts include:



Seedlings only: This is a lower cost option with lower biodiversity outcomes because there is no understory established.



Symmetric biodiverse: Seedlings are planted on top of directly seeded rows, increasing the biodiversity of your project.



Alternating biodiverse: Seedlings and direct seeded rows are alternated.



Enhanced biodiverse: Two rows of direct seed close together in between seedling rows. This increases the number of shrubs and trees increasing your biodiversity.

You can select multiple options per site but should consider a minimum area for each to maximize efficiency due to machinery set up. This activity is undertaken as part of the design phase of a project.

Site Preparation

Once you have shortlisted your areas and a planting plan has been drafted, you should start to prepare for your planting window. We suggest ordering your seed and seedlings as soon as possible as propagation of the seedlings can have a lead time of 6-9 months. The seedlings and seed mix that you order will be informed by your forester and the site inspections completed to inform your design.

If you need help finding reputable nurseries or suppliers, we can point you in the right direction!

Plantings will have a greater chance of success if the country has been prepared effectively to enhance soil moisture. Depending on prevailing site conditions, this may include removal of weeds and ground preparation such as ripping and scalping.

Note: the project must be approved by the ERF before any project activities (aside from initial design) can be undertaken.

Implementation

This stage of the project is when you will implement your project and get your trees planted!

The critical part of a project's successful implementation is the planting window. This predominantly depends on rainfall to ensure the greatest opportunity for tree survival and is different from region to region. In general, the best time to plant is the month after the first heavy rains of the year.

Planting over multiple years

You may wish to stage your project and plant your reforestation project over multiple years to fit in better with your current farm operation. Although this is permitted under the method, your crediting period is fixed to 25 years and you will therefore receive slightly less credits for the areas planted at a later date. For example, if you were undertaking a 200Ha project and chose to plant 100 Ha in the first year, you would receive the full 25 years' worth of credits for this area. If you were to then plant the remaining 100Ha in year 3 of the project, you would only receive 22 years' worth of credits for this area.

Given you receive majority of your credits in the first 10 years, the financial benefit of planting all areas in year 1 may not outweigh the flexibility to add in planting areas at a later date. We can explore this with you and ensure your project is designed to meet your objectives and existing operations.

Ongoing management

Measurement

Under the *Reforestation by Environmental or mallee plantings FullCAM* method, the FullCAM computer model estimates the carbon stocks being held within your planted trees. As discussed earlier in this guide, the model uses a variety of scientific data to give a conservative estimate of your carbon stocks. You are then issued credits based on this modelling.

Reporting

You are required to provide information on the success of your project (in the form of offset reports) to the Clean Energy Regulator (CER) to determine how many carbon credits you are to be issued. You will receive credits at the end of each reporting round, with your first report due within the first 5 years of the project life (but no earlier than 6 months). The first offset report is a more substantial deliverable than the subsequent reports (for future crediting rounds), as it requires the first submission of much of your project information. The minimum number of offset reports you are required to submit throughout the 25-year period is 5, however, if you wish to receive credits more frequently (say, to generate more regular cashflow) you can report more often.

Timing your reporting

Although your modelling is unlikely to change throughout your crediting period (unless an event such as fire impacts the project area), you may choose to strategically time when you submit your reports. This may be because you would like an earlier delivery of credits, or because it suits the timing of your other farm operations.

Audits

A third-party audit of project Offset Reports is required by the CER. The number of reports varies depending on CER discretion (based on complexity and scale of the project). Generally speaking, three or four audits are required over the project lifespan with your first audit due upon the submission of your first offset report.

Coordinating credit issuance

Includes securing the services of a suitably experienced consultant to complete the Offset Reports, liaising between this consultant and the CER, and submitting the reports via the CER digital portal. Upon issuance of ACCUs, these units will appear in your ANREU account - where they can be held, retired, or transferred to other parties.

Management activities

There are certain activities that can only be undertaken in line with certain restrictions throughout your project. This includes:

Harvesting

Only 10% of fallen timber may be removed from a CEA in one calendar year for personal use (i.e., not for sale or other commercial use). All other biomass cannot be removed from a CEA unless for ecological purposes, fire management or traditional indigenous practices/native title rights. This must not affect the ability for the forest to reach forest cover.

Grazing

You may choose to graze your project areas to reduce weeds or just to utilise the space. This can only occur if the grazing doesn't affect the achievement or maintenance of forest cover. The ERF may request evidence that demonstrates this, and it helps to keep a record of the timing and intensity of grazing if applicable. We recommend this doesn't happen during the first stages of early growth while your trees establish (3-5 years).

Thinning

If you need to thin your native forest for any management (e.g., fire control), this may affect the modelling of your carbon stocks. If you plan to thin your forest at any time let us know so we can update our modelling to account for this.

Using lime or fertiliser

Similarly to thinning the forest, applying lime or fertiliser will affect the modelling of your carbon stocks. It's okay to give your seedlings a boost but let us know and keep a record so we can ensure the modelling is accurate.

Key Risk and Success Factors

Risk and success factors which could impact the planting establishment and survival are described in the tables below.

Table 4: Key risk factors

Risks Factors	Explanation	Possible solutions
Rainfall	Variability of rainfall can impact the planting program and it is vital to plan the plantings close to rainfall.	Planting will need to be adaptable and respond to unpredictability – for example, planting early if rain arrives earlier than usual, or delaying planting if it is too dry/wet.
Disease	Risk of disease can impact establishment and long-term health of trees. E.g., Dieback	Seek local advice (e.g., Foresters/Landcare groups) for awareness of known, common, local diseases and preventative measures / solutions.
Pests	Rabbits, Kangaroos, Parrots etc.	Utilise tree guards, browsing deterrents, nets, fencing, pest control where necessary.
Overgrazing	Potential ringbarking and damage to establishment	Do not allow stock to graze plantation in first few years of establishment. Ensure fences are all secure. If you do wish to graze stock on grasses in a plantation, be sure to regularly monitor and remove stock before they begin to damage trees.
Extreme weather conditions/events	Drought, flood, frost, or fire could destroy trees and impact your returns.	Work with a forester or local expert to design your forest in a manner that fosters resilience to these events. A strong fire management plan, planting outside frost, and using drought tolerant native species will help to reduce risk to your forest.
Weeds	Can compete with and choke out an establishing forest.	Consider chemical, biological, or machinery management.
Seedling and seed quality	Risk of failed seedling propagation or poor seed quality.	Consider diversifying seedling propagation across multiple nurseries. Ensure seed suppliers have adequate quality control measures in place and that seed is stored correctly.

Table 5: Key success factors

Success factors	
Inputs	Fertiliser, biochar, inoculants, bio-fertiliser / bio stimulants, wetting agents can improve establishment success rate when used correctly.
Irrigation	Opportunities to irrigate or hand water to ensure success of establishment, particularly on gravelly/sandy soils with lower water holding capacity.
Planting design	Selecting the optimal layout and machinery set ups that are suitable to the landscape and site conditions to ensure the best chance of establishment and survival.
Data Management	The collection, storage, transparency, and quality of all data is crucial when it comes to carbon farming as it's ultimately what offers value to offsetting businesses.

What happens if a bushfire goes through my forest?

A disturbance event that effects greater than 5% of your project area must be reported to the Regulator within 60 days of the event occurring. Depending on the extent and cause of damage and the measures you had in place to prevent this, the Regulator will determine a suitable approach for addressing loss – which may include regeneration or replanting to return the affected area's carbon stocks to its pre-disturbance state. Note that the crediting period for your project is fixed to 25-years and isn't extended due to this loss, so overall you will receive less credits for that area. We allow for a 90% survival rate in our modelling to factor in these potential losses.

If you can't return your carbon stocks to their pre-disturbance state, you will have to pay back the credits you had accrued for this area. We've outlined steps you can take to reduce the risk of these loss events in the Key Risk and Success Factors tables above. For more information on reducing the risk of fires, refer to this [resource produced by the Clean Energy Regulator](#).

Co-Benefit Opportunities

What are co-benefits?

A co-benefit is a positive environmental, economic, social, or cultural benefit derived from undertaking a carbon project, which is additional to the sequestration of carbon.

Co-benefits can provide the project an additional income stream if attached to a carbon credit under an approved co-benefit program but also deliver other far-reaching benefits and enhancements for the environment, farming operation and wider community.

Landowners seeking to add value to their carbon project will need to evaluate their land and the country surrounding it to determine what natural assets or ecosystem services can be derived from it. These may include any of the following:

Biodiversity & Conservation

- Proximity to high biodiversity areas or threatened habitats.
- Addressing fragmentation of remnant vegetation corridors.
- Improving biodiversity through enhanced species diversity, richness, and complexity, or use of rare or significant species native to the area.
- Proximity to important waterways.

Ecosystem Regulating

- Improving resilience of agricultural practices.
- Enhancing productivity of high-risk or marginal agricultural land.
- Improving soil health and reducing soil erosion.
- Responding or building resilience to salinity.

Indigenous Economic & Cultural

- Providing opportunity for Indigenous employment or investment.
- Aligning management with Indigenous Land Management practices.
- Protecting, identifying, or restoring sites of heritage significance.

Co-benefit Programs

There are several recognised accreditors that address co-benefits programs using various methodologies. These methodologies have varying levels of rigour, corresponding to differing costs. Generally, in Australia, accreditation bodies provide the methodology which can then be applied to a government funding program.

Though anecdotally, having verified third party co-benefit accreditation could help to achieve a price premium from voluntary market buyers.

Whilst a co-benefit credit should provide greater value to a carbon credit, it will usually require a greater level of upfront capital, input, and ongoing management/reporting. This will need to be assessed to

ensure any additional expense does not exceed the expected return – unless your project is prioritising these co-benefit outcomes.

Other opportunities

Environmental Plantings Pilot

The CER legislation allows for small projects less than 200Ha in size and meeting select criteria to replace auditing with satellite monitoring under the Environmental Plantings Pilot. This can significantly reduce ongoing costs, with the removal of audit costs. These criteria are straightforward to adopt and will result in a significant reduction in the ongoing costs for your project.

The criteria are:

- The project area is no more than 200Ha.
- The project is modelled as a mixed species block planting using the generic calibration in FullCAM.

If you were to undertake a 200Ha project, you will need to weigh up whether the removal of audit costs outweighs the financial benefits of increased project size, and the yield advantages of belt plantings. We can explore this with you while you're scoping your project.