

INTRODUCTION TO CARBON FARMING

IN SOUTHERN AND CENTRAL QUEENSLAND

Carbon Farming in Queensland

Carbon Farming presents an opportunity for land managers to secure another income from their land as well as make improvements to **their natural capital; their land**. Land use, land use change and the forestry sector, including agricultural land use, play an important role in storing carbon.

There are two ways to farm carbon:

1. By avoiding (that is, eliminating or reducing) agricultural emissions that would otherwise have occurred by changing, or introducing, specific on-farm practices designed to reduce greenhouse gas emissions (GHG) for example: reduced methane emissions from livestock, reduced fertiliser emissions, manure management, savanna fire management or,
2. By sequestering CO₂ from the atmosphere and storing it in the landscape for example: reforestation and managed regrowth (collectively referred to as carbon forestry), avoided deforestation, soil carbon (reducing carbon loss or increasing sequestration).

Queensland is responsible for 90 per cent of Australia's total land sector emissions. In all other jurisdictions except Western Australia and the Northern Territory, this sector acts as a 'carbon sink', meaning that activity in the sector actually removes more carbon from the atmosphere than it releases.



What's the issue?

The increase in concentration of greenhouse gasses (GHG) in our atmosphere is threatening both human and ecological systems. Reducing global emissions has been the topic of ongoing international debate, agreement and action. A number of gasses are responsible for global warming with water vapour (H₂O), carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) being the most prevalent. Each of these gasses occurs naturally in our atmosphere but at elevated levels can cause significant changes to the Earth's climate. The last century has seen a dramatic increase in GHG levels in our atmosphere, driven primarily by an increasing use and dependence on fossil fuels, and exacerbated by large scale habitat clearing.

In a bid to manage and potentially mitigate the worst of these expected outcomes, a number of global strategies (such as the Kyoto Protocol) have been proposed to reduce GHG output. In late 2015, 195 countries operating under the United Nations Framework Convention on Climate Change (UNFCCC), reached agreement on the international commitments to greenhouse gas emissions mitigation, adaptation and finance; and developed the Paris Agreement.

Under the Kyoto protocol and the Paris Agreement, Australia has made commitments to progressively reduce GHG emissions. Reducing the amount of land-clearing in Queensland is an integral step in reducing our overall emissions.





Australian Carbon Credit Units (ACCUs) and agriculture

Setting up and maintaining a carbon farming project involves costs and risks. Any income from the sale of ACCUs, along with the co-benefits from carbon farming, will have costs attached to it. There is the cost of undertaking the actual activity or implementing the change and then there is the separate cost of generating the Carbon Credit - the extra business administrative and accounting costs.

Subject to satisfying the monitoring, auditing, reporting and other requirements under the Emissions Reduction Fund (ERF), an eligible ERF project can apply for ACCUs. Each ACCU represents one tonne of carbon dioxide equivalent (CO₂-e) net abatement (through either emissions reduction or carbon sequestration) achieved by eligible activities – that accord with an approved Methodology.

The Commonwealth government determines which methods are eligible to generate ACCUs. The process for developing new methods involves the Minister for Energy and Emissions Reduction creating a priority list for new method development and then the Clean Energy Regulator developing the priority methods in collaboration with industry, potential users and other technical experts.

An ACCU is a ‘financial product’ under the Corporations Act 2001 and the Australian Securities and Investments Commission Act 2001. Also, of note: income from ACCUs is dealt with in a different manner to Primary Production by the Australian Taxation Office. When selling an ACCU the proceeds are counted as an earning separate to that of Primary Production. More information can be found on the Tax Treatment of ACCUs on the Clean Energy Regulator website. The Australian Taxation Office has information about Claiming Deductions for Carbon Sink Forest Expenses.

An Australian Carbon Credit Unit is a tradable certificate equivalent to one tonne of carbon dioxide equivalent either stored or avoided.

What is Sequestration?

In farming carbon, the land holder can either avoid emissions or ‘sequester’ carbon. Sequestration is the general term used to describe the natural processes that remove CO₂ from the atmosphere and store it in vegetation or soil. Sequestration in vegetation occurs via the process of photosynthesis – as plants use the energy of sunlight to convert CO₂ to carbohydrates for their growth and maintenance. The plant’s growth reflects the amount of CO₂ it has taken from the atmosphere. The plant is generally using more CO₂ in the initial years of growth, slowing over time as plants grow to their full capacity as a carbon store. The amount of carbon that can be sequestered in vegetation varies with species, soil quality, climatic conditions and land management practices.

Carbon accumulates in soil as vegetation dies. Some is incorporated into the soil while a portion is released back into the atmosphere as carbon dioxide. Vegetation assists the retention of soil carbon. Appropriate management of agricultural soils by landholders can reduce the amount of organic carbon loss. Soils with high organic carbon content are healthier and more productive and have higher water-holding capacity.

Sequestration activities are subject to permanence obligations. This means if an ACCU is produced through sequestration, the increase in carbon must be maintained for the nominated permanence period (either 25 or 100 years). Permanence should be considered as part of the risk management strategy, considering impacts and likelihood of fire, drought and the need to sell that parcel of land.





The Australian Government Program for Carbon Farming – The Climate Solutions Fund (CSF)

The Australian Government established the Emissions Reduction Fund (ERF) in 2014 as a means to achieve Australia's 2020 emission reduction target. In 2019 this was changed to the Climate Solutions Fund (CSF). The CSF sets out ways that industry can be a part of reducing GHG. The CSF is voluntary and includes all sectors of the economy and aims to seek the lowest cost abatement. Carbon Farming is the means for the agricultural sector to participate in the CSF. The Carbon Farming Initiative was established in 2011. It has provided the opportunity to recognise the role agriculture can play in reducing Australia's emissions and allows land managers to be paid for their actions.

Before an activity is eligible to generate credits, it requires an approved method for counting and verifying abatement. Land managers can choose to develop a project which complies with the guidelines of carbon farming Methodologies. The Clean Energy Regulator certifies the Australian Carbon Credit Units (ACCUs) which the farmer may then sell on the open market.

The Climate Solutions Fund has three parts:

Contracting: the Australian Government contracts for the supply of Australian Carbon Credit Units (ACCUs) via a voluntary reverse auction process that seeks to purchase lowest cost abatement in the form of ACCUs from land managers, carbon service providers, and industrial efficiency activities.

Crediting: The Clean Energy Regulator is responsible for crediting and verifying ACCUs generated through registered projects. These projects may have a contract with the Australian Government or be generating ACCUs for the supply to voluntary or other secondary markets such as under the Safeguard Mechanism.

Safeguarding: The Safeguard Mechanism seeks to ensure that the savings secured through the contracting process are not overtaken by carbon pollution from high emitting industrial sources.

As at 17 February 2021, there are 281 Queensland projects registered with the Clean Energy Regulator.

How to become involved in Carbon Farming

The Carbon Farming Initiative and the ERF were designed so that individual landholders could register projects and undertake projects individually, however it is a complex system and a very new area of competence and activity for many people. Landowners can get involved themselves or can do so with the support of a service provider. Similarly to the consultants and assistance available for other agricultural industries, the Carbon Farming industry has service providers that assist land managers to participate. The most common entry path is for people to partner with a carbon project developer. Project developers may assist at all steps of the process up to the sale of the ACCU's or they may provide support for particular phases of the project development or implementation. Importantly some project developers share the risk of project failure, while others do not.

Before signing with a particular project developer:

- Read the Australian Carbon Industry Code of Conduct
- Do your research, speak to people who already have Carbon Projects.
- Speak to multiple project developers – look for Carbon Project Developers who will share the risk as well as the rewards,
- Check online at [Queensland Rural Industry and Development Authority](#), your industry body and groups such as the Rural Financial Counselling Service for any assistance that is available.
- Always seek independent legal and financial advice prior to signing an agreement.





People who provide financial services in relation to ACCUs and related financial products and services in Australia may require an Australian Financial Services licence (AFSL), which authorises them to provide those services. You should obtain your own professional advice about the trading of ACCUs, having regard to your own situation.

Further information can be found on the CER website [Before you apply](#)

Key steps in a carbon farming decision process

Do you have the legal right to undertake the project? Is there a suitable method?

Does your high-level analysis suggest that it is worth undertaking further investigation?

Is there a suitable vehicle for participation? This may involve a partnership.

Undertake detailed financial and risk analysis and obtain professional advice about the viability of your project.

Develop the implementation plan and seek a contract to support proceeding with the project.



Four steps to participate in the CSF

Step 1 – Apply

You can participate in the Climate Solutions Fund as individuals, sole traders, companies, local, state and territory government bodies and trusts.

To participate you will need to:

apply to become a Climate Solutions Fund participant
register your project to receive Australian carbon credit units under the Climate Solutions Fund.

Step 2 – Contracts and auctions

Climate Solutions Fund participants with a registered project may bid for a contract to sell their Australian carbon credit units to the Clean Energy Regulator. The Clean Energy Regulator will run auctions to select bidders according to price. For certain projects that can demonstrate additional co-benefit outcomes, selling your credits to the LRF may be an option.

Step 3 – Reporting and auditing

To receive Australian carbon credit units, you will need to submit reports on your registered projects, including reporting on your emissions reductions. You will also need to have your project audited on a regular schedule.

Step 4 – Delivery and payment

Participants who have a contract with the Clean Energy Regulator will deliver Australian carbon credit units according to the schedule in their contract and will then be paid at the price bid at auction and set out in the contract.

More detail about the steps involved is available on the [Clean Energy Regulator's website](#).





Photo: Andrew Drysdale

Land Restoration Fund

The Queensland Government’s Land Restoration Fund (LRF) aims to expand carbon farming in the state by supporting land-sector projects that deliver clear environmental, social and economic co-benefits that deliver clear environmental, social and economic, and First Nations co-benefits in addition to generating ACCUs.

The three priority areas for investment are:

1. Land restoration to improve the health of wetlands and coastal ecosystems, including the Great Barrier Reef.
2. Land restoration for threatened species and biodiversity.
3. Land restoration for social and economic sustainability.

The Land Restoration Fund supports projects that:

- sequester carbon in land and soil to reduce Queensland’s carbon emissions
- boost revenue sources for farmers and other landholders in regional and rural Queensland
- deliver social and community benefits
- deliver cultural and community benefits for Traditional Owners
- improve Great Barrier Reef water quality
- enhance wetlands for fisheries and hatcheries improving commercial fishing opportunities
- strengthen critical habitat protection
- restore ecosystems and degraded land.

The LRF will formally support the following carbon farming co-benefits:

1. benefits to soil health
2. benefits to the Great Barrier Reef
3. benefits to wetlands
4. benefits to coastal ecosystems
5. benefits to threatened ecosystems
6. benefits to threatened wildlife
7. benefits to native vegetation

Projects wishing to apply to the LRF must register with the CSF and go through the CSF crediting process.

Further information is available at the [Land Restoration Fund website](#).

The Land Restoration Fund supports projects that deliver greater benefits and may create increased incentives for land managers to be involved. This may be through providing increased financial return or supporting broader benefits than producing ACCU’s through the Emissions Reduction Fund alone.

Examples of Carbon Farming Projects

Vegetation

- Protecting native forests by reducing land clearing.
- Planting trees to grow carbon stocks.
- Regenerating native forest on previously cleared land.
- Savanna burning.
- Managing bushfires in Australia’s savannas to avoid high intensity fires.

Agriculture

- Reducing emissions from beef cattle and milking cows through dietary supplements or efficient herd management.
- Capturing and destroying the methane from effluent waste at piggeries.
- Building soil carbon through changed farming practices such as crop stubble retention.

An emerging market is that of Blue Carbon which is carbon stored in coastal ecosystems (mangroves, tidal marshes and seagrasses). As of January 2021, the Clean Energy Regulator has yet to approve a method for Blue Carbon, but it has been listed as a priority to be developed over the next 12 months. A report has been produced by the Department of the Environment and Energy to further explain potential Blue Carbon opportunities; Towards an Emissions Reduction Fund Method for Blue Carbon, September 2019.





Be clear about the reasons for participating

Taking up carbon farming is like any other agricultural production decision within an enterprise. Like changing crops, breeding a new line of cattle, or shifting production systems it is a complex decision with many factors to consider. These vary from property to property and it is important to be clear on why a carbon project may suit your enterprise.

Undertaking a carbon project is a business decision with costs and benefits. However not all decisions are purely financial and considerations such as increased sustainability through diversification, opportunities for succession, alternative land uses for less traditionally productive areas, lifestyle decisions, project co-benefits and personal interest in the products or outcomes being developed, all play a part. Having a clear understanding of the drivers behind participation in carbon farming will help determine the type of project being developed and its value to the enterprise.

An additional critical factor in this decision will be the regulatory requirements of the ERF. This will dictate what activities are actually eligible on your property and will contribute to determining profitability.

There are many activities that may benefit the landholder and reduce greenhouse gas emissions but are either not recognized by the ERF or are not economically viable.

Landholders may want to consider the benefits of joining together with other landholders through aggregation.

Because administrative and compliance costs of even a smaller carbon project may be considerable percentage wise, the cost to produce an ACCU will often decrease with higher numbers of ACCUs to be sold. Joining with projects with the same Methodology across a catchment or river system for example, can reduce some of the environmental risks like fire, drought or storm events.

The Clean Energy Regulator website provides information about [Aggregation](#) under the Emissions Reduction Fund.

Like any new business venture, the choice to participate in carbon farming should include a careful consideration of the costs and benefits involved, alongside the risks of the activity being considered. Before deciding to proceed, this should be compared to other activity that could be undertaken within the enterprise. Equally, if the decision is made to not participate, the reasons should be clear, so that if something changes in the future then the opportunity to capitalise is recognised.

Some of the Co-benefits of Carbon Farming

In addition to generating revenue in carbon markets, a carbon farming project may also generate a range of co-benefits for your enterprise. Those benefits will clearly depend on the nature of the farming enterprise and on the type of carbon farming. They include:

- improving water use efficiency
- providing protection for stock (through trees providing shade and windbreaks)
- improving livestock production efficiency
- creating financial diversification
- improving environmental benefits such as increasing habitat area for a threatened species
- improving soil quality
- improving fertiliser use efficiency
- improving the amenity and aesthetics of the local environment.

Co-benefits may be private (accruing within the farm enterprise) or public (accruing to the wider environment outside the farm boundary).



Methodologies

Land managers may undertake many actions which reduce the GHG emissions of their enterprise. In order to gain a financial benefit from generating ACCUs, one of the specific Carbon Farming Methods must be used, following explicit instructions for setting up, undertaking, recording and monitoring the project. There are also specific auditing requirements for projects. Examples of Carbon Farming projects can be found on the Australian Government – Clean Energy Regulator website and are summarised below. The Beef cattle herd management method can reduce the emissions intensity of beef cattle production by reducing cattle emissions per kilogram of live-weight produced.

- The Feeding nitrates to beef cattle method reduce greenhouse gas emissions from pasture-fed beef cattle by substituting urea supplements with a nitrate supplement in the form of lick blocks.
- The Measurement of soil carbon sequestration in agricultural systems method credits measured increases in soil carbon as a result of one or more new or materially different management activities in grazing or cropping land (including woody horticulture) that store carbon in that land.
- A soil carbon in grazing systems project involves storing carbon on grazing land by introducing activities that either increase inputs of carbon to the soil, reduce losses of carbon from the soil or both.
- A model-based soil carbon project involves setting up specific project management activities on eligible land that aim to remove carbon from the atmosphere by increasing the amount of carbon added to the soil. As they grow, plants take up carbon and return it to the soil, where it is broken down to form soil carbon.
- Vegetation projects generate abatement by removing carbon dioxide from the atmosphere and storing it as carbon in plants as they grow. Examples of vegetation activities could include:
 - a. reforestation
 - b. revegetation, or
 - c. protecting native forest or vegetation that is at imminent risk of clearing.
- The Destruction of Methane Dairy Manure method sets out the rules for projects that reduce the release of

methane generated from dairy manure. A project using this method requires the installation and operation of pond covers, gas capture equipment and combustion equipment to existing uncovered effluent treatments, or the replacement of conventional ponds with covered ponds systems.

- The Dietary Additives to milking Cows method applies to Emissions Reduction Fund projects that feed eligible additives to milking cows to reduce the amount of methane emissions. Increasing the fat content of a milking cow's diet reduces methane emissions produced as a result of enteric fermentation (digestive process).
- Savanna Fire Management projects aim to reduce the frequency and extent of late dry season fires in savannas, resulting in fewer greenhouse gas emissions and more carbon being sequestered in dead organic matter.

Useful Resources:

- Carbon Farming In Qld: Qld focused strategies and resources for climate change.

<http://www.qld.gov.au/landrestorationfund>

- Clean energy regulator: Austn Govt media releases, links to information hubs around auditing & markets.

<http://www.cleanenergyregulator.gov.au/>

- Project and Contract registers: Interactive Project Map link to see projects by state or method.

<http://www.cleanenergyregulator.gov.au/ERF/projectand-contracts-registers>

<http://www.cleanenergyregulator.gov.au/ERF/Choosing-a-project-type/Opportunities-for-the-landsector>

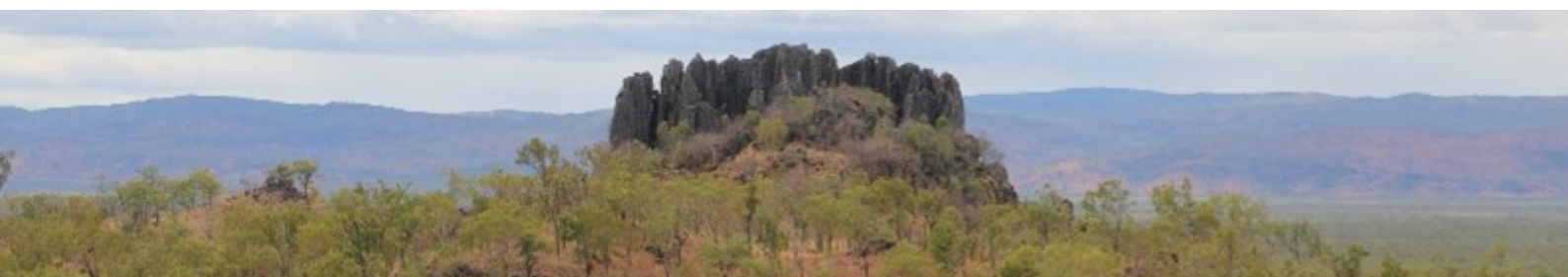
- Carbon Market Institute Industry Code of Conduct: A guide for everyone in the Carbon Market from project developers to advisers. Check project developer signatories.

<http://marketplace.carbonmarketinstitute.org/code/>

- Carbon Credits (Carbon Farming Initiative) Act 2011: Up to date legislation for attaining carbon credits.

<https://www.legislation.gov.au/Series/C2011A00101>

- Department of Environment and Resource Management, Qld (2011), Carbon Farming in Rural Queensland.





Methodologies in use in Southern and Central Queensland

Not all Methodologies are appropriate for all areas in Australia. Within Queensland, existing land use types as well as topography and climate, influence which methods are more appropriate for an area. The main Methodologies for Southern Queensland are identified below (these are relevant for areas including Desert Channels, Burdekin and Wet Tropics NRM regions and regions further south).

Forestry and Green House Gas Emissions

Land clearing and deforestation emits GHG through burning, decomposition of unburnt vegetation and soil disturbance. Reforestation of cleared native brigalow woodlands results in very slow recovery of the emitted carbon. Therefore, from an abatement perspective, it is far better to retain mature brigalow woodlands than to reforest an equal area.

Current Activity

There are 8 vegetation / forest methods available for use to generate credits. Prospective project developers can utilise an Australian Government 'decision tree' to assist in determining the suitability of the individual method and project types. Broadly speaking these methods cover activities across four main areas:

- Afforestation (establishing a forest on land where a forest did not previously exist)

- Reforestation (establishing a forest on cleared land)
- Revegetation, or
- Protecting native forest or vegetation that is at imminent risk of clearing

Currently the majority of projects in SW Qld are using the Human Induced Regeneration of a Permanent Even-Aged Native Forest method.

Required Actions

The specific activities required are dependent on the project type and the method being used to generate the ACCU. Within the range of methods, a number of possible strategies could be employed:

- Integrating livestock enterprise and forestry.
- Establishing plantations on previously cleared pastoral or agricultural properties in small blocks, alleys or windbreaks complementary to more usual land management.
- Integrating trees in pasture or crop lands to improve water and soil function and enhance pasture production and sustainability.

Landholders undertaking a forestry project must first define which methodology will be used by checking that they meet the project eligibility criteria and can address any special conditions required.





Once the project type and methodology has been identified, the process includes the following stages:

- site mapping and evaluation to establish a baseline scenario,
- identifying possible risk factors and
- developing a project plan including a site management plan.

After any relevant land preparations such as exclusion fencing or weed management, activities such as tree planting or protection will occur. Ongoing land management may be required, including post-planting management, pest control, irrigation, management of competing vegetation, monitoring forest health, managing fire risks and collecting data.

Overall, more productive land systems in high rainfall zones will have greater carbon forestry potential than arid lands, and more intensive plantation forestry will achieve higher offsets than environmental plantings.

Benefits

Re-establishment of forest and woodlands – notably of native species - offer one of the easiest ways for land managers to offset GHG emissions as the amount of carbon sequestered is measurable and verifiable. Stands of vegetation, even non-native, may provide habitat to wildlife as well as improving connectivity between other areas of native woodlands and habitat. Often these projects are relatively low cost to establish.



Risks and Limitations

Depending on the character of the region and the history of land use, certain methods will have limited application. The risk of losing forested areas to bushfire or drought could diminish returns over the long term.

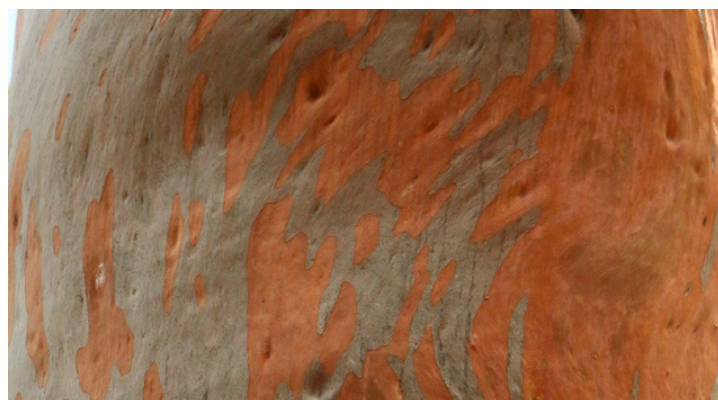
Sequestering Carbon in Soil Grazing Systems

Soil Sequestration occurs as plants capture CO₂ through photosynthesis, die and decay and deposit captured carbon onto or into the soil. The amount of carbon stored in soil reflects the balance between sequestration and emission rates and changing land management activities can therefore alter the rates of sequestration and emissions. Soil carbon has been recognised as a major component of soil health and is known to have multiple productivity benefits.

Required Actions

This method only applies to land that has been under permanent pasture or continuously cropped for at least the previous five years. The land manager can use a range of activities to increase the carbon store or reduce emissions including:

- converting from continuous cropping to pasture
- undertaking pasture cropping (eg planting annual crops into dormant pastures)





- managing pasture by implementing or changing pasture irrigation, applying organic or synthetic fertiliser to pastures, or rejuvenating pastures, including by seeding
- managing grazing by changing stocking rate or altering the timing, duration, and intensity of grazing.

This list is not prescriptive and since the actual change in carbon needs to be measured directly, there is considerable scope for a variety of actions to be undertaken. The land manager must carefully consider what activities they wish to undertake and how they will fit within their current or desired cropping and grazing enterprises, as well as costs involved in the carbon project.

Benefits

Australian soils are generally very low in organic carbon and there are multiple benefits available through increased soil organic carbon regardless of the capacity to generate an ACCU. The ability to generate ACCUs for sale may provide an income source that will enable land managers to make changes to their operations that make them more sustainable in the long term.

Soil organic carbon is important for the chemical, physical and biological components of soil and is the basis of soil fertility. Increased soil carbon increases the availability of nutrients for plant growth including nitrogen and phosphorus. It improves soil structure by holding the soil particles together as stable aggregates, which in turn improves soil physical properties such as water holding capacity, water infiltration, gaseous exchange and root growth.

Risks and Limitations

A transition to new systems of land management will potentially carry an increased cost. Grazing systems, while not incurring the same level of inputs as a cropping system, may also not provide the same level of financial return. A soil carbon project is a sequestration project and therefore landholders will need to maintain the carbon in accordance with either the 25 or 100 year permanence obligation.

