



Cultivating CARBON

www.cultivatingcarbon.com



OPTIMISING RETURNS FROM CARBON FOR YOUR FARM

Working together with farmers, Cultivating Carbon will provide an additional carbon income stream improving the sustainability and profitability of your farm

Background

Recognition of the importance of agriculture to the rural economy and food security is at the forefront of South Africa's national strategy and priorities. Yet, most indicators show that South African agriculture, and specifically the grain sector, is leading to increasing environmental and economic degradation. The impact of conventional, tillage-based agriculture on the environment is severe, not only through soil erosion and fertility loss, but also indirectly through sedimentation, siltation and increased flood risk downstream. The vulnerability of bare soil to wind erosion is an increasingly recognised threat. Most of the South Africa's wind erosion events occur in the north-western Free State and North-West Provinces where large volumes of maize are produced. It is estimated that over the past half century, 46% of soil organic carbon has been lost due to poor cultivation practices, resulting in degraded soils that are unable to sustain future food production in a financially viable manner. Conservation and Regenerative Agriculture (CA/RA) are principal ways in which farmers can contribute to global efforts to mitigate climate change and reduce

greenhouse gas (GHG) emissions, improving a farm's resilience to the future impact of climate change. Besides the GHG emission and carbon sequestration benefits of CA/RA, the additional benefits of improved water holding capacity and consequent sustained crop yields through dry periods is especially important in agriculture areas that are becoming increasingly vulnerable to drought. Carbon sequestration, together with significant savings in fuel, fertiliser and lime, through the adoption of CA/RA can deliver a broad set of benefits to South African farmers.

Besides in-depth carbon expertise, the **Cultivating Carbon** team builds upon decades of experience in conservation agriculture projects. Close relationships have been developed with farmers through the "**Conservation agriculture farmer innovation project**", supported by the Maize Trust over the past decade and implemented by Asset Research¹.

¹ <https://assetresearch.org.za/conservation-agriculture/>



WHAT IS CONSERVATION AND REGENERATIVE AGRICULTURE?

Conventional cultivation, a practice where land is ploughed to a certain depth, left bare for a period of the year and a mono-crop grown, results in soil degradation and loss in productivity. In response, a range of interventions have emerged that limit soil disturbance and loss, create sources of soil organic content and introduce a variety of crops and other species that together improve soil health and production over time. This is termed CA/RA.

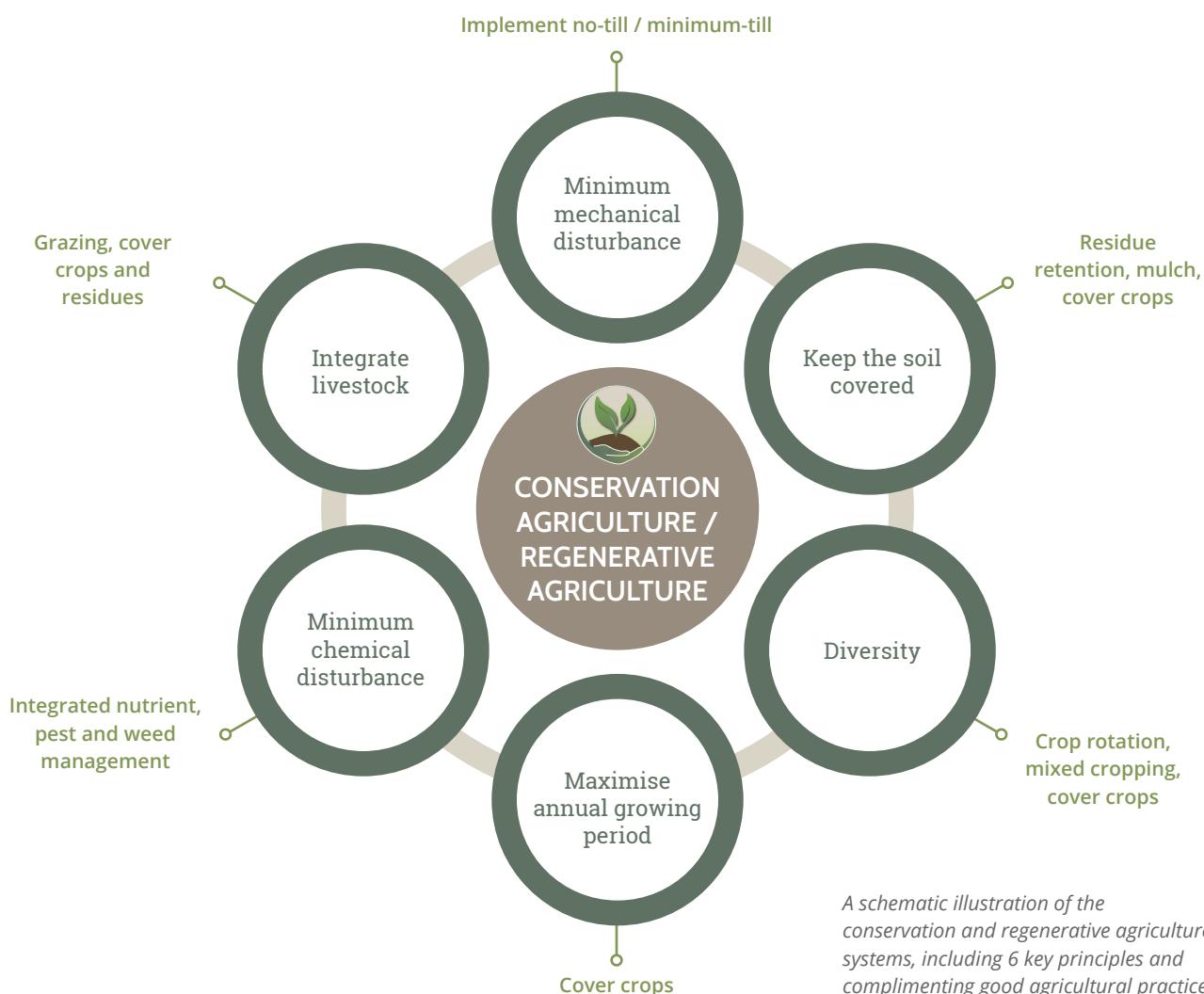


² <http://www.fao.org/conservation-agriculture/en/>

Conservation Agriculture requires, as a minimum, that farmers follow three key practices² :

- Minimum mechanical soil disturbance, i.e., no tillage;
- Crop rotation and species diversification through varied crop types and sequences; and
- Secure at least 30% soil cover at all times, through, amongst others, cash crops, cover crops and crop residues.

In addition to this minimum set of criteria, where appropriate, farmers are encouraged to adopt further activities, termed **Regenerative Agriculture**, such as the integration of livestock, maximising annual growing periods and reducing chemical use.





BENEFITS OF CA/RA FOR THE FARMER

- **Cost savings – reduced fuel and operating costs:** Completely halting tillage and the turnover of soil, significantly reduce tractor usage and associated diesel consumption. Overhead costs of tractor and equipment maintenance are also significantly reduced. Field assessments in the Western Cape have indicated that a reduction in power consumption (including diesel usage, tractor hours, tractor size) of 50% can be reasonably expected.
- **Cost savings – reduced use of fertiliser and agrichemicals:** CA/RA reduces the need to apply synthetic fertilisers and other agrichemicals over the medium to long term. Depending on the objectives and practices of the farmer, in a South African context, a reduction in synthetic fertiliser usage of 15% to more than 50% in the first 5 years is achievable.
- **Improved soil health and erosion control:** Planting a diversity of crops and maintaining organic soil cover throughout the year lead to an increase in microbial activity, soil health and a significant reduction in the loss of topsoil through wind and water erosion.
- **Increased water holding capacity and adaptation to climate change:** Increasing the organic content of soil leads to an increase in water holding capacity, which in addition to reducing immediate irrigation needs, can have a profound impact on the magnitude and resilience of production, especially in dryland systems. CA/RA is a crucial climate change adaptation response, especially in regions that are predicted to become significantly hotter and drier over time.
- **Increased crop yields and additional income from carbon:** South African studies have shown that CA/RA leads to stable, and even increased, production and associated income over time. In addition, the sequestration of carbon in soils and a decrease in GHG emissions mean farms can be eligible for carbon revenues, which together with increased crop sales and a reduction in operating costs ensure greater profitability for farmers.

Aside from significant farm benefits of CA/RA, such as reduced operational costs and increased crop production, Cultivating Carbon provides an exciting opportunity of an additional income stream for farmers through the registration and sale of carbon credits. These carbon credits result from an increase in soil organic carbon and reduced CO₂ emissions due to lower diesel, fertiliser and lime consumption.

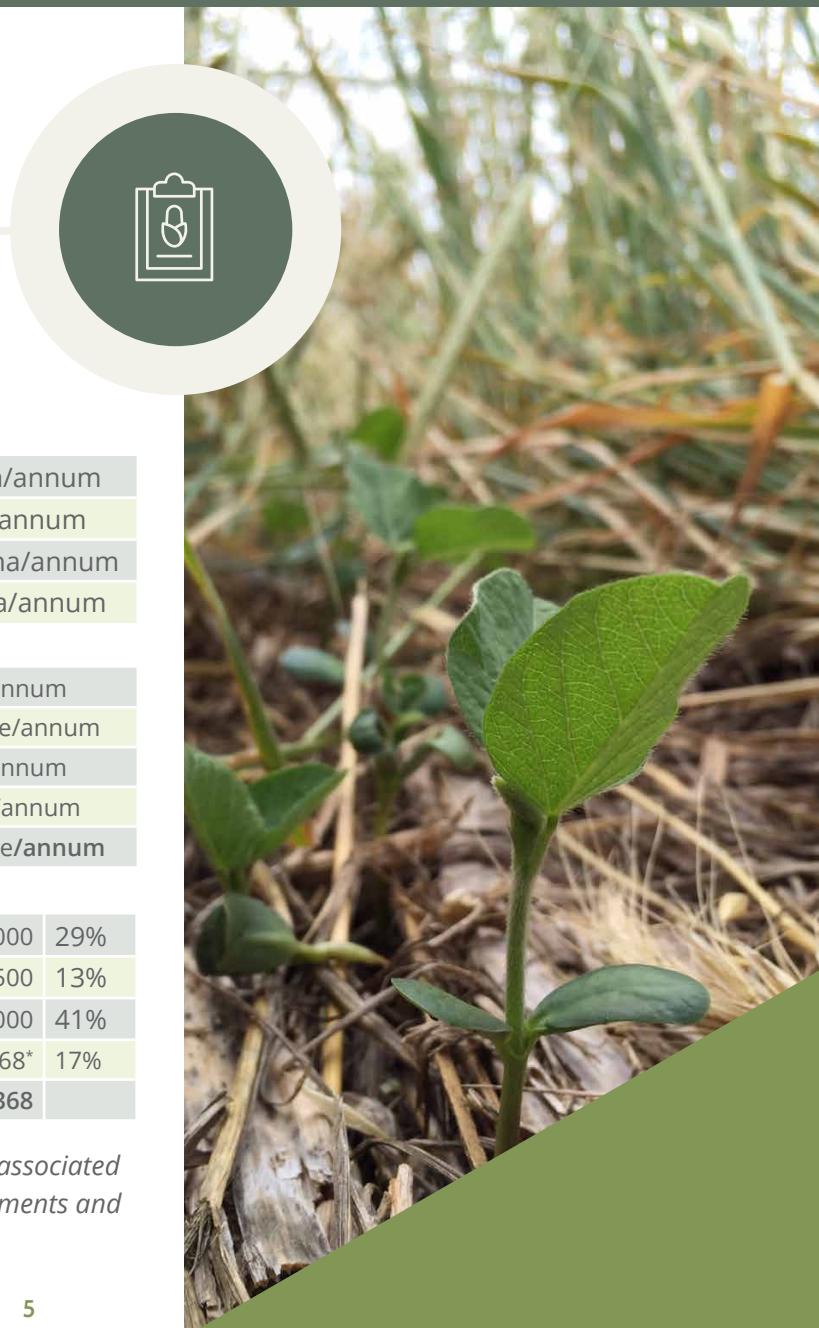
THE CULTIVATING CARBON VALUE PROPOSITION

70% of carbon revenues generated will flow through to participating farmers. In return for its 30% share, Cultivating Carbon will bear the cost of carbon development, monitoring, evaluation and verification through an international carbon standard as well provide access to direct technical assistance for farmers. The intention is to remove the technical and financial barriers to entry that are often associated with carbon markets, to develop a project at scale that reduces the cost per farm and maximises returns for each farmer.

As an example, at a carbon price of R142/tCO₂e (USD10/tCO₂e and a ZAR/USD exchange rate of R14.20), it is expected that a farmer implementing CA could earn an additional R187/ha/annum of carbon income through reduced CO₂e emissions from the decreased consumption of diesel, lime and nitrogenous fertilisers as well as an increase in soil organic carbon. This is in addition to the R872/ha of savings in input costs for diesel, lime and nitrogenous fertilisers. This is illustrated in the following example:

Applicable case study for Conservation Agriculture

Area: 1,000 ha
Locality: North-Eastern Free State
Major crop type: Maize
Carbon Price: R142/tCO₂e (US\$10/tCO₂e)



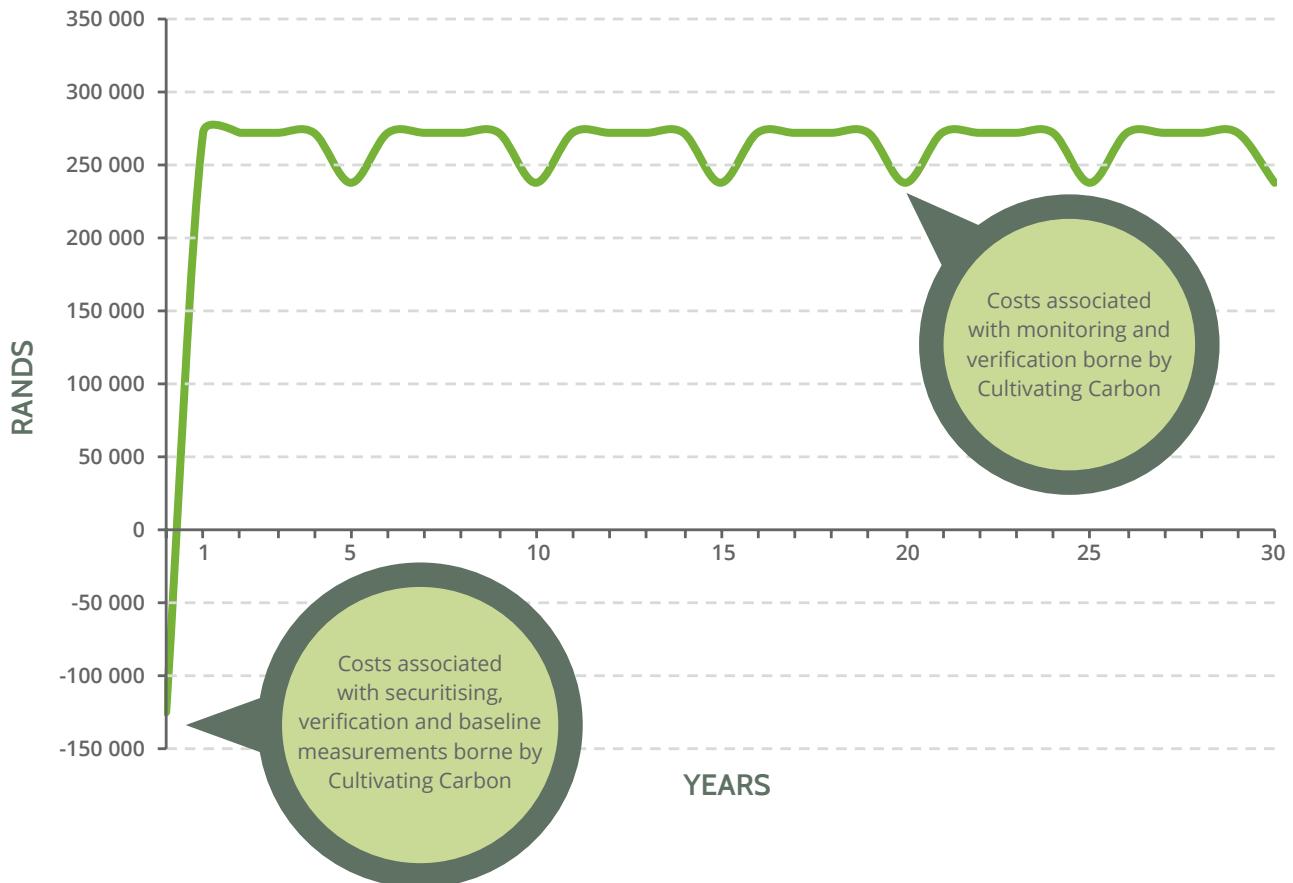
Unit area reduction in consumption because of Conservation Agriculture	Lime	200 kg/ha/annum
	Nitrogen	25 kg/ha/annum
	Diesel	25 litres/ha/annum
CA increase in soil carbon	Carbon	0.25 tC/ha/annum

Annual CO ₂ emission reduction for 1000 ha	Lime	88 tCO ₂ e/annum
	Nitrogen	1,051 tCO ₂ e/annum
	Diesel	67 tCO ₂ e/annum
Annual soil carbon increase	Carbon	917 tCO ₂ e/annum
		2,122 tCO ₂ e/annum

Annual savings from CA for 1,000 ha	Lime	R300,000	29%
	Nitrogen	R137,500	13%
	Diesel	R425,000	41%
Annual revenue for 1,000 ha	Carbon	R189,868*	17%
		R1,052,368	

*This is 70% of the total carbon revenue as all costs associated with securitising, verification and baseline measurements and monitoring are borne by Cultivating Carbon

TOTAL CARBON REVENUE AND EXPENSES FOR 1,000 HECTARES



This additional carbon income is generated through the implementation of CA/RA and subsequent carbon credit generation – more on this below. Revenue will

be generated from the sale of carbon credits to the international (i.e., non-South African) carbon market and local off-takers.



PROJECT OWNERSHIP AND GOVERNANCE

The project ownership and governance are arranged according to expertise and responsibility, as follows:

- The project company, Cultivating Carbon Proprietary Limited (Cultivating Carbon), is 100% owned by Restore Africa Fund 12J Proprietary Limited ("RAFF 12J")³. RAFF 12J and its sister fund, Restore Africa Fund Proprietary Limited (RAFF), collectively referred to as Restore Africa Funds (RAFFs), are impact funds, targeting a broad range of environmental, social and governance outcomes through natural restoration. The objective of RAFFs is to fund conversion from conventional agriculture to CA/RA. Restore Africa Fund Manager Proprietary Limited (RAFFM) is the appointed manager of the RAFFs. RAFFM is responsible for the day-to-day operational ability of RAFFs.
- The project company is operationally managed by Cirrus Advisory Services Closed Corporation (Cirrus)⁴ and RAFFM.
- A framework of financial governance best practices and measures are implemented and maintained by Integrity Asset Management Proprietary Limited (Integrity)⁵ and Wauko Proprietary Limited⁶ (Wauko), whilst on-farm extension services are provided by Integra Trust Group⁷ (Integra).

The project ownership and governance structure is shown below:

³ www.restore-africa.com

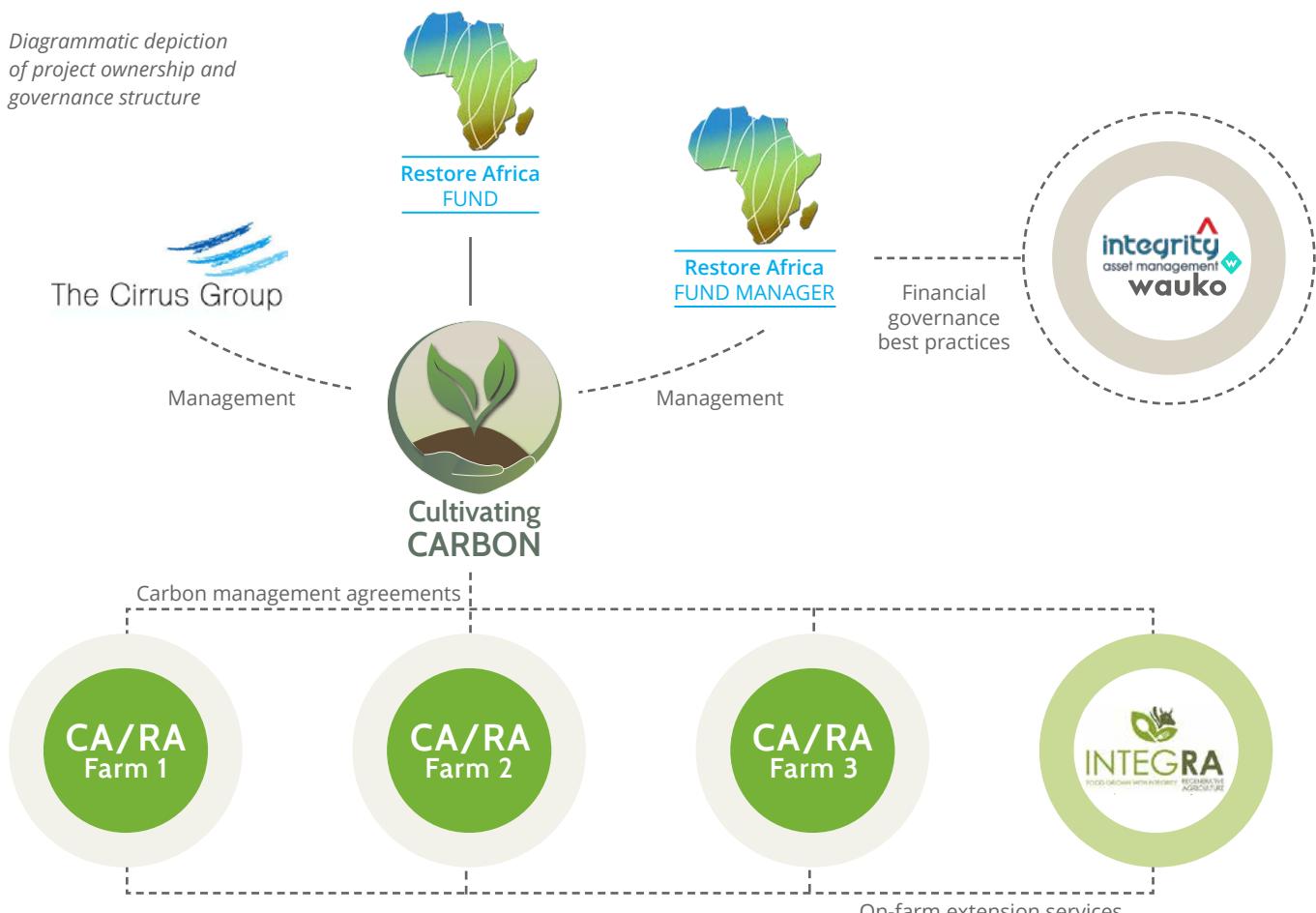
⁴ www.cirrusafrica.com

⁵ www.integrityam.co.za

⁶ www.wauko.com

⁷ www.integrafood.co.za

Diagrammatic depiction of project ownership and governance structure



VERIFICATION, MONITORING AND REPORTING OF YOUR CARBON

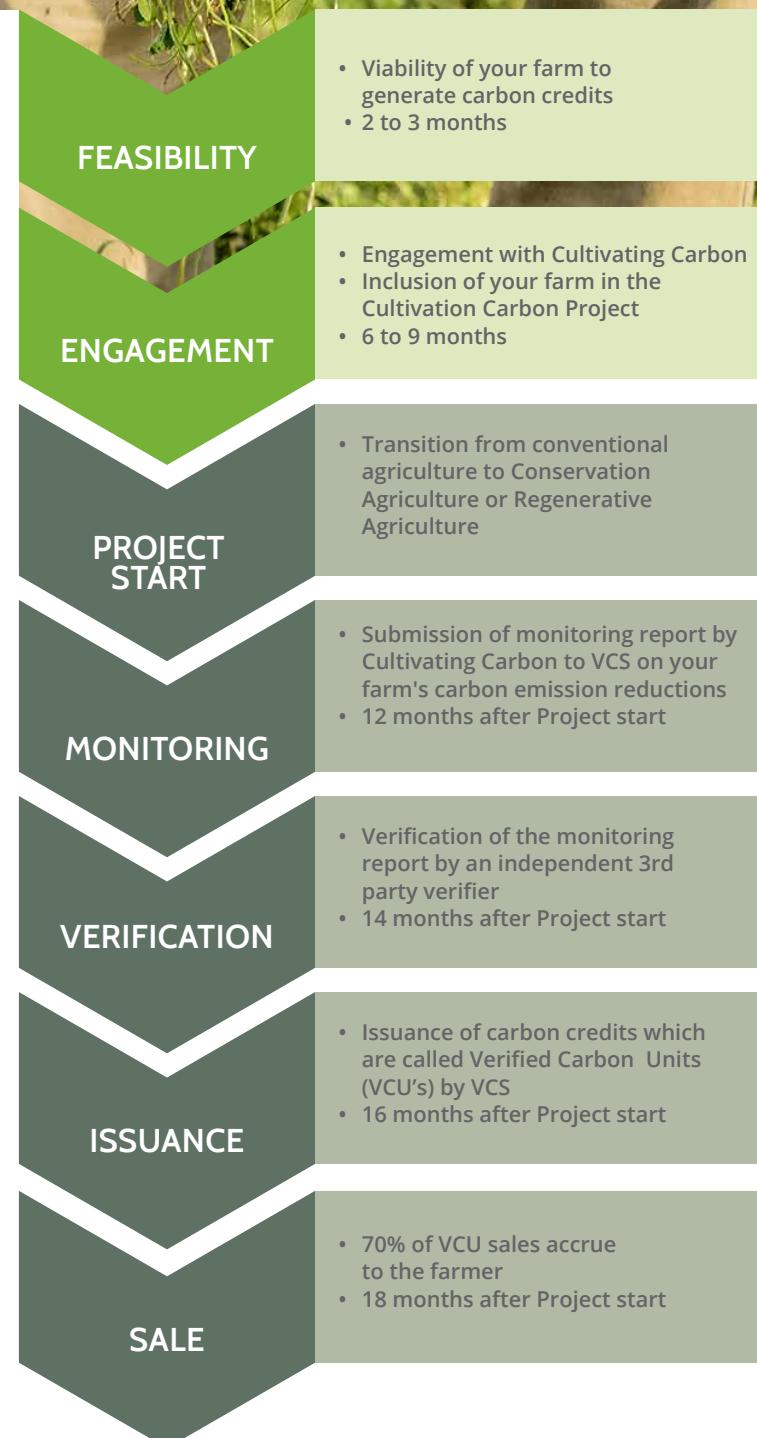
Cultivating Carbon will seek verification through Verra's Verified Carbon Standard (VCS) . VCS is an internationally recognised standard and is generally preferred by international carbon offset buyers as well as locally (where it is one of only two standards recognised under South Africa's Carbon Tax regulations).

Emission reductions due to a decrease in fuel, fertiliser and lime usage as well as the carbon sequestration will be verified on an annual basis based on accurate biophysical modelling and activity-based monitoring, with supporting field measurements once every five years. Remote sensing and further spatial data will be provided by GeoTerralmage , which has substantial experience in mapping agricultural systems in South Africa. Similarly, the analysis of soil samples will be done by an accredited national laboratory in a cost-effective manner. The estimation of changes in GHG emissions due to a decrease in diesel, fertiliser and lime use will be based on existing annual financial reporting done at a farm scale.

Steps to secure and monetise your carbon

The followings steps and timeframe are required to securitise your carbon and ensure an income.

Under the VCS Program, projects are issued unique carbon credits known as Verified Carbon Units or VCUs. Each VCU represents a reduction or removal of one tonne of carbon dioxide equivalent achieved by a project.



⁸ www.verra.org

⁹ <https://geoterralmage.com/>

JOIN CULTIVATING CARBON TODAY

At Cultivating Carbon, we realise the crucial role of farmers and understand that they have limited capacity to navigate this novel journey alone. We have a heart for agriculture and our goal is to ensure thriving and sustainable farms for the future. We do this by generating an additional income stream for the farmer, whereby the bulk of the carbon revenue is directly allocated to the farmer, along with a whole host of additional benefits from the implementation of CA/RA practices. Therefore, we facilitate the entire on-farm carbon credit process, so that you can focus on what you are good at, farming. A farmer partnering with Cultivating Carbon will be facilitated and guided through the necessary on-farm practices that need to be adhered to, for carbon credit qualification, while we take care of the carbon credit administration, measurement, verification, validation, trading and possible other nitty-gritty components.



Together,
we can
cultivate
carbon!



CONTACTING THE CULTIVATING CARBON TEAM



Dr Hendrik Smith started his career in 1993 as soil scientist at the South African Agricultural Research Council (ARC). Since 1997 he was involved in a number of Landcare projects in the ARC for almost 15 years, primarily working on Conservation Agriculture (CA) amongst smallholders in SA. In 2006 he completed his PhD in Sustainable Agriculture at the University of the Free State, developing a model to research and encourage the adoption of CA by farmers. From 2006 to 2012 he fulfilled the role of programme manager at the ARC. In 2013 he was appointed as the CA Facilitator (in Grain SA) with the responsibility to research and develop CA among commercial and smallholder grain producers in South Africa. This programme is supported by The Maize Trust, and is currently being implemented by Asset Research.

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Dr Tony Knowles, managing member of Cirrus specialises in the land-use aspects of global change, providing advice on both climate change mitigation and adaptation measures. Past and current clients include government, development agencies, and private-sector mining, forestry, and agriculture corporations. Specialist focus areas include the development of carbon revenue opportunities through their full life-cycle - from early feasibility assessments to the design of activities, implementation, and the creation of monitoring and verification processes. Tony played a leading role in the South African National Carbon Stock Assessment, subsequent strategic frameworks and led the early development of climate change responses within South Africa's Fruit and Wine Sector. He has been the principal advisor on projects located in numerous countries in southern, eastern and central Africa and was elected as a member of the Gold Standard's Technical Advisory Board where he is tasked with reviewing projects and the development of monitoring standards.

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Dr Jaap Knot has extensive practical experience in conservation agriculture, plant breeding, dairy and (cover) cropping gained in the Netherlands, New Zealand, Lesotho and South Africa. He holds a PhD in Conservation Agriculture, with research focused in the eastern Free State that included soil quality assessments, agricultural economics and social aspects related to no-till adoption and innovation uptake. Jaap currently facilitates conservation agriculture and soil monitoring in the CA Farmer Innovation Programme in the Eastern Free State and Mpumalanga highveld and has worked with the Growing Nations' Trust, the leading agency promoting CA in Lesotho. As a farmer he also implements CA activities, including intercropping and summer cover crop mixes for grazing on his farm near Ladybrand. Jaap has experience in working with commercial farmers and has the facilitation skills to coordinate the CA technology transfer, and on-farm research, development and implementation initiatives.

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Andrew Ardington grew up on a sugar cane and cattle farm in KwaZulu-Natal. Ahead of its time, the farm began integrating sugar farming with cover crops and cattle in the 1970s. Andrew obtained his BSc degree in Agricultural Economics from the University of KwaZulu-Natal. In 1994 he commenced his career in the tourism industry, worked as game ranger at Mala Mala Game Reserve, advancing his love and understanding of nature and its systems. In 2016, Andrew once again got involved in cattle farming and this rekindled his interest in agriculture that works with, rather than against, nature. Andrew became immersed in regenerative agriculture and the possibilities it presented regarding the healing of agricultural soils, planetary health, and human health. This ultimately resulted in him founding the Regenerative Agriculture Association of South Africa to advance regenerative agriculture in the region and the Regenerative Food Hub, an application to assist in the creation of a regenerative food chain via food clubs.

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Fritz Otto is a regenerative orientated agronomist across various disciplines in the South African agricultural landscape, consulting to grain, fruit crops and mixed farming operations in numerous climate zones and provide specialist products to CA/RA farmers. The compilation of Water Quality Management Reports for waste- and wastewater designation for the Department of Forestry and Water affairs and various related services, were provided as a private consultant. He is actively involved in agri-based project management in South Africa and Zimbabwe. He is a Trustee of Integra Trust and director of Integra Link.

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