The Carbon Farming Initiative: sorting the wheat from the chaff

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The Commonwealth's Carbon Farming Initiative (CFI) is a potentially attractive offering and its architects have provided safety nets designed to mitigate financial risk and minimise negative outcomes for farmers.

Nevertheless, there will be good CFI deals and there will be bad CFI deals in the emerging carbon market, as there is in any market.

Land managers evaluating CFI opportunities as a means of entering the carbon economy need to do more than rely on good intent and safety nets and this article will discuss some key considerations when hunting for value as a generator of carbon offsets.

The first things to bear in mind are:

- The CFI is voluntary; not compulsory.
- At this time, farmers will not be charged for their farm-generated emissions.
- Farmers do have an opportunity to sequester carbon or reduce farm emissions and claim an offset credit for that reduction provided they meet the requirements of the CFI.

So where are the opportunities and where are the risks?

The easiest way to assess the risk and reward profile is to break down the various offset-generating opportunities into five distinct parameters.

1. **Technical capability to achieve the outcome.**
2. **Synergy with land management system.**
3. **Carbon dioxide equivalents (CO2-e).**
4. **Kyoto ACCU or Non-Kyoto ACCU.**
5. **Permanence period for sequestration projects.**

1. Technical capability

Determining the risk and reward profile of measures to generate carbon offsets is likely to involve a variety of technical, operational and financial considerations.

The first question is whether the landholder has, or will be able to acquire or develop, the technical capability to deliver the desired outcome in a way that is cost-effective and compatible with the farming enterprise.

FIGURE 1. OPERATION OF AN ECOREMEDY® PILOT PLANT BEGAN IN MARCH OF 2008. THE FACILITY WAS LOCATED AT TYSON FOODS' FEED MILL IN FAIRMOUNT, GEORGIA. TYSON IS AMERICA'S LARGEST PRODUCER OF POULTRY MEAT. OVER THE COURSE OF 11 MONTHS THE PLANT OPERATED 24 HOURS A DAY, FIVE DAYS A WEEK, AND IN THAT TIME CONVERTED MORE THAN 500 TONS OF POULTRY LITTER TO ENERGY THAT WAS USED TO GENERATE STEAM FOR USE IN THE FEED MILL. THIS ALSO REDUCED METHANE EMISSIONS; A BENEFIT THAT OFFERS POTENTIAL FOR SIGNIFICANT REVENUE FROM THE CARBON ECONOMY.

2. Synergy with land management system

An offset-generating activity needs to be compatible with and ideally enhance the farming enterprise as a whole. This is of key importance.

The CFI discourages perverse outcomes, such as cutting down rainforest for palm oil production or using plants that may ultimately become problem weeds to sequester carbon. These types of activities are outlined on the CFI 'Negative List'. The negative list sets out activities that are excluded from the CFI because of a material risk of negative impact on the availability of water, biodiversity, employment, etc. For more information visit: http://www.climatechange.gov.au/en/government/initiatives/carbon-farming-initiative/activities-eligible-excluded.aspx

From a farmer's perspective there is, for example, no benefit in cutting fertiliser rates to reduce nitrous oxide emissions then not being able to meet quality standards for a product, such as protein in wheat.

However, employing new methods to increase fertiliser efficiency would result in significant synergy because there is potential to create a carbon farming opportunity while maintaining production and quality with reduced fertiliser usage and costs.

Well-planned biodiversity plantings that use the right species in the right places can offer numerous benefits including erosion protection and habitat for pollinators and other beneficial insects.

Soil carbon is good in almost all situations.

'Manure management' opportunities can also offer significant opportunities and great synergies for livestock enterprises.

One example of modern manure manage-

ment technology with CFI potential is a farm-scale machine that can take chicken litter straight off the shed floor and turn it into heat, cooling and electricity without drying or pelletising. This approach minimises a waste management cost, cuts energy costs, generates renewable energy certificates and creates a significant carbon offset opportunity by reducing methane and nitrous oxide emissions that are commonly generated in current waste disposal techniques.

While there is not an approved methodology for this process under the CFI at present, flaring methane at landfill and piggeries has already been approved and other manure management methodologies are being considered for inclusion.

http://www.climatechange.gov.au/en/government/initiatives/carbon-farming-initiative/methodology-development/approved-methodologies.aspx

3. Carbon dioxide equivalents – CO_2-e

Different greenhouse gases have varying degrees of impact on global warming.

These impacts are typically expressed in carbon dioxide equivalents (CO_2-e) – the global warming impact one tonne of CO_2 gas will have over 100 years.

Carbon dioxide (CO_2) is the best-known greenhouse gas but is not the only one. Two other important greenhouses gases that have a significant relationship with agriculture are methane (CH_4) and nitrous oxide (N_2O).

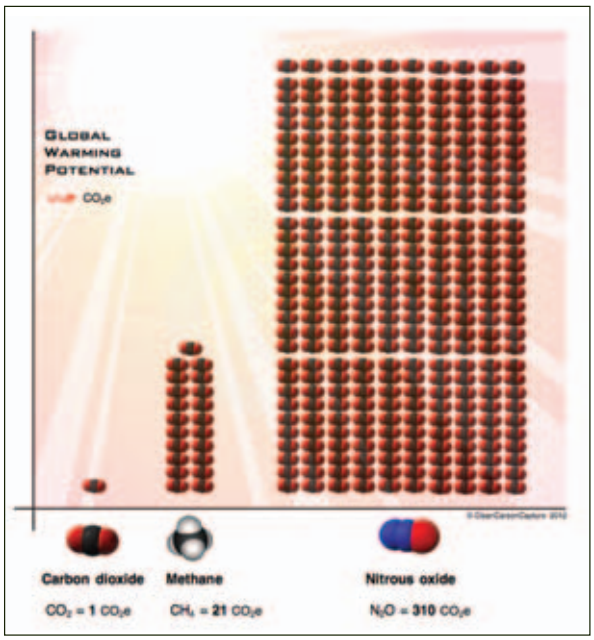

FIGURE 2. CO_2-E IS USED TO COMPARE THE GLOBAL WARMING POTENTIAL OF VARIOUS ATMOSPHERIC GASES.

The magnitude of a gas's greenhouse potency is based on the amount of long-wave atmospheric radiation, predominantly infrared light, it absorbs and converts to heat over a hundred-year period.

As a global warming agent, methane is considered to be 21 times more powerful than CO_2. Nitrous oxide is considered to be 310 times more powerful than carbon dioxide.

Based on these values, saving one tonne of N_2O through improved nitrogenous fertiliser efficiency has the same effect as sequestering 310 tonnes of CO_2 through tree planting.

4. Kyoto or non-Kyoto ACCU

From July 1 this year, Australian companies that generate more than 25,000 tonnes of CO_2 or equivalent each year are required to pay for or off-set their greenhouse gas emissions.

This measure is designed to enable the nation to meet its Kyoto obligations.

Not all forms of offset generation count towards Australia's national target under the Kyoto Protocol. For example, tree planting that meets certain criteria is accepted under Kyoto – the offsets from such plantings are considered Kyoto-compliant – but carbon sequestration in soil is not. Neither soil organic carbon nor long-lived 'recalcitrant' forms of carbon such as biochar are accepted under the Kyoto agreement and offsets from them are considered Kyoto non-compliant. This is important, because liable companies looking for offsets from the land management sector will be able to offset their compulsory carbon liabilities only with approved Kyoto-compliant offsets.

However, there is still a potential market for credits from sequestration in soil.

Credits earned under the CFI are called Australian Carbon Credit Units (ACCUs). There are two categories of ACCU – Kyoto and Non-Kyoto.

The concept of 'Non-Kyoto' ACCUs has been developed to create a market for non-Kyoto offsets generated from the land management sector. The managers of the CFI will attempt to provide value for non-Kyoto ACCU's through a government funding pool. However the market potential for non-Kyoto ACCUs is not clear. The only obvious market for them is voluntary buyers who do not have a compulsory emissions target but want to be seen by consumers as being carbon neutral.

Because compulsory emissions can be offset only with Kyoto-approved methods and the non-Kyoto ACCUs will be for those companies making a voluntary decision it is likely that a significant price differential will emerge for Kyoto-approved ACCUs and non-Kyoto ACCUs. The value of non-Kyoto offsets are likely to be heavily influenced by the economic conditions of the day.

Some offset-generating practices that are not Kyoto-compliant at this time may become Kyoto compliant in the future.

5. Permanence period

Sequestered carbon must be stored for 100 years, with agreed carbon levels maintained throughout this period.

Annual reports and periodic audits of carbon levels are required while carbon levels are being established. Once carbon targets have been achieved and additional carbon is no longer being added, reporting and auditing are required only if stored carbon is lost, for example due to bushfire or drought.

Non-Kyoto projects generating less than 2,500 tonnes CO_2-e a year are not required to provide on-going audit reports.

The approach to avoided emissions, such as reductions in methane and nitrous oxide release, is different. Reductions in emissions need to be measured and verified, but because they are not 'stored' like carbon, avoided emission agreements are not subject to the 100-year time required for carbon sequestration, so commitments to reduce emissions do not carry the same potential liability as carbon storage.

Key criteria when hunting for value

1) Seek to identify offsets that have high synergy (complement or are a 'good fit') with the farming system.

2) Reducing methane (CH_4) and nitrous oxide (N_2O) emissions can create substantially higher returns than sequestering carbon dioxide (CO_2) because of their CO_2-e values.

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A series of field experiments were also conducted in moderately sticky soils to investigate the effects of position and loading of the side wheel on disc unit forces and soil build up.

"Results of the field tests showed that the presence of the gauge wheel, its position relative to the disc blade and its loading could significantly affect the soil build-up," Ali said.

"We also found that forward speed had a remarkable effect on reducing soil build up on the disc due to higher centrifugal forces and shorter soil/disc contact time.

"The interface contact area between a gauge wheel and a disc blade increases with a more forward position of the gauge wheel, which typically makes the situation worse in a sticky clay soil.

"Soil build up on a disc blade coated with ultra high molecular weight (UMMW) polyethylene was slightly less than the build up on a similar blade without the coating but this benefit does not seem sufficient to warrant the cost of implementing such an upgrade and we have no data on the practical wear life of UMMW polyethylene in this application.

"Higher loads on the side wheel increased draught force requirements, suggesting load settings on disc seeder units should be adjusted to match field conditions, with minimum load likely to optimise performance."

The jump force of a disc unit is a key indicator of capacity for single disc seeding systems and this characteristic, akin to the better-known break-out characteristics of tine machines, has proved to be a useful guide to the approximate point of action of the soil force reactions onto the disc blade, Ali said.

"Overall, this project will help us understand the key drivers of single-disc seeder performance and hopefully assist with improving field performance in adverse field conditions such as sticky soils and high residue loads."

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3) Creating offsets that are Kyoto-compliant may provide better medium and long-term value than non-Kyoto ACCU offsets that will be traded in a voluntary market free of any legislative or regulatory requirement to participate.

4) The terms of emission reduction agreements are much less demanding than those for carbon sequestration because avoided emissions offsets dare not subject to the 100 year permanence requirement of carbon storage.

Based on these criteria the best value is going to come from Kyoto-compliant offsets that have a good synergy with the farming system, high CO_2-e and no permanence requirement.

On the other hand, low CO_2-e, non-Kyoto offsets that are not complimentary to the farming system and have a 100-year permanence period are likely to generate the least value.

The key question is not whether to dismiss or jump into carbon farming but 'where are the good deals and how do I avoid the bad?'.