The Secretary
Senate Standing Committee on Rural and Regional Affairs and Transport
PO Box 6100
Parliament House
CANBERRA ACT 2600

Dear Ms Radcliffe,

In my submission to the Senate - Carbon Sinks Forest inquiry, I made mention of a farmer in the Binnu region of WA who was being pressured by his bank to sign an agreement with a Tree Company to lock up a sizeable proportion of his farm for a 'carbon sink'.

This procedure will effectively take food producing land out of production for a minimum of 70 years. Since that submission we have been advised by another Shire Council in the Northen Ag Region of WA that another 4 farms in their shire were doing the same.

With this potential crisis for the local rural communities, as well as the larger ramifications in mind, Mr Tim Wiley (a development officer with DAFWA) and Mr Sam Harburg (a Regional Economist with DAFWA) have carried out an economic analysis of the ramifications for agriculture, and have written an article entitled:

How the Emissions Trading Scheme could affect farm profitability, food production and net green house gas emissions.

A case study from the northern wheatbelt of Western Australia

This article will be published by the Evergreen Farming magazine, as well as being circulated to other rural newspapers.

However, I believe this is very important information for the Senators to be made aware of, and as such I would ask that it appear as an addition to my original submission.

Thanking you in advance.

Would you also pass on to Anne Palmer that we feel that if the senators could fly to Northampton, we would pick them up and show them around some farms in the region, provide them meals etc, and have them back at the airfield by 1.30pm.

(Northampton was an EC declared area last year, and some of our 'positive' soil carbon data came from that region........ during the last 2 years of drought)

If it was at all possible would I be able to join the flight up from Perth...... ?? It would save me a 5 hour drive from my farm.

Yours sincerely

Bob Wilson

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How the Emissions Trading Scheme could affect farm profitability, food production and net green house gas emissions. A case study from the northern wheatbelt of Western Australia

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Introduction

Australia will have an Emissions Trading Scheme (ETS). The exact details of how this scheme will work are still being decided. One of the more challenging aspects in designing the ETS will be whether, when and how to include agriculture. Two key discussion papers on the ETS design have recently been released. These are the 'Interim Report' of the Garnaut Climate Change Review and the 'Green Paper' from the federal Department of Climate Change. The final decisions on government's final policy on ETS trading will be outlined in the 'White Paper' to be released later this year.

Both documents agree in that, a) agriculture should become a 'covered sector', and b) that it would not be possible for agriculture to be 'covered' in 2010 as the accounting methods have not yet been developed. The Green Paper has proposed a target for agriculture to be included as a covered sector from 2015, while the Garnaut Interim Report did not set a date. Professor Garnaut said following the release of his interim report that "my view is we shouldn't be moving to put agriculture in until we've got that right". Professor Garnaut also said "It's very important that the arrangements put in place give true credit for carbon that is in the soil".

In other words Prof Garnaut believes that agriculture should not be covered until it is possible to account for the sequestration of CO_2 on farms, **as well as** accounting for the emissions from livestock, Nitrogen fertiliser, chemicals and fuel use. These emissions are relatively easy to account for. Emissions are accounted by multiplying the size of an 'activity' by the emissions factor for that 'activity'. For example the emissions of nitrous oxide from fertiliser on dry land crops is calculated by the tonnage of fertiliser nitrogen multiplied by a nitrous oxide emissions factor per tonne of fertiliser used (e.g. for Australia the tonnes of N_2O emissions = Nitrogen in fertiliser (tonnes) X 0.003 (tonne N_20 emitted per tonne Nitrogen fertiliser used)). The emissions factor for non irrigated pasture is 0.004 t N_2O per t fertiliser nitrogen.

Accounting for Soil Carbon

This same approach could be used to account for sequestration of carbon in soils and vegetation on farm. The forest industry has developed formulas to calculate the carbon sequestered on trees and oil mallees. Carbon credits from trees and oil mallees are already being sold as offsets in the NSW Greenhouse Gas Abatement Scheme using these formulas. Unfortunately, soil carbon sequestration is not allowed under this NSW emissions trading scheme.

The Green paper has recommended that soil carbon sequestration should not be allowed under the national ETS, either as an off set prior to agriculture being 'covered' or to be used to reduce a farmers net emissions once agriculture is 'covered'. This would mean that the only option farmers would have to offset their emissions would be to plant trees and shrubs that qualify as Article 3.3 sinks under the Kyoto Protocol. These woody vegetation sinks are defined as being more than 2 meters tall, greater than 20% crown cover, greater than 0.2

hectares in area and existing on land cleared prior to 1990. Plantations of oil mallees satisfy this definition and are being trading as carbon offsets in Australia.

Soil carbon sequestration comes under Article 3.4 of the Kyoto Protocol. These sinks are optional for developed nations in the first Kyoto commitment period (2008 – 2012), but are mandatory in the second commitment period (2013 +). Australia has chosen not to include Article 3.4 sinks in its Kyoto Protocol accounts for 2008 – 2012, but must account for them in its UNFCCC baseline accounting for 1990.

The 'Perverse Outcome'?

If the government adopts the recommendations of the Green paper then we could see farm land taken out of producing food and used solely to grow trees such as oil mallees for carbon credits. This is already happening in the Northern Ag Region of Western Australia. If soil carbon sequestration was allowed under the ETS then farmers could make rational choices between trees and other farming practices to sequester carbon in crop land and pasture land.

Farms have been purchased in the NAR to plant to trees and oil mallees as carbon sinks. One farmer in the Binnu region has been forced to take an oil mallee carbon sink contract to avoid having to sell land. The complete failure of both crops and annual pastures in the droughts of 2006/07 has meant he cannot service business debt.

The deal being offered is to plant oil mallee plantations solely as a 'carbon sink' forest on 556 ha of the 1100 ha cleared on his sand plain block. The company will pay all of the establishment cost for the oil mallees. The farmer receives a large up front payment and then 10% of the carbon sequestered over 30 years. The income from the 10% carbon credits will be paid each 5 years and will be based on the market price of CO_2e (CO_2 equivalents) at the time. The up front payment is about the same as the current market value of the land. The relationship between upfront payment and land value is an important consideration as land value will likely be adversely affected by establishment of a carbon covenant.

Carbon trading companies are currently not offering similar deals for soil carbon sequestration due to the risk that these off sets will not be recognised under the ETS. We have conducted an economic analysis comparing the profitability of carbon sequestration in oil mallees versus soil carbon sequestration under grazed perennial grass pastures. The analysis has also investigated the viability of the farmer establishing an Oil Mallee plantation without the assistance of the carbon trading company, thereby retaining the rights to all of the carbon sequestered by the plantation.

Economic Analysis of Oil mallee sinks versus perennial pastures sinks at Binnu in WA

Background

An analysis was conducted using assumed sequestration rates in the oil mallees and in the soil under perennial pastures. A sequestration rate for the oil mallees of 5 t CO_2 /ha/year was used as it is both the figure being predicted in the contract, and is the figure used by Huxtable, Bartle and Giles (2007). Establishment cost for the oil mallees are also taken from Huxtable et al (2007). However these may not be the actual establishment cost to the carbon trading company involved in this Binnu deal.

DAFWA Geraldton has just finished collecting soil samples from 10 sites across the Northern Ag Region comparing soil carbon sequestration under annual pastures and crops with sub tropical perennial grasses. Some soil samples were from established pasture trials with a range of perennial pasture species and an annual pasture control plot. Paired soil samples on farms were taken from either side of a common fence line between perennial pasture paddocks and traditional annual pasture or crop paddocks. The sequestration rate of the perennials was calculated as the increase in soil carbon of the perennials above the traditional annual pasture or crop. Processing of Bulk Density samples has not yet been completed for all the sites, and a Bulk Density of 1.6 has been used for this analysis.

The soil testing showed sequestration rates of the perennial grasses of up to 12 t CO_2e /ha/year, with the denser perennials mostly being in the range of 5 to 10 t CO_2e /ha/year. One of the sampling sites is on a farm adjoining the Binnu property. At this site the sequestration rate of the perennial grasses was 5 t CO_2e /ha/year.

Gross margin analysis was conducted comparing the Oil Mallee deal offered to the farmer with:

1. The farmer borrowing the money, planting the oil mallees himself and receiving 100% of the income from the carbon credits
2. The farmer planting the land to perennial pastures and running trade cattle through winter and spring, **without** payments for soil carbon sequestration
3. The farmer planting the land to perennial pastures and running trade cattle through winter and spring, **with** payments for soil carbon sequestration

Key Assumptions

It was recognised there would be emissions from grazing the perennial pasture, mostly due to methane emissions from livestock. These emissions were assumed to be 1 t CO_2e /ha/year giving a net sequestration of soil carbon for the perennial pasture system of 4 t CO_2e /ha/year. These net emission assumptions are based on the soil carbon sequestration data collected from similar production systems on neighbouring farms as detailed above.

The gross margin of the cattle enterprise associated with the perennial pasture production system was calculated with farmer input at a workshop in Binnu. The enterprise was based on backgrounding 200Kg (Liveweight) ex pastoral steers between July and November and includes a $20/head freight allowance.

The productivity of the perennial pastures was assumed to be 6 Dry Sheep Equivalents per hectare per year (DSE/ha/year). This figure was based on data gathered from a project run by the local Northern Agri Group and the Dept of Agriculture and Food WA in 2006/07 with NLP funds provided through the Northern Agricultural Catchment Council (NACC). Actual grazing data from perennial pasture paddocks on the neighbouring farm, and another similar sand-plain farm in the region, showed the perennials could sustainably carry 4 to 6 DSE/ha/year through the most extreme drought ever experienced in the region.

It is assumed that the sale of carbon credits was the only income attributed to the oil mallee plantation. Legislation currently before the Senate (Tax Laws Amendment (2008 measures No. 2) Act 2008) on “carbon sinks forests” state “you use the land for the primary and principle purpose of carbon sequestration by the trees”. Under this act the oil mallees could not be used to generate additional income from oil or biomass.

Analysis Methodology

The gross margin analyses were conducted using a discounted cashflow to calculate the Net Present Value (NPV) of the cumulative gross margins of each carbon sink option over the course of the 30 year contract offered to the farmer. This method involves applying a ‘discount’(7% per annum) to future economic benefits arising from the plantation. The discount is applied in order to recognise the cost of capital invested in this system. This cost may be the opportunity cost over time of alternate investment options foregone by the decision to invest equity capital in the carbon sink project, or the cost of debt capital invested in the project. If the NPV is greater than 0, the project is creating capital for the business.

Sensitivity analyses were also conducted to determine the profitability of each carbon sink option under different carbon prices, different carbon price trends and prices at which order of profitability between the carbon sink options change. A base Carbon price of \$20/T CO_2e was used in these analyses.

Results

Table 1; Assumptions used in the analysis comparing oil mallee share farming for carbon off sets, self funded oil mallees for carbon off sets, cattle production on perennial pasture with and without soil carbon credits

Key General Assumptions	**Oil Mallee Plantations – Share Farming deal**	**Oil Mallee Plantations – Farmer only**	**Perennial Pasture Systems**
Discount Rate : 7%	Upfront Payment: \$900/Ha	Establishment Costs: \$1,350/Ha	Establishment Costs: \$200/Ha
Payment period: every 5 years	Sequestration Rate: 5t CO_2e/Ha/Yr	Sequestration Rate: 5t CO_2e/Ha/Yr	Sequestration Rate: 5t CO_2e/Ha/Yr
Contract Duration: 30 years	Farmer Share: 10%	Farmer Share: 100%	System Emissions: 1t CO_2e/Ha/Yr
Area: 556 Ha			Net Sequestration: 4t CO_2e/Ha/Yr
			Cattle Gross Margin: \$125/Ha

Table 2: **Net Present Value** (NPV) and sensitivity to establishment cost of oil mallees and CO_2e price of oil mallee share farming for carbon off sets, self funded oil mallees for carbon off sets, cattle production on perennial pasture with soil carbon credits

Price Scenario	**Oil Mallee Plantation – 10% C & \$900/Ha upfront to farmer**	**Oil Mallee Plantation – Farmer funded & 100% of C**	**Cattle Enterprise on Perennial Pastures – With Soil C trading**	**Cattle Enterprise on Perennial Pastures – No Soil C trading**
\$20/t CO_2e	**\$564,586**	**-\$108,736**	**\$1,255,590**	**\$742,098***
\$20/t CO_2e *minus* \$0.5/t CO2e per year	\$545,517	-\$299,429	\$1,103,035	
\$20/t CO_2e *plus* \$2.00/t CO_2e per year	\$640,864	\$654,038	\$1,865,809	
\$20/t CO_2e *plus* \$3.00/t CO_2e per year	\$679,003	\$1,035,426	\$2,170,919	
\$20/t CO_2e *plus* \$5.00/t CO_2e per year	\$755,280	\$1,798,200	\$2,781,138	
\$40/t CO_2e	\$628,773	\$533,128	\$1,769,081	
\$10/t CO_2e	\$532,493	-\$429,668	\$998,844	

* Includes no sale of carbon credits

Results

The results show that planting oil mallees as a carbon sink forest will not be as profitable as grazing perennial pastures even without soil carbon credit sales when subject to the assumptions used in this analysis and a carbon price of \$20/t CO_2e. Based on this data and assumptions, there will need to be a price of CO_2e of \$23.39/t CO_2e for an oil mallee plantation, established and owned solely by the farmer, to break even when cost of capital is accounted for in NPV calculations. This is consistent with the findings of Huxtable et al (2007) who also found that even a fully integrated oil mallee system, including carbon credits, plus oil, plus biomass was not currently profitable.

In this analysis the price of carbon credits needs to reach \$232.55 /t CO_2e before an oil mallee plantation established and owned solely by the farmer will match the NPV of grazed perennial pastures sequestering tradeable soil carbon credits. This farmer established and owned oil mallee system requires a price of carbon of \$43.31/t CO_2e or an annual price rise of \$1.96/t CO_2e/year (from a \$20/t CO_2e) to match the NPV of the deal offered to the Binnu farmer involving corporate support.

Discussion and Conclusions

At a carbon price of \$20/t CO_2e and based on the assumptions used in this analysis; NPV is greater if the land is established to perennial pastures and grazed by trade cattle than if converted to an oil mallee plantation. The price of carbon will have to rise to \$46.51/t CO_2e to enable an oil mallee plantation owned solely by the farmer to match the NPV of a basic perennial pasture production system not including potential soil carbon trading. By allowing soil carbon trading, the NPV of the perennial pasture system rises by a further \$513,492 over the 30 year contract period.

However, despite these results there could be large areas of farm land taken out of food production and planted to ‘carbon sink forests’ if the Australia Emissions Trading Scheme does not recognise soil carbon sequestration. That process has already begun and will be expected to increase as demand for carbon offsets increases prior to and following the commencement of the Australian ETS. This data provides some indication of the carbon price needed to entice farmers to voluntarily convert agricultural land to carbon sink plantations in this region.

If soil carbon sequestration was allowed as emissions offsets under the ETS in the same way that tree sinks are, farmers would have new incentives to convert farmland from annual pastures to perennial pasture, thereby establishing potential carbon sinks. This could make broadacre farmers more profitable and environmentally sustainable, whilst also helping to reduce Australia’s green house gas emissions.

Agriculture will have a vital role in providing both the land and the offsets themselves to the ETS. This analysis provides evidence of the value of soil carbon sink trading systems to enable agricultural production to be maintained. Article 3.3 plantation sinks were potentially not as profitable as existing agricultural production systems. These results show that soil carbon sequestration under perennial pastures represents the most profitable means for agriculture to deliver offsets under an ETS. If soil carbon is omitted from the ETS, large areas of agricultural land in the northern wheatbelt of WA will be removed from food production.

References

Huxtable D, and Bartle J and Giles R (2007). “Factors affecting the economic performance of mallee production systems” in Workshop papers, CRC for Plant Based Management of Dryland Salinity Workshop: *“Capacity of integrated production systems to use water and mitigate dryland salinity”*

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