Garnaut Review on Climate Change

ISSUES PAPER 1: LAND USE – AGRICULTURE AND FORESTRY
The Climate Institute

Contact: Nicolette Boele
Director, Strategic Projects
nboele@climateinstitute.org.au
Level 15, 179 Elizabeth Street
Sydney NSW 2000
P: (02) 9252 5200
F: (02) 9247 6555

TABLE OF CONTENTS

1. Introduction

Climate change and climate change policies present many challenges and opportunities for the agriculture and forestry sectors. A national shift to constrain greenhouse gas emissions offers the sectors the chance to benefit by:

- providing clean energy and electricity;
- mobilising agricultural mitigation and greenhouse offsets; and
- undertaking environmental stewardship on private land and improving the resilience of farming systems to climate change.

The size of the opportunity is a function of the scale of commitment set by the Commonwealth in the short and medium term — the larger the commitment, the larger the opportunities in these areas (see Section 5).

On managing methane and nitrous oxide — agriculture's two main contributing gasses — practitioners and researchers are seeking to understand how to maximise the benefits, while minimising the adverse impacts from government policies aimed towards moving Australia into a internationally competitive low carbon economy. Emission savings from effectively implementing state and territory land clearing laws remain an opportunity for early abatement.

The main question being asked by policy makers within the farming sector and government agencies is whether or not agriculture and forestry should be covered under an emissions trading scheme and if so how. In this submission The Climate Institute presents a case for the rapid deployment of a complementary suite of policies to stimulate a young market in carbon abatement in the agriculture and forestry sectors ahead of its proposed coverage in the Australian Emissions Trading Scheme (AETS).

2. Agriculture and forestry's contribution and available mitigation options

Australia's National Greenhouse Gas Inventory (NGGI) (2005)[i] identifies agriculture as responsible for producing almost 17% of net national greenhouse gas emissions[ii] coming primarily from methane (GWP 21) and nitrous oxide (GWP 310). Global emissions from agriculture are between 10 – 12% globally[iii].

According to the NGGI the major sources of these emissions are:

- Enteric fermentation in livestock - emissions associated with microbial fermentation during digestion of feed by mainly ruminant domestic livestock (mostly cattle and sheep) and some non-ruminant livestock
- Manure management - emissions associated with the decomposition of animal wastes while held in manure management systems
- Agricultural soils - emissions associated with the disturbance of agricultural lands by cropping, improved pastures, and the application of fertilisers and animal wastes to crops and pastures
- Prescribed burning of savannas - emissions associated with the burning of tropical savanna and temperate grasslands for pasture management, fuel reduction, and prevention of wildfires

- Field burning of agricultural residues - emissions from field burning of wheat and other cereal stubble and the emissions from burning sugar cane prior to harvest
- Rice cultivation - methane emissions associated with anaerobic decay of plant and other organic material when rice fields are flooded.

Agriculture is second only to the stationary energy sector for its contribution to Australia's greenhouse accounts in 2005.

Emission from land clearing remain significant despite state legislation banning the broad-scale clearing of land for agricultural use.

Enteric Fermentation

Methane emissions from enteric fermentation and manure management contribute to nearly 70% of emission from the agricultural sector and there is no peer-proven technology to permanently sequester or eliminate emissions from these sources — bar permanently de-stocking ruminants.

Research by Department of Primary Industry Victoria's *Greenhouse in Agriculture* program is investigating this challenge for dairy cows. Initially the research is evaluating the impact of animal management, diet and dietary supplements on animal performance, comparing the improved production against the cost of feeding. If this evaluation results in a neutral or positive financial return, the option is then tested for its methane abatement potential.

From the work conducted to date and the reviews of published literature, an abatement of over 20% of methane produced per animal is achievable. While it is too early to endorse specific practices until further research has proven their efficacy in the field, there is a number of promising and potentially cost-effective options including managing animal numbers, animal breeding and nutrition, dietary supplements, rumen modifiers and biological controls.[iv]

Controlling methane emissions from intensive feedlots has many more near-term opportunities than from broadacre livestock management where the ability to control inputs and outputs, such as feed and manure respectively is more technically challenging and costly.

Agricultural Soils

Nitrous oxide emissions from agricultural soils equate to a loss of soil nutrient and an economic loss to farmers as they represent inefficient use of nitrogen by the soil-plant system. They are also the second largest source contributing nearly 20% of Australia's greenhouse gas emission from agriculture in 2005. While there are some technology (e.g. bio-char) and systems change (e.g. retaining crop stubble), there remains only limited effort by governments to understand, measure and promote ways that these technologies and systems could play a certified role in a carbon market. The National Carbon Accounting System has come some way to profiling soil carbon[v] but recently state governments have led the charge on testing and reporting on fluxes of soil carbon under various conditions[vi].

Practices that increase nitrogen use efficiency via improved use of fertilisers, (including replacement of artificial fertiliser nitrogen by plant produced "natural" nitrogen), and soil and animal management will mean less nitrogen is available in the system to be lost as nitrous oxide. Significant abatement potential exists with nitrous oxide given its high global warming potential compared to carbon dioxide, i.e. 310 to 1, meaning small reductions in nitrous oxide emissions provide high value abatement benefits.

Focusing on the win-win theme of linking wins for greenhouse with wins for farmers, Victoria's *Greenhouse In Action* program has developed management systems that emphasise that practices for reducing nitrous oxide emissions align well with other goals farmers are trying to

achieve in regard to production efficiency and nitrogen use. These include practices for source, rate, and timing of fertiliser applications, and improved soil, crop and pasture management. Naturally to be of value in a carbon market, these systems require verification in various geographical and agricultural environments.

Despite Australian governments not yet providing a monitoring and verification protocol for measuring soil carbon fluxes, one notable development is the registration on the Chicago Climate Exchange[vii] for soil management practices that serve as a proxy, attracting 0.4 tonnes of credit for every 0.4 hectares of paddock employing accredited farming practices. Activities gaining credit include Agricultural Soil Carbon Offsets and Rangeland (grazing land) Soil Carbon Management Offsets.

Similarly CarbonLink Pty a foundation accumulator and broker on the Financial and Energy Exchange (FEX), is in the process of verifying its first packages of soil carbon from several properties in eastern Australia. It is based around creating credits from cell grazing to enable root reserves to rebuild, regrow and be grazed again. This pasture management tool was introduced to Australia by Terry McCosker through his company Resource Consulting Services (RCS) in 1989. More than 4,000 progressive Australian producers have now been trained by RCS.

According to Terry McCosker a one percent increase in soil organic matter over a 10-year period may capture about 50 tonnes of CO_2 that is worth about $1,000/ha gross before costs, at current retail prices.

CarbonLink will be a foundation accumulator and broker on the FEX exchange, and will be able to trade on international exchanges such as the Chicago Climate Exchange, the European Climate Exchange and the New Zealand Carbon Exchange.

These are just a few examples of instruments being established to bring new soil "technologies" to market. Progress is slow and patchy and confidence in soils as legitimate offsets under and ETS is still very low. What is missing in Australia is a centralised accreditation and verification system for soil carbon.

Not unlike Carbon Capture and Storage for the electricity generation sector, many more resources need to be channelled into bringing soil technologies and systems to the market place.

Prescribed Savanna Burning

The third area of opportunity for the sector is around savanna burning where some inroads to commodifying greenhouse gas abatement activities have been made which involve altering burning strategies to reduce greenhouse gas impacts. The challenge remains to extend this learning to other locations and maximise the benefits from this activity.

In one example of savanna fire management, Arnhem Land people are re-kindling traditional fire management techniques which involve burning soon after the rains to regenerate useful plants and animals. This process of management was interrupted about 50 years ago as people started to move into townships and as a result, around half of the landscape is burned by uncontrolled wildfires late in the dry season. Controlled burning creates barriers that stop the intense wildfires later in the year, and in theory reduced carbon emissions.

Measurement and verification are key to this and other emerging emission saving projects. Bushfires NT[viii] measure grass and litter fuels every five metres and the verification team studies the relationship between fuel load, fire frequency and fire intensity. The amount that was there before the fire, minus the amount collected after the fire, is the amount that's gone up into the sky as a greenhouse gas. In one year, if Aboriginal people can reduce the area

burned in wildfires by only seven percent, they create at least 100,000 tonnes worth of greenhouse gas savings.

A hectare burnt in May releases half the greenhouse emissions of a hectare burnt in a hot November wildfire. The reason for this is that doing it early in the year when there is still a lot of moisture in the ground and moisture in the biomass, means there is less going into the air.

Conoco-Phillips has a contract for 17 years with the local fire rangers paying approximately $1 million per annum to actively manage savanna burning[ix].

The sources of emissions from this sector are largely without market-ready solutions, so the deployment of an emissions trading scheme covering agriculture in the near to medium term will attract only limited investment to drive innovation and opportunities for mitigation. The Climate Institute proposes a complementary suite of policies that are transitional in nature and enable the sector to avoid the "valley of death[x]" currently being experienced by some emerging low-emission energy technologies in Australia. These measures should be deployed based on the maximum potential that they can contribute to reducing Australia's greenhouse gas emissions with some consideration to additional ecosystem services that they may perform.

Land Clearing

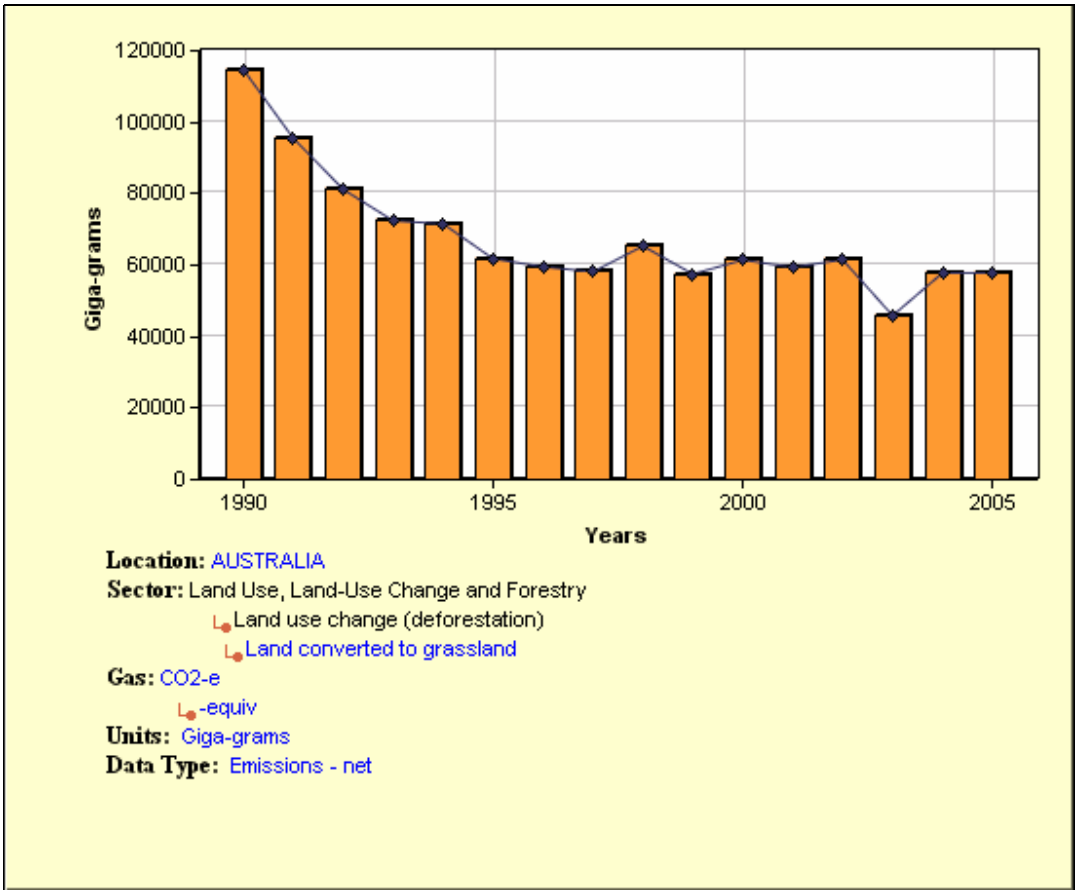
Although not included in the Australia's Kyoto accounts under "agriculture and forestry', emissions from land use change (or land clearing) remains a significant area of opportunity for the Commonwealth — 57.8Mt of CO_2e in 2005 (See Figure 1), and trending upwards.

Queensland achieved a formidable drop in emissions from this source between 1990 and 2005, but it remains responsible for more than 35Mt of CO_2e from land use change per annum.

In New South Wales[xi], emission from land clearing in 2005 stood at 10.8Mt CO_2e, or a fifth of Australia's per annum Kyoto target. Despite recent changes to native vegetation laws, it remains unseen whether or not legal and illegal clearing combined will decrease in real terms in the coming years.

Given that most state and territory jurisdictions have legislated to ban broadscale clearing without a permit (permits are usually contingent upon a net environmental benefit being achieved) the challenge of curbing emissions from this source appears to be in how the jurisdictions implement their respective laws and police illegal clearing. The Commonwealth may assist the state jurisdictions by providing a policy focus to this emission source and offer additional incentives to the states to adequately resource the implementation of these laws.

Figure 1: Land converted to grassland; Carbon Dioxide Equivalent; Emission



Source: Australian Greenhouse Emissions Information System

3. Nature of the sector and the challenges it offers

The unique qualities of the agriculture and forestry sectors are now well understood. Agriculture comprises over 130,000 individual enterprises of which 99% are family owned and 90% earned less than $100,000 from on-farm activities in the tax year 2005/06[xii]. The farming population is ageing and there is a severe skills and labour shortage in many commodity sectors. Some 70% of Australia's agricultural product is exported and the cost of freight, energy and chemicals is on the rise commensurate with the increase in global oil price. Prolonged drought in much of South-East and South-West Australia has provided increased investment risk for the sector and continues to exacerbate social woes for farming families facing increasing debt to equity exposure. The National Water Initiative roll-out has partially stalled creating further uncertainty for several commodity sectors and particularly for farming enterprises along the Murray-Darling Basin.

Therefore policies aimed at the sector must address:

- Engaging an ageing population with only a basic knowledge of climate change and management techniques for dealing with new mitigation technologies
- Large numbers of small and medium businesses, offering complexity to the question of "point of obligation"

- Difficulties in measuring emissions (NOx, CH_4) and the absence of proxies for carbon abatement
- Incentivising and enabling engagement in a carbon market at a local farm level
- Other government policies affecting the sector, such as water reform
- The increased risk of doing business in the sector due to physical impacts of climate change.

The upside of efforts to mitigate emissions from agriculture is often on-farm productivity improvements. However some of these benefits are non-financial and therefore difficult to evaluate compared to other investment decisions.

Policies designed to stimulate and/or require emissions abatement from the sector are most likely to succeed when they are designed to deliver ancillary benefits to carbon abatement. These same policies need to be easily understood and stimulate new practices that can be smoothly adopted as part of, rather than in addition to current farming systems.

4. Internalising carbon costs in the agriculture and forestry sectors – finding the appropriate policies

According to Dr. John Williams[xiii], the farm of the not-too-distant future may only earn part of its income from food and fibre production; the balance may come from 'ecosystem services' like carbon sequestration, maintenance of water quality, and habitat preservation. It involves the community paying for land taken out of production for the public good, more trees, and fewer inputs.

Rather than being dedicated to wall-to-wall production of food and fibre, mosaic agriculture would see land broken up for different purposes according to the landscape, including the provision of natural services of benefit to everybody. Because the entire population depends on the health of our ecosystems, Dr. Williams says these ecosystems services - which could include carbon sequestration, production of clean water and production of oxygen - must be valued and paid for by the community.

He also wants to see farming systems evolve so that flows of water, nutrients, carbon and energy better match the way those flows move in the natural landscape. He believes the fundamental cause of much of our land degradation is an excess of water and a loss of nutrients at key periods of the year. He argues that a decrease in emissions is insufficient and that vegetation cover needs to be addressed as part of the climate change solution.

Scaled planning would be critical to the success of future farming, he says, all the way from the paddock to the countryside as a whole. As an example of how future farm planning might work, he promotes yield maps that indicate the gross returns across the property. Some areas will earn more and some less, under a climate change scenario and a switch to mosaic farming. He argues that this planning enables farmers to see which areas of their property could be safely set aside for paid ecological services, and highlight where food and fibre could be most profitably grown.

Whether or not you agree with Dr. William's vision of the future of farming, may mean the difference between whether or not you operate a viable farm into the future. Much of how the farming sector evolves in the coming decade depends on the way in which:

- The National Water Initiative is administered;
- The agricultural sector is dealt with in an emissions trading scheme and complementary policies to abate emissions from the sector; and

- Native vegetation management is nurtured and supported on private land.

Recent research commissioned by the Agricultural Alliance on Climate Change and undertaken by the CSIRO[xiv] shows that:

- The introduction of emissions trading offers a range of important opportunities for agriculture (including profitable chances to supply offsets and renewable energy, increased demand for existing agricultural products, and substantial potential permit revenues for agricultural programs that provide greenhouse benefits) but also involves some potential challenges; and
- The net impacts of emissions trading on competitiveness will depend on the details of policy implementation and accompanying measures. The Allen Consulting Group[xv] (2006) found that emissions trading would boost domestic agricultural demand at low levels of carbon prices. The Australian Farm Institute[xvi] (2007), however, argues that under higher carbon prices emissions trading will increase the cost of energy and other key inputs, reducing export competitiveness. Our analysis suggests that these cost increases are likely to be small (less than 3% by 2025), and could easily be offset by other policy benefits. Assessing the magnitude of net competitiveness impacts and engaging policy makers on this issue is a priority.

Looking specifically at carbon, the main challenges of involving agriculture and forestry sectors in an emissions trading scheme are widely acknowledged and documented.[xvii][xviii][xix]

If we further acknowledge the challenges presented by the characteristics of the sector and that the solutions to mitigating emissions from the sector are largely in their infancy, then we must match this with appropriate policies. The Climate Institute (TCI) argues that agriculture's full coverage under AETS will not alone provide a road map for new technologies to deliver Australian farming a competitive advantage in a carbon-constrained future. This section explores some existing policy and programs, those promised and those required to enable agriculture to undertake its share of providing greenhouse gas abatement.

4. 1 Existing policies

Some solid first steps were taken by the Howard government including but not limited to:

- Piloting of biodiversity payments to farmers for re-establishing habitat "hot spots" on private land, supported by the $1.5million Maintaining Australia's Biodiversity Hotspots (MABH) program[xx].
- Depreciation for the costs of establishing a qualifying carbon sink forest under the horticultural plant provisions, which came into effect from 1 July 2007. This is enabling costs to be depreciated over a period of 14 years, considerably less than the effective life of such a forest. It is hoped that this measure will attract additional investors to the sector.
- National Agriculture and Climate Change Action Plan (NACCAP) which was launched in October 2006. Despite a year since its launch, the Government can show only modest emission reductions from the program. Its star investment is the *Methane to Markets* program but projects are occurring off-shore rather domestically to the benefit of Australian farmers.

These initiatives indicate the scope of interventions available to the Commonwealth for resourcing the sector for its preparedness for AETS. State and territory jurisdictions have also been applying themselves to the challenges and the following table shows some of the Australian policy measures for climate change and agriculture, current as of July 2007[xxi].

Figure 2: Australian policy measures for climate change and agriculture up to July 2007

Policy, measure or program	Status	Outcomes
Tax Change for Carbon Sink Forests A new tax ruling allows for a more rapid depreciation (14 years) for the costs of establishing a qualifying carbon sink forest under the horticultural plant provisions. A new tax ruling also enables an immediate deductibility for costs incurred in establishing a qualifying carbon sink forest during a five-year period. Deductions under this measure will not be available to carbon sink forests established through managed investment schemes.	Commenced July 1, 2007	Removes some barriers for farmers engaged in carbon sink forests
National Emissions Trading Scheme Some larger agricultural business may find themselves included in a national emissions trading scheme by 2010. The scheme would require large producers of greenhouse gas emissions to measure and reduce their greenhouse pollution, or purchase reduction credits from a secondary market.	Commences 2010	Provides incentives for large polluters to reduce greenhouse gas emissions
Tackling Climate Change, South Australian climate change strategy Includes actions to strengthen the resilience of industries reliant on natural resources, such as agriculture, in the face of potential impacts of climate change. Additional measures will help increase bio-sequestration	Launched May 2007	
Climate Smart 2050, Queensland climate change strategy The strategy includes developing risk management and adaptation strategies to help primary industries manage climate variability and longer term climate change through initiatives such as improving on-farm water use efficiency, breeding more water efficient and drought-tolerant plant varieties, and developing adaptive farming systems. A new Carbon Offsets policy will help Queensland benefit from all offset opportunities under a national emissions trading scheme	Launched May 2007	
National Adaptation Framework and Australian Centre for Climate Change Adaptation, COAG The framework includes possible actions to assist the most vulnerable sectors and regions, including agriculture, forestry, settlements and infrastructure, and health. The Centre will assist particularly affected sectors and regions, planning bodies, farmers, businesses and local government to understand better the impacts of climate change and to develop responses.	Launched April 2007 Commonwealth Government has committed $126mn to establish and run the Centre over the next five years	
National Agriculture & Climate Change Action Plan 2006 – 2009, Natural Resource Management Ministerial Council Provides a framework for the agriculture sector to respond to climate change, including through adaptation, mitigation, building knowledge through R&D, and providing innovative solutions and tools for farmers	Launched in August 2006 Commonwealth Gov't provided first tranche of funding in March 2007, of $5mn	
Greenhouse Action In Regional Australia, Commonwealth Government through the Australian Greenhouse Office Aims to build the capacity of the agriculture and land management sectors to reduce GHG emissions. Specific objectives include providing leadership and coordination of action, developing methods and technologies for measuring emissions, and identifying abatement strategies in partnership with industry	$20.5mn committed for 2004-2008, including $9.4mn for the Strategic R&D Investment Plan	

The Strategic R&D Investment Plan aims to build capacity and target research on technical solutions to emissions management.		
Agriculture Industry partnerships – climate change action for multiple benefits, led by the AGO under Greenhouse Challenge Plus Under this approach the Government is providing information to industry to help it adapt to climate change, manage emissions and integrate climate change into existing management systems	Ongoing activity, which includes Ricegrowers Australia, Landcare Australia and the Riverina Food Group	Improved information for industry groups
Emissions Benchmarks in Agriculture, led by the Natural Resources Ministerial Council Aim is to investigate the use of emissions intensity benchmarks and environmental management systems in agriculture, including new approaches to reducing emissions from agriculture and land use and new measures to promote carbon sequestration	Established by COAG Plan for Collaborative Action on Climate Change, Feb 2006 Public consultation on benchmarking undertaken during 2006	Report from NRMMC to COAG at end of 2006 on the use of benchmarking
Greenhouse Friendly program, led by Commonwealth Government through the AGO This voluntary program provides assurance to the purchasers of voluntary carbon offsets	Established in 2001 The first carbon offsets from land management activities (farm forestry) were accredited in 2007	Greenhouse Friendly carbon offsets established.
Commonwealth biofuels aspiration Aims to secure 350 million litres of biofuels in the nation's fuel supply by 2010	Established in 2005	Provides incentives for biomass
Queensland Ethanol Industry Action Plan Aims to expand the market for ethanol based fuels	Established in 2005	
State Renewable Energy Targets Victorian electricity retailers are required to purchase a minimum of 10% renewable energy by 2016. The South Australian Government has set a renewable energy target of 20% by 2014. The NSW Government has foreshadowed a renewable energy target of 15% by 2020	Established in 2006	Provides incentives for biomass
NSW Greenhouse Plan, led by the NSW Greenhouse Office Includes reducing emissions and increasing sequestration from land management, improving the understanding of the carbon cycle on farms, raising awareness with farmers, and promoting sequestration	Published 2005 Various activities underway to meet the objectives	
NSW Greenhouse Gas Abatement Scheme This scheme obliges electricity retailers to reduce the greenhouse intensity of the electricity sold to NSW consumers, and establishes a trading scheme to reduce emissions at least cost	Established in 2003	Attracting investment in offsets from farm forestry
NSW Native Vegetation Act 2003 New legislation that places controls over the clearing of native vegetation	Enacted in 2003, with requirements starting in 2005	Is expected to reduce GHG emissions due to land clearing in NSW by 3.7 Mt CO2-e by 2010
Queensland Greenhouse Strategy, led by the Qld EPA Includes a range of actions including R&D on mitigation strategies for grazing and cropping, and research and monitoring of emissions from land clearing and soils.	Published in 2004, with activities ongoing	Information is being made available to rural communities
Queensland Vegetation Management and Other Legislation	Enacted in 2004	Is expected to

Amendment Act 2004 New legislation that places controls over broadscale clearing of remnant vegetation and allows for some ongoing clearing, including: clearing regrowth; clearing for fodder; thinning and clearing of encroachment; and clearing under exemptions.		reduce GHG emissions due to land clearing in Queensland by 20.0 Mt CO2-e by 2010
South Australian draft strategy for climate change, led by the Department of Premier and Cabinet, SA Government Draft includes actions to manage natural resources sustainably with optimum resilience and capacity to adapt to climate change. Also proposes strategies to reduce emissions from agricultural production, promote renewable energy including biomass and promote offsets	Strategy expected to be finalised in 2007	
Victorian Greenhouse Strategy, 2002 and the Environmental Sustainability Action Statement, 2006 Includes a suite of actions designed to promote better understanding of the impacts of climate change on rural Victoria, the development of tools and management practices to build resilience, and the use of partnerships and extension programs to communicate this information	Commenced in 2002, reviewed and expanded in 2006 through the ESAS	Regional partnerships have been successful in mitigating emissions and raising knowledge in rural towns
CarbonTender, led by the Victorian Department of Sustainability and Environment A $3 million program to establish new vegetation that is permanent and indigenous on sites with high biodiversity values	Commenced in 2002/03 and ran for 3 years – no plans to extend	Expected to result in over 150,000 tonnes of CO2 being removed from the atmosphere.
BushTender, led by the Victorian Department of Sustainability and Environment A $650k program to quantify carbon sequestration benefits of better management of existing vegetation	Commenced in 2004/05	
Western Australia Greenhouse Strategy, led by the WA Department of Environment and Conservation Includes actions to enable producers and land managers to develop and implement actions to reduce emissions and promote sequestration. The strategy's development included specific evaluation of opportunities for the land management sector to create carbon offsets	Published in 2004	

4.2 Promised policies

Measurement and verification of carbon (bio-sequestration) offsets

The Commonwealth Government has promised to set up a national standard for carbon offsets to ensure consumer confidence in the rapidly growing carbon offset market. The carbon offsets scheme will also feed into the national standard for carbon offsets and will:

- build on existing schemes to minimise duplication;
- provide national consistency:
- include minimum standards for offsets;
- require ongoing management where necessary to ensure integrity;
- require credits to be cancelled when used to provide an offset;
- require all products on the market to be accredited:

- include appropriate verification and validation protocols:
- take international developments into consideration; and
- include standard carbon neutral calculations.

The Commonwealth will develop the standard and its administration by December 31 2008 as an integral part of preparation for emissions trading.

The national standard for carbon offsets will draw on the current standards that are used in Australia including:

- The Federal Government's Greenhouse Friendly Program;
- The NSW Greenhouse Gas Reduction Scheme – which allows NSW Greenhouse Gas Abatement Certificates to be created; and
- The Mandatory Renewable Energy Target which allows Renewable Energy Certificates to be created.

The Australian Emissions Trading Scheme

The AETS is set to commence in 2010 and is unlikely to include the agriculture sector in its first phase, but may accept some bio-sequestration activities to assist covered sectors to adapt to the newly regulated market.

As noted in its submission to this Review, the National Farmers' Federation (NFF) will be encouraging its members to refrain from selling offsets to covered businesses in the first few years when the price of such offset credits is likely to be low. The NFF will encourage members to retain offsets credits to better hedge against future costs imposed by an emissions trading scheme when agriculture becomes covered in the future.

4.3 Needed policies and programs

Government policies targeted at tackling climate change should focus on three main pillars: effectiveness, efficiency and flexibility. Emissions trading is currently the focus of so much policy effort because theoretically, it provides a least-cost way of achieving abatement. Proponents in the stationary energy sector understand that emissions trading will drive some efficiency measures and help influence major energy infrastructure investments going forward. In the past decade the sector has been subjected to a number of government interventions, from regulation to programs offering payments for emissions abated at least cost.

Outside management under NEMCO, the energy sector is impacted by:

- the Renewable Energy Electricity Act (Mandatory Renewable Energy Target) and its related acts and regulations affecting electricity retailers and impacting on new, clean electricity generation;
- a rolling suite of Mandatory Energy Performance Standards particularly at an appliance level;
- programs to encourage innovation such as the Greenhouse Gas Abatement Program and Low Emission Technology Development Fund; and
- national accreditation for Greenpower products

to name a few.

Government support for emissions abatement and technology development in the agricultural sector is currently under-prioritised given the contribution to the national accounts that

emissions savings from this sector may have, particularly the one single source of agricultural emissions that accounts for 11.1% of Australia's total emissions profile. The effective administration of native vegetation and land clearing laws could also see up to 40Mt of CO_2e saved.

The Prime Ministerial Task Group on Emissions Trading suggested that the agricultural sector should be fully covered by emissions trading after all practical and technical issues are resolved, but that offsets from the sector can be provided at the commencement of trading in 2010 with no ceiling to the number of offsets created. Given that New Zealand has a 2013 timeline for full coverage of its agricultural sector and our two governments are working together to explore the potential interconnectivity of our respective emissions trading schemes, it is prudent that we work to identify and roll-out transitional policy measures that will assist Australian farmers to adapt to climate change now and secure their viability in a carbon constrained international economy, ahead of their coverage in the AETS.

Research by the Australian Farm Institute reveals that the agriculture sector in the short term will experience an increase in costs from the introduction of an emissions trading scheme as the higher costs of production borne by covered sectors are passed on through the supply chain to primary producers. Most considerably this impacts broadscale and crop specialists whose energy, freight and chemicals inputs comprise 48% of farm input costs.[xxii]

In its submission to this Review, the National Farmers' Federation makes references to complementary policy measures that will assist the sector to engage in emission reduction activities from which it can profit. The Climate Institute notes that more than the stationary energy sector, the agricultural sector requires a broad suite of policy and program measures to equip it for a low carbon economy, largely due to the infant state of most potential technologies available and the large number of small enterprises that comprise the sector.

Some possible measures are listed below and The Climate Institute strongly encourages the Commonwealth, perhaps via COAG to explore, recommend and resource a full suite of complementary policy measures for the agricultural and forestry sectors enabling them to participate fully in emissions trading in the near future.

1. National Standard for bio-sequestration credits

Building on the Commonwealth's commitment to creating a national standard for carbon offsets, the Commonwealth should play a lead role in coordinating efforts to monitor, evaluate and verify fluxes in carbon from soil improvements and other emerging "technologies" such as the use of plantstones in binding carbon and nitrogen to plant systems. Groups such as the Australian Soil Carbon Association and CarbonLinx are good examples of private sector initiatives attempting to seize opportunities in an emerging carbon market for bio-sequestration credits. However with the advent of a voluntary carbon market of which some of its participants are currently being reviewed by the Australian Competition and Consumer Commission, this new market may require some government regulation to restore confidence and certainty for investors and consumers alike.

State agencies, including NSW Department of Primary Industries and the WA Department of Agriculture and Food have committed resources to longitudinal research based around monitoring and verification of soil fluxes. Most other states and territories have similar trials however these efforts remain largely uncoordinated.

The output from these trials, plus the addition of Commonwealth resources to a more expedient and geographically inclusive trial, would provide helpful information such as the extent to which soil carbon can help Australia reduce its greenhouse gas emissions and the marginal cost of abatement through soil carbon based on different trial conditions. Technical data could also be provided directly to the Commonwealth for the creation of proxies to be

used for soil carbon management under the forthcoming National Offsets Accreditation Program.

2. Productivity reward/emission intensity reduction incentives

Emissions savings from enteric fermentation could be encouraged now by providing a performance based incentive to improve feed and grazing systems that result in higher efficiencies of animal protein production. Although the measure may not reduce absolute emissions from this source, it may assist with the per-unit reduction of emissions and an incentive for continual improvement in productivity. This style of policy intervention often results in "learning by doing" and new innovations, helping transition to full coverage under an emissions trading scheme.

3. Accelerated depreciation for emission reduction equipment and hardware

In the same way that an emission trading scheme attempts to internalise the cost of polluting the atmosphere with gasses responsible for climate change, accelerated depreciation of environmentally "helpful' technologies encourages the deployment of technologies that assist with fixing the problem. The financial viability of embedded electricity generation is encumbered by both the slow depreciation of equipment for linking to the grid, such as meters and the lack of incentive for reducing losses via distributed generation. Ironically it is often low-emitting technologies such as photovoltaic power systems that have longer lives (manufacturer warranty up to 20 years) and therefore depreciate more slowly than polluting technologies such diesel generators (between five and 10 years).

4. Commodity specific incentives, e.g. an LETDF for the agricultural sector

With a dedicated fund (modelled on the Low Emissions Technology Development Fund), the sector could find immediate emission savings from the capture and flaring of methane from feedlots or use of the methane in the production of heat and power consumed near or onsite. There are currently no incentives for farmers to produce their own power to consume locally and/or export to the grid.

Already the *Methane to Markets* program has demonstrated a low cost abatement measure that has multiple on-farm benefits. A LETDF for the agricultural sector in Australia would provide the funding for innovative application of near commercial technologies and provide an useful transition to possible coverage in an emissions trading scheme.

5. RD&D sweetner, such as broadening Renewable Energy Development Initiative

By adjusting the priorities of Commonwealth and State programs such as the National Heritage Trust and Renewable Energy Development Initiative (REDI), public funding would more directly result in outcomes aligned with Australia's commitment to achieve at least a 60% cut in greenhouse gas emissions by 2050. Some of this focus could be actively made on the agricultural and forestry sectors, particularly where they intersect with other emission creating sectors, such as waste and electricity.

The Australian company Microbiogen is researching the use of a non-GM plant biomass termed lignocelluloses in the process of converting sugars into ethanol. Relative to traditional feedstocks, lignocellulose is in plentiful supply at low cost and do not compete with high value human food and fibre production on arable land. Sources include corn stover, sugar cane bagasse, wheat and rice straw, forestry wastes, waste paper, and other plant based wastes. Their usage are relatively low cost because they are waste by-products from other industries such as agriculture and are not used as human food. Microbiogen attracted international investment in July 2006 and more recently the Australian government grant programme REDI provided a grant of a further $2.5million to fund further research for Microbiogen.

6. CMA level funding for abatement initiatives (CMAs as POO)

A study conducted in 2006 by the NSW Department of Primary Industries (DPI) and the Murrumbidgee CMA found that with some minor changes to their existing systems, CMAs could become carbon pool managers under the NSW Government's Greenhouse Gas Abatement Scheme (GGAS).[xxiii] GGAS provides income to farmers for planting new trees and managing stocks existing permanent vegetation.

Research being undertaken by NSW DPI's Forest Resources scientists is providing more precise data on the growth of native tree species in low-rainfall areas where commercial forests have not traditionally been planted. This will contribute to the development of models which underpin carbon accounting methods for use by pool managers in emissions trading markets.

While the reality of CMAs managing carbon pools depends on developments in national and international emissions trading policy, NSW DPI research is laying the platform for natural resource managers to join with landholders in attracting additional income for targeted re-vegetation.

A measure similar to the former Greenhouse Gas Abatement Program (GGAP) could benefit CMAs where they seek to achieve complementary NRM outcomes, such as reduced salinity, improved soil moisture and productivity and riparian zone vegetation. CMAs could bid into the fund based principally on the units of greenhouse gas emissions savings they can achieve, but funding is allocated based of measures including but not limited to technology transfer and NRM benefits.

7. Credit for early action

Because the timeline around involving agriculture remains uncertain, the Commonwealth would assist investors by determining if and how it will reward (or not penalise) early abatement activities in the agricultural sector.

Currently nitrous oxides from soil conditioners are counted as a greenhouse gas under the UNFCCC/Kyoto accounting framework, while the carbon in soils is not counted for Australia. If there is to be worthwhile permanent carbon sequestration efforts by farmers, such as via bio-char application to soils, then these technologies must be recognised for their contribution both as an abatement activity and an offset for other covered sectors ahead of the agriculture's coverage in the AETS.

5. The agricultural sector providing climate solutions

This section notes agriculture and forestry's role in providing non-agricultural solutions to climate change.

Some possible options to explore include:

- Improving land management practices
- Stopping broad-scale land clearing
- Undertaking permanent native re-vegetation

A recent study commissioned by the Agricultural Alliance on Climate Change (AACC) and undertaken by the CSIRO, shows that with a high carbon price there are considerable benefits for agriculture in providing non-farming services to the economy.

The report focuses on the prospects for rural Australians becoming valued service providers in three important areas of Australia's low carbon future:

- providing clean energy and electricity;
- mobilising agricultural mitigation and greenhouse gas offsets; and
- supporting environmental stewardship on private land.

The paper presents the best available information on the potential supply of each of these services from rural Australia, assesses key challenges or impediments that need to be overcome in order to realise this potential, and estimates the associated benefits for Australia rural businesses and communities.

Relevant to this paper on LULUCF are the following report findings:

1. The potential for creating offsets through vegetation sinks is very large, but realising these benefits will require clarification of policy settings and improvements to accreditation arrangements. Establishing new plantation forest at around double the average annual rate for the last decade would offset 18 million tonnes of CO_2e per year after 15 years (equivalent to one fifth of direct agricultural emissions in 2005), and could yield gross carbon revenues of $360 to $920 million a year, or more.

2. Environmental stewardship payments have the potential to address climate related pressures on both landholders and ecosystems. Implementing an ambitious voluntary stewardship scheme could more than double the area of actively conserved native vegetation through total outlays of $740 to $1,630 million per year, some of which might be funded through the carbon value of the native vegetation protected.

All of the report's benefits are summarised in the following table. The opportunities quantified in the table have been selected on the basis of two key tests. First, does the issue represent a chance for rural business and communities to make a positive contribution to reducing emissions or addressing the impacts of climate change? Second, does the issue provide a new enterprise opportunity or source of income for rural people or businesses?

The right hand column of the table highlights the main factors that will influence whether a challenge becomes a reality, or the scale of the benefit derived from an opportunity.

Figure 3: Summary of opportunities and challenges for rural business and communities from emissions trading and related policies in 2020-2025

Issue		**Scale of Impacts**		**Contingent on**
		$20 /t CO_2e	$50-65 /t CO_2e	
Potential increased agricultural profitability or reduced competitiveness from	challenge or opportunity	challenge difficult to quantify, engagement likely to deliver net benefits of $25 million		potential cost increases from emissions trading could be offset or outweighed by other

emissions trading (a)		pa or more		policy actions
Liability for direct agricultural emissions (in advance of competitors in export markets)	potential challenge	could be very large		how and when agricultural emissions are included in emissions trading
Wind power *- gross revenues* (b) *- net income or profit* (c)	opportunity	 $255 m small	 >$822 m $44-263 m	ambitious emissions reduction target or other support for renewable energy
Bio-electricity *- gross revenues* (b)		$47 m	>$354 m	
Who bears the burden of reducing direct agricultural emissions, and the size of this burden (a)	challenge or opportunity	more than $70 m		whether policy empowers and supports voluntary action, vs prescriptive regulation or penalties
Vegetation offsets *- gross revenues* *- net income or profit*	opportunity	 $367 m small	 $918+ m $550+ m	level of the carbon price and details of policy development
Sub-total: Net new income or profit for rural communities (d)		**$95 million pa**	**$815-1,310 million pa**	
Stewardship payments (gross revenues) (e)	opportunity	$740-1,630 million pa		significant expansion of stewardship scheme
Total potential revenues including stewardship payments (d)(e)		**$835-2,940 million per annum**		

Notes and Sources: Qualitative assessments of impacts based on discussion in the text of the report. All dollar estimates refer to the scale of impacts per year around the period 2020 to 2025, and are based on new estimates undertaken for this report as presented in text and tables, except for (a) from The Allen Consulting Group 2006b, and (b) calculations based on bio-electricity and wind generation projections from REGA 2007 and unit revenues from Saddler et al 2004. (c) Based on wind royalties. Estimate for $50/t CO_2e is $44 million, consistent with the scenarios in REGA 2007, rather than full potential royalties of $147 million shown in Table 2. (d) Totals assume competitiveness issues are addressed and that government bears the economic burden of reducing direct agricultural emissions, and treats these program outlays as new income. (e) Value of stewardship payments are not assumed to be directly related to carbon prices.

The major findings and specific opportunities and challenges summarised above give rise to the four key messages from the discussion paper.

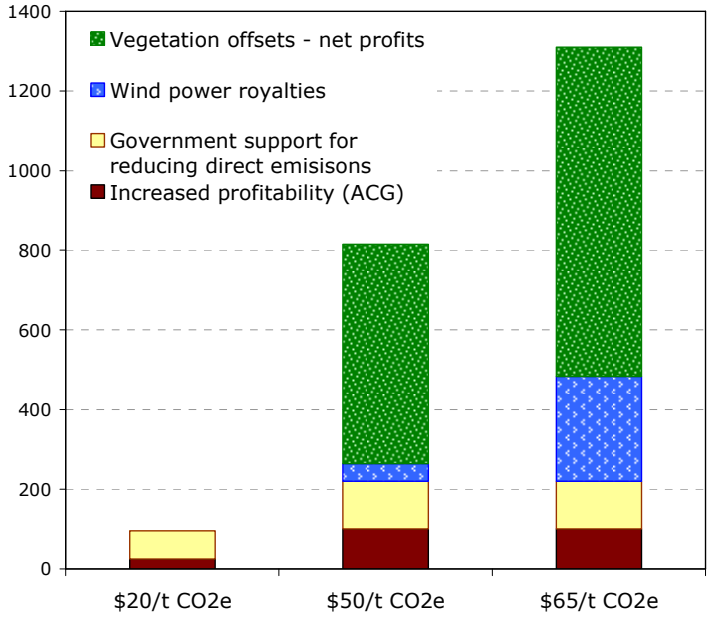
(1) *Rural businesses and communities appear best served by more ambitious medium term emissions reduction targets*

The interests of rural businesses and landholders are likely to be best served by scenarios involving more ambitious mid-term emissions reduction targets, along with higher carbon prices and policies that support renewable energy deployment in the near-term.

Rapid and effective global action to reduce emissions is important to reduce the direct risks and impacts of unmitigated climate change, such as lower rainfall, higher temperatures and evaporation, increased drought and fire risk, and more severe extreme events.

At a national level, the analysis presented in the report suggests that carbon prices of $15 to $30/t CO_2e are unlikely to open up widespread new opportunities for rural business and communities, while carbon prices of $50 to $75/t CO_2e could unlock significant financial revenues, help diversify rural income streams, and promote rural employment. Estimates of the potential revenues associated with different opportunities suggest that carbon prices around $50/t CO_2e could generate around 10 times more revenue for rural businesses and communities than prices around $25/t CO_2e. Against this, higher carbon prices may create competitiveness issues by raising input costs unless addressed or offset by other policies, including support for renewable energy or stewardship payments. Higher carbon prices may also increase the risk of more intrusive policy mechanisms to promote mitigation if a voluntary approach does not deliver effective abatement.

Figure 4: Net new income or profit for rural communities at Different carbon prices, 2020-2025 (A$2005 millions)



Source: Table ES1.

(2) *Careful policy design is needed to ensure emissions trading enhances agricultural competitiveness*

Emissions trading is expected to increase energy prices and may raise total farm input costs by up to 3% by 2025, notwithstanding that direct agricultural emissions are initially excluded from the scheme. Increased costs of this magnitude could be easily offset by benefits from other policy actions, such as increased support for adaptation to climate variability, the co-benefits of abatement policies (such as meat production gains associated with reductions in methane emissions from livestock), or reductions in business taxes funded by the proceeds of emissions permit auctions. Assessing the magnitude of net competitiveness impacts and engaging policy makers on this issue is a priority.

Over the longer term, close involvement of agricultural producers and peak groups in the development of emissions reductions options will be important for enhancing the

competitiveness of Australian agriculture and positioning the sector to influence the development of policy, including the possible extension of emissions trading to include direct agricultural emissions.

(3) *Clear policy signals are required to mobilise investment and activity, and deliver benefits for Australia*

Good decision making and risk management in rural Australia requires clear policy signals from government, through progressively more detailed policy announcements and guidance. Rural businesses and communities have much to offer Australia as emissions trading and other policies to address climate change are introduced. Most of these contributions involve investment and sustained action, and so will only be fully mobilised as policy settings are clarified.

(4) *A collaborative approach to detailed policy development will yield the best results for Australia, and Australia's rural businesses and communities*

A collaborative and consultative approach to detailed policy development will yield the best outcomes for Australia, and for Australia's rural businesses and communities. The deployment of renewable energy, development of effective policies to support abatement of agricultural emissions, implementation of vegetation offsets and accreditation arrangements, and realising the potential of stewardship payments all involve a host of judgements that can only be robust if they are informed by practical on ground knowledge. Rushing to implement partial or prescriptive policies can create long term problems. In the words of the Prime Ministerial Task Group on Emissions Trading:

"The agricultural sector should be engaged to develop realistic options."

7. Conclusion

While policy makers focus on the design and roll-out of the AETS, opportunities for abatement by and within the agricultural sector remains largely untapped. In order to realise the potential for the sector a number of complementary measures need to be urgently deployed to assist in bringing to market those technologies that will assist Australian farmers in remaining internationally competitive while well positioned to operate in a low carbon economy.

References

[i] Australian Greenhouse Office (2006) *National Greenhouse Gas Inventory 2004* Department of Environment and Heritage, Canberra. http://www.greenhouse.gov.au/inventory

[ii] http://www.greenhouse.crc.org.au/greenhouse%5Fin%5Fagriculture/

[iii] Bellarby, J., Foereid, B., Hastings, A and Smith, P. (2008) *Cool Farming: Climate impacts of agriculture and mitigation potential*, Greenpeace International, Amsterdam, January

[iv] Griffin, T (2007) Newsletter, Department of Primary Industries Victoria

[v] McKenzie, N., Ryan, P., Fogarty, P. and Wood, J. (2000) *Sampling, Measurement and Analytical Protocols for Carbon Estimation in Soil, Litter and Coarse Wood Debris – Technical report no. 14*, AGO, Canberra

[vi] NSW Department of Primary Industries, WA Department of Agriculture and Food

[vii] [vii] http://www.chicagoclimateexchange.com/

viii Also see CRC Tropical Savannas Management - Darwin, NT

[ix] Horstman, M (2007) *Savanna fire management in Arnhem Land*, for Catalyst, Australian Broadcasting Commission

[x] Michael Grubb (2004) *Technology innovation and climate change policy: an overview of issues and options*, Keio Journal of Economics

[xi] Department of Natural Resources (2006) *NSW Wood Vegetation Change 2004 to 2006 Report*, NSW Government http://www.nativevegetation.nsw.gov.au/p/woody_veg_change_2004_2006.pdf

[xii] Keogh, M (2007) Biodiesel production for rural Australia workshop, Australian Farm Institute presentation in Canberra

[xiii] Author unknown (2007) *How future farming will look*, The Land, April 5

[xiv] Hatfield-Dodds, S., Carwardine, J., Dunlop, M., Graham, P. & Klein, C. (2007) *Rural Australia Providing Climate Solutions*, CSIRO for Agricultural Alliance on Climate Change

[xv] Allen Consulting Group (2006) *Emissions Trading and the Land: Issues and Implications for agriculture*. Report to the National Farmers' Federation. ACF, Melbourne

[xvi] Keogh, M. (2007) op cit

[xvii] Garnaut Climate Change Review (2006) *Issues Paper 1 Climate Change: Land use – Agriculture and Forestry*, Melbourne

[xviii] National Farmers Federation (2008) *Submission to Garnaut Climate Change Review*

[xix] Keogh, M et al (2007) *The New Challenge for Australian Agriculture: How do you muster a paddock of carbon?* commissioned by the NSW Farmers' Federation, Sydney

[xx] http://www.environment.gov.au/biodiversity/hotspots/programme.html

[xxi] Cambiar (2007) *Agricultural Alliance on Climate Change – issues paper*, The Climate Institute, Sydney July

[xxii] ABARE (2007) *Change in direct energy (fuel/electricity) on broadacre and crop specialist farms: 1990-2006*

[xxiii] http://www.dpi.nsw.gov.au/research/updates/issues/november-2007/carbon-scheme