

Contribution to the Garnaut Review

Issues Paper 1- Climate Change: Land Use – Agriculture and Forestry

In Particular Four Key Issues Facing Australian Agriculture with Climate Change and its Participation in the Efforts to Reduce Greenhouse Gas Emissions

By

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Adaptation in the Agricultural Sector:

The low key positioning of agriculture in the Australian discussion at Government level concerning has left agriculture badly exposed. Political leaders have focused on the damage which climate change might have on agriculture. A half full bucket approach would have seen the potential. There has been a serious under assessment of the innovative capacity both of the country, and equally significantly, of agriculture.

Adaptation to climate change is no longer a question of defining what is causing it –human behaviour or “sunspots”. It is a risk management decision, about which agriculture is extremely aware. With global warming occurring, are we prepared to do nothing as a consequence of assuming that it is not us; and then having nowhere to go if, after 10-20 years, we finally determine that it is us! Or, do we assume that it is us, go hell for leather mitigating our carbon emissions, and be in a position to unwind it should it be discovered that humans are not the main driver of carbon emissions. Clearly, this is the risk management option we must adopt.

Adaptation of agriculture to climate change requires one visible variable – the price of carbon. In its absence, no planning can be made; no investment will follow; land use will remain uncertain; and worst of all, the stark

changes required of land use under the new climate change regime will not follow.

Significantly, the price of carbon will build in the costs which we make by our activity on the environment for the first time. This structural change is entirely consistent with the behaviour of most who operate in the paddocks of agriculture.

The price of carbon will emerge easily as a result of two sets of decisions by government. The first is the setting of a date such as 30th September, 2008 where every household and business will complete the calculation of their carbon footprint based on the science of the day, and contained in a Climate Footprint Calculation Package, similar to the Tax Package currently sent out by the Australian Government for the completion of tax returns. Calculation of carbon footprints will be an annual event which will take into account the changing science. As a consequence, a new profession will spring up – that of carbon accountants and carbon auditors.

The second set of decisions is the settings determined by government of the amount by which each business and household must reduce their net carbon emissions. This might be 10% by 2010, 17.5% by 2015 and 25% by 2020, etc. Upon these two sets of decisions, a carbon price will immediately emerge as those net emitters will search for the cheapest and best way of reducing their net emissions. If the carbon price was \$5/t of carbon, it is likely that net emitters will purchase carbon credits. If the carbon price is \$50/t carbon, net emitters may have the incentive to invest in research and innovation to control their own emission reduction.

Now, with a carbon price, agriculture can make plans for land use and new technology; ranging from changing the crops and trees farmers might grow to researching methods of reducing methane production of sheep and cattle; to alterations to agricultural practices which allows higher soil carbon accumulation,

Culturally, agriculture across most of Australia will adapt very quickly. Western Australia and South Australia are renowned for their adoption of new technology, mainly as a result of their poor soils and the larger size of their essentially family farms.

Structurally, the introduction of the carbon price as economic mechanism will increase the drive towards corporate farming. The key difference is that the environment now becomes fully priced in the near term. Corporations will, accordingly respond.

Previously, when the environment was less a factor of economics, and if a factor at all, it was a factor of long term economics. The family farm was essential for the balance of the farm enterprise with agricultural ecosystem management. This was manifest in so many ways. Much of the land care was done by farmers with no short term economic consequence. Family owners worked well beyond 8 hr days and 5 day weeks to take the extra yard towards improving their natural environment and ecosystem. It is part of the culture of the family farm structure. I personally witnessed the difference between corporate and family farm time horizons, even then when the corporation is regarded as the most innovative in Australia's investment banking industry.

Now with a short term economic incentive in favour of the environment for the first time in the history of agriculture, corporate farming will be expected to become a major factor in the industry. It is likely that there will be economies of scale which will be both a result of the corporate farm structure as well benefiting it. For example, biomass use in power stations requires large biomass growth in close proximity to the power station, a setting suiting large corporate agriculture.

The downside to the emerging corporate farm structure may be regional development and regional towns. Should the carbon price be sufficiently high to either stimulate industry having high labour levels or stimulate increasing levels of industry in the regions, then regional towns will mushroom and become prosperous. In this hope – hope because it is very hard to predict accurately until the carbon price revolution is underway – the social infrastructure to service education, health, aged care and policing cannot be compromised. If it is, regional towns throughout regional Australia will decline rapidly and become self fulfilling.

There are family farms in many areas of Australia, especially Western Australia where the climate was among the most reliable in the country, and possible the world, which have born the brunt of the climate change shock. The shock has not been the fault of these farmers. The economic and

emotional pain which these family businesses are suffering is not the fault of the families.

The Australian community, and especially the former Australian Government has seriously disadvantaged Australia by their inaction in the face of the shock, in particular the inaction of not linking Australia into the rest of the world through ratification of Kyoto and the lack of implementing a cap and trade carbon policy. These same family farm businesses deserve a combination of support from the government to meet their needs for immediate sustenance as well as transition funding for adapting their land to new uses, complementary to the economics of the climate change shock.

Conclusion:

- 1. Australian agriculture will readily adapt to climate change once a carbon price emerges, as there are many opportunities available.*
- 2. Corporate farming is likely to replace the family farming structure as a result of the carbon price providing a short term economic measure of managing the environment.*
- 3. Family farmers deserve transitional arrangements as they adapt their land to new uses consistent with climate change economics.*

Mitigation Options for Agriculture:

Mitigation options for agriculture relate to the soil, fuel, stock and farm inputs such as fertiliser and chemicals, and remnant vegetation.

Soil mitigation revolves around crop rotations and tillage. Many farmers have already adopted minimum/no tillage. This both reduces fuel consumption and conserves soil carbon. Others take care with their cropping practices to conserve stubbles and build organic carbon sinks; and combine this restorative practice with tillage which minimises release of carbon emissions. Central to calculation of this mitigation is the commencement time. Good farmers have been working to increase the organic carbon of their soils with innovative farming practice since the mid 80s.

Fuel mitigation is aided by minimum/no till practices, with the downside offset being the higher use of chemicals for weed control. Fuel mitigation is also aided by use of biofuels, and usurps the myth that *Brassica* plants such as canola remove disproportionately more nutrients than cereal crops such as

wheat. However, government settings for 100% biofuel use make it uneconomic. These government settings need to be reviewed so that they are slanted in favour of small business and net emission mitigation rather than the big oil companies.

Stock mitigation of methane requires research similar to that which has increased the productivity agriculture over the past 100 years at least. The micro-organisms which scientists have already found in kangaroos may be transferable to sheep and cattle; and pasture plants may be found having a digestibility which mitigates the production of methane.

Reducing the input of fertilisers and chemicals is a function of the agricultural systems employed. The more organic carbon, the less N fertiliser which will be required. The more stock, the less reliance on chemicals. The most promising mitigation of fertiliser will be research which seeks to a cheaper method of soil sampling for calculating nutrient availability. This will likely aid the calculation of organic carbon as well.

Remnant vegetation, either fenced or growing naturally on private land needs to be encouraged. The same incentive mechanism which applies to countries to preserve their rainforests needs to apply to Australian farmers who have preserved trees strategically, and non strategically on their properties. These sinks have a parallel with the many small boats which successfully evacuated British troops from Dunkirk.

Conclusion:

- 1. Soil carbon and remnant vegetation are huge carbon sinks for which agriculture deserves to obtain value.*
- 2. Commencement times for calculating sequestration which has already occurred must be taken into account.*
- 3. Research expenditure must be ramped up in several areas, most important of which is aimed at reducing methane emissions by stock.*

Practical Considerations for the Inclusion of Agriculture in an Emissions Trading Scheme:

The practical considerations apply to measurement, preservation and life time of the sequestration entity.

Measurement of carbon sequestration will require a huge and ongoing research program, be it for organic carbon sequestered in the soil; or carbon sequestered by different trees – oil mallees/blue gums/ and the range of other tree species which propagate on different soils across Australia. Agriculture whose history has been one of limited profitability except where high prices and good seasons line up, will adapt quickly to farming carbon either as a direct or indirect “crop”.

Accuracy of measurement is fundamental to any tradeable commodity, and it is very much the same with agricultural sequestration options.

The problem for agriculture is that there are many sequestration options, each having varied sequestration rates and at different stages of plant growth or soil condition. Activating, and in some cases re-activating research programs in to sequestration measurement, as well as emission measurement as with livestock, and soil carbon requires urgency if agriculture is to make the important and necessary contribution to net emission reduction; and at the same time to earn revenue from the environmental concern which many farmers embody into their agricultural practices.

Regrettably, carbon sequestration does not always build. Sometimes it may deplete. How will carbon unit traded deal with this occurrence?

The lifetime of carbon sequestration may also vary, or be unknown, especially as new species show potential sequestration. Having 100 year contractual arrangements will eliminate many cases of sequestration opportunities. Contracts should be from 30 years upwards, and include trees which have already been planted.

Sequestration measurement of annuals as in cereal crops, pastures (both grazed and ungrazed) needs to be done. There is no case for farmers to be left out of the commercial loop if they are contributing to reduce net emissions.

While reduction of carbon emissions has to be undertaken with vigour and a determined commitment, if the technological breakthroughs take longer than anticipated, slippage can be accommodated by making industry related adjustments to the caps. We are all in the position of being subject to social engineering to mould our behaviour in favour of the environment.

Conclusion:

- 1. Carbon measurement across a number of sinks is a major issue and must be accurate and audited for tradeable contracts.*
- 2. Sequestration contracts should have terms extending 30 years and longer.*

Recognition of Carbon Sinks and Offsets:

Satellite and global positioning system (“GPS”) technology, of the kind used by agriculture already in its “Pastures in Space” program as carried out by the Department of Food and Agriculture, should be able to referenced and applied for the ready measurement of much of the carbon sink availability.

The Institute of Agriculture within the University of Western Australia is already working with a newly designed, low cost micro spectrometer which can detect organic matter on-the-go. While this instrument may apply for soil organic carbon measurement, similar techniques may be relevant for vegetation of different types.

There can be no doubt that for any sequestration contract having years of lifetime, regular, and probably annual audits will be required to occur. New professions will arise such as carbon accountants and carbon auditors. Professional and audited measurement will be the only factor which can give the necessary confidence to a carbon market. Moreso that these measurements and audits are standardised across the world.

Once a carbon sequestration contract has met the international standards and has been signed off by appropriate auditors, it can be submitted to the global market through brokers, etc. This does not mean that all sequestration contracts have the same carbon offset amount – each contract can be different. The carbon price and the net amount of carbon sequestered will form the basis of the carbon credit traded.

Clearly, trading of carbon credits will become sophisticated very quickly, with forward and derivative markets developing. This will serve to make the markets deeper and provide better price discovery for the market.

Conclusion:

- 1. GPS technology is already existent and needs referencing to achieve much of the measurement required for carbon sinks.*
- 2. Measurement of carbon sinks must have the integrity and accuracy of value to be completely respected as a tradeable contract.*