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From: mairianne mackenzie
Sent: Thursday, 19 March 2009 6:07 PM
To: Nicole, Sophia (REPS)
Subject: Re: Agriculture and Climate Change Terms of Reference

To: Standing Committee on Primary Industries and Resources
Standing Committee on Infrastructure, Transport, Regional Development and Local Government

R1.121, Parliament House, Canberra 2600

From: MairiAnne Mackenzie, founding member Environmental Farmers

Please accept the following submission.

Current and prospective adaptations to impacts of climate change on agriculture

Thankyou for the opportunity to comment.

PRELIMINARY COMMENTS

This submission suggests some areas of research and government intervention for farm-based adaptations, with a caveat.

Modest change not an option

The terms of reference emphasise promotion of adaptation to climate change. However, judging by the most recent estimates of future climate made by the IPCC under a path of least change from current rates of greenhouse emissions, adaptation to the resulting severe climate change will not be sufficient to make the Australian climate viable for modern human society.

In the absence of changes to reduce greenhouse emissions, emphasis on adaptation will act to strengthen acceptance of our current path towards catastrophic climate change. Therefore, adaptation without any mention of reducing emissions is dangerous.

Deep adaptation needed

Adapting to climate change includes not just dealing with new physical weather regime, but also adapting mentally, altering our worldview, to recognise the new landscape (physical and economic) in which we operate, the need for abatement and the consequent change in lifestyle on farms. We must learn how not to worsen the problem. This is a vital adaptation.

So to be responsible, adaptation must be seen as part of a strategy based primarily on reducing emissions. This is the caveat.

We need a cultural shift so that an agriculturally simplified landscape is not the only image of rural landscape that is valued. The existing culture (which works towards an industrialised landscape) forms the basis of our current economic focus on a minority of aspects of the environment and so is very influential. The existing culture has been expressed economically. Although there is back-and-forth reinforcement between culture and economy, the primary adaptations we must make are cultural, while technical ones will express a new set of priorities.

Hard to market

The physical environmental cost of agriculture and its downstream manufacturing have mostly been ignored by the human economy. Like all environmental problems, they are hard to market because they may be incremental and slow to appear, and because their source may be hard to identify. Therefore government action is needed to speak for the community cost and to establish a price in dollars. The changes suggested below to better represent community interest will need the exercising of a more general voting system or "market", namely government. Germany has imposed minimum environmental standards for farming, and if similar were imposed in Australia, farmers farming for greater ground cover would not be disadvantaged.

Adaptation and Abatement can be Allied

A major and well discussed aspect of adapting to a drier climate will be improving soils' water holding capacity and temperature stability by increasing soils' percentage of organic carbon and, eventually in active soils, humus.

It should be no surprise that this adaptation can be achieved by abatement: reducing agriculture's diesel consumption per tonne of produce. This is because fossil fuel has until now been used to break down the very natural capital that would have helped us cope with a drier climate, and whose loss has significantly weakened the planet's ability to absorb increased greenhouse emissions: in particular here, soil carbon including humus. Greater economic advantage has until now accrued not just to those who consume natural capital non-sustainably, but to those who, in pursuing increased the rate of goods production, increase the rate of consumption of natural capital. A powerful form of public recognition of the benefits of valuing natural capital needs to be initiated. Including natural regrowth of native vegetation in any Carbon Trading Scheme might be one element of this. Without this there is a risk of clandestine clearing and replanting with regular plantings that do qualify.

Soil Carbon promotes Resilience

On cleared land the destruction of natural capital is continued by consuming the layer of "litter" and groundcover on the soil, and the humus in the soil, without allowing it to reform. As is now established scientifically, soil disturbance by cropping machinery increases the exposure of plant material and humus in the soil to oxygen, and this increases the rate of oxidation of carbon and so the rate of emission of CO₂ from the soil. This humus and litter would increase the soil's water-holding capacity and increases the soil's ability to grow produce and store even more carbon. Humus holds many times its own weight in water, and helps support a microbial network in the soil that can supply plants with minerals until we construct an industrial version of natural mineral cycling.

SUUGGESTIONS

Decreased Diesel Use

Diesel use in agriculture, mostly used at present to inhibit an adaptive change towards storing more carbon in soils, can be reduced by:

- Using narrower sowing points on seed drills (Adaptive aspect : less moisture lost from the soil and less humus lost by exposure to air. Other benefits: less work and less fuel, as less soil broken)
- Discouraging the feeding of grain to livestock. Promote pasture fed meat. (Adaptive aspect: except in a minority of cases, if livestock require to be fed much grain, the paddocks will be bare to an extent that will reduce carbon incorporation, humus formation and water holding capacity. Overgrazing and hand feeding is the standard practice in most grazing operations in temperate Australia where rainfall has dropped. Less feeding will means lower stocking rates or better management of pastures and more ground cover.. Other benefits: less stock means less methane produced, less agriculture required because grain would be eaten directly, so that less land is required per calorie of food produced)
- Continuing to develop sowing techniques that require even less soil disturbance (as above, can elaborate)
- Reducing the use of industrially fixed nitrogen fertilisers. This will reduce the suppression of the soil's own nitrogen fixing microbes. (Adaptive aspect: if achieved without depressing plant growth, this will promote better soil health and greater soil water holding capacity and carbon storage in soil. Other benefits: less carbon-intensive inputs to crops.)
- Relaxing the requirement of grain buyers for very low "screenings" (seed from non-desired plant species), so that less energy need be spent on killing weeds. (Adaptive aspect: paddock will have better cover.)

Areas of research or extension

- Introduce environmental accounting on farms: How many indigenous species did a farmer have at the beginning of the year compared with at the end? How many tonnes of soil? Roughly how much carbon has been captured and how much emitted?
- Measure commercial benefits of reserves being left within farms
- Measure the benefits of planting trees around dams (40 m from water) to slow evaporation from wind.
- Continue work on more precise methods of measuring soil carbon levels.
- Discourage the burning of stubbles where this is still done
- Assess whether or not, on a total lifecycle assessment, construction of pyrolysis plants, haulage of agri-char to farms is a better investment than alternative methods to produce more vigorous plant growth *in situ* on farms, with the subsequent increase in *living* soil carbon stores (humus) whose slow oxidation provide some of the metabolic energy needed for a healthy soil microbial network (Adaptive aspect: increase soil fertility (both options))

Adaptation to higher fuel prices

- Increasing local food production (more resilient rural populations)

- Carting grain by rail (less damage to roads)
- Increasing the take up of curved sowing points on seed drills (less work done because soil, which is partially fluid, flows better past a curved tyne)
- Slowing down the production of new machinery, which represents significant greenhouse gas emissions in its manufacture, and instead promoting the repair industry and the refitting of older equipment with energy saving modifications.

Absolutely basic adaptations to Climate Change

- Shift in cultural understanding away from the view that the land is improved when indigenous natural capital is removed.
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- Cessation of clearing more land
- Applying the same rubric as used in domestic energy saving: insulating hot water tanks/urns, turning down the thermostats, using smaller vehicles for personal transport on-farm where 2 or 3 tonne vehicles are common, minimising trips, instead of returning to "base" for breaks, more tools etc.

Thankyou for your time.