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| Secretary:     | .....  ..... |

Rosemary Hook

23<sup>rd</sup> March, 2009

The Committee Secretary,  
Standing Committee on Primary Industries and Resources,  
House of Representatives,  
Parliament House,  
CANBERRA ACT 2600

Dear Committee Secretary,

**Submission to the inquiry into the role of government in assisting Australian farmers to adapt to the impacts of climate change**

Following are comments I wish to submit to the Committee on Primary Industries and Resources in relation to the above inquiry. I apologize for their submission after the due date. These comments are made from my perspective, experiences and observations as a grazier managing an 800 ha property about 200 kms north of Canberra, although I also have a background in land and soil science. I have raised a number of issues that I think require consideration in the context of your inquiry but I do not feel qualified to offer recommendations.

Thank you for the opportunity to provide input to the inquiry.

Yours sincerely,

Rosemary Hook

# Comments on the concept of adaptation to climate change

## *Key point*

I find the title of this inquiry worrying – it *assumes* agriculture *can* adapt to climate change and so, perhaps unintentionally, promotes this view which may lead to a level of complacency about the need to *avoid* anything but perhaps relatively minor climatic changes. Adaptation is only possible if the climatic changes are not very great, but the past summer points to the possibility of extreme events, and the view that agriculture can adapt to such developments may be optimistic. Perhaps the inquiry also needs to consider the role of government in assisting Australian Farmers to help *avoid* climate change”. Many practices which will help mitigate climate change will also be those which are more successful in the face of change.

## *Expansion of issue*

### 1. The experience of last summer

Climatic events on the farm over this past summer have changed my view with respect to Climate Change, from concern to alarm. These events, which occurred within about a month, included:

- Unprecedented heat over an extended duration;
- A week of strong wind, unusual both for its duration and the time of year
- A hailstorm that stripped the dead grass from a paddock and put it in the dams or took it down the creek with a flow that appears to have been quite amazing; and
- Dams that were full to overflowing on one half of the property and half to a third full on the other half. The emptier dams had bluegreen algae.

At the same time there was flooding in North Queensland and horrendous fires in Victoria.

I had thought that the potential changes associated with Climate Change were in broad values, timing and distribution – what we have experienced this summer has been extreme differences and changes over short time frames and distances. This puts a completely different perspective on management prospects and has me seriously wondering whether farming can “just adapt”. I’ll try and explain some of my concern, and this is not even starting to think about other complications which may arise.

The area that was stripped by hail had dry grass over a foot high and with close to 100% soil cover – given the area is a slope with rocky outcrops, how much soil would have been lost without that cover? Now I am wondering how do I graze *and* maintain grass cover sufficient to give protection in those conditions? Then what about the increased fire risk such cover produces, particularly given that hot windy days are also expected to increase? There is another side too, even with the good ground cover, a high proportion of the rainfall would have been lost – if rain comes like that in future, all at once with little in between spasmodic heavy falls, then pastures and other vegetation will struggle to survive as such rainfall does little to recharge the soil profile. While good ground cover can increase infiltration, there is no farming environment (soil and associated cover) whose infiltration capacity could match the rainfall intensity of that storm. The only possible landscape that could cope would be a rainforest where the canopy would do much to reduce the energy and the underlying soil had high infiltration capacity.

Establishing the trees and shrubs needed to protect soils, becomes just that much harder – they need watering through such summer events if they are to survive (though there may be a “slow release” water capsule under development that can be used on planting). Not only is this time consuming to the extent that it would not be an option in many situations, but working outdoors in the conditions of last

summer is exhausting both physically and mentally. I felt viability only remained because the period to be endured before there was more stability, was relatively short. What about when extreme events go for longer and are not followed by rain, or properties are devastated by fires every few years? Also, what about when heat causes infrastructure failures (particularly electricity supply as happened recently in Victoria) at the same time so you can't use stoves, refrigerators, air conditioners and the like, to help keep yourself? And to come back to the initial point, right at the time establishing perennial vegetation to help remove CO<sub>2</sub> becomes even more imperative, it also becomes harder – negative feedback loops which make conditions worse. This also applies to increased fires of course, and the increased oxidation of organic matter with increased heat.

To me, last summer provided a glimpse of the possibilities for a future climate and made me very aware that should extreme events become more common and of increased duration, trying to live and farm (as we currently know it) would be extremely difficult, if not impossible. I can now envisage conditions where the notion of adaptation is unrealistic and it concerns me that we may be deluding ourselves that it will be possible.

## 2. Current modeling

My understanding is that global climate modeling only indicates likely directions of change, for example, less rainfall, higher temperatures and more extreme events. I understand that it is not possible to model regional or local weather patterns that would include factors such as rainfall intensities and duration, wind speeds, coincidence of extreme heat and wind days, and the like. I also gather that in order to try and understand future conditions for agriculture, modeling is being used to predict regional changes to growing seasons and soil water profiles. However, as it is not possible to model future weather patterns as inputs to the regional models, *assumptions* are made as to how rainfall will be distributed, temperatures reached, the duration of hot or cold periods, and so on. From what I know of some assumptions being made, I think the past summer has indicated that many could well be wrong – while those who carry out such modeling and prediction would probably be the first to admit this, the problem is that outputs generated tend to become accepted as “what will happen”. As planning becomes more widespread, one can see that the assumptions and non-definitive nature of the predictions, will be forgotten.

## 3. System changes

The concept that agriculture can adapt, also relies on the assumption that the underlying systems will remain functional. Again, this may well be an unwarranted assumption. Just as an example, if populations of insects necessary for pollination are reduced or cannot survive under the changed environmental conditions, and/or if populations which are pest species, thrive, there are enormous consequences for the success or otherwise of crops, pastures & domesticated animals. There seems to be very little “whole systems thinking” in current discussions of possible adaptation but rather a focus on specific components such as plant or animal breeding. We are not envisaging how biological systems could fail and what the agricultural consequences would be. Indeed, the same also holds true for man-made infrastructure – what would be the effect of continued power failures due to failure of infrastructure from heat stresses? Refrigeration breakdowns at abattoirs, failure of processing equipment – the list would be endless.

## ***Implications***

- The notion of adaptation should be used carefully, and we need improved capability to predict future weather patterns to underpin our understanding of realistic options;
- Systems thinking and research is essential;
- Predictions of future climate scenarios used for planning must state the assumptions made.

# Comments on cultural and social issues in the agricultural sector

## *Key points*

- Many farmers do not recognize that there is a problem – they do not think climate change is either happening or likely to happen and this group will not consider changing their practices/management until this underlying view changes. Public meetings, provision of courses, distribution of literature and the like, are of little assistance, as this group simply does not attend or read the material.
- While many farmers are innovative, others still adhere to the attitudes and practices they learnt as they grew up in farming – they do not really know how to think differently, make different decisions or implement new practices. They do not necessarily reject the notion of climate change but that they are captive to the past. It is partly that they are unable to move from their “comfort zone”, but often feelings of pride and self-worth are involved as well. Holistic management approaches which challenge current decision making processes and offer management frameworks suited to changing climatic conditions, are already available and being taught by various groups (see submission from The Fenner School of Environment & Society) but can only be utilized by those who are ready to try something different.
- The current financial stresses on farmers resulting from the many poor seasons this decade, can exacerbate an inability to change. While such stress can be a catalyst for change, in other cases it can become a major impediment – the concept of thinking differently or trying new practices can be an impossible challenge when a person is struggling to cope.
- There is a major divide in thinking, both within the farming community and within the science that supports agriculture, between those who essentially work with the natural system (ecological agriculture) and those who are more interested in highly modified systems (high inputs, high technology and high outputs). In many instances it could be categorized as a tension between production and the environment. Those with a high production focus often justify/rationalize their approach on the basis of the need to feed ever increasing populations. They also tend to regard a more biological approach as “alternative” – non business-like, not scientifically based and generally not mainstream. The issue is that many practices being adopted as likely to have improved carbon footprints and as being more resilient to climate change (such as holistic management), are from the biological realm and likely to be dismissed by those with a “high tech” focus.

## *Implications*

- There is a clear need for the development of programs to assist farmers, to be advised by research from social science groups. For example, the Sustainable Farms Project within the Fenner School at ANU, is currently investigating the attitudes of graziers to their farm landscapes – an understanding of such attitudes is vital in designing assistance programs (including financial) to which a *broad spectrum* of farmers will respond.
- Successful support programmes, such as assistance provided for farmers to attend holistic management courses (run by HM Educators, RCS and Principal Focus) and to obtain professional farm planning advice, should be continued.

- It may be appropriate to provide financial incentives/rewards for implementing practices known to be beneficial, but which do not necessarily require acceptance of climate change per se – the “land stewardship” type payments that have been considered in other contexts.
- In funding research which underpins the development of appropriate agricultural systems, the government needs to ensure that whole farm systems and their carbon economy are considered. This is to avoid developments which may have beneficial aspects but which overall are part of or support, carbon expensive farming systems.

## Comments on the effects of some predominant paradigms in science

### *Key points*

- Related to the last section, is the culture within science: reward in science research generally, and in this case in agricultural science more specifically, generally comes through research and publication in the scientifically “fashionable” areas of the time. Trends in science thinking (the dominant paradigms) can mean that alternative views are dismissed without proper assessment and scientists who may investigate the alternatives, tend to be sidelined.

I am aware, for example, of one research scientist within the CSIRO whose research associated with “biological” approaches to farming was subjected to negative pressure and who left the organization as a result. I think the influence of current paradigms may also explain why, to the best of my knowledge, there has been little scientific evaluation of the effectiveness of the large and increasing range of “biological fertilizers” on the market. They are regarded by many farmers as a component of less carbon expensive and less ecologically damaging, farming systems. I find myself wondering why the lack of independent scientific scrutiny and whether scientists have avoided the area for fear of being seen to support or connected with, “biological agriculture” and the consequences that may bring.

- A corollary of the above is that there is often little reward for on-the-ground research with farmers, particularly where farmers and/or their advisers have some input into research directions and design (different from on-farm trials or investigations). As a consequence, many scientists have actually lost touch with what innovative farmers are doing (complicated/exacerbated by the high productivity versus natural system divide as well) and it has sometimes led to an implicit view that science should lead the farmers, rather than accept that there may be times when their input is invaluable.

I believe this science culture has hindered investigations into the possibility of increased sequestration of carbon under “new” agricultural practices (such as cell grazing and pasture cropping). Rather than investigate these possibilities, many in the scientific community have rejected them out of hand. Factors contributing to this rejection include scientists being unfamiliar with the practices; biological approaches to agriculture (to which cell grazing and pasture cropping belong) not being part of the current predominant paradigms in agricultural science; and a reluctance among some scientists to accept that science might not be up-to-date.

### *Implications*

- The implications are many, but I think much could be achieved by a research programme (for example through a CRC) focused on “greenhouse friendly agricultural *systems*”, where industry participants with an ecological orientation to agriculture are one of the partners.

## Issues within the larger community

### *Key points*

- Farmers do not operate in isolation and so changing farmers' attitudes and practices also requires changing attitudes in the larger community, particularly among those servicing the needs of farmers. This is especially true with respect to banks. Those providing loans to agriculture need to understand the issues so that farmers are not pressured into inappropriate higher production in order to service debt. Indeed, banks could form a pressure point in helping farmers change orientation and practices.
- The loss of high quality agricultural land (fertile soils and reliable rainfall) to urban development or mining, is not assisting farmers in adapting to climate change. Why are we, as a society, allowing agriculture to be lost from land highly suited to it, particularly under a changing climate, and from areas where transport costs (carbon costs) are reduced because of proximity to markets?

### *Implications*

- Assistance programs for farmers which do not consider the context in which farmers operate, will have reduced effectiveness and could miss major opportunities for facilitating change.
- If national food security is vital to this country, the government needs to ensure that its various policies give it the priority it deserves. It is no good providing assistance to agriculture on the one hand, only to undermine it at a much deeper and more profound level.

## Financial obstacles to change

In this submission I have focused on attitudinal/societal issues as, unless these are addressed, there may be little change within that group of farmers who have so far shown no inclination to adopt new practices. Clearly though, changing one's production system inevitably has financial costs and this can be a major impediment to change simply because the monetary resources are lacking.