

# Agricultural Competitiveness White Paper

## Introduction

Australia's future agricultural capacity will be determined by the impacts of global climate responses to increased average global temperatures. Failure at this stage to plan both mitigation and adaption strategies will ensure that Australia's agricultural capacity will continue to decline. Unless broad policy responses are adopted across all sectors of the Australian and global economy to mitigate the impacts of rising global temperatures and the impacts this will have on agricultural production, any attempts to improve Australia's agricultural competitiveness will be doomed to failure.

Recognition of the contribution of human activity to increasing greenhouse gasses and the effect this has had on global climate systems will be an essential ingredient of any future policy response to the need to increase agricultural production and improve returns to farmers.

Attempts to adopt strategies to adapt to changing climate will be unsuccessful unless mitigation strategies are adopted to deal with the drivers of the changes we are currently experiencing on a local and global scale. Without mitigation strategies adaption will always lag behind the cause of the need for adaption. Mitigation and adaption are not alternative strategy responses to shifting climate induced by a warming planet. "The cost of adaption and whether a planned adaptive response has any chance of working depend on the effectiveness of mitigation and therefore the extent of climate change." (Garnaut, *Four Degrees of Global Warming*, 2014.)

An essential policy response canvassed in the "Agricultural Competitiveness White Paper" must address the need for agriculture to adopt mitigation and adaption strategies. The issues canvassed in the Issues Paper in particular: food security; farmer decision and improving farm-gate returns; increasing competitiveness; contribution to rural communities; regulation; agricultural exports; investment and job creation will all be directly influenced by the effectiveness of climate policy, mitigation and adaption.

## Factors impacting on agricultural competitiveness not addressed in the Issues Paper

Australia's current policy strategies for dealing with human induced global warming are aimed at limiting average global warming to +2°C above 2000 above pre-industrial levels. However there is growing scientific evidence that mitigation efforts, including Australia's, will result in global average warming of +4°C above pre-industrial levels by 2100.<sup>1</sup>

Analysis of 20 plus Global Climate Models (GCM) produces a range of possible scenarios depending on the extent and success of mitigation efforts to limit CO<sub>2</sub>e emissions. Due to the extent of human activity of on the drivers of global climate the planet will continue to experience increased average global temperature. It is therefore imperative that the impact of global warming and the resultant climate changes be taken into account when developing future agriculture policies. A report by the United Nations Economic and Social Commission for Asia and the Pacific identified:

*“climate change holds the potential to radically alter agro-ecosystems in the coming decades and there is already evidence of devastating crop failures. Predictions concerning food production vary. However, even if overall production were to remain high, declines in certain parts or the Asia-Pacific region may be expected. Over the long term, adapting and mitigating impacts from climate change will have to be top priority for all countries.”* (UNESCAP, 2009: 11)

While there is a high level of certainty that global warming and climate change is occurring and that it is occurring at an increasing rate, there is substantial uncertainty surrounding the actual changes in climatic factors effecting Australian agriculture. While the predicted impacts of climate change on Australia's agriculture vary depending on the models and scenarios employed there is no uncertainty that climate change will have negative impacts on Australian agriculture. It is only the extent that is uncertain and much will depend on mitigation efforts to reduce the rate of increase in average global temperatures.<sup>2</sup>

The impacts of climate change will be manifest in:

- **Temperature**

Agriculture in Australia is highly responsive to average temperatures. Production systems, crop yields and livestock are impacted by high and low extremes.

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<sup>1</sup> “While much political attention is focused on the potential of global warming of 2°C relative to pre-industrial, the [IPCC's] AR4 [Fourth Assessment Report] projections clearly suggest that much greater ranges of warming are possible by the end of the 21<sup>st</sup> Century in the absence of mitigation.” (Betts et al., 2009:1)

<sup>2</sup> The climate projections derived from the GCMs and emissions scenarios suggest that well before +4°C is reached almost every region in Australia each year will be experiencing what were historically exceptionally hot conditions. (Hennessy, et al., 2008)

McKeon et al., (1988) suggested that a 2°C increase in temperature could reduce wheat yields in Queensland by 6 per cent.

Wang et al., (1992) suggested that a 3°C increase in Wagga Wagga and Mildura could reduce mean yields by up to 50 per cent depending on cultivar.

The climate projections derived from the GCMs and emissions scenarios suggest that well before +4°C is reached almost every region in Australia each year will be experiencing what were historically exceptionally hot conditions (Hennessy et al., 2008).

- **Rainfall**

Rainfall is a critical influence for Australian agriculture. It determines what crop varieties are planted and where and how crops are grown. It also has an impact on annual production and quality amongst many other elements of Australian agriculture.

Climate projections based on increased temperatures indicate rainfall reductions in Southern Australia and about an even chance for either a decrease or increase in Northern part of Australia (Whetton et al., 2013; Hennessy et al., 2007).

*“While some of the rainfall decreases projected in the scenarios do not seem large (e.g. 25 per cent), in a grain-cropping location like Birchip in northern Victoria, such reductions would result in more than a doubling of the frequency of ‘exceptional’ droughts, a reduction by 90 per cent of the frequency of high rainfall years, and the rainfall historically experienced in half of all years would be experienced in only 19 per cent of years.” (Howden, M; Schroeter, S; Crimp, S; “Four Degrees of Global Warming” 2014).*

The impacts of reductions in rainfall on Australian agricultural production could be quite marked. Estimated levels of global warming considerably less than +4°C would see a decline in wheat production of up to 13 per cent and beef production by 19 per cent by 2050. (Gunasekera, et al., 2008).

Indicative decreases in production per unit area of core agricultural commodities are up to 40 per cent under the more extreme scenarios of mean rainfall decline, notwithstanding the positive impacts of elevated CO<sub>2</sub> on yield (Howden, 2003).

- **Evaporation**

Both dryland and irrigated agriculture yields are highly sensitive to the impacts of evaporation. Evaporation is likely to increase with climate change and when combined with the anticipated reductions in rainfall suggests a significant increase in drought risk over most of Australia. (CSIRO and BoM, 2007; Whetton et al., 2013; Hennessy et al., 2008).

- **Water availability and quality**

Lower rainfall and increased evaporation are likely to substantially reduce water resources as average temperatures increase. Significant reductions in annual water availability in the Murray-Darling Basin could be experienced by 2030<sup>3</sup>. The medium scenarios, however, all indicate reductions in average annual flow although increased annual variability in rainfall may increase the size of flood events. (Howden, M; Schroeter, S; Crimp, S; "Four Degrees of Global Warming" 2014).

- **Pests, diseases and weeds**

Global warming and the associated change in climatic zones is likely to alter the range, severity, species and distribution of pests, diseases and weeds impacting on agriculture. However while current knowledge does not indicate the specific changes that may occur the range of possible outcome is quite wide.

The impact of crop diseases can be influenced by hotter, dryer or wetter conditions, or a combination, depending on the physiology of the particular disease.

Similarly insect impacts on crops in a warming climate is uncertain.

IPCC, 2007b, identified concerns that a range of weed species will increase their competitive advantage under elevated CO<sub>2</sub> and higher temperatures.

- **Food production**

Population growth, especially in Asia, will put increasing pressure on global food supplies while. The net effect of his consumption pressure and the negative impact of climate change on Australia's productive capacity is that Australia's food surplus may shrink and become negative under certain climate change and population scenarios, particularly at the potentially higher temperature range.

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<sup>3</sup> Increasing water scarcity in key irrigation areas such as the My-Darling Basin region is predicted to significantly reduce production rates by 2030 (Sanders et al., 2010) well before a +4°C temperature occurs.

Unless the White Paper gives consideration to the established scientific data relating to the impacts of human activity on global climate systems and the modelled impacts of increased temperature on agricultural production systems any policy development arising from the White Paper will be ineffective in addressing the future needs of Australian agriculture. In order for White Paper recommendations to make an effective contribution to future of Australian agriculture and Australian farmers the scope of the recommendations will, by necessity, be required to extend beyond the agriculture sector and address the range of mitigation measures which must be adopted both locally and globally to prevent catastrophic global warming. Unless effective mitigation measures are considered any policy aimed at adaption will be lagging behind the changing climatic factors, in other words always trying to play catch-up.

## **Issue 1: Ensuring food security in Australia and globally**

*What opportunities exist to expand agricultural production in Australia and how can we take advantage of them?*

Any opportunities to expand Australia's agricultural production will require more research to identify the likely shifts in climatic zones resulting from increased temperature, changes in rainfall patterns and associated impacts. This will enable the identification of the most suitable agricultural production systems to cope with the changing climatic conditions. Research is required to improve both long-term weather and climate forecasting or modelling.

This will require a regulatory framework to encourage farmers to adopt the most suitable production systems for their location. The areas that are currently targeted for agricultural development are likely to become unsuitable for agriculture by 2050. Market forces are unlikely to achieve the necessary shift in adaption to deal with changing climate, short-term self-interest will over rule long-term desirable outcomes for the whole society.

The only opportunity to expand agricultural production lies with increases in research and development to enable agricultural production systems to cope with the effects of climate change. This is essential for agriculture to have any hope of meeting the challenge of reduced capacity and increasing demand.

There will be significant opportunities to export Australian agricultural technology only if research and development is focused on developing mitigation strategies and

technologically innovative adaption techniques. The solutions developed for Australian agriculture to deal with hotter global climate could be exported.

## **Issue 2: Farmer decisions for improving farm gate returns**

**The White Paper will consider the means of improving market returns at the farm gate, including through better drought management.**

Despite the current political rhetoric and short term belief that the era of low cost energy can continue, the finite nature of fossil fuels and the simple laws of supply and demand, energy costs will inevitable increase over time. The only positive impact on future energy costs will be the development of alternative and renewable energy sources which will reduce in cost as uptake increases and the technology is developed.

A crucial strategy for farmers to improve farm profitability (not necessarily farm gate returns) will be the adoption of methods to decarbonise all agricultural energy inputs.

A significant challenge for farmers will be to recognise that changing social attitudes to traditional practices threaten their social licence and therefore community acceptance of their operations. Quite often outside social pressures are the catalyst for the majority of farmers to follow the early adaptors and adopt more progressive and less environmentally damaging and more humane farming practices. Essential in the process of adopting more ecologically sustainable farming practices as well as decarbonising agriculture will depend on developing a much wider understanding amongst farmers of the importance of the role functional ecosystems play in sustainable and profitable agriculture.

Part of the decision making process for farmers will be the recognition that shifting climatic zones resulting from global warming will require modification of production systems and methods to maintain profitable and viable enterprises. Shifting climatic zones will require farmers to hone their decision making skills to be proactive and anticipate the likely changes which will be forced upon them by climate change.

Essential to this process will also be the recognition of the adage: “you cannot solve problems with the same thinking that created them”. Unfortunately this requires Government to show leadership and not reactive and just following the mob.

Better drought management will depend upon the recognition of the increasing frequency of severe weather events and climatic influences. This will require the identification of areas

where some types of agriculture are inappropriate or alternatively more appropriate.

Short term drought relief could become permanent welfare unless the impacts of a warming climate are taken into consideration. This will require the identification of zones where certain agricultural activities or practices should not be undertaken. If the farmer accepts the risk of carrying out unsuitable practices community support should not be available.

### **Issue 3: Enhancing access to finance**

**The White Paper will consider access to finance, farm debt levels and debt sustainability.**

The impacts of global warming with the inevitable increase in drought, flood and extreme weather events having a negative impact on agricultural production and will require the development of a range of policy options which take account of the increasing threats to yields, farm viability and debt levels.

Essential to this process will be the development of a zoning system to identify areas where certain production systems are either suitable or unsuitable. The South Australian Goyder Line is an example of this approach.

An extension of this system would be the development of a system to enable farmers to save their debt and not sow crops or carry livestock when seasonal conditions indicate less than a certain percentage of success. Croppers and the more successful livestock enterprises have sound management rules to govern their operations such as not sowing unless a certain depth of soil moisture is present. However as seasonal conditions deteriorate over a number of seasons and crop failure; poor livestock returns and/or feeding costs compound debt levels there is a tendency to push the limits of the management rules and adopt increasing levels of risk.

A system of business support at a level above household welfare which enables farmers to maintain a minimum level of activity and some employees without increasing debt levels until conditions indicate something above a (sic) 50% chance of success. This would ensure that when conditions improve the enterprise is able to move back into production without crippling levels of debt.

However, should a farmer choose to carry out activities in areas identified as unsuitable or marginal financial assistance should not be available.

## **Issue 6: Improving the competitiveness of inputs to the supply chain**

**The White Paper will consider the efficiency and competitiveness of inputs to the agriculture value chain—such as skills, training, education and human capital; research and development; and critical infrastructure.**

In line with the need to decarbonise the economy in general order to avoid catastrophic climate change by 2100 CO<sub>2e</sub> emission reductions will need to be far in excess of current reduction targets. The IPCC's conservative reduction range of CO<sub>2e</sub> emissions to keep global temperature below +2°C is in the range of 25-40% below 2000 levels.

This will by necessity require the decarbonising of agriculture sector. It is inevitable that traditional energy costs will increase as finite resources are consumed. Gas prices will come under increasing pressure for export parity pricing. Opportunity exists for agriculture to reduce reliance on fossil fuels and increase inputs of renewable energy, particularly from current waste products or small scale solar or wind plants. Investments in research and development will continue to improve and accelerate technology and continue to reduce the costs of renewal energy sources and contribute to the efficiency and competitiveness of inputs into the agriculture sector.

## **Issue 7: Reducing ineffective regulations**

**The White Paper will consider the effectiveness of regulations affecting the agriculture sector, including the extent to which regulations promote or retard competition, investment and private sector-led growth.**

An essential element of any regulatory framework is to ensure an efficient regulatory regime to achieve the desired policy outcomes. This requires clear thinking on behalf of Government with an emphasis on practical outcome that benefit society as a whole and avoid ideological bias. Regulation based on short-term linear decisions which have unintended negative consequences must be avoided. This type of decision making by government is the basis for a considerable amount of ineffective regulation.

For all industry, including the agriculture sector, complying with regulations that ensure product safety, product integrity and protect market access are an investment not an expense. Similarly for agriculture regulation that ensures the maintenance and improvement



of the essential ecosystems that are required to maintain sustainable farming systems are a vital investment for the sector.

## **Issue 9: Assessing the effectiveness of incentives for investment and job creation**

**The White Paper will consider the effectiveness and economic benefits of existing incentives for investment and job creation in the agriculture sector.**

The current programs, with the possible exception of Caring for our Country, do not cater for the adjustment which will be required to adjust to a warmer climate. Incentives for research, development and adoption of technologies, techniques and practices to decarbonise agriculture, improve water use efficiency, the development of crops that can cope with increasing atmospheric CO<sub>2</sub> and research into the most suitable practices for shifting climatic zones will provide the financial benefits required to maintain a viable and sustainable agriculture sector in Australia.

An underlying requirement for ensuring that incentives and investment in agriculture are effective is sound strategic planning and planning for structural adjustments. Farm start-up particularly for the development of new enterprises in areas where they previously did not exist should be treated as regional development.