



FUTURE FARM
INDUSTRIES CRC

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Ms Jeanette Radcliffe
Senate Standing Committee on Rural and Regional Affairs and Transport
PO Box 6100
Parliament House
Canberra ACT 2600

28 March 2008

Dear Jeanette

Thank you for your 27 February invitation to make a submission to the *Climate Change and the Australian Agriculture Sector* inquiry. On behalf of the Future Farm Industries CRC (FFI CRC) I am pleased to take up this opportunity.

I apologise for the late submission and sincerely hope you are able to receive it.

As I explain further, our experience and observations through developing new farming systems options are particularly relevant to your second term of reference – the need for a national adaptation strategy.

FFI CRC is developing perennial plant technologies and farming systems for southern, temperate Australia with the goals of being more profitable, sustainable (natural resource management benefits) and adaptable (to climatic variability). We are building on the work of our predecessor, the CRC for Plant-based Management of Dryland Salinity, who identified many perennial plant species and cultivars for incorporation into innovative grazing and cropping systems and new woody crop-based regional industries.

Importantly, these plant technologies and farming systems have proved to be very resilient and more productive in the field under recent drought conditions while some could be mitigation options.

Please find attached two brochures; one outlining the capability of the CRC (2 pages) and the other describing the various options we may have for farmers to adapt to climatic variability and early onset of climate change.

Consideration of the need for a national strategy for agricultural industries to adapt to climate change should take into account what options are prospective for farmers in the near term as well as in the longer term. I would be pleased to brief the committee further on this relevant work if invited to your hearings.

On the basis of our economic and policy analysis, which are core components of the CRC's work, I make a number of comments about the current direction of climate change policy thinking.

Please find attached a recent address I gave to the Rural Press Club of Victoria which puts these arguments more fully.

From recent modelling by ABARE it looks like the negative impact of climate change on agriculture will be about 9% by 2030. This is a significant reduction but requires immediate qualification. The prediction is based on more conservative climate change projections and doesn't account for carbon fertilisation. Most importantly it doesn't consider adaptation which in the case of wheat could halve the projected impact.

So, adaptation is very important.



I quote here a recent statement I made regarding the lack of attention to adaptation in the development of public policy:

"The Federal Government has recently signalled that farmers should not expect taxpayer-funded drought relief unless their farming practices are adapted to the changing climate. Despite this challenge to farmers, climate change modelling and impact assessments continue to consume most of the financial resources, with only lip service being paid to adaptation.

Recognition of adaptation is further being clouded by 'hype' in the farming community that suggests farmers will be able to sequester carbon in plants and soils and sell it through the proposed emissions trading scheme. This is a distraction. These schemes are for larger players who can validate to a fussy buyer or regulator the amount of carbon sequestered, underwrite its security for 70-100 years, and manage the risk of depletion events such as fire and erosion.

An effective public policy that responds to the challenges of climate change will contain a balanced program of measures and actions for mitigation of greenhouse gases and adaptation to changes already under way, such as more variable rainfall. It needs to contain a combination of global policy instruments (the proposed national emissions trading scheme) and measures that can be adopted by individuals, families, businesses and governments such as perennial plant-based farming systems.

The longevity of greenhouse gases in the atmosphere and their impact on climate means that climate change will continue to occur even after mitigation actions have taken effect. This is why adaptation is so important. It is also why we should urgently develop options that help farmers cope with unseasonal rainfall, periodic drought and the early onset of climate change."

On the other hand ABARE's recent report on *Climate Change Impacts on Australian Agriculture* (Australian Commodities, December Quarter, 2007) concluded with several policy implications that align with, and can be supported by, the work of FFI CRC:

1. "Measures to mitigate greenhouse gas emissions ... will be a key to lessening the projected adverse impacts of climate change"
2. "Adaptation measures provide opportunities to manage risks and adjust economic activity to reduce vulnerability and improve business certainty."
3. "There is a continuing need to improve productivity to cope with potential pressures emerging from climate change ... policy responses."
4. "Further research is required on both adaptation and mitigation technologies."

To this I would add that adaptation will require more than simple technological solutions. A future strategy should be thinking about the transformational farming systems that not only cope with economic impacts but are capable of protecting or conserving natural resources including plant diversity.

Finally, timeliness will be very important for successful implementation of a national adaptation strategy. Buoyant commodity prices and a breakdown of El Niño indicate an immediate prospect for farm adjustment and new enterprise managers. This last occurred in the 1980s.



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On the other hand there are indicators of tensions and potential delays with making some government initiatives operational; in particular, the National Climate Change Research Facility and the Climate Change Research Strategy for Primary Industries.

Again, I will be pleased to discuss these views more fully if invited to your hearings.

Yours sincerely

Kevin Goss
Chief Executive Officer



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Key contact:

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New Woody Crop Industries (regional) - FloraSearch

New woody crop industries include new plant resources (e.g. native perennials) for evolving and existing regional industries including timber, charcoal, biomass energy and carbon sequestration.

Research focus:

- > Breeding to improve key species;
- > Prospectus for a prototype commercial harvester;
- > Commercial feasibility investigation; and
- > Combine water-harvest technologies (design and demonstration) with growth models to predict yields and optimise returns.

Outcomes:

- > Increased water efficiency;
- > Economic diversification; and
- > Biological diversification.

Key contact:

Mike Bennell, email: bennell.mike@saugov.sa.gov.au

Biodiversity and Water (catchment)

The Biodiversity and Water program focuses on quantifying ecosystem services for conservation of biodiversity, minimising trade-offs to water resources, and evaluating perennial plant adaptability to subsoil constraints and climate variability.

Research focus:

- > Provide new and enhanced habitat while increasing production values;
- > Conserve biodiversity by better managing water and salt (Biorisk);
- > Protect biodiversity by minimising the risk of genetic pollution of native species, and introduction of weedy species;
- > Maximise ecosystem services for the full range of community goals; and
- > Maintain water supply while protecting water quality.

Outcomes:

- > Farming systems evaluated for their catchment-scale impacts;
- > Biodiversity and water benefits built into other FFI CRC programs;
- > Tools that identify best solutions in risky environments and underpin market-based instruments;
- > Information and training to predict outcomes and make better decisions; and
- > Adoption of biodiversity and water resources conservation promotion.

Key contact:

Ken Wallace, email: ken.wallace@dec.wa.gov.au

Economic, Social and Policy Analysis

This program includes informing the development of new industries, farming systems and technologies, the design of more effective adoption and commercialisation strategies, and the development of better tools for improved decision-making.

Research focus:

- > Evaluate existing technologies;
- > Evaluate prospective technologies;
- > Research directions (internal priorities);
- > Research targets; and
- > Prioritise data gaps and sensitivity analysis.

Outcomes:

- > Aim to integrate science and economics;
- > Evaluate CRC technologies;
- > Advise on adoption of CRC outputs; and
- > Improve policy design.

Key contact:

Bill Malcolm, email: b.malcolm@unimelb.edu.au



Education and Training - EverTrain

Education and training of industry representatives is integral to the innovation, technology development and systems integration which will enable farmers to evaluate and adopt climate-adapted farming systems.

Program focus:

- > Postgraduate education;
- > Innovation in education; and
- > Capacity building.

Outcomes:

- > Targets will be met for individual technologies and farming systems from 2009;
- > A national Salinity Knowledge Exchange established; and
- > 75% of trainees will be accredited to the Certificate III level.

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Further Information

For a more comprehensive overview of FFI CRC and its activities, please visit: www.futurefarmcrc.com.au



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Latest research suggests farmers will take the brunt of climate change if predicted rainfall reductions eventuate. CSIRO expects rainfall to decrease by around 10% in southern Australia. Drought months will increase across the country - by as much as 80% in the south west.

Besides erratic and reduced rainfall, increasing temperatures, and disease and pest outbreaks are expected to make farming more difficult.

The recent 'millennial drought' provided an opportunity to look at Australian farming practices and consider how they can adapt to a drying climate. Strategies and insights gained to tackle the recent drought are highly relevant to the climate change challenge.

Our Vision

Future Farm Industries Cooperative Research Centre knows agriculture must be innovative and will lead dryland primary production to adopt new systems and technologies that ensure Australian farmers:

- > Are well prepared for the impacts of climate change.
- > Are more efficient with sustainable use of natural resources and reduced environmental impact.
- > Continue to be profitable through constant innovation and adjustment in changing circumstances.
- > Can counter potential losses in farm output due to climate change with adaptation and continued productivity improvement.
- > Can contribute to the mitigation of greenhouse gases and participate in carbon emissions trading.
- > Can improve agriculture's competitive advantage globally through innovation.

FFI CRC has a vision that from 2010 farmers across southern Australia will have climate-adapted and sustainable production and grazing systems options to choose from. FFI CRC will lead an accelerated R&D effort to provide solutions with an emphasis on:

- > Innovative systems and new crop industries better adapted to Australian conditions;
- > New plant technologies and farming programs that efficiently use rainfall;
- > Assessment of perennial plant-based farming systems for their water, carbon and energy balances and their potential for contributing to mitigation of climate change; and
- > Expert leadership and service through a national training program that will build capacity to adopt new farming practices and adapt to a climate-impacted future.

FFI CRC believes Australian agriculture's adaptability to climate change must be a critical consideration in the development of policies that reduce greenhouse gas emissions and encourage emission trading.

Through implementation of its research and development program, and by taking advantage of emerging opportunities, FFI CRC will lead the way for Australian farmers adapting to climate change.

Real Choices

FFI CRC's programs will ensure Australian farmers have real – and timely – choices in a changing climate. These choices will be practical and sustainable but will require additional R&D investment at a time when farmers suffering drought have the least capacity to respond. During the next decade, FFI CRC will lead this accelerated solutions-based R&D for Australian dryland agriculture.

Integrating new technologies into old systems and developing new and innovative farming systems is critical to the approach that FFI CRC will use to find the solutions needed.

Its technologies and paths to adoption sit within cropping, grazing and alternative forestry systems under a 'mixed farming' model that has proved robust for decades. It has research, education and



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Real Choices cont...

commercialisation partners in the agriculture and natural resource management sectors. It has the economic and social skills to interpret and apply farming systems and technologies under development into farm business advice, regional catchment and landscape advice and policy options.

Its vision of creating innovative farming systems and new woody crop industries built on perennial plants better adapted to Australian conditions has been backed by the Australian Government and 16 R&D organisations for seven years.

Profitable Perennials

FFI CRC will transform agricultural systems across southern Australia by developing Profitable Perennials™, and applying perennial plant technologies to innovative farming systems that will:

- > Increase the productivity of existing livestock and grain industries;
- > Develop new regional industries through investment in woody crop production on farm;
- > Reduce the risk of natural resource degradation, including dryland salinity, and improve conservation of biodiversity and water resources; and
- > Adapt to drought and climate change.

This transformation will be built on new technologies, identified in partnership with industry, and on the capacity of FFI CRC to develop farming systems that incorporate these technologies into Australia's various agricultural landscapes.

Already FFI CRC has grazing technologies and systems under development with the capability to improve farm profit by 50%, making far more efficient use of rain in the medium rainfall zone.

EverGraze

EverGraze is a high performance prime lamb production system based on a combination of perennial pasture plants, which has been superior to benchmarked district best practice in the last three drought affected years. Its greater

water use will also provide a salinity benefit. EverGraze will be ready for adoption in 2009 with a plan to reach 2400 farms by 2014.

Continuous improvement of productivity and resilience will result from incorporating additional perennial plant technologies currently under development.

These include:

- > Integration of lucerne and temperate perennial grasses;
- > Introduction of new and better adapted cultivars of sub-tropical perennial grasses, chicory, birdsfoot trefoil, sulla, red clover and strawberry clover; and
- > Effective use of the already adapted native perennial grasses.

Saltland Production

Revegetation and grazing of salt-affected land is only marginally profitable with perennial plant technologies now available. FFI CRC aims to improve the profitability and reliability of saltland production, and its adaptability to a changing climate and declining soil moisture through a combination of soil engineering and plant technologies.

In three years time FFI CRC will have delivered new plant technologies, decision support tools and improved, adapted livestock and cropland management packages for salt-affected land to farmers.

New perennial plant technologies for this purpose include:

- > Next generation salt tolerant pastures – Melilotus, Lotus tenuis, Panicum maximum
- > 'High nutrition' saltbush; and
- > Salt tolerant wheat

Commercial release of cultivars will begin in 2010 and salt tolerant wheat from 2013.

FFI CRC is taking a fresh approach to ensuring grazing and cropping systems adapt to drier, hotter conditions. Work is beginning with experimental plots of perennial plant species and cultivars across western, southern and eastern Australia that could transform cropping and grazing systems.



Enrich

This project is screening Australian native and introduced plants for their production and persistence, as well as matching to nutritional requirements and identification of beneficial compounds that could reduce internal parasites and methane production. Potentially they will be the basis of new grazing enterprises in areas where cropping is no longer profitable due to the drying climate. Farmer and regional Natural Resource Management groups are enthusiastically joining in this research effort. Practice change on 500 farms is possible by 2014.

New, adapted shrubs include Rhagodia, saltbush, and acacia.



EverCrop

Cereal cropping is still the mainstay of profitable wheatbelt production. 'No till' systems and controlled traffic technologies continue to improve water use effectiveness. However, under a drying climate, particularly on more marginal soils, perennial plants in the non-crop phase offer distinct benefits through water management in the landscape, lower cost organic nitrogen delivery, and weed and disease control. EverCrop will be piloted on 100 farms in 2014.

New, drought tolerant perennial plant technologies include:

- > Temperate perennial grasses (south-east); and
- > New low rainfall legumes – Bituminaria, Cullen, Lotonis and wild lucernes.

FFI CRC also plans to add a new dimension to its R&D effort – the assessment of all perennial plant-based farming systems for their water, carbon and energy balances. These new metrics will inform the contribution of these systems to mitigation of climate change.

FloraSearch

This project has first identified new woody crops with potential to supply new industries – biomass energy and biofuels, carbon sequestration and credits, woodchips for panel board and forage for livestock production. These developing climate-friendly crops will be integrated into landscapes dominated by cropping and grazing.

New, adapted woody perennial plant technologies include:

- > oil mallees, acacia species and various fodder shrubs. (see Enrich)

EverTrain

Key to the outcomes of FFI CRC's R&D is building the capacity amongst farmers to adopt new systems and technologies and to adapt to a climate-impacted future. FFI CRC will prepare a new generation of expertise to lead and service agriculture through a national training program for farm leaders and service professionals and post-graduate education.

Education and training of industry representatives is integral to the innovation, technology development and systems integration which will enable farmers to evaluate and adopt climate adapted farming systems.

Key influencers in this process are leading farmers, private sector service professionals (including Landmark agronomists), public sector extension officers (including partner agency officers), and community organisation staff in farm production and natural resource management. EverTrain will be a national approach to delivery and



EverTrain cont..

accreditation of all such training, including assessment of demand, training material development, delivery, and on-going monitoring and evaluation. This ambitious program is built on a pilot scheme that provided 1,500 people with training in salinity management and perennial plant strategies.

Under EverTrain:

- > Targets will be met for individual technologies and farming systems from 2009;
- > A national Salinity Knowledge Exchange will be established; and
- > 75% of trainees will be accredited to the Certificate III level.

Collaborators

FFI CRC is a collaboration of the major R&D organisations of southern Australia, the agricultural industries major R&D investors and a large agribusiness company. These participants have endorsed the vision for developing “real choices in a changing climate”. The CRC is ready to lead this work now.

Collaborators include: Meat & Livestock Australia, Grains R&D Corporation, Australian Wool Innovation, Landmark, CSIRO, The University of WA, The University of Adelaide, The University of Melbourne, Charles Sturt University, Department of Agriculture & Food WA, Department of Environment & Conservation WA, SA Research & Development Institute, Department of Water Land & Biodiversity SA, Department of Primary Industries Vic, Department of Primary Industries NSW, Department of Environment & Climate Change NSW.

Delivering Solutions

There are already large and important initiatives for climate prediction and impact assessment, for mitigation of greenhouse gases and development of emissions trading under way. Key policy advisors repeatedly emphasise that adaptation and mitigation must combine to ensure Australia’s response to climate change is effective.

To ensure Australian farmers are given real choices in a changing climate, FFI CRC will bring in additional investment and new partners to accelerate R&D to make farming systems adaptable to climate change. This increased investment will mean more research can be undertaken at a faster rate, ensuring earlier on-farm uptake.

Much of this R&D has already begun with some systems ready for adoption from 2010 on. The additional investment in FFI CRC will mean farmers are able to be part of the solution and ensure the Australian agricultural industry takes a robust and realistic approach to tackling the climate change challenge.

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Further Information

For a more comprehensive overview of FFI CRC and it’s activities, please visit: www.futurefarmcrc.com.au



FUTURE FARM
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Address to RPCV

28 February 2008



FUTURE FARM
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PROFITABLE PERENNIALS™ FOR AUSTRALIAN LANDSCAPES

Delivered by Kevin Goss, Chief Executive Officer, Future Farm Industries Cooperative Research Centre

Introduction

Thank you all for coming here today.

I would like to begin by saying that I accept as irrefutable the scientific evidence that Australia will experience a drying climate and our agriculture will bear the brunt of less rainfall.

However, Australian agriculture isn't a faultless victim of global warming.

On the contrary, it plays a significant part in the problem. Sixteen per cent of global warming emissions attributable to human activity are caused by agriculture.

Having contributed to and expecting to be adversely impacted by global warming, Australian agriculture will inevitably be drawn into a policy debate on how to reduce its environmental footprint.

If agriculture responds inappropriately, there will be an impact on the National economy. The recent prolonged drought alone reduced the Gross Domestic Product by 0.5 to 1.0% and this was felt in the economy.

Therefore, the challenge for the whole country, not just farmers, is to work together and create new forms of water-efficient agriculture that reduce greenhouse gas emissions; for dryland farming as well as irrigated agriculture.

I'm not here to paint a gloomy picture of the future, but instead to convince you that we can tackle the challenge of climate change and that farmers can have options to adapt to climatic variability sooner than you may realise.

In other words we can provide farmers with the real choices they need in a changing climate.

Already, there are farming systems and new plant technologies under research and development today that are better adapted to drought and erratic rainfall. In essence, the first step in creating Australian farming systems ready for a drier climate has already been made.

Their performance under the drought and unusual seasonal conditions suffered in recent years has given us pointers for more productive, environmentally friendly and better adapted farming systems for tomorrow.

We can continue this work now because no matter what the big policy decisions are, these changes still have to be made, and the sooner the better. We don't even have to resolve the

argument whether climate change is due to human activities; farmers face climatic variability today.

Perspective

Most of you here have witnessed Australian governments and the agricultural community engage in discussions about climate change policy in recent months. At the forefront is Professor Ross Garnaut's recently released interim report on climate change – a report that focused on the need of greenhouse gas emission targets and the establishment of a national emissions trading scheme. Its emphasis was largely on the mitigation of greenhouse gases – a very important part of but not the whole climate change response.

Governments need to be reminded that adaptation measures to climate change are also an important consideration. Professor Garnaut acknowledged this but didn't discuss adaptation, saying it will be a prominent feature in his final reports. Importantly, he made the point that climate change will continue to occur even after mitigation schemes have come into effect.

Agricultural production will be particularly vulnerable to these lagged responses.

With that in mind, I will now summarise some of the evidence about the potential impact that climate change will have on Australian agriculture and the potential offsets from adaptation.

Using accepted climate change scenarios and its own global trade and environmental model, ABARE in its December 2007 commodity report predicted a 9% reduction in wheat and meat production by 2030, and a 13-19% decrease by 2050. The reference point for these reductions was continued productivity growth at historic levels. Also of concern, the predicted negative impact on exports was even greater and it varied significantly with commodity.

I conclude from this work several key points:

- The likely negative impact of climate change on agriculture under the 'do nothing' scenario is very significant but not disastrous.
- This may be a worst case scenario because the prediction does not take into account the possibility of increased plant growth from carbon fertilisation.
- Adaptation is not taken into account either.

ABARE quoted an earlier study that estimated the likely benefit from on-farm technological adaptation measures in the wheat industry. It calculated that the predicted negative yield impact in 2030 could be reduced from 9% to 5% through adaptation – a significant reduction.

What is adaptation and what are these adaptation measures we talk about? They can be simple technologies such as better plant cultivars or complex farming systems such as 'no till' crop establishment. And better cultivars and 'no till' cropping in particular have revolutionised crop water use efficiency resulting in greater and more reliable yields, especially in average to below average rainfall years.

However, an outstanding feature of Australia farming is what we call 'mixed farming'; the combination of cropping and livestock production in one farm business. It has proved to be resilient over many decades and particularly adaptable in recent years.

A 2007 report from the National Grain & Graze Program, a joint venture by GRDC, AWI, MLA and L&WA has revealed that the productivity of the livestock enterprise is what distinguished the high profit farms from the low profit ones, not cropping. This at first seems

counter intuitive given the recent dominant trend of farmers increasing their cropped area. The results can be explained by the recent difficult seasons when the data was collected. The key point is that over time and variable seasons, the mixed farm is the best bet, with crop carrying the farm business in some years and livestock in others.

My take on this analysis is that adaptation of dryland agriculture to climate change is an important and realistic objective.

Vision

My vision is that Australia takes the opportunity to accelerate research and development into farming systems capable of maintaining agriculture's productivity growth, reducing its environmental footprint, and adapting to climatic variability. We can make these gains in the short term while preparing it for climate change in the longer term.

The 'millennial drought', the worst since the Federation Drought around 1900, and recent unseasonal rain has had an upside. It has given perennial plants a chance to prove themselves to be superior performers in grazing systems field trials.

The timing is right, and if we continue to find new ways to adapt, I predict that in a few years we will see generational change in the make-up of Australian farmers - a change that will build the long-term capacity to cope with climate change.

Concerns

However, I am concerned that climate change thinking is "off the mark" Put bluntly, we are in danger of passing up an opportunity to make significant and immediate headway against climate change because of distractions with the wider policy discussion.

I have several reasons for this concern:

Firstly, climate change policy development is paying 'lip service' to adaptation.

For the time being it is focussed on setting greenhouse gas emissions targets and trading schemes.

More disconcerting is the skewed government investment in climate change programs. Climate change modelling and impact assessments consume most of the resources. The big ticket items for adaptation research include work on plant growth function under elevated atmospheric carbon dioxide.

I am alarmed at the little consideration for adapting farming systems to the climatic variability that is already upon us. Mitigation, climate prediction and impact analysis are important for the longer term, but where will the practical options come from for farmers who need solutions in the shorter term? I will speak to this shortly.

Secondly, there is 'hype' in the farm community that farmers will be able to sequester carbon in plants and soils and sell it through emissions trading. This is a distraction. Experience with the NSW Greenhouse Gas Abatement Scheme has already shown that individual farmers and incremental improvements in soil carbon will not be in the market.

These schemes are for larger players who can validate to a fussy buyer or regulator the amount of carbon sequestered, underwrite its security for 70-100 years, and manage the risk of depletion events such as fire and erosion.

Enthusiasm for profiting from 'carbon farming' should not cloud the overall challenges for agriculture – reducing greenhouse gas emissions and adapting farming systems to be sustainable through the changing climate.

Thirdly, gaining drought tolerance through the technical fix of genetic modification is attractive but only one of the plant improvement tools available. In selecting among the mix of plant technologies, speed, cost and reliability of getting a result will be the key to right choice.

Drought tolerance GM is a far cry from introducing single genes into cotton for Heliothis control or into Round-up ready canola. There are an unknown number of genes involved in drought tolerance, which dramatically increases the complexity of the task and raises the chances of adverse outcomes. This will require more time and money.

There is no 'silver bullet' for drought tolerance. The work on drought adapted farming systems that I describe today is a quicker, cheaper and more reliable path which can also provide genetic understanding for the biotechnology approach.

The Way Forward

Today I am here to personally promote a way forward for farmers to adapt to climate change by developing practical options through accelerating research and development and taking advantage of a once in a generation opportunity.

On what basis can I make this claim? My argument is that:

- There are promising plant technologies and farming systems in trials now.
- There are imminent economic and social changes that make this the right time for their adoption on farm.
- I lead the Future Farm Industries Cooperative Research Centre (FFI CRC), the perfectly placed National joint venture to take up the challenge.

One of our success stories is EverGraze™, a new grazing system that pushes the limits of productivity and water use in high-rainfall zones. You will hear a lot more about EverGraze™.

Picture a 70 ha research site – there are three of them across Australia, including at Hamilton in Western Victoria. On it is a unique combination of perennial pasture plants grazed intensively by highly fertile sheep nurturing additional lambs in specially formed nurseries. The pasture species and sheep breeds at the outset may be familiar to you, but their combination under high performance management is radically different. And so are the results.

At Hamilton, the meat turn-off per hectare was 50% superior to the top 20% of producers in the South West Farm Monitor project. The site has just completed three tough seasons with the 2006 rainfall 30% below the 40 year average. Beef steers on other plots have also shown this superior performance.

What is causing this productivity boost? The combination of perennial plant species fully exploits year round rainfall, no matter how variable, to match animal feeding requirements. To top it off, strategic mowing of the taller perennial grasses provides shelter for lambing ewes and young lambs, providing them with a more benign environment for growth and survival.

An equally important objective for EverGraze™ is greater water use and enhanced environmental benefits. In 2007, there was no recharge to ground water at the Hamilton site, effectively removing any salinity risk. There was ground cover year round, preventing erosion. It has been so successful, we are now expanding EverGraze™ onto low-input native perennial grass sites, adopting the same principles and adding a biodiversity objective.

EverGraze™ is iconic for future farming systems that are more productive, more environmentally friendly, and adaptive to climate change. It has very strong industry backing, with major investment from MLA and AWI. Complementary to and based largely on the successful EverGraze™ model, are other future farming systems planned for the medium and low rainfall zones – some are even more radical.

Enrich™ is a project that is selecting and developing deep-rooted perennial forage plants for grazing in harsher environments marginal to cropping. Some of these plants, including Australian native plants, are new to agriculture and well adapted to climatic constraints. Their success will come from biochemical research into matching animal nutritional requirements with beneficial compounds that can reduce methane output and control intestinal worms. Enrich™ can be a cleaner, greener livestock enterprise for farming districts facing the largest climate change impacts.

The lower rainfall mixed farming zones offer particular challenges in seeking new plant technologies, but new opportunities are emerging.

For example, a plant that has captured the attention and imagination of our plant breeders by showing great promise in plots in WA is *Bituminaria bituminosa*, a perennial pasture legume from the harsh climate of the Canary Islands. It has stayed green all summer and thrived in unseasonal summer rain. Another promising perennial pasture legume is *Cullen*, a straggly Australian native plant that has good nutritional value and persistence.

I have said that the timing is right for bringing on these farming systems and plants under an accelerated program of research in partnership with farmers, training of farmers' advisers and adoption activities. Under FFI CRC's current plan, EverGraze™ will be adopted on 500 farms in 2009 and on 2,400 farms by 2014. Its companion farming system, EverCrop™, and the Enrich™ options will be ready for farmer adoption from 2014. Also in our plans are short cycle woody crops in wide spaced formats with cropping and pasture, and profitable crop and livestock production from salt affected land.

Why the urgency? Why seek to accelerate this plan even further? Technological and social change in farming is cyclical, in that it follows economic peaks and troughs. And it's not what you may think. Most farms change hands in good economic times, not during drought. It's at this time that farms amalgamate and new talent enters farming, providing the means for investment in new technologies and practices. As I look forward, commodity prices are particularly strong and there's a better than even chance of an average winter season. Farmers will be inclined to crop heavily in 2008, to return significant profits within one year. They will be ready to invest in the next cycle of technological changes, and as I have demonstrated the mixed farm with new perennial plant-based systems will be the best long term bet.

With accelerated research and development, and effective farmer collaboration in trials and demonstrations, we can take advantage of a once in a generation opportunity.

What are the credentials of the Future Farm Industries CRC to do this? FFI is a unique public-private joint venture of R&D organisations, industry and regional organisations covering Victoria, New South Wales, South Australia and Western Australia. Think of who

should be involved in such a venture and we have them collaborating – departments of primary industries, CSIRO, universities, and conservation agencies. Landmark, one of Australia's biggest agribusiness firms is a core commercial partner. We have the financial backing of the major R&D corporations and the Australian Government, and several catchment management authorities are involved in our projects.

FFI CRC is not just a research venture. We will train farmers and those servicing, advising and influencing their business decisions such as Landmark agronomists, government extension officers, farm management consultants, natural resource management coordinators, and leading farmers under a National EverTrain™ program.

FFI CRC is setting out to develop climate adapted farming systems and plant technologies under the Profitable Perennials™ brand. Our target with current resources is adoption on 7.5 million hectares by 2020. However, the total area farmed in the relevant rainfall zones is 60 million hectares, so there is plenty of scope for acceleration and expansion.

Conclusion

In summing up I would like to say that Australian agriculture is on the verge of a new opportunity for accelerated research and development to adapt farming systems to climate change. Such a concerted R&D program will build and enhance the capacity of Australia's agribusiness and natural resource management sectors and sow the seeds of generational change.

The timing has never been better. Agriculture's improved economic outlook, and structural adjustment and recovery from the 'millennial drought' will drive additional investment in these new farming systems.

The Future Farm Industries CRC is a national joint venture with the right partners and proven track record and know-how to lead the way and make these changes.

It is imperative that we act now and invest in innovation, research and development and national collaboration on adaptive farming systems for mixed cropping and grazing that will give farmers options quicker, cheaper and more effectively.

Farmers will have real choices for a changing climate.

Thank you for listening.

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Future Farm Industries Cooperative Research Centre aims to transform Australian agriculture and rural landscapes by developing and applying Profitable Perennials™ technologies to innovative farming systems and new regional industries.
