

"Achieving Outcomes by Building Capability"

The
**AgriBusiness
Group™**

Adjusting to Climate Change

**Results of a Workshop for the New Zealand
Pastoral Farming Industry held in
Wellington, March 2008**

**Prepared for: MAF Policy
Prepared by: The AgriBusiness Group
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Also acknowledged is the vital co-operation of MAF Policy staff in Christchurch and Wellington in managing the liaison with participants and the workshop operations.

Notwithstanding the acknowledgements above, the contents of this report are the responsibility of the three consultants.

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March 2008***

Please Read

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Executive Summary

Background and Methodology

The New Zealand Government has committed to a plan of action on Sustainable Land Management and Climate Change. As part of that commitment the Government has announced that a Technology Transfer program will be developed to provide and support land managers with sufficient information and choice of technologies to enable and encourage them to:

- Adapt to a changing climate
- Reduce total greenhouse gas emissions and improve the efficiency of resource use
- Take advantage of new business opportunities relating to climate change.

As part of the design process MAF contracted The AgriBusiness Group to design, facilitate and report on a pastoral farming industry two-day workshop for up to 60 representatives of the industry. The workshop run by MAF, in partnership with the Pastoral Greenhouse Gas Research Consortium (PGGRC), was held on 4 and 5 March in Wellington.

The workshop had three aims:

- **To ensure that all participants have common knowledge of the issues and policy framework.**
- **To identify the key elements of a successful technology transfer program aimed at achieving adaptation to climate change and mitigation of greenhouse gas emissions.**
- **To secure a high level of commitment from farmers and industry leaders for the need to adjust farming practices to climate change and the reduction of greenhouse gas emissions.**

To achieve these objectives the workshop was designed to be run in two distinct phases. Firstly, to impart information to the participants, and to gauge their individual reactions to that information. Secondly, to present set questions to small groups of participants, with all the questions related to the design and delivery of a technology transfer program.

No formal feedback was recorded in terms of the overall success of the workshop in achieving its aims. Informal feedback collected in the week following the workshop indicated that the participants viewed the workshop as having been a success – as assessed by:

- the quality and amount of new knowledge they gained
- the calibre of attendees
- the level of participation and depth of discussion that took place

Workshop Outcomes

Workshop participants saw the issue of climate change as very important, and in principle supported the need to adjust to climate change and reduce greenhouse gas emissions, however, in the absence of information, they found it difficult to make a strong commitment. This was particularly true in relation to greenhouse gas mitigation technologies and uncertainties over the policies that will surround the introduction of the Emissions Trading Scheme (ETS).

On Day 2 groups identified many significant changes that have occurred to farming systems in the past and the causal drivers. They also identified numerous changes that farmers have to adapt to right now.

The workshop produced a comprehensive list of the key drivers for change, suggested activities, and possible delivery mechanisms – all being important elements in the design of a technology transfer program.

Key Drivers for Change

- Show me the money! - financial benefit, greater profit, survival, capital gain, efficiency or reduced costs
- Attractive/beneficial new technology
- Forced change - International / national / regional regulations and requirements, industry codes and requirements
- Change in belief system/lifestyle e.g. the new practise being more sustainable, and environmentally friendly
- Market requirements or opportunities
- Sustainability
- Public pressure eg. dirty dairy

Key Messages

The key messages that the participants have given to those responsible for the technology transfer program can be grouped under the following headings.

- 1. Economic impacts are the major driver for change**
- 2. Farmers are already adjusting to climate change, and feel competent to do so**
- 3. There are inadequate tools available to farmers to help them assess the current state of their farms**
- 4. Farmers are struggling to deal with a number of issues and the perceived negative impact of the ETS is not something that they will want to hear**
- 5. The farm business should be seen in an holistic way**
- 6. Farmers need a toolbox of different practices and decision support tools to enable them to manage the changes on their farm**
- 7. The need for linkage and integration with existing programs**
- 8. Concerns on the competitiveness of NZ pastoral farming and the impact on the viability of the industry**

Recommendations for Next Steps

The results of this workshop are the key input into the development of a framework for a technology transfer program.

The framework will set out a pathway to be followed, and will allow all the activities proposed during the workshop to be set out, relative to impacts and priority. As the participants identified during the workshop there is still a lot of the detail to come, hence the term “framework” rather than a comprehensive plan. As detail is learnt or decided in the future, it can be added onto the framework. The framework structure will also highlight what is not known, and where the priorities should be for investing in future knowledge generation.

The investment that all parties have made in this workshop will be best realised when there is a framework in place, and when the implementation of that framework is strongly supported by land managers and their associated industries and agencies. The following suggested next steps are intended to ensure that the focus remains on building and implementing that framework.

- 1. Develop and Complete the Framework.**
- 2. Continue to utilise the knowledge and positive approach of the Workshop Participants**
- 3. Undertake an evaluation of existing technology transfer activities**
- 4. Use of the workshop results to design a wider farmer survey**

MAF has the opportunity to take a holistic approach in its communications to land managers, focussing on the whole business. It would also reflect the approach that MAF policy analysts will be taking when they are analysing the total impacts of all the government’s policies on climate change on New Zealand’s land-based businesses.

The following report:

- Sets out the background and workshop methodology,
- Summarises the workshop outcomes and key messages
- Recommends next steps and
- Reports a record of the detailed contributions of the participants

The day one presentations can be viewed and downloaded from www.maf.govt.nz/

1. Background

The New Zealand Government has committed to a plan of action on Sustainable Land Management and Climate Change. As part of that commitment the Government has announced that a Technology Transfer program will be developed to provide and support land managers with sufficient information and choice of technologies to enable and encourage them to:

- Adapt to a changing climate
- Reduce total greenhouse gas emissions and improve the efficiency of resource use
- Take advantage of new business opportunities relating to climate change.

The purpose is driven by the need to “achieve behaviour change to achieve adaptation and mitigation”.

It is proposed that a Technology Transfer Framework covering a 5 to 10 year program is to be designed and approved by Government by 30th June 2008. As part of the design process MAF proposed to run an industry workshop in March 2008.

In January 2008 MAF contracted The AgriBusiness Group to design, facilitate and report on a pastoral farming industry two-day workshop for up to 60 representatives of the industry. The workshop run by MAF, in partnership with the Pastoral Greenhouse Gas Research Consortium (PGGRC), was held on 4 and 5 March in Wellington.

The workshop was to be an initial step in achieving the aim of producing a framework for a technology transfer program that would be supported by the farming industry. Therefore industry participation in the workshop was crucial to identify the critical issues to be targeted over the next 10 years.

This document reports the process and results of that workshop consultation. Where workshop participants are quoted verbatim, their comments appear in italics.

Section 2 reports the Workshop Methodology

Section 3 reports the Workshop Outcomes

Section 4 reports Key Messages

Section 5 reports Recommendation for Next Steps

Section 6 reports the contributions recorded from the Workshop sections.

The day one presentations can be viewed and downloaded from www.maf.govt.nz/

2. Workshop Methodology

The workshop had three aims:

1. To ensure that all participants have common knowledge of the issues and policy framework
2. To identify the key elements of a successful technology transfer program aimed at achieving adaptation to climate change and mitigation of greenhouse gas emissions
3. To secure a high level of commitment from farmers and industry leaders for the need to adjust farming practices to climate change and the reduction of greenhouse gas emissions.

The invitation and participant list was constructed to achieve a cross section of land managers, science providers, educators, technology transfer agents, processor / marketers, industry representatives across the pastoral sectors.

To achieve the objectives the workshop was designed to be run in two distinct phases. Firstly, to impart information to the participants, and to gauge their individual reactions to that information. That reaction was collected and is recorded in Appendix 5. Secondly, to present set questions to small groups of participants, with all the questions related to the design and delivery of a technology transfer program.

These two phases were generally split between Day 1, predominantly information presentation and discussion and Day 2 predominantly group workshop sessions tailored by the outcomes of Day 1 as shown in the workshop programme (Appendix 1)

The Day 1 information transfer was divided into three sections:

- **Context** - International and national commitments of pastoral farming industries and pastoral sector policies
- **Impacts** - of climate change policies on the farm business and industry
- **Science** – Climate change and adaptation and green house gas emissions and mitigation

To collect the information generated throughout the two days, two separate methods were adopted.

During day 1, when the formal presentations were made, each attendee was provided with a feedback sheet (Appendix 3) to complete. At the conclusion of each section, eg context, participants were asked to record the main messages they took from the presentations and any reaction they had to the material presented. At the end of the day these sheets were collected and the information collated (Appendix 5). The summary from the sheets was presented at the start of day 2.

During the second day the workshop was split into six groups each of approximately 10 people. The group was supplied with a set of questions (Appendix 4) and the responses were collected and collated (Appendix 5).

3. Workshop Outcomes

This section of the report summarises the outcomes of the individual sessions, more detailed reporting of the contributions can be found in Appendix 5.

No formal feedback was recorded in terms of the overall success of the workshop in achieving its aims. Informal feedback collected in the week following the workshop indicated that the participants viewed the workshop as having been a success – as assessed by:

- the quality and amount of new knowledge they gained
- the calibre of attendees
- the level of participation and depth of discussion that took place

3.1 Day 1 – Information Transfer

At the conclusion of Day One, participants were invited to hand in the questionnaire that they had been filling in progressively during the day. Of the approximately 60 participants, 43 handed in a completed workshop questionnaire..

Analysis of these responses provides a demographic of workshop participant representation as shown in (Appendix 2).

The responses on those questionnaires were collated into a summary that was reported back to the workshop to introduce Day 2. During the presentation, the participants were invited to add or expand on the statements presented. These contributions were recorded separately. Both the feedback and the whiteboard session followed the broad headings in the program –Context, On-farm and Industry Impacts and the Science.

The full results are recorded in Appendix 5.

Workshop participants saw the issue of climate change as very important, and in principle supported the need to adjust to climate change and reduce greenhouse gas emissions, however, in the absence of information, they found it difficult to make a strong commitment. This was particularly true in relation to greenhouse gas mitigation technologies and uncertainties over the policies that will surround the introduction of the Emissions Trading Scheme (ETS).

3.1.1 Changes in participants perceptions

In response to the question “How important do you think adaptation to climate change and mitigation of greenhouse gas emissions are to the future of NZ pastoral farming?”, on a scale of 1-10, where 10 = critically important, and 1 = not at all important, participants scored an average of 6.5 at the start of the workshop, and 8.5 at the end of the presentations.

The reasons for changing scores were recorded as:

- Having a better understanding of the topic and the issues
- Realising that change is inevitable, and adjustments will need to be made
- Seeing the issue in context of what is happening in other sectors and overseas

While the participants view of the importance increased significantly as a result of the presentations there were a number of comments suggesting that this response was driven

by concerns of the potential negative impacts of the impending changes. This was particularly in relation to emissions trading.

These comments included:

- There are still many things to be done – in science and in policy
- Science is years away, industry is not prepared, and competitors are not in the game
- Need clearer indication of likely costs
- This policy – ETS, is a threat to farm sustainability
- The lack of measuring ability makes management difficult
- There is the potential to have a major negative impact on the national economy
- The approach is not being creative in finding solutions

3.1.2 Key messages taken from formal presentations (Day 1)

CONTEXT

- Complexity at farm level
- Understanding of phase out timing and emissions trajectory, and flexible end date
- No mention of soil carbon
- Government leading change
- Market opportunities
- Know what is happening with neighbours
- No practical mitigation options

Context Whiteboard Session

- *Water must be seen as part of the sustainability basket*
- *Simple practical things can make useful contribution when looking at the whole issue*
- *Need to ensure that there is a compatible policy framework with our competitors*
- *Cost benefit balance needs to be kept to the forefront*
- *Climate and technology are part of business considerations*
- *Issue awareness at this point needs to be “carefully couched” to avoid distress*
- *While they are separate, need to tie adaptation and mitigation*
- *Remember two strands of climate change and greenhouse gas emissions are separate for planning technology transfer*
- *Need working models*
- *Need to engage the community and demonstrate*

On Farm IMPACTS

- High costs of emissions will have major impacts on business
- Will influence strategic and day-to-day decisions
- Measurement methods important
- Farming systems choices to be made
- Lack of tools to help farmers
- Pragmatic process of estimating costs and impacts needs to be developed.
- What are the costs of mitigation strategies?
- Adaptation policies vary and costs and benefits vary
- More work on opportunities needed.

Industry IMPACTS

- Economic drivers for change are high.
- Forest sequestration opportunities.

- Will markets pay more or is it an access issue.
- May force industry to source product offshore.
- The need for farmers and industry to engage in this.
- Sector profitability major concern.
- Market drivers doubtful – will we be competitive?
- Potential complexity in measuring and administering
- Industry has a role in research and aiding implementation.
- Extension of growing seasons.

On Farm and Industry Impacts Whiteboard Session

- *Uncertainty of the carbon price/value*
- *What/ who are Incentives and drivers for this?*
- *Is it being driven by entrepreneurs – a capital global investment?*
- *Need to focus on what we can do*
- *Level of engagement needs to be set so that the focus is on:*
practical responses now
coping with extreme events
- *Need balanced information to attract farmers and bring them along*
Start on adaptation = good news
Keep outside policy confusion away
- *Message (as related to ETS) is not conducive to technology transfer*
- *Difficult to be willing to engage if the options and outcomes are “too hard”?*
- *Present “best opportunities” with adaptation – Picking winners*
- *Establishing “value” of land*
Picking winners
Good record
- *Look for consumers that will pay – pass on costs*
- *Respond to market demand*
- *System needs incentives/disincentives to change to achieve objectives*
- *Need to look at timing*
Adaptation timescale
Need to have tools

SCIENCE – Climate Change Adaptation

- Good evidence as to climate change.
- Water management and efficiency important.
- Some positive aspects to change - need to be proactive.
- Ranges of technology changes and farm system design.
- Regional diversity.
- Infrastructure investments necessary.
- Looking for resilient farms.
- Need freedom to make land use changes and be willing to adapt.
- Climate change data is necessary part of change
- More publicity needed regarding adaptation system.

SCIENCE – GHG Emissions and Mitigation

- Current methods of mitigation are minimal and may not be suitable for profitable farming.
- Research has a big challenge.
- Mitigation time horizon may be long -no immediate fix.
- Need to have clear cost benefit models for mitigation options
- Ballpark figures of emissions per animal.

- Manipulate the diet with high energy feeds.
- Wider presentation of current state of knowledge needed.
- Diet manipulation should be considered more.
- Genetic options may be the best answers.
- Farmers should identify their own solutions.

3.2 Day 2 – Key elements for a successful technology transfer program.

On Day 2 the workshop split into six working groups and each group given three sets of questions under the themes of;

- Drivers for Change
- Priorities and Delivery Preferences
- Designing a Framework.

The questions posed are shown in Appendix 4.

Each group recorded their responses and following the small group sessions there was a report back and further discussion using the whole workshop which was recorded on the whiteboard. Full results are recorded in Appendix 5. The whiteboard summaries are as follows.

Drivers for Change

- | | |
|---------------------------------------|--|
| • <i>What is in it for me?</i> | • <i>Leading people where they want to go</i> |
| • <i>Profit – survival, intensive</i> | • <i>Adaptation short term (create appetite)</i> |
| • <i>Clear messages</i> | • <i>Walk before we run</i> |
| • <i>A pathway for action</i> | • <i>Recognition and carrots</i> |
| • <i>Regulation</i> | • <i>Money and other benefits</i> |
| • <i>Environmental concerns</i> | • <i>Continual plan for improvement</i> |
| • <i>Market Forces</i> | • <i>POO becoming PO reward</i> |
| • <i>Attractive technology</i> | • <i>Combine with existing initiatives</i> |
| • <i>Belief</i> | • <i>Practical and clear</i> |
| • <i>Market opportunity</i> | • <i>Demonstrated benefits</i> |
| • <i>Peer pressure</i> | • <i>Having tools and solutions</i> |
| • <i>Business growth</i> | • <i>Quietly delivered</i> |
| • <i>Ease of use of inputs</i> | • <i>Modify existing programs</i> |
| • <i>Lifestyle recognition</i> | • <i>Show me the money</i> |
| • <i>Providing leadership</i> | • <i>Peer systems</i> |
| • <i>Multiple benefits</i> | |

Priorities and Delivery Preferences

- *Provide decision support – fill in the blanks*
 - *The farm*
 - *Fiscal*
 - *Environment*
- *Work farm by farm*
- *Provide clear information*
- *Take holistic, whole farm approach*
- *Use existing networks,*
- *Initiate awareness, education, understanding, programs*
- *Carbon conservation*
- *Promote forestry*
- *Start with easy stuff*
- *Look at social effects of new policies and technologies*
- *Undertake Cost benefit work*
- *Develop a toolbox of a range of options*
- *Pick the “low hanging fruit”*
- *Set up farm awards*
- *Profile better farmers*
- *Community buy in and support*
- *Get ready for 2012 review*
- *Individualise changes*
- *NIU*
- *ERW*
- *Water use*
- *Include Energy Saving measures*
- *Prioritise adaptation*
- *Sort out ETS before going out with messages*
- *Exploit Genetics*

Designing a Framework – Key Outputs

- *Decision support tools*
- *Awareness*
- *Education and, up-skilling*
- *Linkages with existing programmes*
- *Economic futures analysis (case studies)*
- *Community communication – feedback to wider community and NGO’s*
- *Communication and co-ordination with policy (local and central govt.)*

Designing a Framework – Measures of Success

- *Each farmer knows their Carbon footprint (2013 at 1990 levels) – available on a national database*
- *Generation Y take responsibility – more in Ag*
- *Measurable drop in GHG*
- *Technology available*
- *Less conflict*
- *World leadership in GHG emissions reduction*
- *Greens acknowledge Ag performance publicly*
- *Market acceptance plus premium*
- *Still farming – “Gas safe” certified*
- *Planting forests*
- *Global progress (benchmark)*
- *Progress relative to requests*
- *Retention and enhancing market access*
- *“New science” uptake*
- *Informed decisions*
- *Efficiency*
- *Meeting obligations at least \$ cost*
- *Measurements*
 1. *Water storage*
 2. *Inhibitor use*

Groups identified many significant changes that have occurred to farming systems in the past and the causal drivers. They also identified numerous changes that farmers have to adapt to right now.

The workshop produced a comprehensive list of the key drivers for change, suggested activities, and possible delivery mechanisms – all being important elements in the design of a technology transfer program.

Key Drivers for Change

- Show me the money! - financial benefit, greater profit, survival, capital gain, efficiency or reduced costs
- Attractive/beneficial new technology
- Forced change - International / national / regional regulations and requirements, Industry codes and requirements
- Change in belief system/lifestyle e.g. the new practise being more sustainable, and environmentally friendly
- Market requirements or opportunities
- Sustainability

Other change drivers

- Public pressure eg. dirty dairy
- Information delivered in the right way, identifying benefits of changing
- Health Issues were a driver in the shift to organics
- Providing good solutions to a well known farming problem
- A benefit that is clear to the farmer.

The final session of the workshop looked at the question “where to from here – what needs to happen next”.

- Workshop report to be out by 31 March
- Workshop presentations available on line
- Build links with education
- Find role models for leadership and ongoing support
- Build support throughout each sector (along supply chain)
- Integrate into existing regional activities
- Regular updates from MAF to workshop participants
- Provide help for farmers – assessment tools and case studies
- Hold regional forum meetings
- Reference: www.earthpolicy.org Arthur L Brown

4. Key Messages

The key messages that the participants have given to those responsible for the technology transfer program can be grouped under the following headings.

1. Economic impacts are the major driver for change

In almost every example that was discussed, the financial implications of any change were listed as at the forefront of people's considerations. In the past decreased business profitability had led farmers to proactively seek ways to change, whether through reducing inputs, intensifying production, or changing land use. Imposition of an Emissions Trading Scheme was seen as no different. Financial survival was quoted as a key driver, and changing land values was included as an economic driver.

Farmers will assess the costs and benefits of any change, and this will include consideration of the likely risks. One speaker asked whether it made better business sense to plant trees to offset carbon, or to buy credits. Until an analysis of the relative merits of mitigation or offset responses is available, there could be little point in promoting forestry as a mitigation option. Each business would have to carry out that analysis on their own land.

The scarcity of economic analysis on the impacts of climate change, particularly around greenhouse gas emissions was noted, and the need to address this issue was identified as a key aspect to be incorporated in the design of the technology transfer program.

2. Farmers are already adapting to climate change, and feel competent to do so.

Participants in the workshop believed that adaptation to climate change was already taking place on farm. It was a topic that they felt relatively competent and confident to address, and there was concern that the proposed technology transfer program might duplicate a multitude of regional and local initiatives that were already underway.

However, given that there were such uncertainties around the mitigation options for greenhouse gas emissions – uncertain policies and no apparently financially beneficial technologies to apply, it was suggested that any activity undertaken as part of the technology transfer program should initially be built around climate change adaptation until environmental and economically beneficial mitigation options were developed.

The science community on the other hand believed that farmers were responding to incremental changes in the climate by fine tuning their farming operation, and had not fully appreciated the quantum of the change that would be coming and the magnitude of system adaptation required.

This brings us back to the question of the likely incidence of climatic events (both probability and severity) and the possible cost to the farmer, versus the cost of changing the farming system.

Many of the suggestions that were put forward as ways that farmers could adjust their business to climate change were considered to be “best practice” farm management, and as such should be relatively easy to promote for adoption.

3. There are inadequate tools available to farmers to help them assess the current state of their farms

Farmers asked to have the ability to assess their businesses, so that they understood the extent of their greenhouse gas emissions liability, and the relative sources of those liabilities. They would use that information to make business decisions on the inclusion of mitigation technologies and adaptation practices in farm business decision thinking.

Overseer was quoted as a product that would be able to provide that assessment, but there may be an issue in reconciling accuracy and ease of application. Farmers asked for a tool that was simple to use and gave them a “rough” indication of the carbon footprint.

The ability to assess individual farm businesses so that each manager could make appropriate decisions, was critical.

4. Farmers are struggling to deal with a number of issues and the perceived negative impact of the ETS is not something that they will want to hear.

Recent drought has had a major impact on the viability of pastoral farms. For sheep farmers this has come on the back of several years of low lamb prices and a poor outlook for financial returns. Many are naturally preoccupied with survival.

The concept of increasing production costs by introducing an Emissions Trading Scheme was received very negatively, especially as it was seen to render sheep and beef operations non-viable. This was in the absence of any cost effective mitigation technology.

The message from the workshop was that farmers in the regions should not be given the information that was provided at the workshop – in relation to ETS - until mitigation technologies, options and strategies are available to be presented with it as a complete package. With policies still uncertain, and with the current poor financial returns, any program that took out the high cost message would be reacted to very negatively.

Interestingly the participants also said that if the financial implications of the proposed ETS had not been presented to them, they would not have engaged as they did in the topic. Nor would they have contributed so actively to the workshops.

The net effect was their recommendation that the initial focus should be on adapting to climate change.

5. The farm business should be seen in an holistic way

Whole farm systems and business considerations were quoted throughout the workshop. Participants referred to the interrelationship of different practices, and the need to understand the wider impacts before recommending change. There was a perception that a focus on a single issue, such as a mitigation technology, might be detrimental to the overall farm business.

While one of the key messages was that adaptation to climate change should be given initial priority, and that programs for climate change and greenhouse gas emissions were different, there were examples quoted of situations where a recommendation in one area could be counterproductive in another. A farmer, who stated that he was planting lucerne to cope with drought, was viewed by the greenhouse gas scientist as increasing his emissions.

In practice there can be no complete separation of the issues. By adopting a whole farm systems approach, it will be important that any recommendation for change in one area is assessed for its potential impacts in the other. Individual response recommendations could cause promoters to be embarrassed if they have to rescind advice because they had failed to fully evaluate the whole farm environmental and economic performance.

6. Farmers need a toolbox of different practices and decision support tools to enable them to manage the changes on their farm

As well as asking for a tool that allowed them to assess their business, and to benchmark progress, there were also many requests for a range of tools that they could apply. Decision support tools that would enable a land manager to assess the impacts of applying new practices or new technologies were mentioned often. This would also feed back into the request to be able to assess the costs and benefits of change.

Tools also included the range of husbandry practices that are available to reduce energy usage, to reduce nitrogen losses from the system, to improve soil moisture retention, etc. While many of them are not new to farming, with changing circumstances – climate change and ETS, farmers may be more willing to reassess their adoption of these practices. For a technology transfer program, this will involve a transfer of both knowledge and skills, and probably the provision of peer support. One-on-one support was mentioned in this context.

7. The need for linkage and integration with existing programs

Strong emphasis was placed on the need for this technology transfer program to integrate with existing programs, as mentioned in 2 above. Participants felt that there was already an overload of activities being undertaken, and were not keen to see a new program imposed into this crowded and noisy environment. This was particularly important if the programs were going to overlap.

It was also felt that existing programs could be modified to accommodate the needs of this program, and that would avoid having to have two programs.

When asked what other issues farmers were having to address, and therefore what would be competing for farmers' attention if a climate change technology transfer program was implemented, the participants listed:

- Animal welfare issues eg mulesing
- Environmental regulations, eg effluent management
- Increasing scrutiny from overseas customers and local NZ public
- Changing market demands
- Shortage of suitable labour
- Food safety/ traceability
- Shrinking rural infrastructure
- Water availability
- Shift to tourism and other non-farming land uses
- Uncertain future for next generation

Realising that these issues are in addition to coping with business survival, it would be easy to see that adapting to future climatic events, or reducing emissions because of a cost that will not be fully here for many years, might not be seen as a priority. A successful technology transfer program for climate change would benefit from linking to the above list of topics.

8. Concerns on the competitiveness of NZ pastoral farming and the impact on the viability of the industry

The presentation of the possible financial impacts of the introduction of the ETS on farm profitability caused a great deal of consternation to the participants. This economic information had not been seen prior to this workshop even though submissions on ETS are currently before the parliamentary select committee.

Farmers' reaction was initially disbelief that such a policy could be promulgated, when it would clearly spell a significant challenge to the competitiveness of New Zealand's pastoral farming industry. This was because of the additional costs to the farmers, and the likelihood that our competitors would not have adopted such a scheme. Suggestions from MAF that this was being pulled through by the market were not supported as strongly by the industry speakers.

There was rebuttal that the presentations of the financial impacts on business as usual lacked balance and did not show the ability to reduce the impacts of emissions trading costs through the use of mitigation technologies and increasing productivity. Information was not available to present to the workshop to enable this balance to be presented, although increasing productivity could well increase emissions. The fact that this comment was made is indicative of the lack of adequate and robust financial analysis available.

While the farmer reaction is not strictly in relation to a technology transfer program it is included as a key message because there is a real risk to the program from both withholding financial analysis because of inadequate data, or from providing the information in a setting where there is no opportunity for discussion and exploration of the topic.

5. Recommendations for Next Steps

The results of this workshop are the key input into the development of a framework for a technology transfer program. The workshop program was designed with this end in mind.

The framework will set out a pathway to be followed, and will allow all the activities proposed during the workshop to be set out, relative to impacts and priority. As the participants identified during the workshop there is still a lot of the detail to come, hence the term “framework” rather than a comprehensive plan. As the detail is learnt or decided in the future, it can be added onto the framework. The framework structure will also highlight what is not known, and where the priorities should be for investing in future knowledge generation.

From participant feedback (Appendix 5), and the context for the workshop design, there are a number of natural next steps to ensure that the workshop becomes a part of a continuous development and implementation process. The results of the workshop will be used in the program design, the participants have asked to be kept informed of future developments, and want to be available for further input and possibly involved in some of the implementation activities. There is now a natural reference group of informed people who could assist policy makers monitor the impacts of their policies and the technology transfer program.

The investment that all parties have made in this workshop will be best realised when there is a framework in place, and when the implementation of that framework is strongly supported by land managers and their associated industries and agencies. The following suggested next steps are intended to ensure that the focus remains on building and implementing that framework.

1. Develop and Complete the Framework.

The development of the framework will require the input of a number of people, an action plan, a timetable, and resourcing. It will be an ongoing development. There will need to be a range of experience available for the drafting the framework. The draft will then need to be able to be used as part of a more extensive consultative approach to secure widespread support. This consultative approach needs to encompass all parts of the value chain.

All programs should have an agreed, formal monitoring and evaluation process written into the work plan. Where there is the expected degree of ongoing development as is likely with this subject, it will be especially important.

One of the most common issues with any work plan is that the energy often runs out once the plan is written. Implementation is then overlooked. The framework needs to be able to be used as a relatively simple management tool by the program director, and the delivery agents. Objectives and responsibilities must be clear.

For the wider audience the framework will be an important communication tool.

2. Continue to utilise the knowledge and positive approach of the Workshop Participants

The workshop participants have invested two days of their time to attend the workshop. MAF has invested considerable funds in providing expert speakers and a forum for discussion. The participants have expressed a keen interest to be kept informed of future developments, and the MAF Senior Analyst, Climate Change Tech Transfer, has made a commitment to keep in regular contact with them.

There is also an opportunity to utilise the skills and wisdom in the group as a reference group or sounding board for new initiatives, especially as regionally specific activities start to be included in the program. The key to this will be to ensure that there is regular contact. Short emails that are easy to read, sent out more often, as part of a structured communication program, was discussed as one way of retaining and strengthening the relationship between MAF and the participants that has been established now.

3. Undertake an evaluation of existing technology transfer activities

It was suggested at the workshop that one of the major outputs of the technology transfer program would be the need to link and integrate with other programs, and to avoid duplication and overload by unnecessarily adding a new program. While this issue will be included in the overall framework there is nothing to prevent an evaluation of existing programs beginning now.

In the evaluation it would be important to assess the aims and the achievements of the existing programs on their ability to improve the resilience of the farm business to climate change and the costs of greenhouse gas emissions. An evaluation also needs to be made of the flexibility of the program (and willingness of the participants and program managers) to incorporate some of the messages that would be key to a successful technology transfer program on climate change adaptation and greenhouse gas mitigation.

4. Use of the workshop results to design a wider farmer survey

MAF had indicated that following the workshop there would be a more comprehensive survey carried out of land managers and key influencers. This would enable a more quantitative assessment than was possible with the small number of workshop participants. The survey would assess changes to farmer attitudes to climate change since the last survey carried out in 2003, and would establish new baselines for future evaluation. It would also provide further information on practices and perceptions around climate change adaptation and greenhouse gas emissions offset and mitigation technologies for those designing and implementing the technology transfer program.

This workshop has provided a wealth of qualitative data that should be included in the survey design, and MAF will make the workshop results available to the survey team. Some of the workshop participants, such as members of the Technical Advisory Group, could also assist in presenting these results, to ensure that the survey team understands the context of the statements.

Given the urgency to complete a draft of the framework, it would also be important that the survey is coordinated with that framework, possibly having similar structures. The vision and outcomes that will be set out in the framework will drive the technology transfer program, and therefore should drive the survey.

Finally, there is a proposal for MAF to conduct a survey of farmers as part of the communication strategy. Again, there is a real risk to the integrity of the technology transfer program if the results from this workshop are not included in the survey design. Adding to that is the risk that the communication strategy could be designed solely around enunciating the policies associated with climate change and greenhouse gas emissions on the land. The feedback from the workshop was very clear that land-based businesses are seen as a whole, as a total system, and that a technology transfer program has to take an holistic approach. Those businesses will be impacted by rising fuel, fertiliser, processing, transport, and energy costs, and these all need to be included in the communication messages.

MAF has the opportunity to take a holistic approach in its communications to land managers, focussing on the whole business. It would also reflect the approach that MAF policy analysts will be taking when they are analysing the total impacts of all the government's policies on climate change on New Zealand's land-based businesses.

6. Appendices

Appendix 1 – Workshop Program

Pastoral Farming Industry Workshop

Adjusting to Climate Change – Adaptation and Mitigation

Tuesday 4 & Wednesday 5 March 2008

Westpac Stadium Rooms, Wellington

Workshop Aims

- To ensure that all participants have common knowledge of the issues and the policy framework
- To identify the key elements of a successful technology transfer program aimed at achieving adaptation to climate change and mitigation of greenhouse gas emissions

Programme

Day 1 - presentations, discussion and feedback - scene setting, information provision and identifying issues to explore on Day 2

9.30am	Registration, Tea & Coffee	
10.00am	Welcome Introduction Overview of New Zealand's policies Overview of the Pastoral Greenhouse Gas Research Consortium	Geoff Mavromatis The AgriBusiness Group Mike Jebson, MAF Policy Mark Aspin, PGGRC
10.20am	Context International and National commitments of pastoral farming industries Pastoral sector policies Workshop session – Information needs	Julie Collins, MAF Policy
11.15am	Farm Business Impacts On-farm impacts across NZ pastoral farms Impact on our farm business Workshop session – Key impacts on-farm	Stuart Ford, The AgriBusiness Group Collier Isaac, LandCorp.
12.00-1.00pm	Lunch	
1.00pm	Impacts – Industry level Dairy Industry Meat Industry Workshop session – Key impacts for industry	Sean Newland, Fonterra Dennis Butler, Alliance
2.00pm	Science Beginners guide to climate change A farmer's experience of adapting to a changing climate Workshop session - Adaptation examples	David Wratt, NIWA Richard Hill, Farmer

3.00pm	Tea & Coffee	
3.30pm	Science Beginners guide to greenhouse gas emissions Mitigation examples	Harry Clark, AgResearch Cecile De Klein, AgResearch
4.15pm	Current state of knowledge, commitment, research & future plans	Mark Aspin, PGGRC
4.30pm	Workshop session – Collection of recording/ feedback sheets Summary of Day 1, and Key issues for Day 2	Geoff Mavromatis
5.00pm	Close	

Day 2 – exploring and identifying the key elements for a successful technology transfer programme – content to be tailored by outcomes of Day 1

8.00am	Review of Day 1 group activities and individual worksheets Workshop session	Geoff Mavromatis
9.00am	Communicating with and educating the future generation of land managers	Jacqueline Rowarth, Massey University
9.30am	Drivers for Change Workshop session – What factors will lead farmers to change their farming practices?	Geoff Mavromatis Small Groups
10.30am	Tea & Coffee	
10.50am	Group Session 1 -Drivers for Change Presentations of individual group findings and workshop discussion	Geoff Mavromatis
11.10am	Designing and managing the National Technology Transfer Program	Katherine McCusker, MAF Policy
11.25am	Group Session 3 - Priorities and Funding Workshop session - Establishing priorities and setting selection criteria for proposals	Geoff Mavromatis Small Groups
12.30-1.30pm	Lunch	
1.30pm	Group Session 3 - Draft technology transfer program Workshop session - your proposed design, targets and timelines	Geoff Mavromatis Small Groups
2.30pm	Summary Where to from here	Geoff Mavromatis Katherine McCusker
3.00 pm	CLOSE WORKSHOP, Tea & Coffee	

This Pastoral Farming Industry Workshop is being run by MAF, in partnership with the Pastoral Greenhouse Gas Research Consortium (PGGRC). It will contribute to developing a Technology Transfer Program within the New Zealand Government plan of action on Sustainable Land Management and Climate Change.

Appendix 2 – Workshop Participant Representation

Workshop Analysis

Attendance: 43 people completed worksheets on Day 1, from the approximately 60 people attending

Occupation, organisation, or industry group? Tick all that apply

8	Industry group – please specify – Dairy NZ, Fonterra, Maori, PGGRC, FAR
6	Science – please specify – Crop & Food, AgResearch, Massey Uni, Lincoln Uni
3	Commercial, servicing – please specify - Consultant
2	Local, National Government – please specify – Regional Govt, Consultant, Organics Aotearoa NZ
9	Other – please specify – Tertiary Education, TAG-CC, Maori, AgITO,
24	Farmer - please specify farm type below, tick all that apply

7	Dairy
5	Dairy Support
1	Other (specify) Forestry

14	Sheep
16	Beef

5	Deer
5	Cropping

Gender and Age Group.

27	Male
13	Female
3	Not specified

1	Under 25
5	25 - 35
12	35 - 45

17	45 - 55
8	55- 65
0	Over 65

Appendix 3 – Workshop Questionnaire Day One

Pastoral Farming Industry Workshop

Adjusting to Climate Change – Adaptation and Mitigation

We would like to copy worksheets at the end of Day1, and return them to you for Day 2

1.0 About you

1.1 What is your occupation, organisation or industry group? Tick all that apply

- Industry group – please specify
- Science – please specify
- Commercial, servicing – please specify
- Local, National Government – please specify
- Other – please specify
- Farmer - please specify farm type below, tick all that apply

- | | | |
|---|--------------------------------|-----------------------------------|
| <input type="checkbox"/> Dairy | <input type="checkbox"/> Sheep | <input type="checkbox"/> Deer |
| <input type="checkbox"/> Dairy Support | <input type="checkbox"/> Beef | <input type="checkbox"/> Cropping |
| <input type="checkbox"/> Other (specify) Forestry | | |

1.2 Your gender & age group?

- | | | |
|--|-----------------------------------|----------------------------------|
| <input type="checkbox"/> Male | <input type="checkbox"/> Under 25 | <input type="checkbox"/> 45 - 55 |
| <input type="checkbox"/> Female | <input type="checkbox"/> 25 - 35 | <input type="checkbox"/> 55- 65 |
| <input type="checkbox"/> Not specified | <input type="checkbox"/> 35 - 45 | <input type="checkbox"/> Over 65 |

5.0 IMPORTANCE

5.1 How important do you think adaptation to climate change and mitigation of greenhouse gas emissions are to the future of NZ pastoral farming?		
Please write B for before the workshop and A for After the workshop		
0	5	10
Not at all important		Critically important
If you have had a big shift in thinking during Day 1, what caused this?		

2.0 CONTEXT – International & National Commitments & Policies

2.1 What have you heard that you think are important messages?		
Did you already know this?		
Which messages will be important in a successful technology transfer programme?		
	Already knew Y/N	Important in program

4.0 IMPACTS

3.1 What have you heard that you think are important messages?

Did you already know this?

Which messages will be important in a successful technology transfer programme?

Impacts – On Farm

**Already
knew Y/N**

**Important in
program**

Impacts – Industry level

4.0 SCIENCE

4.1 What have you heard that you think are important messages?

Did you already know this?

Which messages will be important in a successful technology transfer programme?

Climate Change and Adaptation

**Already
knew Y/N**

**Important in
program**

Greenhouse Gas Emissions and Mitigation

Appendix 4 – Workshop Group Sessions Questions

NZ PASTORAL FARMING - ADJUSTING TO CLIMATE CHANGE

GROUP SESSION ONE – WHAT WILL LEAD TO CHANGE?

Background:

We need to better understand why people change what they do, if we are to design a framework for an effective technology transfer program.

Questions:

In respect to building a resilient farming business that can cope with climate change and the cost of greenhouse gas emissions:

1. What significant changes in farming systems have happened in the past, and what has driven them?
2. What other changes do farmers have to adapt to right now?
3. How does adjusting to climate change rank in importance and urgency to these?
4. Why would farmers change their farming decisions and their farming practices?
What are the key drivers?
5. In designing the technology transfer framework, how do we build in the key drivers?

NZ PASTORAL FARMING - ADJUSTING TO CLIMATE CHANGE

GROUP SESSION TWO: TECHNOLOGY TRANSFER PROGRAM PRIORITIES AND SELECTING DELIVERY PREFERENCES.

Background:

Given that there are limited resources and that farmers have limited time to absorb and act on new information (while maintaining their current farming operation), we need to ensure that any investment is made in the areas with the highest priority.

Because circumstances will change over time it is also important to understand how and why priorities are set so that we can modify future activity.

Once a program has been designed and we move into the delivery phase, we have a range of ways of delivering the information. Our choice should be set by the outcomes we want.

Questions:

1. What topics or areas would you set as priorities for a technology transfer program designed to assist and support farmers making changes that enable them to cope with the impacts of climate change and greenhouse gas emissions?
2. Why have you selected each topic?
3. What outcomes have you set for each topic?
4. What ways of delivering the technology transfer program should be used here? Why have you chosen the ways you have listed? What are the advantages and disadvantages of each?

Appendix 5 – Results of Group Discussions on Days One and Two of the Workshop

RESULTS from Group Discussion Sessions

Day 1 – SCIENCE – Adapting to Climate Change

Following the presentation from Richard Hill, Canterbury farmer, the participants were asked to identify other adaptation techniques or practices that they were aware of. The following is the list recorded for the whole group.

Adaptation Examples

- *Changing pasture species/feed crops*
- *Using species that have lower (nitrogen) input requirements*
- *Adjust timing of farm operations*
- *Build flexibility with land parcels in different climatic zones*
- *Build up soil organic matter*
- *Changing land use – change enterprises, increase afforestation*
- *Change breeding/trading stock balance*
- *Manage catchment land cover water balance*
- *Increased use of forestry – multi culture options*
- *Develop action plans for likely events, such as floods*
- *Plant crops that maximise moisture efficiency – (WUE)*
- *Create water storage structures*
- *Improve the efficiency of water storage and water usage*
- *Build up carbon sinks to obtain the credits*

Day 2 - Feedback and comments from Day 1

At the conclusion of Day One, participants were invited to hand in the questionnaire that they had been filling in progressively during the day. The questionnaire is included as Appendix 3. Overnight the comments on those questionnaires were collated and the summary put into a PowerPoint presentation that was used to introduce day 2. During the presentation, the participants were invited to add or expand on the statements presented. These were recorded separately, and are shown under the heading “white board session”. Both the feedback and the whiteboard session followed the broad headings in the program –Context, On-farm and Industry Impacts and the Science.

PowerPoint Presentation

Slide 1

Sustainable Land Management and Climate Change
Plan of Action
Technology Transfer
Feedback on Day One

Slide 2

Where Are We Now?

- Before we can design our technology transfer program framework we need to know the base we are starting from.
- Look at comments and feedback from Day 1,
- Discuss as a whole group and agree where we are now.
- Comments and Feedback – Day 1

Slide 3

How Important?

- At start of workshop – average rating 6.5 (10=critical)
- At end of workshop – average rating 8.0

Reasons for Change in rating

- Better understanding
- Change is inevitable
- Seen in context

Slide 4

IMPORTANCE

- Still things to be done
- Science is years away, industry is not prepared, and competitors are not in the game
- Need clearer indication of likely costs
- Threat to farm sustainability
- Lack of measuring ability makes management difficult
- Impact on national economy
- Not creative in finding solutions

Slide 5

CONTEXT

- Complexity at farm level
- Understanding of phase out timing and emissions trajectory, and flexible end date
- No mention of soil carbon
- Government leading change
- Market opportunities
- Know what is happening with neighbours
- No practical mitigation options

Slide 6

On Farm IMPACTS

- High costs of emissions will have major impacts on business
- Will influence strategic and day-to-day decisions
- Measurement methods important
- Farming systems choices to be made
- Lack of tools to help farmers
- Pragmatic process of estimating costs and impacts needs to be developed.
- What are the costs of mitigation strategies?
- Adaptation policies vary and costs and benefits vary
- More work on opportunities needed.

Slide 7

Industry IMPACTS

- Economic drivers for change are high.
- Forest sequestration opportunities.
- Will markets pay more or is it an access issue.
- May force industry to source product offshore.
- The need for farmers and industry to engage in this.
- Sector profitability major concern.
- Market drivers doubtful – will we be competitive?
- Potential complexity in measuring and administering
- Industry has a role in research and aiding implementation.
- Extension of growing seasons.

Slide 8

SCIENCE – Climate Change Adaptation

- Good evidence as to climate change.
- Water management and efficiency important.

- Some positive aspects to change - need to be proactive.
- Ranges of technology changes and farm system design.
- Regional diversity.
- Infrastructure investments necessary.
- Looking for resilient farms.
- Need freedom to make land use changes and be willing to adapt.
- Climate change data is necessary part of change
- More publicity needed regarding adaptation system.

Slide 9

SCIENCE – GHG Emissions and Mitigation

- Current methods of mitigation are minimal and may not be suitable for profitable farming.
- Research has a big challenge.
- Mitigation time horizon may be long -no immediate fix.
- Need to have clear cost benefit models for mitigation options
- Ballpark figures of emissions per animal.
- Manipulate the diet with high energy feeds.
- Wider presentation of current state of knowledge needed.
- Diet manipulation should be considered more.
- Genetic options may be the best answers.
- Farmers should identify their own solutions.

Slide 10

WHERE ARE WE NOW?

- What can we agree on?

White Board Session

Context

- *Water must be seen as part of the sustainability basket*
- *Simple practical things can make useful contribution when looking at the whole issue*
- *Need to ensure that there is a compatible policy framework with our competitors*
- *Cost benefit balance needs to be kept to the forefront*
- *Climate and technology are part of business considerations*
- *Issue awareness at this point needs to be “carefully couched” to avoid distress*
- *While they are separate, need to tie adaptation and mitigation*
- *Remember two strands of climate change and greenhouse gas emissions are separate for planning technology transfer*
- *Need working models*
- *Need to engage the community and demonstrate*

On Farm and Industry Impacts

- *Uncertainty of the carbon price/value*
- *What/ who are Incentives and drivers for this?*
- *Is it being driven by entrepreneurs – a capital global investment?*
- *Need to focus on what we can do*
- *Level of engagement needs to be set so that the focus is on:*
 - *practical responses now*
 - *coping with extreme events*
- *Need balanced information to attract farmers and bring them along*
 - *Start on adaptation = good news*
 - *Keep outside policy confusion away*
- *Message (as related to ETS) is not conducive to technology transfer*
- *Difficult to be willing to engage if the options and outcomes are “too hard”?*
- *Present “best opportunities” with adaptation – Picking winners*
- *Establishing “value” of land*
 - *Picking winners*

- *Good record*
- *Look for consumers that will pay – pass on costs*
- *Respond to market demand*
- *System needs incentives/disincentives to change to achieve objectives*
- *Need to look at timing*
 - *Adaptation timescale*
 - *Need to have tools*

Designing and Managing the National Technology Transfer Program – Katherine McCusker

Feedback and comments

- *This tech transfer strategy has to present the value proposition for change. This includes the consumer.*
- *Counting efficiency gains. How is efficiency measured, and by what? \$ input, resource input, - is that what we want?*
 - *Measuring*
 - *Measuring units*
- *Social marketing – carrots and sticks*
- *Natural resource management and measuring*
 - *Triple bottom line*
 - *“natural capital”*

Day 2 – Group Session 1 – Drivers for Change

The workshop was split into six groups and each group given the set of questions shown in Appendix 4. Each group recorded their responses and these have been collated below. Following the small group session there was a further discussion using the whole workshop, and their comments are recorded as part of a “whiteboard” session.

Question 1. What significant changes in farming systems have happened in the past, and what has driven them?

Significant change	Drivers of the change
Increase in production, efficiency and intensification	Economic factors including land values
Better effluent management	Council regulations
Irrigation developments	Rural bank cheap loans, and govt promoted schemes Risk management Economic / production increase potential
Wholesale uptake of No-tillage / direct drilling over most farm types	Mostly economic drivers due input cost increases. (DD gives labour, machinery, fuel and soil conservation savings / benefits). Roundup price coming down, cheaper DD machinery. Regional Council and other agency promotions.
Intensification / high input farming Others went lower input / higher value / lower costs	Removal of NZ agricultural subsidies Driver is economics. Decreasing returns meant farmers had to change what they did to survive
Increased use of water	Peer pressure, regulation and need for business growth

Increased fertiliser usage and change in nitrogen use	Higher production and profits Visible, simple technology Monitor Farm extension project
Dairy industry productivity targets	Industry set targets and drove them through Dexcel
All developments in Dairy industry	Profit and increase production per cow. Genetic improvement over whole industry
Changes in relative profitability of enterprises e.g. Recent changes from sheep and beef / trees into dairy	Economic realities, new technology. Lack of market access – Tariffs on beef in Europe limited amount that could be sold, so lower prices.
Scanning technology	High numbers of dry stock. More efficient / cost effective stock mgt
Tree planting boom in the 1990's	Price spike for timber due to high prices paid by Koreans. Prices have been mostly low ever since (little new planting in spite of erosion control subsidies being available in places.)
Removal of farming subsidies in 1980's	Government policy
More flexible farming systems	Seasonal variations and market variations, including impacts of exchange rates Linkages with higher returning land use options Need to continually improve
Changes to markets	Demographic changes in our markets Increasing competition Move to higher value niche markets “greening” of the market
New technology	Need to lower costs without losing production Science Need to remain competitive
Community pressure	Increasing public concerns on environment and food safety

Question 2. What other changes do farmers have to adapt to right now?

Changes are farmers adapting to right now.	Results & Drivers of the change
	1 = more important 5 = less important
• Rural communities are dying	1) major concern for all, especially in maintaining rural services
• Meat industry near collapse and serious concerns about the economic survival of many farms	1) Future viability
• Bleak future for the next generation of farmers	1) Succession issues
• Animal welfare and environmental regulations	2) Markets and govt / regional / regulations
• Increasing scrutiny of farming practice by NZ public and customers abroad	3) Continued access to use resources and access to markets is essential for survival.

	Bad PR is putting a lot of pressure on farmers leaving them feeling rejected, alienated, and not valued. Increasing regulation / compliance and resource consent costs.
• Need to meet market demands for type / specifications of product produced	4) Changes to the type of products required by markets / processors
• Traceability / quality assurance requirements	5) Market drivers / requirements Regulations, processor requirements
• Moves towards tourism and more diversified income sources	5) Economic drivers and need to spread risks of income fluctuations away from just pastoral farming. Values of land “to look at” and not farm
• Climate change mitigation	5) Not important until it becomes necessity and drivers are clear.
• Rising input costs	1) Impacts on viability of the farm system and the farm business
• Tight labour market	1) Impacts from both quality and quantity of labour and effects on production and quality of product
• Land use competition	3) Options available but require capital
• Sustainability of farming business	1) Major issue facing sheep and beef farmers
• Maintaining land and water quality	2) Needed to maintain production and meet regulations and market access
• Water storage and use	3) Long term investment
• Multiple issues facing the agricultural industry	

Question 3. How does adjusting to climate change rank in importance and urgency to these?

- Adaptation to climate change is ranked as important provided it meets one of the drivers identified above
- Adaptation is part of normal business optimisation and will depend on confidence in climate change predictions
- Adjusting will depend on the cost and the benefits
- Adjusting will depend on whether short term or long term changes - simplicity
- Carbon management is unimportant compared to the economic survival issues many farmers are facing now.
- Farmers have always had to adapt to variable climatic and market conditions. They expect to do this irrespective of climate change policy.
- If government imposed climate regulations come with a high cost, priority will be high. But as many farms are already struggling financially this could be the last straw. If the cost is high, urgency to change will be high, but it could cause severe disruption due to the current financial difficulties.
- The key issue for farmers is not adapting to climate change but the mitigation measures/ regulations that the govt is imposing.

Question 4. Why would farmers change their farming decisions and their farming practices? What are the key drivers?

- Show me the money!
- Sustainability
- Adaptation is good farming practice
- Mitigation changes if they needed for financial security
- Most examples in Question 1 were driven by - \$, greater profit, survival, capital gain, efficiency or reduced costs
- Attractive/beneficial new technology
- Forced change - International / national / regional regulations and requirements, Industry codes and requirements
- Change in belief system/lifestyle e.g. the new practise being more sustainable, and environmentally friendly
- Market requirements or opportunities
- *Other change drivers*
 - Public pressure eg. dirty dairy
 - Information delivered in the right way, identifying benefits of changing
 - Health Issues were a driver in the shift to organics
 - Provide good solutions to a well known farming problems
 - A benefit that is clear to the farmer

Question 5. In designing the technology transfer framework, how do we build in the key drivers?

- Combine with existing, sustainable farming practice, education and adoption initiatives
- Provide practical and clear information
- Show farmers that there are benefits
- Develop the tools and solutions
- Tailor to appropriate timing, sector and geography
- Use the \$ benefit/profitability of a technology
- Give a range of potential options, “toolbox” for farmers to choose from
- Change will be driven by “big signals” and the ability to change, whether STICK - policy, regulation, market or CARROT – technology
- Demonstrate good practice
- Use a holistic approach
- Focus on whole farm systems
- Develop peer support systems
- Provide robust cost-benefit analysis for the \$ and non-\$ options and outcomes
- Integrate productivity with environment
- Publicise good messages and feel good messages
- Raise awareness through education and communication
- What technology is to be transferred? The message is far from clear to this group. Farmers don't have a problem with the climate adaptation measures, but the mitigation measures

and how they will apply are far from clear. Will farmers be charged above base line 1990 emission levels or total emissions?

- Need clear information. Document examples of carbon profiles in 1990 cf now on real farms.
- Change Point of Obligation (PoO) to Point of Reward (PoR) Farmers adopt changes more quickly when there is a \$ benefit to them.
- The rewards need to sit with the farmers. This is needed to give a clear market signal to encourage change.
- This group was annoyed by the comment that “the system needs to be simple” was given as being the reason why potential soil carbon build ups on farms is being left out of the equation.
- Reward for increasing soil carbon levels is one way some benefit could come back to individual farmers, yet it is being ignored.
- There seems to be little science effort going into understanding soil carbon. All the science effort seems to be going into rumen / methane reduction while the soil is being largely ignored.
- Farmers need to demand that processors incentivise the process, i.e. provide carrots
- Need good information setting out different options with pro’s and con’s
- Develop good tools for farmers to self monitor carbon management with
- The most obvious mitigation method is to promote forestry and regeneration of natives (provide subsidies / grants for native biodiversity). But this isn’t working as little planting is happening (even with grants for erosion control). This is because there are other disincentives with forestry eg. Uncertainty with costs of carbon taxes at harvest, little hope of good future returns / markets, poor past returns, long term nature of the investment, and landscape and planning restrictions and problems of drying up water short catchments.
- Need coherent local / govt policy on forestry. All the above need to be addressed if forestry is to flourish.

White board session

Drivers for Change

- *What is in it for me?*
- *Profit – survival, intensive*
- *Clear messages*
- *A pathway for action*
- *Regulation*
- *Environmental concerns*
- *Market Forces*
- *Attractive technology*
- *Belief*
- *Market opportunity*
- *Peer pressure*
- *Business growth*
- *Ease of use of inputs*
- *Lifestyle recognition*
- *Providing leadership*
- *Multiple benefits*
- *Leading people where they want to go*
- *Adaptation short term (create appetite)*
- *Walk before we run*
- *Recognition and carrots*
- *Money and other benefits*
- *Continual plan for improvement*
- *POO becoming PO reward*
- *Combine with existing initiatives*
- *Practical and clear*
- *Demonstrated benefits*
- *Having tools and solutions*
- *Quietly delivered*
- *Modify existing programs*
- *Show me the money*
- *Peer systems*

Group Session 2 – PRIORITIES

Again small groups were given set questions (appendix 4) and the responses collated into the table below. A whole workshop discussion also took place after the small group session, and the comments are recorded under the “whiteboard” session.

Topics for technology transfer priority?	Why has the topic been selected?	What Outcomes have you set for each topic?	What delivery methods should be used to transfer the technology?
Robust Emissions Report on an individual property e.g. Overseer	<ul style="list-style-type: none"> • For farmers to understand their position • To individualise and focus the response • To get whole picture perspective • For benchmarking 	<ul style="list-style-type: none"> • To generate interest • Create awareness and understanding • Build knowledge • Benchmarking opportunities 	<ul style="list-style-type: none"> • ‘One to one’ contacts are beneficial and must be aspired to in spite of being resource intensive • Monitor farms and demonstrations • Use existing facilities and networks
Provide a “Toolbox” of information options: <ul style="list-style-type: none"> • N inhibitors • Irrigation efficiency • Herd home • Feeding pads • Tree planting • Reafforestation • Feed type opportunities • Biological efficiencies • Soil management • Direct drilling • Soil carbon • Energy savings Show any potential lift in productivity and economic analysis	<ul style="list-style-type: none"> • To give options • So can customise options • To give flexibility • To demonstrate practical response • To provide a response to the emissions report • To provide a perception of control • Simple • Timely-can be done now • Measurable • Easy to demonstrate • To encourage more innovation • Reforestation provides multi-benefits, sequesters carbon and 	<ul style="list-style-type: none"> • Behaviour change • Emissions reduced • More efficient production • Farmers feeling positive • Improved public perception of the industry • Resilience of systems and business 	<ul style="list-style-type: none"> • Demonstration on farms/in the community • Practical and technical interaction • Expose people to a wider range of opportunities • Individual farmer choice, response and decision making • Osmosis • Endorsement of existing information e.g. “Climate Tick”, “Green Tick”, “Environment Tick” • Part of “Whole farm management plan” • Create excellence awards

taking climate change scenarios into account.	gives opportunity to use permanent forest sink initiatives		<ul style="list-style-type: none"> • Use a relevant deliverer • Create a champion for new technologies
<p>Training Of rural professionals</p> <ul style="list-style-type: none"> • Fertiliser company reps. • Consultants • Supply company reps. • Accountants <p>At industry entry point</p> <ul style="list-style-type: none"> • Tertiary training – Polytechs and universities • AgITO 	<ul style="list-style-type: none"> • To assist with good decision making by farmers • Provides a quick way of getting information to farmers • To achieve an interpretation and implementation of an Emissions Report 	<ul style="list-style-type: none"> • Well trained professionals delivering good dissemination of information 	<ul style="list-style-type: none"> • Use existing networks but these must be resourced (for training etc) • Use “Enviro-Direct” example from Dexcel e.g. “Climate-Direct” and register • FAR, Dairy NZ, Meat & Wool
Decision Support to examine the financial implications on the whole farm enterprise/build a whole farm model	<ul style="list-style-type: none"> • Takes into account climate, fertiliser, water, soil, supplementary feeds, energy, land and stock enterprises, carbon values and greenhouse gasses • Financial clarity for decision making taking into account all factors • Fiscal benefits of mitigations on farm 	<ul style="list-style-type: none"> • Financial and environmental sustainability • Confidence for decision makers 	<ul style="list-style-type: none"> • Add onto existing programmes as part of best practice • Cost benefit analysis to include carbon accounting
Reducing N loss from a system	<ul style="list-style-type: none"> • Reduced costs and environmental impacts 	<ul style="list-style-type: none"> • Measurable reduction in N use 	<ul style="list-style-type: none"> • Using feeds with higher ME/protein/carbohydrate ratios
Increasing awareness and understanding of science, markets and politics	<ul style="list-style-type: none"> • To achieve shared responsibility • To understand what this is all about 	<ul style="list-style-type: none"> • Farmers making informed decisions 	<ul style="list-style-type: none"> • Use existing networks • Whole range of media • Make sure processors and

	<ul style="list-style-type: none"> To understand what this means for me 		marketers are well informed
Measuring and benchmarking performance improvements	<ul style="list-style-type: none"> To be able assess the impacts and cost: benefits of changing farming practices 	<ul style="list-style-type: none"> Mitigation and measures of farm resilience included in existing benchmarking programs 	<ul style="list-style-type: none"> Linkage with existing programs – both dairy and monitor farms
Prioritise adaptation	<ul style="list-style-type: none"> To focus on what we can control <ul style="list-style-type: none"> “light the little fires” “pick the low hanging fruit” 	<ul style="list-style-type: none"> Relevant and practical systems Recognisable changes taking place to farming systems 	<ul style="list-style-type: none"> Demonstration in the community ‘One on one’ consultation
Clarifying how ETS will work. Redesigning the ETS policy so that the fazing out of “free” emissions is linked to mitigation technology becoming available	<ul style="list-style-type: none"> To understand what this is all about To understand what this means for me Incentive for farmers to adopt technology 	<ul style="list-style-type: none"> Practical, proven technology adoption Farmers who do not uptake technology as it becomes available will have to pay for their carbon emissions 	<ul style="list-style-type: none"> MAF policy papers, including analysis Industry analysis and comment Simple communication
Securing community buy-in	<ul style="list-style-type: none"> To engage and bring the community along with us 	<ul style="list-style-type: none"> Acceptance and Commitment Support for what farmers are trying to do, rather than criticism from environmental lobby 	<ul style="list-style-type: none"> Awareness programmes Use existing channels Establish community groups Acknowledge the linkages between urban and rural groups

One group facilitator took the group notes back with him and produced a more comprehensive set of responses, which do not easily fit into the table above, but are considered valuable enough to set out separately below.

Priorities for tech transfer (No particular order)

1. Get community buy-in to engage and bring the whole community along. Achieve by using a whole farm approach, communicating the science that is being done, scene setting the context
2. Building soil quality / carbon is already a goal for many farmers. Encourage research that supports / gives information that moves in this direction .
3. Carbon conservation through no tillage / direct drilling / minimum tillage. (In addition to soil carbon build up, there are fuel carbon savings compared with full cultivation that used to be carried out pre 1990.) Many farmers are already doing this and could be receiving carbon rewards for it. (NZ No-tillage Association has a proposal for 2 PhD students to study this – DCH comment!)
4. Start where farmers are now. Promote the easy to do mitigation measures for a quick return. Publicise existing soil science on how to build up soil carbon. New rumen science is indoors and will take years before there is any return
5. Forestry is probably the easiest method to promote. Most farmers have waste land that could be planted. But what are the requirements? Can bocks be harvested? There is not enough clear info for farmers to make decisions on. Need actual farm examples worked through. Are there problems with Kyoto definitions? Do these need to be changed? Need a proper forestry tech transfer plan.
6. Need worked examples of how the carbon system would treat planted natives and encouraging natural regeneration of natives under scrub. This could have significant biodiversity benefits as well. (could additional incentives be given for biodiversity benefits if natives were used?) Farmers have little info on this option.

Methods for technology transfer

7. Clearly set out what the mitigation options are eg biofuels for farm use, no tillage, forestry, native scrub regeneration. What are the requirements, relative costs and benefits?
8. Need to research the social effects of implementing this climate change stuff. What will the financial / social impacts be on rural and other communities? Need proper social / economic studies. Are we going into this too fast especially since our competitors may not include agriculture? Cost benefit analysis for NZ as a whole?
9. How do we generate the feel of a “Movement” like the soil conservation movement of the 1960’s ?
10. Need carbon footprint / sustainability benchmarking for a variety of individual farm types. Use case studies on the Meat and Wool monitor farms, MAF statistical monitor farms. Need a range of farms and farm types for high to low inputs. Then farmers could work out where their property fit along the curve.
11. Farmers don’t want just national average information. Needs to be regionally based. Build on existing tech transfer monitor farms.

Some technology transfer delivery methods

Farmers don't really understand what carbon foot printing / budgets mean or look like for farms. Need to get lots of examples done so people get their heads round it, and come to understand the issues and mitigation options.

- Document and publish carbon footprint for high profile properties. Use existing Dairy discussion groups / monitor farms, Meat and wool monitor farms, Ballance farm environment award properties. Learning from leaders programme, the ARGOS project (organic / conventional / Maori Trust comparisons)
- Provide grants for free carbon foot printing / environmental impact identification with a consultant one on one with farmers who are willing to participate.
- Want an impartial independent delivery system – not by people with a vested interest like fertiliser companies! There is an issue that its often mainly fertiliser coy reps who know how to use Overseer. Should the govt pay for this independent monitoring and bring back MAF advisers!?! Need overseer training for farmers too.
- Where does Education fit in ? Up-skilling the rural workforce is required. E.g adult education, correspondence, online courses, web based training (Problems with rural internet),training of the trainers.
- Need to sort out conflicting policy objectives between national, regional, and local government on issues relating to use of exotic and native trees and forestry. There are climate change policy conflicts at the different levels of govt on issues like catchment water yields, biodiversity, wilding trees, tourism, recreation, and landscape issues.
- Package up possibilities / options, and combine with other sustainable land management promotions.
- How / who is going to deliver this programme?
- Biodiversity options eg bush retirements need to be in the context for the region.
- Need ongoing carbon focus groups to work on the topic as a group. ***Continual improvement participatory action research!*** (It is good for complex topics).

White board session

Topic priorities

- *Provide decision support – fill in the blanks*
 - *The farm*
 - *Fiscal*
 - *Environment*
- *Work farm by farm*
- *Provide clear information*
- *Take holistic, whole farm approach*
- *Use existing networks,*
- *Initiate awareness, education, understanding, programs*
- *Carbon conservation*
- *Promote forestry*
- *Start with easy stuff*
- *Look at social effects of new policies and technologies*
- *Undertake Cost benefit work*
- *Develop a toolbox of a range of options*
- *Pick the “low hanging fruit”*
- *Set up Farm Awards*
- *Profile better farmers*
- *Community buy in and support*
- *Get ready for 2012 review*
- *Individualise changes*
- *NIU*
- *ERW*
- *Water use*
- *Include Energy Saving measures*
- *Prioritise adaptation*
- *Sort out ETS before going out with messages*
- *Exploit Genetics*

Session 3

Draft Technology Transfer Programme

Instead of the proposed small group session, as per the program, the whole workshop worked together to answer two questions:

- i. What would be the key outputs of a technology transfer program?
- ii. What would a successful technology transfer program look like – where would we look and what would we look for?

1. Key outputs of a Technology Transfer programme

- *Decision support tools*
- *Awareness*
- *Education and, up-skilling*
- *Linkages with existing programmes*
- *Economic futures analysis (case studies)*
- *Community communication – feedback to wider community and NGO's*
- *Communication and co-ordination with policy (local and central govt.)*

2. What success would look like

How would I know it was a worthwhile investment?

- *Each farmer knows their Carbon footprint (2013 at 1990 levels) – available on a national database*
- *Generation Y take responsibility – more in Ag*
- *Measurable drop in GHG*
- *Technology available*
- *Less conflict*
- *World leadership in GHG emissions reduction*
- *Greens acknowledge Ag performance publicly*
- *Market acceptance plus premium*
- *Still farming – “Gas safe” certified*
- *Planting forests*
- *Global progress (benchmark)*
- *Progress relative to requests*
- *Retention and enhancing market access*
- *“New science” uptake*
- *Informed decisions*
- *Efficiency*
- *Meeting obligations at least \$ cost*
- *Measurements*

- *Water storage*
- *Inhibitor use*

Where to from here

The final session of the workshop looked at the question “where to from here – what needs to happen next”.

- Workshop report to be out by 31 March
- Workshop presentations available on line
- Build links with education
- Find role models for leadership and ongoing support
- Build support throughout each sector (along supply chain)
- Integrate into existing regional activities
- Regular updates from MAF to workshop participants
- Provide help for farmers – assessment tools and case studies
- Hold regional forum meetings
- Reference: www.earthpolicy.org Arthur L Brown