Future Woolscapes

What might the world and the wool industry look like in 2030?

Brief Summary

June 2006

future scenarios
and opportunities

LandWater & Wool

Shaping the future

Australian Government
Land & Water Australia

another innovation
australian wool limited

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Executive summary

We live in a very uncertain world. To make sense of where we are, where we are going and how we're going to get there, tools like scenario planning can assist organisations or industries to think differently about the future and to help deal with the uncertainty we face.

The Future Woolscapes (FW) project has used a scenario planning approach to focus on learning about long-term future issues which can assist decision-making in relation to both broad Research & Development (R&D) direction and specific R&D projects. **It has not tried to predict the future for the industry.**

This paper summarises four possible scenarios (different worlds) and how the wool industry can best prepare. It provides background to the project; a brief description of the scenarios developed; some themes which emerged that pertain specifically to research and development; and suggested "next steps".

We know that there are no facts about the future. But... **"when thinking about the future, it is not about being right, but about being ready"**.

The FW project examined a range of key issues (from those that we are relatively sure about to others that we are very unsure about) that may impact on the world and thus the wool industry over a 25-year time-scale. Some of the issues considered by the project team in developing these worlds included climate change, environmental and animal welfare pressures, competitive fibres, opportunities from new technologies, new uses for wool and the changing face of consumer preferences.

Reports were commissioned on each subject from experts in the field. Copies of these reports are available on the AWI website: www.wool.com.au. A set of wool industry stories was then developed which describes the "worlds" that certain key factors might create. The potential implications of each of these "worlds" for the wool industry were then examined.

"What might the world and the wool industry look like in 2030 – and what might be the implications?"

Some of the issues which emerged from the development of the scenarios included:

1. Industry politics and disharmony are a real threat to the industry – a united vision for the Australian wool industry is needed
2. Incremental gain across the industry may not be sufficient to avoid significant restructuring
3. Sustainable resource use and animal welfare are likely to become increasingly important
4. The ability to track fibre through the pipeline may well be required
5. A likely move to further agricultural specialisation and potentially a significant relocation of wool production, especially into the less arable areas
6. The potential for wool and sheep meat production to diverge
7. The scale of the enterprise, ownership structure and skills required is likely to alter
8. The need for labour saving technology on farm
9. Productivity and quality improvements in both production and processing will be critical: new technologies need to be harnessed and "paradigm change" solutions found
10. The location of processing may well alter, especially wool scouring
11. Consumer markets will change
12. New wool products that meet these changing consumer needs and expectations will be paramount (value, individuality, immediateness, well-being and confidence, comfort, security and welfare and environmental assurance)

A number of suggested next steps to maximise the value of the project are also provided. Primarily it is suggested that the Future Woolscapes project is just a small, initial step in developing a longer-term view of the industry.

With this project as a first step in mind, it is suggested that:

- AWI and LWA consider the scenarios identified as part of future strategic planning
- A comparison is made of these scenarios with AWI's and LWA's existing R & D Portfolio Plans and gaps are identified for research investment
- Scenario planning be incorporated into AWI and LWA's routine strategic planning processes
- The "expertise" of the Future Woolscapes Forum is captured and maintained as a Reference Group
- Outcomes of the Future Woolscapes project are communicated to other audiences

What seems abundantly clear from the Future Woolscapes project is that a vigorous and innovative research and development program is critical to best equip the wool industry for the future. So too is a sense of direction and a clear vision for the industry.

Future consumers?

The future consumer:

- Wealthier and healthier
- Much older and much smarter
- Caring and conscious
- More female orientated
- Operates in a global economy which is more east than west
- Familiar with mega retail and web commerce
- Three requirements - value, value ,value
- Requires instant consumer satisfaction or else

Source: David Connors, 2004.

"… the Future Woolscapes project is just a small, initial step in developing a longer-term view of the industry."

"… a vigorous and innovative research and development program is critical to best equip the wool industry for the future."

Background – Look to the future

Future Woolscapes is a scenario planning project that is a component of the joint Australian Wool Innovation Limited (AWI) and Land & Water Australia (LWA) "Land, Water & Wool" Program. This project has focused on learning about the long-term future to assist decision-making in relation to R&D projects and directions. It was deliberately scoped as "blue sky" to explore the trends and patterns evident around us today, and to look at how they may shape the wool industry over the next 25 years.

As we live in a very uncertain world, the tool of scenario planning can assist our industry to think differently about the future and to help deal with the uncertainty we face.

Often, the future of the wool industry is the subject of discussion. The Future Woolscapes project did not seek to address that question; however, it has applied a rigorous approach to better understand some of the key factors that the industry faces; explore the very different futures these factors may create; and identify the opportunities, threats and ways to prepare for, and even influence, those futures. This knowledge informs the strategic decisions that we can take today to help make the wool industry more sustainable and more viable over the long term.

The project deliberately sought to challenge the way the wool industry thinks – both in the short and long term. A mature industry, such as wool, needs to look well "outside the square" as part of a whole strategic planning process. Business as usual, status quo and incremental gains must be challenged from time to time – as they are unlikely to be sufficient to guarantee future prosperity and longevity.

Future Woolscapes created a set of stories which describes the "worlds" that certain key factors might create.

The focusing question of the Future Woolscapes project was:

"What might the world and the wool industry look like in 2030 and what might be the implications of that?"

Using a 20 person National Forum, drawn from across wool and other industries, Future Woolscapes examined a range of key issues that may impact on the world and thus the wool industry over a 25-year time-scale. Some of the issues considered were:

- Social issues – global and national demographic changes, labour availability, community attitudes;
- Climate variability and change;
- Land use and environmental and animal welfare pressures;
- Terms of trade for the wool industry;
- Competition from other agricultural enterprises;
- Competitive fibres – new products; production levels and prices;
- The opportunities from new technologies – biotechnology, nanotechnology, organic machines etc;
- Potential new uses for wool; and
- The changing face of consumer preferences.

Reports were commissioned on each subject from experts in the field. Copies of these reports are available on the AWI website: www.wool.com.au.

The National Forum then developed four very different scenarios (what we refer to as four different "worlds") based in the year 2030. Each of these worlds is equally likely and possible. The potential implications of these "worlds" for the wool industry were then examined.

"…Future Woolscapes has examined a range of key issues that may impact on the world and thus the wool industry over a 25-year time-scale."

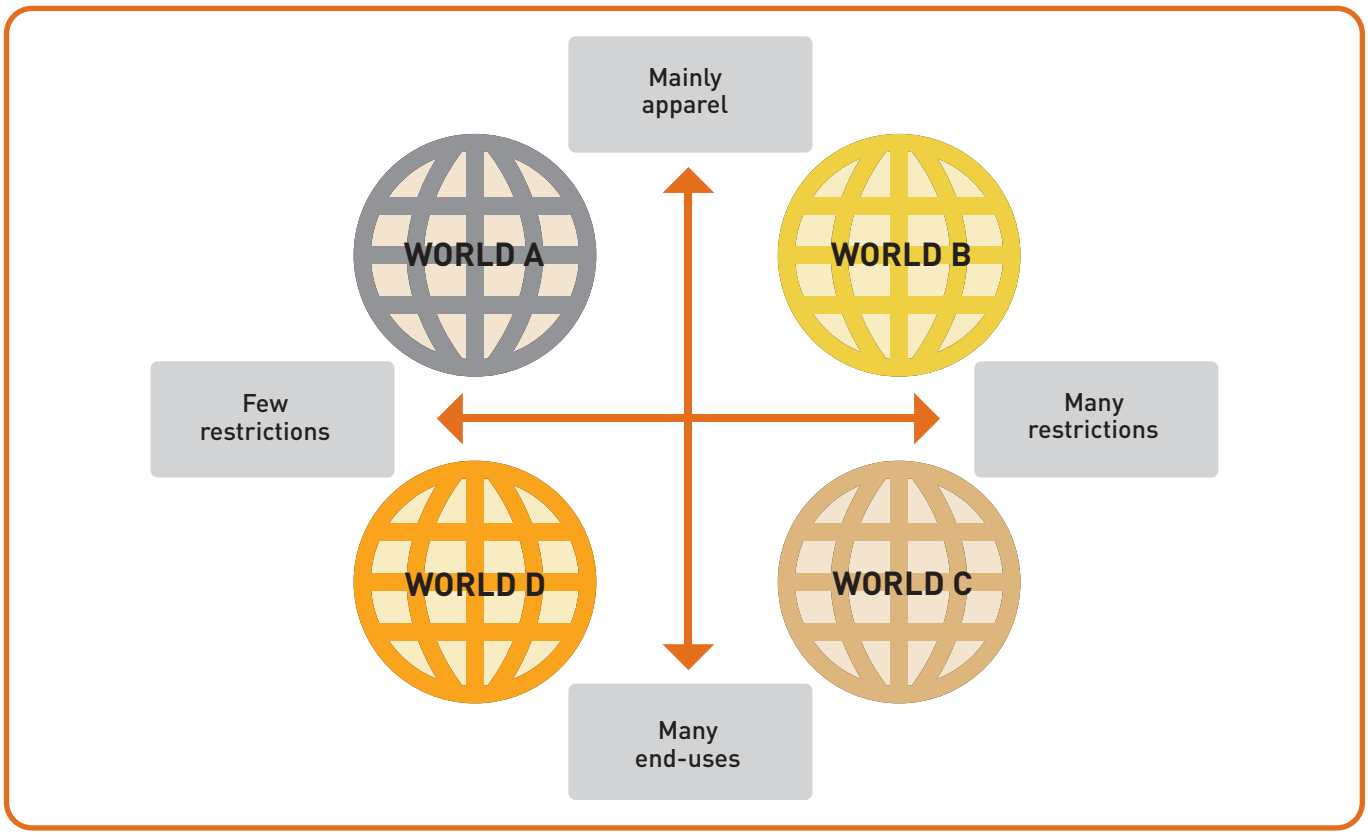
Main outputs – Future shock?

There are five main outputs from the FW project:

- A set of commissioned "expert" reports on specific issues that may (or may not) impact on the world and the wool industry going forward (as listed on page 4)
- Four totally different wool industry scenarios (written as short stories) set in the year 2030
- Indicators that may be employed via a scanning process to identify if any of these scenarios are emerging
- Some implications and possible strategies for the wool industry to consider
- A network of people from across the wool industry capable of working together, undertaking strategic thinking and acting as futures champions for the industry

The four scenarios are built around two key "dilemmas" facing the industry as represented in the following framework. The "dilemmas" chosen were:

1. What restrictions will there be on society in general and farmers in particular – will they need a licence to operate? (Supply factors)
2. Will there be demand for wool and where will it come from – will it be just for apparel use or a diversified product range? (Demand factors)



"The four scenarios are built around two key 'dilemmas' facing the industry as represented in the framework."

The Scenarios

World A "The Squeeze Continues"

Primary assumptions

- **There are few restrictions on society and industry**
- **Wool is primarily used for apparel**

In this world, consumers are "king" and personal health and environmental issues are of critical importance to them.

Governments play a limited role in people's lives after they were held responsible for some near environmental disasters years before. Farmers have complete freedom to operate and it is a totally deregulated industry. It is also a very fragmented industry and specialist wool production has been "squeezed out" of traditional production areas. Other wool production comes as a poor quality by-product from cereal and lamb producers, as well as from small "cottage" farmers.

In response to market pressures, a group of like-minded specialist woolgrowers have rallied together and have introduced their own environmental accreditation scheme. They have also formed a co-operative (Wool Australia Corporation (WAC)) to deal directly and openly with vertically integrated retailers. Wool is confined to apparel end-uses and is marketed on its human health and "wellness" properties (based on research findings).

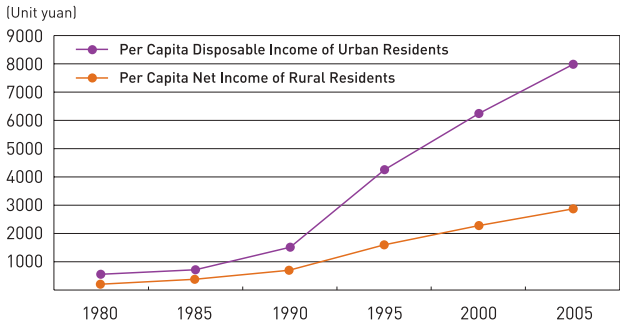
China is a powerhouse economy but wool scouring is under real pressure because of environmental and bio-security concerns. The wool industry is a bit smaller than before and it is still tough to make a living. But the specialist woolgrowers involved in WAC are doing okay, largely because they invest heavily in technology (gene mapping, animal transponders, virtual fencing, genetic defleecing, non-aqueous scouring, short spindle processing, smart fabrics etc); have a transparent and eco-friendly production system; seek external investment; and adopt modern selling and targeted marketing strategies.

"… consumers are 'king' and personal health and environmental issues are of critical importance to them."

To quote from this scenario:

- "A regular customer has returned some underwear after they found that the thematic indicators in the garment (which constantly measure and adjust for next-to-skin humidity) didn't seem to be operating"
- "The latest market research that MaoMart has done shows that the health consciousness of the vast bulk of consumers in the 30 to 65 target market, shows no signs of diminishing"
- "The use of some of the latest nanotechnologies has also assisted Wool Australia Corporation and MaoMart to capture specific health conscious market segments"
- "Fences have been progressively dismantled and animals controlled by the "Kelpie Transponder", a small device attached to sheep which emits a barking sound when sheep approach the reality fence"

Consumer market growth in China



Source: www.macrochina.com

Will Chinese consumers become the largest market for wool product?

What might the world and the wool industry look like in 2030?

World B "Fashion Police Rule"

Primary assumptions

- **There are many restrictions on society and industry**
- **Wool is primarily used for apparel**

This is a highly-regulated world. The production and marketing of wool is influenced by strict Government regulations on the use of land, water and vegetation.

Agriculture has been forced by market demands, world trade regulations and domestic government policy to operate under environmental accreditation schemes. Farmers are receiving environmental services payments to help to compensate for the cost of complying with these systems.

The sheep industry in Australia has become polarized into specialist wool producers and specialist lamb producers. Fine Merino wool is a specialist "green" niche product for apparel that is being used in high quality clothes marketed to wealthy middle-aged conservatives. The coarse wool from prime lamb producers is of poor quality and is sold into interior textile applications. Specialist wool production operations have been forced into the hilly and un-arable country of the medium and high rainfall zones in the southern states that is not suitable for intensive cropping, forestry, vineyards or semi-rural lifestyle farms.

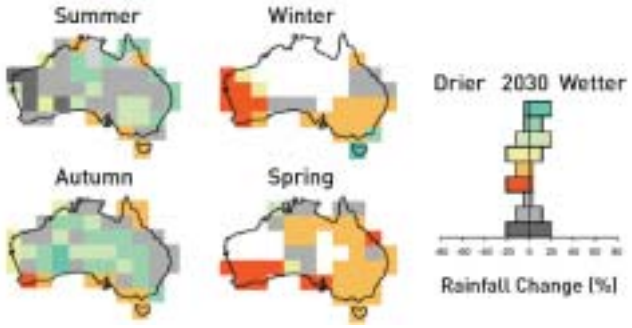
Total annual production of fine Merino wool is 115 million kilograms. Labour and management challenges have influenced the pastoral zone to become a breeding zone for non–wool breeds of lamb. Northern Australia is experiencing strong growth through new irrigation developments which are supplying an insatiable Asian market for fruit, vegetables, meat and fish. Northern Africa has become the world's new industrialised region. While the wool industry has shied away from Genetically Modified Organisms (GMO's), it is now about to review that policy.

"…a highly regulated world. The production and marketing of wool is influenced by strict Government regulations on the use of land, water and vegetation."

To quote from this scenario:

- "The production and marketing of wool is influenced by strict Government regulations on the use of land, water and vegetation"
- "The sheep industry in Australia has become polarized into specialist wool producers and specialist lamb producers"
- "The key selling proposition used by the marketers of this elite wool is that it is a natural product, produced in an environmentally friendly way, without the use of genetic modification"
- "The government has socially engineered the demography of Australia by accepting the majority of immigrants into Darwin and Northern Australia"
- "The Northern African countries have gained political stability and have become the cheap labour source of the globe"

Average seasonal and annual rainfall change (%) for around 2030 relative to 1990



Source: CSIRO, 2001.

How will seasonal rainfall patterns impact on agricultural production?

The Scenarios

World C "Accredited Crimp is King"

Primary assumptions

- **There are many restrictions on society and industry**
- **Wool has many end uses**

This is a high-tech world and a highly regulated one. The family farm at the turn of the century has all but disappeared and "corporate" farming with lease-back arrangements has taken its place. The latest technologies are used at every step by highly-skilled and well-educated farmers.

Because of government regulations and in order to comply with the "corporate" ethos of the time, a licence to operate a wool production enterprise is needed. This includes a regular environmental audit to show that the natural resources on the property are actually being enhanced. Even marketing is highly regulated with only fibre less than 18 micron being allowed to use the term "wool".

Research has also allowed wool to diversify in its end-uses. Marketed under the SuperExcel brand, fine wool is still used in high quality apparel products but also in a range of medical applications – mainly paediatrics, geriatric care, burns units and infectious diseases hospitals. It is also recognised as the leading "hepa-filter" on the market.

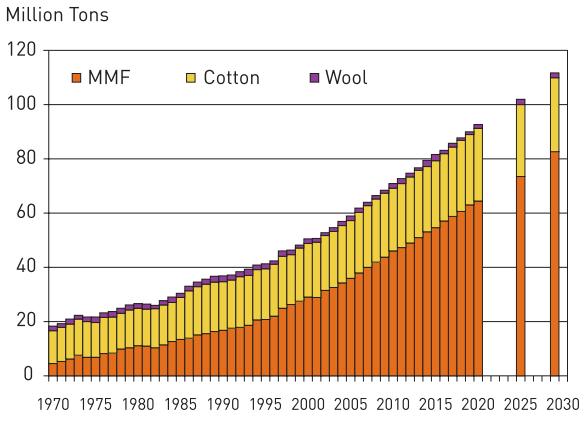
All wool scouring is done on the farm so as to meet strict environmental regulations and for bio-security reasons. Twenty percent of production comes from shedded sheep. Genetically Modified Organisms (GMO's) are now totally accepted. China, India, Brazil, Russia and sub-Saharan African countries are driving world growth and are the primary markets for SuperExcel fibre.

"… a high-tech world and a highly regulated one. The family farm at the turn of the century has all but disappeared and 'corporate' farming with lease-back arrangements has taken its place."

To quote from this scenario:

- "The use of the description for 'wool' is limited to sheep-produced fibre that is 18 microns or finer. The term becomes 'SuperExcel'"
- "Micro-chips have the capacity to determine micron, DNA characteristics and monitor internal and external parasites, so they are an essential management tool"
- "All licensed SuperExcel producers have to submit their 'flock analysis' to renew their approved SuperExcel flock licence"
- "Consumers are able to scan a swing ticket to identify the property of origin for their product, with internet access to details of the property, the SuperExcel grower's qualifications and accreditation, and flock characteristics"
- "'New-age' lanolin is the base used in popular products like anti-aging face creams, ultraviolet resistant sun creams and a number of common pharmaceuticals"

Fibre production 2030



Source: PCI Fibres, UK, 2004.

Synthetic fibre production predicted to grow strongly!

What might the world and the wool industry look like in 2030?

World D "Wool Ain't Wool"

Primary assumptions

- **There are few restrictions on society and industry**
- **Wool has many end uses**

In this world, Governments take a back seat. Constraints on business are minimised as the free market economy rules and the consumer is queen and king.

It's survival of the fittest in the business world – Darwin was right! - and survival means carving out a niche and defending it by delivering to customer expectations. A united, aggressive and innovative industry, formerly, 'the Australian wool industry', contributes 10 percent of national GDP and is a leading export earner. Led by its 'whole-of-value-chain' peak body and now corporatised AUSWOOL, it controls five percent of global animal fibre – including wool – production and markets its broad product range through its ECOCHAIN stores. ECOCHAIN reflects industry ethos.

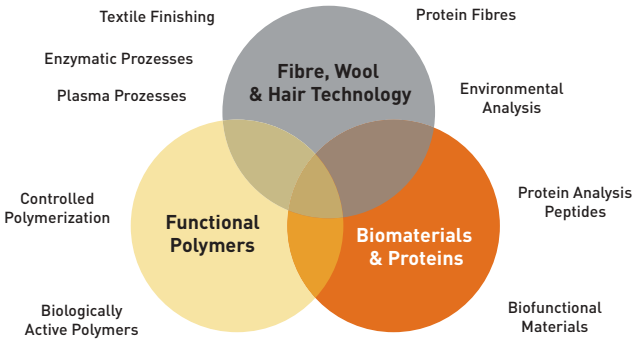
Initially stimulated by consumer demand for environmentally certified products in the early 21st century, adoption of environmental management systems has signalled an industry-wide commitment to transparency and traceability throughout the supply chain. Thus, when the World Trade Organisation's (WTO) environmental legislation impacted on processing in 2015, AUSWOOL was positioned to begin a roll-out of its industrial ecology parks, located close to centres of innovative design and manufacturing in Europe, Japan and North America. The product range in 2030 includes cosmetics, health care applications, apparel, and high value industrial goods, including electronics applications. At the end of 2030 AUSWOOL lists on the New York Stock Exchange and, in one day of trading, out-capitalises the global communications giant, News Corporation.

"… Governments take a back seat. Constraints on business are minimised as the free market economy rules and the consumer is queen and king."

To quote from this scenario:

- "The European Union and Japan issue a statement that, effective immediately, all food and fibre imported by their respective countries will require full certification of compliance with stringent environmental, social and cultural conditions"
- "Woolgrowers also realise that their future system will depend on 'easy-care' animals"
- "Instead of having hundreds of wool batch mixes, five processing streams, with strict specifications to meet identified marketing demands, have been developed"
- "In Chicago, trading in the new Animal Fibres Futures Market tops that of canola for the first time"

Meeting of many sciences



Source: Aachen University, Germany, 2004.

How will science create new fibre and product development opportunities?

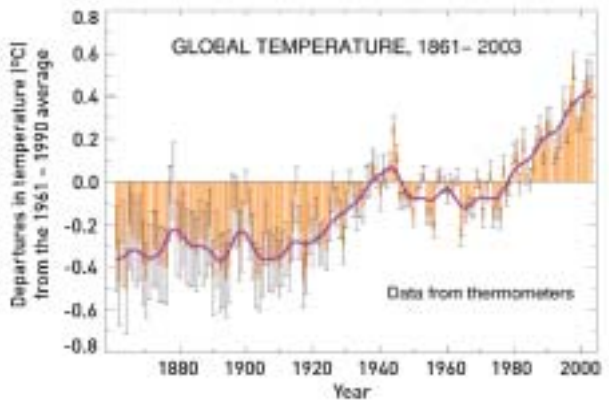
Major points arising from the Scenarios – Back to the future

The scenarios developed in Future Woolscapes track two major areas of uncertainty or dilemma - one around the degree of regulation imposed upon the wool industry; the other around the primary use or demand for wool. Other areas of uncertainty considered included:

- The degree to which technology will resolve some of the current issues, particularly production issues, and the timing of such advances
- The dominance of China and or India as emerging markets and the potential demand for Australian wool
- The ability of the industry to overcome its fragmentation, to co-operate, to act as a single industry
- The ability of the industry to resolve value chain issues
- Wool's ability to withstand pressure from synthetics, maintaining cost /value competitiveness and market share
- The ability for wool to meet future (and currently unknown) consumer preferences
- How community values may change – materialism versus "non market values"

These are all areas for further exploration and research. Gaining greater understanding of these factors will provide more certainty about the future shape of the industry and therefore better strategic decisions.

Global temperature change, 1861 – 2003



Source: CSIRO, 2004.

What impact may global warming have on pasture and animal production and on consumer preferences?

Using the two "dilemmas" selected, there were a number of consistent themes across many of the scenarios. These included:

Vision

1. The belief that the wool industry continues to be "dogged" by politics, disharmony and negative perceptions (internal and external) was a common theme and was seen as being a continuing and significant threat to the industry (a lack of a clear vision for the future).
2. Due to ongoing pressure from competing fibres and other agricultural industries, incremental gain across the industry may not be sufficient to avoid significant restructuring and disruption.

Demonstrate sustainable resource use

3. Sustainable resource use was identified in all scenarios and is likely to become an increasingly important issue – the demonstration of "impact" on the environment may be needed. This area may be further impacted by potential climate change (mean annual temperatures may increase by 0.4 to 2.0 degrees Celsius and there may be lower rainfall in some areas).

Animal welfare

4. Equally, the well-being and welfare of both animals and people was identified in each scenario.
5. As a minimum, the ability to track fibre and demonstrate the degree of sustainability and welfare in its production is thought to be necessary during the timeframe of the scenarios.

"Gaining greater understanding of these factors will provide more certainty about the future shape of the industry and therefore better strategic decisions."

Production relocation?

6. There is likely to be a move to further agricultural specialisation. Combined with pressure for land-use (lifestyle, amenity, other agriculture enterprises with food probably winning over fibre in most scenarios – e.g. grain production may increase over three fold; meat production by 30 percent to 90 percent) there may well be significant relocation of wool production, especially into the less–arable areas.
7. However, there is some suggestion that the often held view that Merinos will be bred increasingly for both wool and meat may not necessarily be the case. Will wool and sheep meat production diverge as it has done in cattle, poultry etc?

Ownership and skills

8. The scale of the enterprise and its ownership structure is also likely to (need to) alter significantly. Economies of scale and capital investment will need to increase.
9. The "new age" farmer is likely to require a very different set of skills to those that we have today – more business orientation and less labour used on farm.

Labour saving devices

10. Manual labour will become scarcer – people will not want to do hard physical work and almost certainly not want to travel to do it. The woolgrower population will continue to age (average from 55 to 60). The need for labour saving technology seems evident.

Brain... not brawn

11. As the terms of trade for wool will likely continue to reduce (the real price of wool predicted to decrease by two percent per annum), profitability will need to come from brain-power, not brawn, and productivity and quality improvements ($ per hectare) will become paramount – using both existing and new technologies.
12. Wool production (sheep) may be well positioned to be an important element in sustainable and profitable land use (cropping rotations, less arable areas). But this position must be demonstrated to the market and to farmers.

Harness new technologies for production

13. Harnessing the opportunities created by new technologies will be vital to find "paradigm" change solutions to current production and processing impediments (parasites, harvesting, sheep health and bio-security, genetic progress, cost and time of processing etc).
14. Some common themes that emerged in relation to sheep management were individual measurement and monitoring, aligning nutrition with production, and remote management.

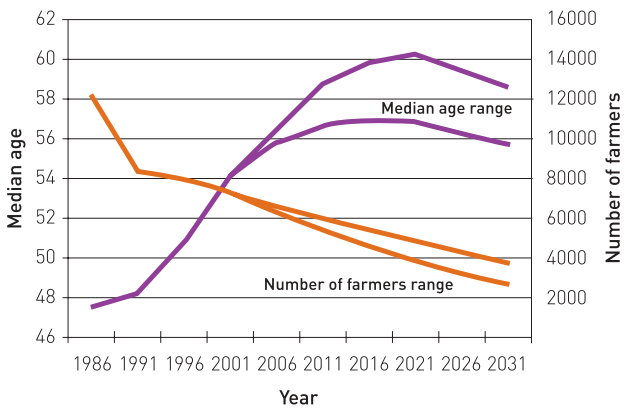
Shortening the pipeline

15. Direct trading and the use of financial instruments was a common theme. There was no mention of the ongoing widespread use of the auction system.

Processing

16. There was concern about China's market dominance and whether it will remain as the wool processing centre of the world.
17. The processing of wool, especially scouring (which was identified by all scenarios), will become even more closely scrutinised (bio-security, water use, pollution etc) and may end up as a limiting factor for the industry.

Number and age of woolgrowers



Source: Victorian Department of Primary Industries, 2004

With an ageing population, what are the implications on labour availability and labour saving technologies?

Major points arising from the Scenarios – Back to the future (continued)

Processing costs

18. Equally, the lower productivity and thus higher cost of wool processing compared to other fibres will limit its ability to penetrate increasingly "demanding" market places (see below re products and consumers). The location of processing may well alter.

Competitive fibre pressure

19. The growth in synthetic fibre production will remain unabated (increasing from 57 million tonnes to 107 million tonnes, predominately polyester). Price competition will be fierce and product development will continue to seek to mimic the properties of natural fibres (processing 0.6 denier fibres!).

Consumers – value, heath, environment

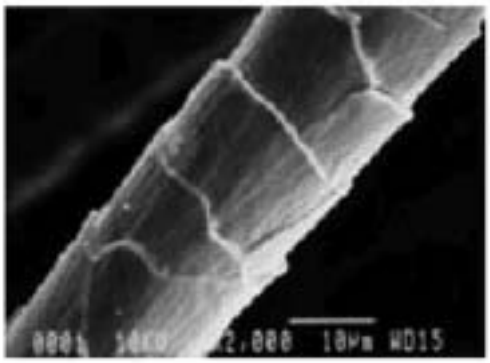
20. Consumer markets will change. There will be 8 billion people in the world and the majority will have instant access to information. Consumers may be far more environmentally aware than they are today and may scrutinise the "footprint" of the entire product pipeline they look to purchase. It is suggested that they will also become far more focussed on value; more east orientated than west; very health conscious; and that comfort and fit ("made to measure" and "just in time") will become more important.

New technologies – new products

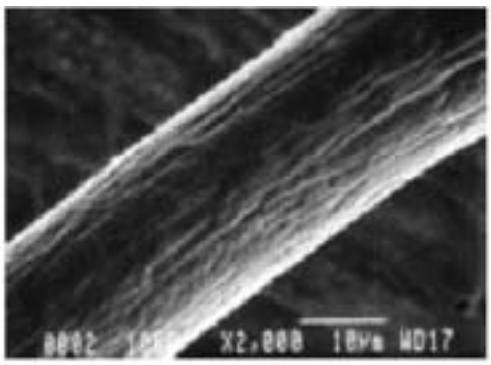
21. To meet the needs of the future consumer, investment in new products (for both apparel and other uses) and targeted marketing programs that provide value, individuality, immediateness, well-being and confidence, comfort, security and environmental assurance are seen as important. Adoption of new emerging technologies to meet these challenges should be actively pursued.

New technologies – Biotechnology

Keratin-degrading enzyme from mould



Untreated (with scaly cuticle)



After treatment with new keratin-degrading enzyme (the cuticle has been removed)

Source: OWARI Textile Technology Centre, Japan.

Enormous opportunities are emerging for improved production and new wool products from harnessing new technologies

Next steps into the future

What seems abundantly clear from the Future Woolscapes project is that a vigorous and innovative research and development program is critical to meet potential future wool industry opportunities and threats. So too is a sense of direction and a clear vision for the industry.

Presentations have been provided to AWI and LWA Boards and Senior Management teams. These presentations have:

- Provided an overview of the Future Woolscapes project – the research papers, outputs, key findings, scenarios, and some possible implications; and
- Identified the most appropriate next steps.

It is hoped that these organisations will further consider and debate the scenarios and the opportunities and threats that are identified for the wool industry.

At the same time, a detailed communication plan has been developed to provide the findings of the Future Woolscapes project to a broader market.

It is only by industry organisations and groups critically examining the research papers and the set of scenarios developed that real value from the project will be obtained.

It is only by considering the research papers and scenarios that real value will be delivered

Appendix 1 – Papers provided to Future Woolscapes National Forum

Key background papers requested

1. "Aspire Australia – 2025" – Summary of the three Scenarios. Business Council of Australia, March 2004.
2. "Modelling Australia's Fisheries to 2050 – Policy & Management Implications" Foran et al for FRDC, March 2003

Future Woolscapes commissioned papers

3. "The Potential Impact of Climate Change on Woolgrowing in 2029", CSIRO Sustainable Ecosystems, May 2004
4. "Towards a Profitable and Sustainable Australian Grains Industry – Pointers to a Future Woolscape" John Lovett, May 2004 (Note: A Guide to Future Woolscapes based on the Grains Council of Australia document "Single Vision")
5. "Social Pressures Likely to Reshape Australia's Woolgrowing Industry Over the Next 25 Years", Department of Primary Industries, Bendigo, May 2004
6. "Land and Animal Management – 2029", Mackinnon Project, University of Melbourne, May 2004
7. "Competitor Trends in 2029", PCI Group, UK, June 2004
8. "Project Narelle – Markets & Consumer Preferences to 2029", Ian Fergusson & Associates, Brisbane, June 2004
9. "Project Dolly – Impacts of the New Technologies", Ian Fergusson & Associates, Brisbane, June 2004
10. "Breeding Forage Plants in the Genome Era", Prof. G. Spangenberg et al, Plant Biotechnology Centre, Agriculture Victoria, La Trobe University, Bundoora, 2000 (Note: this is not a Future Woolscapes commissioned paper)
11. "The Potential Impact of Biotechnology on the Australian Sheep Industry in 2029", Prof. H Raadsma, University of Sydney, June 2004
12. "Briefing Note on Biotransformation of Wool", Dr P Swan, AWI, May 2004
13. "Accelerated Growth of Food Exports form Australia: A Feasibility Study Commissioned by the Australian Fresh Food Alliance", Dr L Ward, October 2003 (Note: this paper was not commissioned by Future Woolscapes. However, Dr Ward used this study as background to discuss the implications for the wool industry)
14. "Consumer Preferences in 2029 and the Implications for the Wool Industry", David Connors (ex MD of the Woolmark Company)
15. "Will Wool Growing be a Viable Business in 2029 – A Review of Price and Productivity Trends", David Sacket, Holmes & Sacket, Wagga Wagga, June 2004

Other papers of interest

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21. "Outlook 2003", The Futurist, 2003

Appendix 2 – Members of the Future Woolscapes National Forum

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