

australian wool
innovation
limited



SHEEPCRC



Institute of TAFE Tasmania

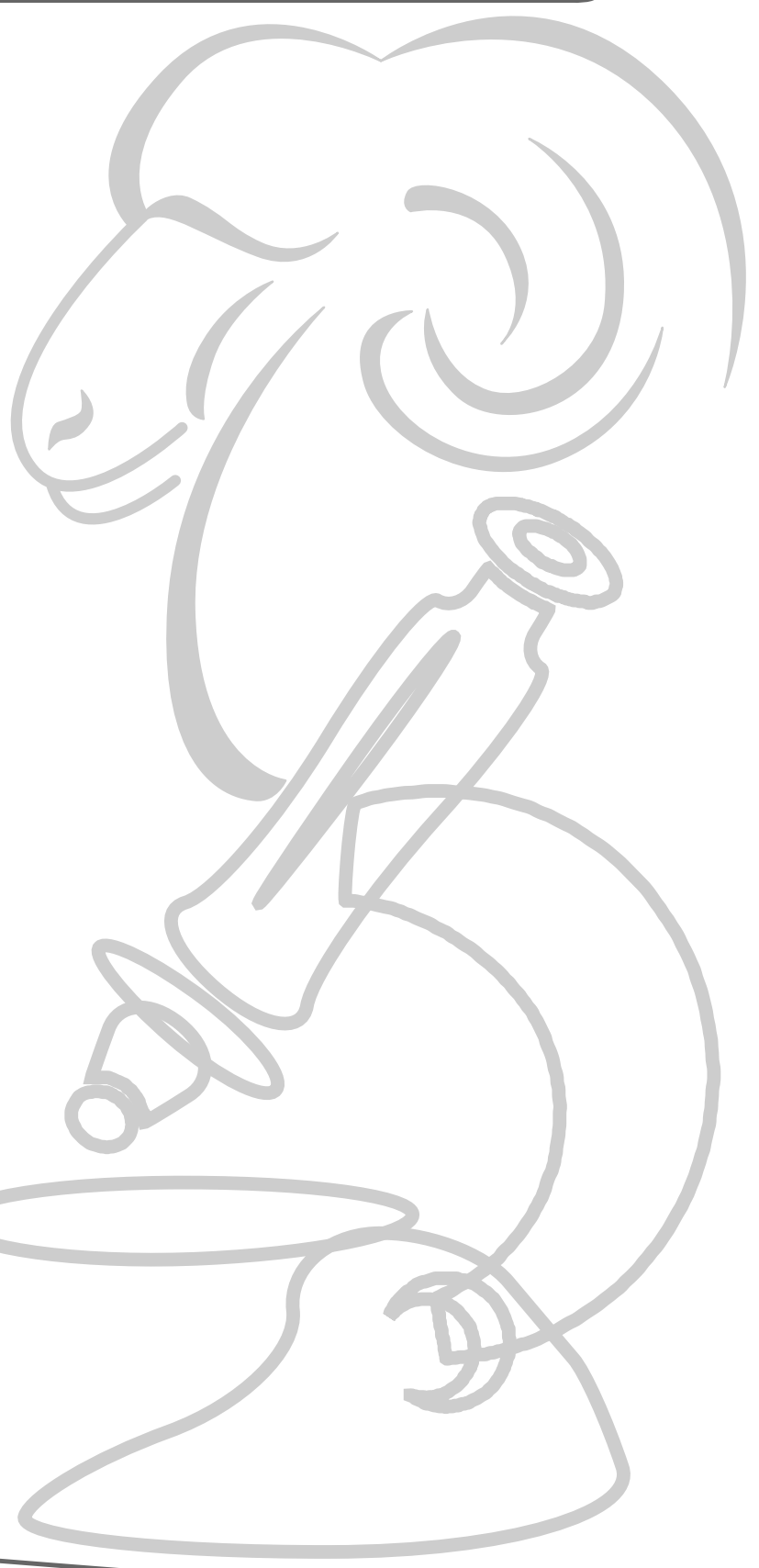


Tasmania



UTAS

SCIENCE & WOOL



PROJECT **REPORT** JUNE 2006

CONTENTS

1.	Executive Summary	3
1.1	Background	
1.2	Terms of Reference	
1.3	Highlights and Innovations	
1.4	Key Recommendations	
2.	Introduction	4
2.1	Background to Science & Wool	
2.2	Science & Wool Stakeholders	
2.3	Related Programs	
3.	Science & Wool Planning	5
3.1	Project Plan	
3.2	Project Team	
3.3	Itinerary	
3.4	Budget	
3.5	Teacher Resource Kits	
4.	Science & Wool Delivery	9
4.1	Sheep Parasites	
4.2	Wool Fibre Testing	
4.3	Pasture Species	
4.4	Evening Function	
4.5	Electronic Tagging of Sheep	
4.6	Lifetime Wool Project	
4.7	Campbell Town Show	
4.8	Program wind-up	
4.9	Transport, accommodation and meals	
4.10	Budget	
5.	Science & Wool Evaluation	12
5.1	Outcomes	
5.2	Outputs	
5.3	Participant Feedback	
6.	Conclusion & Recommendations	13
7.	References	13
8.	Appendices	14
8.1	Science & Wool Participant Feedback	
8.2	Science & Wool Participant Photographs	
8.3	Essential Learnings	
8.4	Science & Wool Program Brochure	
8.5	Science & Wool Evening Function Invitation	

1. EXECUTIVE SUMMARY

1.1 Background

Science & Wool was developed as a one-and-half day professional development session for Tasmanian science teachers and career planners to showcase the science behind the Australian wool industry. The program was delivered on the 1-2 June 2006 as a pilot to a total of eight participants from the Department of Education (DoE) and Office of Post Compulsory Education and Training (OPCET).

This report outlines the development and delivery of Science & Wool, discusses the outcomes, evaluates the success and includes recommendations for future programs.

1.2 Terms of Reference

This Project Report has been written by the project manager, Tracey Taylor of the Department of Primary Industry and Water (DPIW) and includes consultation with and comments from the project team and stakeholder group.

1.3 Highlights and Innovations

The key highlight of Science & Wool was being able to portray Tasmania's wool industry as a dynamic, highly specialised and exciting career choice for students interested in science. Program participants had the opportunity to speak with leading wool industry scientists, undertake practical procedures in the laboratory and experience the enthusiasm and passion of those who have careers in the wool industry.

The primary innovation was the demonstration of DPIW, OPCET and DoE working together to deliver benefit to both the primary industry and education sectors. The primary industry sector had the opportunity to showcase one of its commodities, address skill shortages and promote a professional image, and the education sector broadened the knowledge of its participants which will flow through to the schools and students.

1.4 Key Recommendations

A complete list of recommendations can be found in Section 6 of this report. However the key recommendations are -

- Investigate funding opportunities to deliver Science & Wool in 2007.
- Investigate opportunities to extend the concept and framework behind Science & Wool to other agricultural sectors ie Science & Meat, Science & Vegetables etc
- Continue to build on the relationships and partnerships formed between DPIW, OPCET and UTAS to further enhance the profile of agriculture as a career and in the community.

2. INTRODUCTION

2.1 Background to Science & Wool

Science & Wool was developed in partnership between Tasmania's wool industry, Government and education stakeholders. Science & Wool forms part of the 'Promoting Science that Underpins the Sheep Industry' education program conducted by the University of Tasmania's School of Agricultural Science, funded by the Sheep CRC.

The recently released Creating our Future Report (p. 103-106) highlights that Australian "farm and food businesses are becoming increasingly sophisticated, requiring a highly educated and skilled workforce." This report also outlines that whilst there have traditionally been low levels of tertiary education amongst agricultural workers, this is starting to change. "The number of university graduates involved in agriculture has tripled in 20 years to 2004, however, recent years have shown a decline in interest in agriculture at higher education institutions" (p. 105). Lastly, the Creating our Future Report states (p. 105) "it is important that the proportion of workers in agriculture with post-school qualifications grows over time ...a long term decline in the number of university graduates in agriculture could affect the sector's ability to change and adopt new practices."

A media statement in May 2006 from a leading Tasmanian agricultural scientist and business leader said "the shortage of qualified workers in Tasmania is an enormous ongoing problem particularly in regard to science-based skills. Young people nowadays are unaware of where the opportunities are in science."

2.2 Science & Wool Stakeholders

Science & Wool stakeholders worked together to design and deliver the program. Stakeholders included -

Government Agencies

- Department of Primary Industries and Water (DPIW)
- Department of Education (DoE)
- Office of Post-Compulsory Education and Training (OPCET)
- TAFE Tasmania
- Tasmanian Institute of Agricultural Research (TIAR)
- University of Tasmania (UTAS)

Industry Partners

- Australian Wool Innovation (AWI)
- Elders-Webster Ltd
- Midlands Agricultural Association (Campbell Town Show Society)
- Roberts Ltd
- Women in Agriculture

2.3 Related Programs

A number of programs are currently operating within the Tasmanian primary industry and education sectors focusing on promoting careers in science and agriculture including -

- Cropping a Career, Working in Wool and A Taste for Dairying
- School Industry Links Program
- Professional Development for Science Teachers Program
- Student Science Camp

3. SCIENCE & WOOL PLANNING

Science & Wool was funded through the 'Promoting Science that Underpins the Sheep Industry' education program which gave it a predetermined focus. However, there was a wide scope as to how to deliver the program and Tasmania was one of six states invited to develop and deliver a project. Previous experience of the project manager has shown that when promoting agricultural careers to students, it is difficult to engage the teachers and career planners. So, by putting together a professional development session for school teachers and career planners, it was envisaged that they would be enthused and supportive of agriculture and provide a link between industry and students.

3.1 Project Plan

The planning and delivery of Science & Wool was detailed in a project plan developed by the project team and submitted to UTAS to secure the necessary funding. The key elements of the plan are listed below -

3.1.1 Outcomes

Science & Wool was designed and delivered as a professional development program for high school science teachers and career planners to demonstrate the science underpinning the wool industry. The program had two key outcomes -

- To increase the knowledge and understanding by science teachers and career planners of the high level science underpinning the Australian wool industry and of the Working in Wool Industry Induction Program.
- To provide practical and theoretical information for Science & Wool participants to use in their classrooms/as career planners.

3.1.2 Outputs

The two key outputs necessary to deliver the outcomes above were -

- Science & Wool program developed and delivered to 10 science teachers/career planners.
- Science & Wool Teacher Information Kit developed.

3.1.3 Measuring Success

Two key measures were developed through which the success of Science & Wool could be determined -

- Successful delivery of Science & Wool.
- Post-participation feedback from participants to determine understanding of the wool industry, the science behind the wool industry and of career options available.

3.2 Project Team

Science & Wool was developed and delivered by a project team led by a project manager. Each team member contributed to planning and delivering the program by using their expertise and specialised knowledge.

Many other government and industry representatives also contributed to the development and delivery of the program.

3.2.1 Project Manager - Tracey Taylor, DPIW

Tracey, in her position as Communications Specialist, managed the development and delivery of Science & Wool. Tracey has a degree in Agricultural Science and experience in delivering similar programs to students, such as Working in Wool, along with developing suitable materials.

The key tasks that Tracey undertook were -

- Preparing the project plan and confirming the funding
- Liaising with UTAS and OPCET
- Drafting the program
- Organising venues, buses, accommodation and catering
- Organising some presenters and liaising with Campbell Town Show representatives
- Managing the budget
- Liaising with participants before the session
- Drafting and assembling the resource kit
- Accompanying the participants on the session
- Preparation of the project report
- Liaising with other team members.

3.2.2 Project Team Member - Andrew Bailey, DPIW

As a wool classer and agricultural officer who also has a degree, Andrew's key contribution was in providing information, contacts and expertise on the Tasmanian wool industry.

The key tasks that Andrew undertook were -

- Organising the laboratory, wool testing, pasture breeding and e-tag sessions
- Liaising with key industry leaders to give presentations to participants
- Sourcing and packaging the wool samples for testing
- Sourcing specialist resources for the teacher's kit
- Hosting the evening function.

3.2.3 Project Team Member - Christine Storey, OPCET

In her position as Vocational Education and Learning Development Officer, Christine provided the network and knowledge to recruit participants. Christine also provided feedback on program and information kit content.

The key tasks that Christine undertook were -

- Promotion of the program and recruitment of participants through individual contact
- Advice and support to the project team on professional development session
- Accompanying participants on the bus
- Follow-up with participants to source their feedback forms
- Inviting key education representatives to the evening function.

3.2.4 Other key contributors

Experts from sectors of the wool industry participated in and contributed to Science & Wool -

- Bonnie Beall, Brian Horton & Lyndon Iles, DPIW
- Eric Hall, TIAR
- Eric Hutchinson & Simon Zatorozec, Roberts Wool
- Cameron Fullager, Elders-Webster
- Rob Goddard, TAFE Tasmania
- Daniel & Sue Fish, Campbell Town Show Society
- Donna Harris & David Russell, UTAS

3.3 Itinerary

The itinerary for Science & Wool encompassed a number of key areas within the wool industry allowing participants the opportunity to experience the science behind sheep health and nutrition, wool testing, management of flocks, sheep breeds and conformation and wool fleece types.

Day 1 - 1 June 2006

Mt Pleasant Laboratories, DPIW, Westbury Road, Launceston

Time	Activity
1.00 pm	Introduction to program and outline of wool industry
1.30 pm	Sheep Parasites <ul style="list-style-type: none"> • faecal egg counting practical session in laboratory
3.00 pm	Wool Fibre Testing <ul style="list-style-type: none"> • practical session on wool fibre testing using the OFTA machine and the science involved • outline of different wool fibre types as they relate to sheep breeds
4.15 pm	Pasture Species <ul style="list-style-type: none"> • practical session looking at pasture species accession and testing
5.00pm	Day round-up

Degrees Catering, University of Tasmania, Mowbray, Launceston

Time	Activity
6.30 pm	Drinks and Nibbles <ul style="list-style-type: none"> • casual function of about 25 participants with guest speaker and other brief presentations

Day 2 - 2 June 2006

Cressy Research & Demonstration Station, DPIW, Main Road, Cressy

Time	Activity
7.45 am	Meet at Mt Pleasant for transfer to minibus for travel to Cressy
8.30 am	Electronic Tagging of Sheep <ul style="list-style-type: none"> • practical session on the tags working and applications on farm or for research • the science underpinning sheep tags and future developments
9.20 pm	Lifetime Wool Project <ul style="list-style-type: none"> • outline of the project and its objectives
10.15 am	Travel to Campbell Town Show

Campbell Town Show, Main Road, Campbell Town

Time	Activity
10.50 am	Arrive at Campbell Town Show
11.00 am	Working in Wool Presentation <ul style="list-style-type: none"> • meet students and see them presented with their participation certificates and bursaries
12 noon	Lunch <ul style="list-style-type: none"> • with Working in Wool participants and industry stakeholders
1.30 pm	Show Fleeces & Sheep <ul style="list-style-type: none"> • inspect the champion fleeces and sheep and discuss what makes them the best • discussion with wool industry representative on careers and international wool marketing
3.00 pm	Program wind-up session and conclusion.

3.4 Budget

The funding for all direct costs for Science & Wool was provided by UTAS via the 'Promoting Science that Underpins the Sheep Industry' education program. Other stakeholders, including DPIW, OPCET, TAFE, TIAR, Elders-Webster and Roberts Ltd contributed to the planning and deliver of Science & Wool through the allocation of time and resources. A copy of the budget submitted to UTAS can be found in the Appendices.

3.5 Teacher Resource Kits

The project team put together a resource kit for each participant of the program. This kit was divided into the following sections -

1. Science & Wool - About the Program
2. Sheep Parasites
3. Wool Fibre
4. Pastures and Nutrition
5. E-Sheep and Lifetime Wool
6. Merino Sheep
7. Working in Wool Program
8. Wool Industry Overview
9. Wool Textiles
10. Contacts and Information

Each section was designed to provide background information pertinent to each session of the program. Information was gathered from leading industry research bodies and also combined local knowledge. The teacher resource kits also included a book on pasture species selection, a CD on sheep parasite management and a pasture measurement ruler.

Contact information and details on Science & Wool stakeholders and presenters was also provided along with links to further, more detailed information. Feedback on these kits was positive with one participant commenting -

"The general information in the handout folder also looks an excellent resource and has the potential to produce a tidy unit of work."

4. SCIENCE & WOOL DELIVERY

The delivery of Science & Wool was relatively simple due to the rigorous planning phase where each session was set-up to be delivered in isolation at a particular time and place with an appropriate expert presenter. The project team accompanied the participants throughout the two days and facilitated the sessions with other presenters.

The only hitch in this was integrating into the Campbell Town show, where we were reliant on other timetables and where presenters were very busy on that day.

This section will outline the key points of each session of Science & Wool.

4.1 Sheep Parasites

This session was run in the Mt Pleasant Animal Health Laboratory where accredited parasitology testing for sheep is undertaken on a daily basis. Farmers bring in faecal samples of their flock which are tested to determine the parasite species and burden. Results aid farmers in formulating their parasite management strategy.

The laboratory technician took the participants through the steps of preparing a faecal sample, putting it on a slide and then identifying and counting the parasites under the microscope. Each participant could then prepare and count their own slide. In fact, one participant in their feedback said the highlight of Science & Wool for them was -

"Counting faecal eggs from a slide that I had prepared myself."

This session gave the participants some practical skills that could be taken back to the classroom as a practical session for students. They also made an important industry contact in the laboratory session who would make herself and information available to them upon request.

4.2 Wool Fibre Testing

The concept behind this session was to demonstrate the difference in wool fibre diameter, strength and length as related to sheep breed and wool quality. An industry representative with a portable fibre diameter measuring machine came along and tested prepared samples. There were about 30 wool samples, covering the major merino fleece types, non-fleece types other breeds and some oddities, provided to participants to feel the texture of and then see how they were tested. The participants could then write down the tested figures onto a small sample bag and take back to the classroom.

This session was approached with enthusiasm by the participants, with many of them taking a number of samples for further work in the classroom. In the feedback, one participant highlighted that -

"The wool samples will be very useful for microscope work."

4.3 Pasture Species

This session involved a discussion with one of the officers involved in the Plant Herbage Development Program within TIAR. This program aims to assemble, identify and develop productive, drought tolerant and persistent perennial grasses, perennial and annual legumes and browse plants for sustainable agricultural use here in this state. Over the life of the program TIAR/DPIWE staff have participated in four major collecting missions: Spain/Portugal (1993), Tunisia (1995), Kazakstan (2002) and Azerbaijan (2004). These missions have resulted in TIAR gaining access to a broad array of wild plant germplasm. This material is used as a basis for screening and the identification of traits such as salt, acid, cold, drought or waterlogging tolerance. The first commercial variety developed within this program, "Arrotas" Arrowleaf clover, was released to farmers in 2005 through the program's commercial partner Tas Global Seeds.

Participants had the opportunity to learn the importance of pasture to the wool industry and the critical role that science plays. They also experienced, as one participant put it -

"The passion each of the presenters had and the enjoyment they gain from their work."

4.4 Evening Function

This session was a casual function where there was finger food and some drinks. Here participants had a chance to chat about the industry and what they thought of the day. Unfortunately, this event wasn't very well supported by industry, due other commitments during the week, however, there was a leading industry representative as a guest speaker. This person gave an overview of the wool industry on a global scale and spoke of some of the future challenges that wool as a fibre will be facing in competing with synthetic fibres.

A representative from UTAS also spoke about the current project promoting agriculture and science to schools and offered assistance to anyone who may like to be involved in these programs.

The feedback from this event was also positive,

"The social function was certainly well catered for and an opportunity to talk."

4.5 Electronic Tagging of Sheep

This session was undertaken in the shearing shed at Cressy Research and Demonstration Station. Here, each participant was given an electronic ear tag that had been programmed with their name and school details. They could then see these details on a computer once their tag had been scanned. This demonstrated the type of information that would be contained about each individual sheep on their tag. Participants then had the opportunity to participate in the scanning, weighing and condition scoring of a mob of sheep.

The applications and benefits of this technology were also discussed, particularly the use of voice recognition software to reduce workload on the operator. Participants were impressed by the technology, with one providing the following feedback -

"The datalogging aspect was most interesting, especially the additional information such as the fractiousness of a sheep from the number of times it moves/struggles on the scales."

4.6 Lifetime Wool Project

There was a general discussion on this national project - the basis of which is that the nutrition of the ewe during pregnancy has the potential to affect the wool production of its progeny during its life. Here, discussion was based around optimum ewe condition scores, with participants having the opportunity to assess the condition score of a sheep. The importance of managing ewe feed intake according to pregnancy and the current practice of scanning pregnant ewes to see if they are carrying single or twin lambs was also discussed.

General feedback on the program highlighted -

"In dealing with so many aspects in science, it is invaluable to be able to connect to real life situations in order to give the students an appreciation of why we do things and the role science has to play in their lives."

4.7 Campbell Town Show

The Campbell Town Show is unique and also well known in the world of agriculture as 'the longest continually run show in the British Commonwealth' Founded in 1838 by a group of far sighted and progressive landowners, this show has played a leading role in the display of Tasmania's high quality livestock and wool. From its inception, livestock and wool producers have used exhibits as a yard stick for achievement of a very high standard.

The show has a long a fascinating history with wool and sheep judging being a major reason for it's longevity. There are many varied exhibits, classes and trophies awarded to participants in both sheep judging and the various wool classes.

Science & Wool participants had the opportunity to mix with the leading growers and businesses in Tasmania's wool industry and experience the passion that these people exhibit. A TAFE wool trainer spent a session with the participants walking around the sheep exhibits, discussing the breed differences and outlining the important points when judging a champion sheep.

Participants then spent some time with the TAFE trainer in the fleece judging section where participants had the opportunity to discuss the key characteristics and judging points of merino and crossbreed fleeces.

Lunch was an informal gathering with the students participating in the Working in Wool program, enabling Science & Wool participants to learn more about this innovative program. The objective of Working in Wool is to increase the number of young people choosing a career in Tasmania's wool industry by providing a positive day experience of the industry.

A key industry leader also spent a short session the Science & Wool participants talking about the big picture of the wool industry and how his company is now moving towards vertical integration of their operations in China. He put a positive view on the industry and provided valuable summary information for program participants.

4.8 Program wind-up

This was an informal round-table discussion held at the Campbell Town show. It was a basic run through of how participants thought it went, and how useful the information would be for their use in schools. There was also discussion on what could be facilitated in the future and if they would be interested in participating in further programs. All participants were asked to return feedback forms.

4.9 Transport, accommodation and meals

Participants were asked to meet at Mt Pleasant Laboratories on Day 1 of the program. where this session took place. They then made their own way to the University for the evening session. On day 2, participants met at Mt Pleasant Laboratories where they were transferred to a hired 8-seater minibus and driven to Cressy and Campbell Town by one of the project team.

Accommodation and breakfast was provided in a local hotel for participants who resided outside the greater Launceston area. Lunch on Days 1 and 2, along with evening food were also provided as part of the program.

4.10 Budget

At the time of completing this report, invoices have not yet all been received, however, indications are that Science & Wool will have been delivered significantly under budget. This is due to a number of factors including -

- Paid 1.5 days teacher relief for 5 participants only , as the OPCET participants did not require this payment. The budget allowed for 2 days payment for 10 participants.
- Paid accommodation for 1 participant only as the rest lived in the local area. The budget allowed for 1 night's accommodation for 10 participants.
- Hired a minibus for 1 day. The budget allowed for 2 day's bus hire.
- Evening function venue catering was very competitive.
- Industry representatives contributed their time without expense. The budget allowed a cost for this.

5. SCIENCE & WOOL EVALUATION

5.1 Outcomes

To increase the knowledge and understanding by science teachers and student career planners of the high level science underpinning the Australian wool industry and of the Working in Wool Industry Induction Program.

The positive verbal and written feedback from Science & Wool participants supports the success of this outcome. An example is given in the following feedback -

"It vastly increased my knowledge, appreciation and understanding of the wool industry. Practical knowledge and examples of application are invaluable in the classroom.

It alerted me to the wide variety of careers and opportunities attached to the wool industry. Career planning and education are important aspects of the curriculum and the more first hand knowledge we are able to experience, the better we are able to inform our students."

To provide practical and theoretical information for Science & Wool participants to use in their classrooms/as career planners.

Once again, positive verbal and written feedback supports the success of this outcome. An example is cited below -

"Students always want to know 'how this will help them in the outside world.'

As a teacher, the more real life examples you can draw on, the richer your teaching and so the richer the experience for the students. In dealing with so many aspects in science, it is invaluable to be able to connect to real life situations in order to give the students an appreciation of why we do things and the role science has to play in their lives."

5.2 Outputs

Science & Wool program developed and delivered to 10 science teachers/career planners.

Initially, there target of 10 participants was achieved. However, a few days before the commencement of Science & Wool, two participants had to withdraw due to unforeseen circumstances. There was not enough time to recruit any more participants. Therefore, the program was successfully delivered to five secondary school science/agriculture science teachers and three OPCET career planners.

Science & Wool Teacher Information Kit developed.

This was developed and as previously mentioned, received positive feedback.

5.3 Measuring Success

Successful delivery of Science & Wool.

The program was delivered as planned.

Post-participation feedback from participants to determine understanding of the wool industry, the science behind the wool industry and of career options available.

The feedback provided by Science & Wool participants was overwhelmingly positive. A full record of comments can be found in the Appendices. Suggestions for improvements and program follow-ups were also constructive and will be taken on board in the planning and delivery of any future programs.

6. CONCLUSION & RECOMMENDATIONS

From the feedback and evaluation it can be concluded that Science & Wool was a valuable, innovative and ultimately successful program for both participants and organisers. It demonstrated a multi-agency approach to delivering a program of value to both the education and agricultural industry sectors.

Positive feedback from participants on the planning, delivery and materials of Science & Wool indicate that this is a unique program that was embraced by participants. Recommendations for future programs are below -

- 6.1 Investigate funding opportunities to deliver Science & Wool in 2007.
- 6.2 Incorporate participant feedback into further enhancing and improving Science & Wool for the future.
- 6.3 Investigate opportunities to extend the concept and framework behind Science & Wool to other agricultural sectors ie Science & Meat, Science & Vegetables etc
- 6.4 Investigate opportunities to further involve Science & Wool participants in other activities such as school excursions to agricultural businesses.
- 6.5 Continue to build on the relationships and partnerships formed between DPIW, OPCET and UTAS to further enhance the profile of agriculture as a career and in the community.
- 6.6 Investigate further opportunities to develop programs/forums promoting agriculture as a career.

7. REFERENCES

Agriculture and Food Policy Reference Group 2006, *Creating our Future: Agriculture and Food Policy for the Next Generation*, Report to the Minister for Agriculture, Fisheries and Forestry, Canberra, February.

8. APPENDICES

8.1 Science & Wool Participant Feedback

Below is a list of questions posed with a summary of written responses from participants.

How will your participation in Science & Wool be useful in your teaching program?

- As a Pathway Planning Officer working with Year 8 and 9 students in high schools, the value I saw in the program was underpinned by the different career opportunities in this particular area. As a result, I will hopefully be able to share this knowledge with students to arm them with information on what is out there in the way of careers for this industry and perhaps how they can go about working towards this pathway.
- It vastly increased my knowledge, appreciation and understanding of the wool industry. Practical knowledge and examples of application are invaluable in the classroom.
- It alerted me to the wide variety of careers and opportunities attached to the wool industry. Career planning and education are important aspects of the curriculum and the more first hand knowledge we are able to experience, the better we are able to inform our students.
- Due to the huge interest in Ag Science at my school (with our farm), I am hoping to start and agricultural science unit at the school, starting next year. This will be more to do with the science than the ag and this unit will be an excellent area of study for our students.
- Datalogging is used in the senior science classes. The uses to which this technology can be applied has been increased. Also the practical wool samples and resources folder can be used at all levels.
- When visiting schools and speaking to teachers in the grade 8 and 9 teams I will be able to show them the resource package and refer them to relevant information in particular associated careers in the wool industry.
- Show folder and talk about the program to science teachers in the schools I visit.

Did participating in Science & Wool alter your perception of the importance of science in the sheep industry? If so how.

- Absolutely. I had no idea of the science involved but now have an appreciation for the work that is being done to improve and promote the wool industry in Australia and around the world. The opportunities created by research, analysis and testing in relation to careers is huge in this industry.
- Absolutely. I had never really thought about it from a scientific point of view before. The range of scientific applications was much broader than I would have imagined.
- Yes. I learned how science was becoming more important in the industry but needed to see it for myself and put it into a logical order and process. Doing this allowed all this to accrue.
- Again, the datalogging aspect was most interesting. Especially the additional information such as the fractiousness of a sheep from the number of times it moves/struggles on the scales.
- Yes, having access to people in a variety of roles within the sheep industry and their passion for their work definitely altered my perception of science in the sheep industry.
- Yes, I knew that there were more than just farmers/growers involved in the industry but my knowledge of the variety of science careers in the industry was very limited.

How will the knowledge gained in Science & Wool help you to further enthuse your students in science?

- Through advising them of the opportunities available in this area and how, if interested, they can set out on a pathway leading into that area.
- Students always want to know “how this will help them in the outside world.” As a teacher, the more real life examples you can draw on, the richer your teaching and so the richer the experience for the students. In dealing with so many aspects in science, it is invaluable to be able to connect to real life situations in order to give the students an appreciation of why we do things and the role science has to play in their lives.
- Students out here are interested already and this has given more information to further their interests.
- Computing careers, science/lab based careers, the wool industry itself, wool classing, seed banks and travel.
- As I do not have contact with students this would be difficult but I can certainly make others involved with students and teachers aware of the science involved.

What were the highlights of Science & Wool for you?

- Learning about the testing (Parasitology) of animals and the role played by the DPIW. Bonnie was great. The whole program was excellent.
- I enjoyed the entire program. I thought the variety of topics and the range of speakers was excellent and was particularly impressed with the passion and commitment most of them showed towards their particular involvement and its contribution to the industry.
- I love ag and found the whole program interesting and informative. It even helped change my farming practices.
- Counting faecal eggs from a slide that I had prepared myself.
- The hands on experiences in particular the testing for eggs in the lab; the passion each of the presenters had and the enjoyment they gain from their work; the social function which was certainly well catered for and an opportunity to talk.
- Visiting the laboratories, research farm and Campbell Town Show.
- Practical look at industry ‘in action’.

How could Science & Wool be improved?

- Maybe a little more structure – personally I liked the casual approach but for some it would have been good to have a bit of a get to know you at the start so we knew where everyone came from and maybe find out what they would like to get out of the program. The speakers/guests could have been geared up a little on our backgrounds as well as they were a bit unsure of what to focus on etc. Overall though it was a great experience.
- Maybe a little more information on the wool processing aspect and the technology involved there.
- I don't believe there is a lot of room for improvement but I do believe it could now encourage a similar program for students (money for buses etc for rural schools).
- NA
- I thought the program was excellent, however in the ideal world make it 2 full days and include the Roberts wool store.

Will the material you have been given be useful in your general science classes?

- As I don't teach, it's not applicable. However I will pass this information on to staff at the schools I work with for them to use.
- Yes. The wool samples will be very useful for microscope work as will the parasitology and egg detection prac. Unfortunately, we do not have a school farm so are fairly limited in practical experiences with animals and pasture.
- The general information in the handout folder also looks an excellent resource and has the potential to produce a tidy unit of work.
- Yes it is great. Maybe a few other techniques could be put in to help schools who don't have access to the expensive equipment.
- The samples and resources folder will certainly become incorporated in some of my ag science classes.
- N/A other than career related information.
- In my current role I hope to be able to show/pass on the information gained from the days to teachers in schools who did not attend.

Would you recommend others participate in Science & Wool?

- Yes, definitely.
- I certainly would.
- Yes.
- Definitely.
- Yes - I intend to promote the program when visiting schools.

What understanding have you gained of the wide career options available in the wool industry, the broader agricultural industry and particularly those related to science?

- As above, there is a huge scope of career opportunities and the issue the industry is facing is that potential future employees know very little about them. It's valuable information for myself as I can actively pass this information on to students and staff as well as parents to promote the industry as one of opportunity for those aspiring in these particular areas.
- Per knowledge gained.
- Scientists involved in research, laboratory testing, wool classification.
- Marketers, business/finance, farmers/growers.

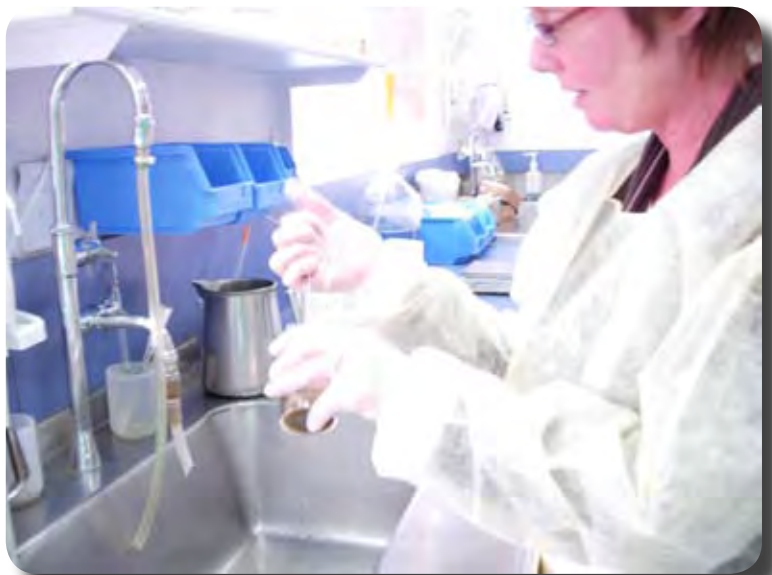
Any other comments?

- Thanks program organisers, I think you've done an awesome job putting this all together. It was very worthwhile experience.
- Great food and wine at the Uni.
- Thanks program organisers for putting together such a terrific couple of days with such a wide range of experiences. The program ran smoothly and the presenters were all most interesting. It is a rare opportunity for teachers to get out into industry and the real world of business and it is such an invaluable experience (especially when it falls on the last two days of term!!)
- Thank you for your help. It was fantastic.
- Well organised program that included a variety of hands-on activities and passionate guest speakers.
- Useful teaching resource package.

8.2 Science & Wool Participant Photographs



Preparing and examining sheep faecal egg samples in the laboratory.





Checking out wool fibre sampling.



E-tagging sheep at Cressy Research & Demonstration Station



Chatting with industry leaders at Campbell Town Show.

8.3 Essential Learnings

The Essential Learnings Framework is the curriculum framework for learners from Kindergarten to Year 10 in Tasmanian Government schools. It is also in use in many non-government schools. The five Essential Learnings are - Thinking; Communicating; Personal Future; Social Responsibility; World Futures. More information on Essential Learnings can be found at www.education.tas.gov.au.

Science & Wool has a number of links to this framework including the following -

Thinking - Inquiry

Understands the process of inquiry and uses appropriate techniques for posing questions, defining problems, processing and evaluating data, drawing conclusions and flexibly applying findings to further learning and creating new solutions.

Practical sessions with wool industry scientists and technicians demonstrated the processes required when addressing and researching an industry issue. The importance of observation, enquiry, logical processes, appropriate planning and data collection along with using industry knowledge and expertise to draw conclusions and make recommendations were demonstrated.

Personal Futures - Creating and Pursuing Goals

Understands how to create, set and review goals for life and how to work with others to achieve own and shared goals.

Through discussions with wool industry professionals, examples of goal setting, collaborative working and how career paths have to be flexible, Science & Wool demonstrated how goals can be set and achieved in a variety of ways.

World Futures - Creating Sustainable Futures

Understand the environmental principles and ethical issues involved in creating and working towards sustainable futures.

Much of the focus of science in the wool industry is focused on ensuring environmental sustainability. One example was faecal egg testing as a part of a worm management plan so growers can ensure that chemical drenches are not used unnecessarily, and when they are used, that they are at their most effective.

World Futures - Designing and Evaluating Technological Solutions

Understands how to design, make and critically evaluate products and processes in response to human needs and challenges.

The use of electronic tags in the sheep industry demonstrates that similar technology in data-logging can be used in a variety of ways to meet human needs. Science & Wool demonstrated that the applications of such technology are apparently endless - including voice recognition, ability to track animals from birth to death etc.

World Futures - Understanding Systems

Understands that the social, natural and constructed world is made up of a complex web of relationships and systems.

Science & Wool demonstrated that wool production is a very complicated natural and constructed system. It starts with ensuring that the pasture the sheep eats is palatable and suited to the environmental conditions and the sheep's nutritional requirements; the wool must be of a particular type to suit its purpose (ie Italian suit versus carpet), with a complex system of measuring the wool's attributes - and in between these is a large web of relationships and systems that are affected by local, national and international environments.

8.4 Science & Wool Program Brochure

SCIENCE & WOOL

Explore the science behind Australia's wool industry in this innovative program.



SCIENCE & WOOL CONTACTS

DPIWE

TRACEY TAYLOR
COMMUNICATIONS SPECIALIST
 DEPARTMENT OF **PRIMARY INDUSTRIES**
 AND WATER
 PO BOX 46, **KINGS MEADOWS**, 7249
P:6336.5212 F:6344.9814
 WWW.DPIWE.TAS.GOV.AU
 TRACEY.TAYLOR@DPIWE.TAS.GOV.AU

OPCET

CHRISTINE STOREY
VEL DEVELOPMENT OFFICER - NORTH
 DEPARTMENT OF **EDUCATION**
 OFFICE OF **POST COMPULSORY**
EDUCATION & TRAINING
 255 BRISBANE ST, **LAUNCESTON**, 7250
P:6336.2792 F:6334.1449
 WWW.OPCET.TAS.GOV.AU
 CHRISTINE.STOREY@EDUCATION.TAS.GOV.AU



SCIENCE & WOOL



1-2 JUNE 2006

SCIENCE & WOOL

An innovative program for secondary school science teachers that shows the science underpinning Australia's wool industry.

Tasmanian wool stakeholders are proud that their industry is consistently using science to increase production and improve wool quality and animal health.



Learn how science aids in the management of internal parasites; investigate the effect of ewe nutrition on the lifetime wool production of its offspring and see the science behind the development of pasture plant species.

Take back ideas, resources and concepts you can use in your classroom. Build networks with leading scientists in Tasmania's wool industry.

Limited places are available so if you are interested in this program send your application in soon.

SCIENCE & WOOL PROGRAM

DAY 1 - 1 JUNE 2006

- 1 pm DPIWE laboratories @ Mt Pleasant
 - faecal egg counts
 - wool fibre micron testing
 - pasture species breeding
- 6 pm Venue in Launceston
 - drinks and dinner
 - meet leading wool scientists

DAY 2 - 2 JUNE 2006

- 8 am Travel to Cressy Research Station
 - electronic tagging of sheep
 - Lifetime Wool Project
- 12 pm Travel to Campbell Town Show
 - meet Working in Wool students
 - discussion of show fleeces
 - discussion of show sheep
- 3 pm Return to Launceston

Accommodation will be offered in Launceston for teachers who require it.

Up to 1.5 days teacher release will be paid to schools to facilitate participation.



SCIENCE & WOOL APPLICATION

NAME: _____

SCHOOL: _____

ADDRESS: _____

PHONE: _____

MOBILE: _____

EMAIL: _____

I will require accommodation in Launceston

Places on this program are limited to 10 participants.

Please return this application by **5 May 2006** to -

Christine Storey
 VEL Development Officer
 Guaranteeing Futures Northern Team
 Department of Education
 Office of Post Compulsory Education & Training
 255 Brisbane Street, Launceston, 7250

Successful applicants will be notified by 11 May 2006.

8.5 Science & Wool Evening Function Invitation

SCIENCE & WOOL



WOOL INDUSTRY EVENING INVITATION

Science & Wool is an innovative program for secondary school science teachers that shows the science underpinning Australia's wool industry. Tasmanian wool stakeholders are proud that their industry is consistently using science to increase production and improve wool quality and animal health.

The **Science & Wool** program demonstrates how science aids in the management of internal parasites; investigates the effect of ewe nutrition on the lifetime wool production of its offspring and shows the science behind the development of pasture plant species. This program also looks to the future of our wool industry and the opportunities in the textile and manufacturing industries.

Science & Wool participants will take back ideas, resources and concepts to use in the classroom and build networks with leading scientists in Tasmania's wool industry.

WHEN THURSDAY 1 JUNE 2006

WHERE DEGREES, UNIVERSITY OF TASMANIA, MOWBRAY

TIME 6.30PM - 8.30PM

RSVP DRINKS AND NIBBLES PROVIDED SO PLEASE RSVP TO
TRACEY.TAYLOR@DPIW.TAS.GOV.AU OR 6336 5212

