



FARMING SYSTEMS INSTITUTE

STUDY TOUR REPORT

United States of America

David Kelly
Development Extension Officer (Cotton)
Queensland DPI, FSI, Emerald

Tour Funded By The Cotton Research & Development Corporation



Touring Party

Mark Hickman, David Kelly, Greg Salmond, James Quinn



Executive Summary



FARMING SYSTEMS INSTITUTE

STUDY TOUR REPORT David Kelly, Development Extension Officer (Cotton). Emerald **United States of America (USA)**

A tour was undertaken to the USA by four members of the Australian Cotton CRC National Extension team. The tour group was as follows:

- Greg Salmond, Senior Development Extension Officer, QDPI, FSI (Dalby)
- James Quinn, Cotton Industry Development Officer, NSW Agriculture (Moree)
- Mark Hickman, Cotton Industry Development Officer, NSW Agriculture (Gunnedah).
- David Kelly, Development Extension Officer, QDPI, FSI (Emerald)

The principal objectives of my study tour were to raise my awareness and understanding of the following:

- the roles and methods adopted by USA extension staff, farmers, and consultants in the application of Best Management Practice (BMP) systems.
- the integration of the extension of technology with the implementation of such programs.

Other issues to be investigated include; extension practice, Integrated Pest Management (IPM), major advancements in Transgenic crops, and farming systems practice. All of these issues are at the forefront for the Australian Cotton Industry. These issues will be covered in more depth in the reports submitted by the other members of the touring party.

With respect to the development of BMP programs I took particular interest in the forces driving agricultural industries towards this change. Not unlike Australia, these forces stemmed from the issues of Environmental Impact, Workplace Health and Safety and consumer demand for 'clean, green' products. The intensity of the pressure placed on the agricultural industries in these regards varied from state to state and seemed to correlate positively with the extent of urbanisation.

We viewed with interest the different methods being employed to combat these problems, their effectiveness in addressing the issues, and the extent to which it hindered the farmer from doing business. The methods we observed were legislation, BMP systems, and general extension practice.

California is the most highly populated state we visited with a massive urban population and very intensive agricultural industries. Agricultural producers in California were governed very heavily by legislation ranging from the pesticide application laws to limits of products available for use. While this system is effective in preventing improper use of pesticides and reducing impact on the environment, the requirements are extremely rigid and almost prohibitive in the running of a farming operation.

We examined two BMP type programs in other states including Farm'a'Syst in Tennessee and Delta FARM in Mississippi. These systems were born out of the need for agricultural industries to demonstrate environmental stewardship, that being, responsible chemical handling and use, and management practices that minimised the impact that the operation was having on the environment. This gave these industries social and political capital which are of huge importance in relation to such things as the registration and availability of new chemical products. Both of these programs were excellent from an educational view point, providing excellent resources and a framework which farmers could set about a process of improvement. In both programs extension staff were incorporated as resource people in specific areas. We were very impressed by the level of training that the extension staff had in the USA, most holding Masters Degrees or PhD's.

My recommendations and conclusions from this tour are as follows:

- As the Australian Cotton Industry BMP program continues to evolve, the Australian Cotton CRC National Extension Team needs to cement its role as an important technical resource for growers through its explicit inclusion in the development of the manual to the incorporation of BMP issues into general extension activities.
- The regulation of agricultural industries in the USA is further advanced than what we have seen in Australia, although there is every indication that will soon happen here. As extension staff, we need to stay fully abreast of this by nurturing strong links with industry bodies such as local grower associations, Cotton Australia, and the Australian Cotton Industry Council.
- The USA extension effort received great benefit from the level of training of their staff. Australian Cotton CRC National Extension Team staff should be encouraged to undertake more specialist training in areas that would benefit the team and the industry in general.

I would like to thank the Cotton Research & Development Corporation for funding this study tour and the three other members of the touring party. I would encourage you to read the detailed tour report that follows.



STUDY TOUR REPORT

United States of America



FARMING SYSTEMS INSTITUTE

David Kelly, Development Extension Officer (Cotton). Emerald

Purpose and objectives of overseas travel

To raise awareness and understanding in FSI Development Extension Officer (Cotton) in:

- the roles and methods adopted by USA extension staff, farmers, and consultants in the application of Best Management Practice systems.
- the integration of the extension of technology with the implementation of such programs.

Other issues to be investigated include; extension practice, Integrated Pest Management, major advancements in Transgenic crops, and farming systems practice. All of these issues are at the forefront of the Australian Cotton Industry.

Tour group consists of four of the National Cotton Extension Team. This team, inclusive of the FSI officer plays a pivotal role in the adoption and auditing stages of Best Management Practices in the Australian Cotton Industry.

Introduction

The tour was undertaken by:

- James Quinn, Cotton Industry Development Officer, NSW Agriculture (Moree)
- Greg Salmond, Senior Development Extension Officer, QDPI, FSI (Dalby)
- Mark Hickman, Cotton Industry Development Officer, NSW Agriculture (Gunnedah).
- David Kelly, Development Extension Officer, QDPI, FSI (Emerald)

Funding was supplied by the Cotton Research and Development Corporation and Australian Cotton CRC.

Travel Itinerary

July 1999

Day	Date	Location	Activities and Highlights
Mon	5	San Fransisco CA	Arrive in USA, travel to Santa Cruz on way to San Jouqinn Valley
Tue	6	Merced CA	Dr Bill Weir, Farm Adviser, Uni of California Daniel Burns, Cotton Grower, 'San Jaun Ranching' Dos Palos
Wed	7	Visalia CA	Steve Wright, Farm Adviser, Uni of California
Thu	8	Corcoran CA	Bruce Roberts, Farm Adviser, Uni of California JG Boswell Company, Jim Razor, Nathan Heeringa
Fri	9	Shafter CA	Bob Hutmacher, Extension Officer Cotton, Uni of California Dr Glen Fitzgerald, Remote Sensing & GIS Researcher USDA
Sat	10	Los Angeles CA	Domestics
Sun	11	LA > Memphis TE	Travel to Memphis
Mon	12	Jackson TE Milan TE	Dr Owen Gwathmey, Crop Physiologist, Uni of Tennessee Blake Brown, Superintendent, Milan Experiment Station Melvin Newmann, Extension Plant Pathologist, Uni of Tennessee
Tue	13	Benoit MI Stoneville MI	Charles Cogan, Cotton Grower Gordon Andrews, Extension Entomologist, Mississippi State Uni. James Robbins, Entomologist, Mississippi State Uni. Dr Will McCarty, Cotton Specialist, Mississippi State Uni. Dr Jane Dever, Agrevo Dr Alan Blaine, Soybean Extension Specialist, Mississippi State Uni. Jim Thomas, Irrigation Engineer, Mississippi State Uni.
Wed	14	Stoneville MI	Fibremax Variety Experiment Plots. Brad Lewis, Jeff Gwynn, Agrevo Attend Delta Farm Fest, Agricultural Field Day Trey Cook, Executive Director, Delta Farm

Thu	15	Scott MI	Deltapine International Headquarters <input type="checkbox"/> Dr Kater Hake, Vice President, Agronomic Services <input type="checkbox"/> Dr Kevin Howard, Agricultural Engineer <input type="checkbox"/> Jay Mahaffey, Technical Service Entomologist <input type="checkbox"/> Jim Presley, Regional Agronomic Service Manager <input type="checkbox"/> Harry Collins, Head of D&PL Transgenic Program <input type="checkbox"/> Tom Ledher, President, D&PL International
Fri	16	Travel	Travel from Cleveland MI to Palestine TX
Sat	17	Travel	Travel from Palestine TX to College Station TX
Sun	18	Hewitt TX Riesel TX	Mark Nemeec, Cotton Consultant. Chris Dahl, 'Robinson Field' Cotton Grower.
Mon	19	College Station TX	Cotton Incorporated Breeders Tour Dr James Supak, Extension Program Leader, Texas A&M Dr Paul Baumann, Extension Weed Specialist, Texas A&M Robert Lemon, Cotton Agronomist, Texas A&M
Tue	20	Robstown TX	Harvey Buehring, County Extension Agent, Texas A&M
Wed	21	Memphis TE	Travel from Corpus Christi TX to Memphis TE
Thu	22	Milan TE	Attend Milan No Till Field Day
Fri	23	Travel	Travel from Memphis TE to Los Angeles CA.
Sat	24	Travel	Travel from Los Angeles to Sydney
Sun	25		
Mon	26	Travel	Arrive Sydney 6:00 AM, Arrive Emerald 4:30 PM

This report focuses on the main issues I studied on this trip, that being, the roles and methods adopted by USA extension staff, farmers, and consultants in the application of Best Management Practice systems and the integration of the extension of technology with the implementation of such programs. The other issues will be addressed in detail in the reports of the other tour members.

The Cotton Industry in Australia has embarked on a process of adoption of Best Management Practice (BMP) programs. The objective of this is a sector response to external pressures which could ultimately prevent the industry from doing business. The BMP aims to allow growers to improve their farming operations, with particular focus on reducing impact on the wider environment. Charged with inculcating this process to the industry has been a force comprising of Cotton Australia (peak cotton industry body) staff and extension staff. From the outset, extension staff were to cover the 'technical' side of the operation, being able to provide 'nuts and bolts' information to cotton growers as they make their way through the BMP process.

My goal for this study tour was to gain a better insight into how the Australian Cotton CRC national cotton extension team could best apply themselves in their role in the adoption of BMP.

In doing I not only questioned my counterparts in the USA on the roles that they play and the methods that they utilise, but also tried to gain understanding as to what forces were leading agricultural industries down the path of environmental stewardship.

Why focus on environmental stewardship?

Our travels took us to a number of farming areas with very different make-ups.

The first area visited was the San Jouquin Valley in California. We were amazed at the intensiveness of agricultural industry and urban development in what is essentially is a desert area. Average annual rainfall for much of the location was about 5 inches (125mm) and the agricultural industry is essentially fed by water generated from snow melts in more northern states.

The sights of cotton fields in the middle of towns and directly bordering feedlot dairies was something we were not familiar with, considering the sorts of problems this would incur in Australia. It soon became apparent to us however that the pest spectrum there allows for much fewer pesticide applications, and hence cotton production does not have the same stigma about it.

In the past, California agricultural industries commanded some political clout, however this has been eroded as the urban population increased. This is not only from the major cities of San Francisco and Los Angeles, but also the large towns which pepper the agricultural areas such as Fresno and Bakersfield. This influence has impacted on the agricultural industries significantly from the use and availability of pesticides, and application of fertilisers. The major issues that came under attention were worker safety and the pollution of the environment.

During the second and third week of our tour, we spent time in the states of Tennessee and Mississippi. This was predominantly dryland cropping (cotton and soybeans – and lots of it) with average annual rainfalls of between 30 and 50 inches (740mm – 1235mm). Pressures on agricultural industries seemed less here, and similar comments came from growers, industry personnel and extension staff alike – “this is a farming area”. Environmental issues, however did exist. We became aware of the issue of pollution of ground water through agricultural pesticides as well as urban waste.

Options to control the problems.

In gaining an understanding of the situation in the USA in terms of external social and environmental forces impacting on agricultural industries, we saw many parallels with Australia. This was also the case in viewing how these issues were being addressed. We saw situations where this was being tackled through legislation, BMP Programs and through general extension programs. In looking at these I draw on similarities with the system we are in, comment on effectiveness and offer suggestions in the way we can improve the way we can operate as an extension team.

1. Legislation.

The objective of the Australian Cotton Industry BMP program is to have self regulation which is more practical and to eliminate controls under legislation which is generally more restrictive.

The reason the industry has taken this approach became very apparent during our time in California.

What Does It Involve?

The Chemical laws in California are incredibly stringent and are unlike any other state (except for the far east as we were told) because of the huge urban influence. For a producer to apply any chemical they need three things:

1. An **accreditation certificate**
2. A requisition from a certified **Pest Control Adviser (PCA)**
3. Approval from the **county agricultural commissioner**.

To gain the accreditation certificate the producer needs to complete a course on chemical handling, equipment calibration, and Occupational Health and Safety, a course not too dissimilar to the ‘Farmsafe’ courses operating in Australia. PCA’s operate the same as crop consultants in Australia, however their services seem to only encompass insect scouting and control recommendations. It is a requirement that they are registered and need to undertake continuing education to maintain this registration. This comprises a set number of hours per year which may include field days or university courses. The recommendation sheet used by the PCA’s are very intensive, requiring the input of much of the Label and Material Safety and Data Sheet (MSDS) information.

Explicit records of each chemical application are required to be kept encompassing a paper trail from the time of purchase, the application of the pesticide, through to the disposal of the container. One particular grower pointed out to us that if you purchased a drum of chemical, and that drum was not received at the disposal depot, questions were asked.

Training of farm staff on the handling and use of pesticides is a requirement of all farm operations with an intensive initiation process followed up by monthly updates.

Auditing of this system comes under the jurisdiction of the Agricultural Commissioner, an official appointed to each county to uphold the agricultural regulations and laws of the state.



'I do believe that's cotton'

Inspecting Ultra Narrow Row (UNR) trials at Merced, California

The commissioner has the power to audit any farming operation at any time, checking such things as record keeping, worker training, and chemical handling facilities.

What Do Farmers Think?

We questioned a manager of a large farming operation in Kings County as to his, and other farmers attitude to this level of legislation. We were told that there was general dissatisfaction and even non compliance in the initial stages because of the amount of time required. As several people were prosecuted however, farmers generally began making this a part of their farming operation. This manager even conceded that the process had a positive impact on both him and the wider farming community. He suggested that it allowed him to keep fully in touch with legislative requirements and the process was made much easier with the use of a computer. The benefit to the wider farming community has been the elimination of the "riff raff", the minority of the people that generally cause the most problems.

Our Impression.

Our impression of the legislation system California was a very rigid and time consuming solution to the problem of worker safety and environmental contamination. It allowed no flexibility for a grower to develop a practical solution specific to their farming operation. To this end it made it almost prohibitive for a producer to grow a crop if pesticides were required.

The Australian Cotton Industry has seen a glimpse of this situation with the new use restrictions and application requirements on Endosulfan. The new label contains some requirements that are almost unworkable on a practical level. There is every indication however that this sort of requirement will move onto other chemistry.

We as extension officers need to be very aware of this situation and move our efforts to accommodate this. An example of this is the continuing trend towards ground rig application because of its potential to reduce drift and increase efficacy. We need to know what growers are doing in terms of ground rig



'Check out that Johnson Grass in the background'

Inspecting herbicide tolerant cotton trials with Dr Paul Baumann, Texas A&M

work and be ready to offer solutions to problems. There are three new larvicide products being released on the market this season and all are gut poisons, requiring insect feeding for them to work. If good coverage is not achieved the application will fail.

2. General Extension Programs.

USA Extension Staff

We spent time with approximately 10 extension officers in the USA who ranged from generalists to specialists in entomology, pathology and physiology. All of these officers obviously has a tremendous amount of rapport and respect amongst their client group. This was brought about principally by the supply of quality and timely information. One thing that became quickly obvious to our group was the levels of qualification that these officers had. Whilst most of them were principally 'generalists', they had undertaken further study (ie Masters, PhD's) in specific fields. While each of these officers worked in a particular county, as a team they were each able to utilise each other strengths.

We saw this to a great extent in both California and Texas.

Incorporating Environmental Stewardship.

I made a point of questioning these officers on their role in promoting 'environmental stewardship' in their programs. This meant not only promoting practices that resulted in less impact on the environment but also considering the environmental impact of all practices.

We encountered many excellent examples of this in our travels. Examples of this are as follows.

- Bruce Roberts, the county agent in Hanford, California had a program for optimising nitrogen fertilisers. This involved getting optimum yield without applying product to excess where leaching would pollute ground waters.
- There had been a significant amount of research conducted into the use of bio-solids (treated sewerage) for use in agricultural crops in California. Being in close proximity to several highly populated

areas, there is no shortage of this product. The application of bio-solids had shown great agronomic benefits, improving soil fertility and being a source for organic matter. Unfortunately, this product is high in pathogens and heavy metals and has been banned under state law for use on all food crops. In most areas this excludes its use on all crops except cotton. In this situation, either the law had changed since the research had been conducted or no consideration had been given to the food safety issue. Either way, the practice is not widely used, and thus the research was wasted.

- Dr Paul Baumann, Professor and Extension Weed specialist at Texas A&M University releases a number of publications on weed control in cotton. These cover products and rates for use at various stages of the crop. In addition to this, he has also produced information on how to reduce the incidence of herbicides in ground water systems. This encompasses product selection, rates, banding, reducing surface run-off and the promotion of integrated weed management.

Our Impressions

Meeting with these extension officers highlighted and reinforced two important points in the promotion of environmental stewardship in extension efforts:

- Extension officers need to have a high level of technical expertise in the fields they are working in and an excellent level of rapport and respect in their client group. Promoting environmental stewardship is often not as easy as promoting increased yield or production because the immediate monetary benefits are not always obvious. To do this successfully we need an explicit knowledge of the system we are working in, that being the client group and the production system.
- The use of a 'systems approach' to extension is essential because a change in practice will lead to a change in many other parts of the system. To this end, the Australian cotton extension team needs continuing involvement in the large issues associated with the industry. For example, this means cementing our role as a

technical base for the BMP. This will avoid the situation of us promoting systems that conflict with the interests of the wider industry.

The more experienced members of the Australian Cotton Extension team have been successful in generating an excellent relationship with their client group and a good general knowledge of cotton production in Australia. This has been enhanced further by a number of the team completing the Cotton Production Course at the University of New England. Our effectiveness in the industry however could be further enhanced if we were to undertake further training and become more specialised in some fields such as most of the extension staff that we met with in the USA. For example, I am a member of the Environment Extension Team which has focussed mainly on pesticide application but will likely expand. I believe I could play an increased role in this team if I was to improve my skills in environmental science.

3. Best Management Practice Programs

During our trip we came across two BMP type programs aimed at improving farming operations with the intent to minimise environmental impact. These were **Delta F.A.R.M** (or Delta Farmers Advocating Resource Management) in Mississippi and **Farm'a'Syst** in Tennessee.

Delta F.A.R.M

What Is It?

Delta F.A.R.M was established by an association of all farming industries in northwest Mississippi. It encompasses all farming industries. Its mission statement reads that "*it is an association of growers and landowners that strive to implement recognised agricultural practices which will conserve, restore, and enhance the environment of Northwest Mississippi.*"

This area of the USA is not as regulated as California, although there is still the presence of pressures such as community perceptions and environmental groups.



A 'Delta Farm'

A farming operations participating in the Delta F.A.R.M project had a sign like this erected at their front gate.

The program has embraced the support and assistance of several private, state and federal agencies, including **Careful by Nature**, an environmental group, **Mississippi Dept of Wildlife, Fisheries and Parks**, and the **United States Department of Agriculture**.

Whats Involved?

Participating growers receive a program manual every year which has a list of 'Best Management Practices' that growers should aim to achieve and information on who to contact for assistance with each issue. An example of this is as follows:

*Manage **Crop Residue** to reduce erosion and for insect control and to improve your organic matter.*

NRCS 453-2765

Extension Service 325-2311

USDA-ARS 686-5213

This manual is a total of 19 pages long and is very easy to read.

Each year participating growers fill in an evaluation form based on a numbered scoring system to assess current practice. Example question are as follows:

- *Do you manage crop residues?*
_____ (score out of 10)
- *Do you sub-soil or chisel in the fall?*
_____ (score out of 20)

The information generated in these evaluations is used in two ways:

1. To educate the public on the efforts that the agricultural industries are making in environmental stewardship. This sort of information is not only useful for promoting agricultural industries to the wider community but also when stating a case for such things as pesticide registration.
2. To provide Delta F.A.R.M staff with the opportunity to develop a work plan for each Delta F.A.R.M member. The work plan will aid producers in the implementation of additional programs on their farm, leading to improvement.

This plan is developed by the Delta F.A.R.M staff with the assistance from professionals from various constituent groups following the evaluation.

A total of 500,000 acres is covered by the program, encompassing about 10% of the area, although this number is increasing steadily. The Executive Director of the Program, Trey Cook suggested that the process was reasonably easy to 'sell' because the constituents were involved from the beginning. Participating producers play a large role in the promotion, through 'word of mouth', encouraging neighbours to join and being actively involved in introductory meetings. Other promotion was done in advertisements and features on TV, radio and newspapers.

Each participating grower has a large sign erected on their property, adding further promotion to the program. The grower needs only to be participating in the program to get this, without reaching any specific standards. We questioned Mr Cook on whether it was a concern that the program would lose face if a participating grower caused a problem (ie spray drift). In this situation he stated that his response would be that the grower is aiming to improve their practices and in doing so would aim to not cause the problem again.

Our Impressions

Our group was very impressed with the simplicity of the Delta F.A.R.M system and its ability to generate information that demonstrated improvements in farming practices. It allows producers to gauge how their operations compared to others in many aspects and gives excellent opportunity for them to develop plans for improvement.

The role of extension staff here is explicitly written in where an expert in a particular field is associated with one of the 'best practices'. If a producer has a question about something, he/she knows exactly who to contact.

The Australian Cotton BMP manual is much larger than the Delta F.A.R.M manual, aiming to enclose a lot of information. This proved very daunting to many growers.

Tennessee Farm'a'Syst.

Whats Involved?

The Farm'a'Syst project is funded, in part, under an agreement with the Tennessee Department of Agriculture and the U.S. Environmental Protection Agency. The goal of the project is to help farm families and rural residents assess and reduce risks affecting the quality of their water. It goes beyond any one industry and aims to include the wider community.

Participants in the program are given a series of assessment and fact sheets on such topics as:

- Assessing Hazardous Waste Management.*
- Assessing your Farmstead Site.*
- Assessing your Private Well.*
- Assessing your Pesticide Storage and Handling*
- Assessing your Fertiliser Storage and Handling*

Each of these fact sheets are written by an expert in that area. Assessment is done through a series of yes/ no questions such as:

- Do you store more than 55 gallons or more than 550 pounds of pesticides on your property? **Yes/ No.***
- Does the pesticide storage have a gravel or dirt floor? **Yes/ No***

The aim of this is to highlight to the participant that they may have a 'high risk' situation. For each question or issue, there is some explanation in the fact sheet of simple guidelines that can be followed to reduce the risk. In addition to this there is a series of contacts.

Recommendations are made on 'best practice' in reducing contamination of water. To assist participants in the adoption of these 'best practices', the University of Tennessee has set up 'Model Site Demonstrations'. These are sites where 'best practices' have been applied to reduce the risk of contaminating water resources. Open days are held at these sites where the public can inspect 'first hand' the options that are available to them.

During our time in Tennessee we had the opportunity to visit one of these sites at the Milan Agricultural Research Farm.



'That plane is awfully close'

Ag plane entertaining attendees of the International Cotton Breeders Tour at Texas A&M

The chemical storage facility at this location was designed to 'best practice' in terms of signage, bunding, ventilation and emergency procedures. During the Milan field day we were presented with the process of risk assessment and planning undertaken in the design and construction of the facility. This served as an excellent prototype for any large farm operation or business that was handling moderately large amounts of pesticide.

The University of Tennessee monitors local water quality to assess problem areas which may in turn direct the focus of the program.

This program is presented in a very user friendly way, catering for the wider community. We struck several parallels with this system and the Cotton Industry's BMP Program.

- Both programs focuses heavily on 'risk assessment' which allows people to develop plans based on their needs rather than imposing 'blanket strategies' for all situations. For example there is less risk associated with a small farmer storing smaller amounts of pesticides than a large farm which may store large amounts. It is

therefore inappropriate that the small farmer construct a storage facility to the extent of the larger farm.

- Both systems use 'model demonstrations' as a way of aiding adoption. The Australian Cotton Industry BMP has a series of 'pilot farms' across the country that consists of producers who go through the full process of self assessment, management plan development and external audit. The purpose of this is to (1) allow other BMP participants to view the system in progress and (2) allow the developers of the system to assess its workability and effectiveness.

Similar to the Delta F.A.R.M program, Farm'a'Syst uses extension resources as a 'point of contact' for those who are looking at improvement and need some assistance.

Our impressions of Both BMP Programs.

Like the Australian Cotton industry BMP, both of these systems rely on voluntary compliance, allowing interested participants to improve their operations with the promise of incentives in the future. The problem here is that there will be always a number of people who choose to not take part in the program and their actions impact on the rest of the industry. Voluntary participation also often leads to a rate of adoption that is too slow to address the issues that it was created for. This has occurred in Australia where the Endosulfan drift problems in the 1998-99 cotton season sent tremors from producer to federal government level. It was evident that the BMP program was not evolving quick enough to address this problem so alternative solutions were needed. The Australian Cotton Industry has since begun work on a program of self regulation, developing an explicit code of conduct for pesticide application, which, if not complied with would be met with industry sanctions. This regulatory program is intended to run side by side with the more educational BMP program.

In this situation we need to continue our role in ensuring growers have the best information on applying pesticides, not only to minimise their impact on the environment but also to serve their primary purpose of controlling insects.

Conclusions & Recommendations:

- The Australian Cotton Industry BMP Program is in a constant state of improvement and evolution. Feedback is constantly being received from growers regarding the process and new units are being included such as Workplace Health & Safety. As this evolution takes place, the Australian Cotton CRC National Extension Team needs to cement its role as an important technical resource for growers through its explicit inclusion in the manual to the incorporation of BMP issues into general extension activities.

- The regulation of agricultural industries in the USA is further advanced than what we have seen in Australia, although there is every indication that will soon happen here. Indeed, the changes to the Endosulfan label that have occurred in the past 6 months have heralded changes in the industry unparalleled in its history. As extension staff, we need to stay fully abreast of these issues by nurturing strong links with industry bodies such as local grower associations, Cotton Australia, and the Australian Cotton Industry Council. There is every indication that as an industry we will be moving down the path of self regulation in an attempt both reduce the impact of legislation, and assure customers a quality final product.
- The USA extension effort received great benefit from the level of training of their staff. Australian Cotton CRC National Extension Team staff should be encouraged to undertake more specialist training in areas that would benefit the team and the industry. This would be an excellent role for the more senior members of the extension team to discuss what issues and priorities are important and levelling some direction. There also may be an avenue here for some kind of scholarship program within the industry for extension staff.

Thanks go to the following:

- **Cotton Research & Development Corporation** for funding this study tour.
- The three other **tour members**.
- The **people we visited** during our tour and showed us tremendous hospitality.