

EXTENSION AND PROFITABILITY – IMPLEMENTATION OF PROFITABLE AND SUSTAINABLE APPROACHES

Ingrid Christiansen¹ and the National Cotton Extension Network²
Australian Cotton Cooperative Research Centre / Qld DPI, Toowoomba
Australian Cotton CRC / Qld DPI, NSW Agriculture and CSIRO, Emerald to Griffith

Cotton Extension Network – a Resource for the Industry

Distributed across every major cotton growing region, the Australian Cotton CRC's National Extension Network aims to enhance the returns to industry accruing from the implementation of research and development. Industry Development Officers (IDO), District Agronomists, specialist officers in the areas of Water Use Efficiency, Irrigation, Integrated Pest Management (IPM) and Spray Application Technology and a National Coordinator provide a close link between industry and research. In addition to their local role, each member contributes to a national extension effort through one of the Insects, Farming Systems, Environment, Diseases & Weeds or Water focus teams. These teams work closely with researchers and their ACGRA members to ensure that consistent messages are extended across the industry with minimal duplication of effort.

The cotton extension network is not alone in delivering to industry. The decision support group and many researchers, along with numerous industry participants, take an active role in the communication of results to industry. In addition, Cotton Australia's grower services managers play a key role in the implementation of Best Management Practices (BMP) and participation in key issues which impact on industry profitability in the political arena such as water reform.

Information and Confidence to Implement new Technologies

The extension network aims to provide profitable and sustainable outcomes for industry through influencing the awareness of, knowledge of and attitudes towards the adoption of technologies. This is achieved through information transfer (from researchers, consultants and growers), confidence building and demonstration. Using the principles "Tell me and I forget, Show me and I remember, Involve me and I understand", a range of tools are employed by the National Cotton Extension Network to promote profitable and sustainable practices. These can be categorised into five major activity areas: Information Transfer; Trials and Demonstrations; Groups; Benchmarking; and Education. Through each of these is threaded evaluation to ensure that activities are reaching the mark and achieving positive outcomes for industry.

Information Transfer

A wide range of media are utilised to communicate relevant information gathered from research and from the actions of growers and consultants. These include:

INFORMATIONpaks ENTOpak, SPRAYpak, MACHINEpak, SOILpak, NUTRIpak and WEEDpak are a compendium of relevant information on their specific issue for the cotton industry developed by researchers with support from extension teams. Designed as reference manuals they aim to take information from the filing cabinets and brain cells of researchers, consultants and growers to collate it in one, easy to reference source.

Newsletters Regional fax-out or email newsletters such as Cotton Tales and WaterWorks aim to provide timely, concise, locally relevant information to the industry.

Media A host of public media services the cotton industry and is an effective means for raising the awareness of new technologies and regional issues.

Field Days are a widely used forum for observing the results of trials, hearing from researchers and promoting discussion between industry participants. Figure 1 indicates some of the reasons people attend field days.

The format of field days varies based on regional preferences and purpose. They range from short farm walks focussed on a single topic to full day bus tours covering a wide range of issues. Regional committees play a strong role in arranging field days.

Workshops on specific issues such as spray application technology allow the issue to be discussed and demonstrated in greater detail.

Collation, distribution and interpretation of regional data such as pheromone trap results for timely use through the season.

Web The Cotton CRC website hosts a wide range of information resources and tools such as day degree calculators. Freely accessible, the website has been redesigned to enhance the functions it can offer. Forums and chat rooms will soon be operational. An average of 2 500 web pages are accessed by over 500 visitors per day with web hits increasing following the posting of a CRC e-News.

Computerised Decision Support Decision Support Tools, in particular CottonLOGIC have been developed to aid the accessibility of research information and to make it more readily usable. Further tools such as the OZCOT crop simulation model have been developed initially for research and are being developed as a crop management tool (Carberry and Bange 1998). A water use efficiency calculator is currently under trial and HydroLOGIC, a decision support for irrigation management is under development.

Technology Resource Centre Cotton CRC's Technology Resource Centre acts as a central point for the development and distribution of information resources. It also maintains industry distribution lists and develops the CRC website. It coordinates multiple format delivery such as the IPM guidelines which are available as a CRC Update, in ENTOpak, the Cotton Pest Management Guide, Insect Pocket Guide, CottonLOGIC CD or the Cotton CRC website.

Link with Research The extension team provide a channel to enhance two-way communication between research and industry. This is particularly important with the increasing size and distribution of the industry.

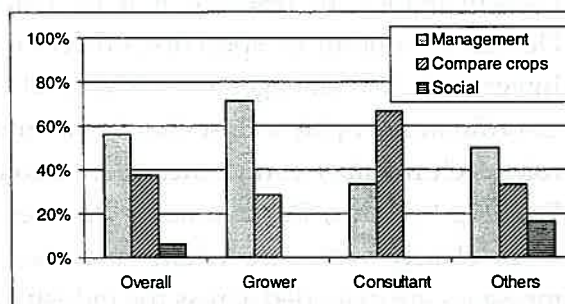


Figure 1: Reasons people attended the 2001 Upper Namoi Field day. 90% of those attending felt the day provided ideas for management changes. Source: Hickman 2001

Are the information tools effective?

Several evaluation mechanisms indicate that the information resources delivered to the industry are valued. *"The most advanced agricultural industry when it comes to information transfer from the development corporations."* Information resources are generally regarded to be useful – very useful (Figure 2) and 97% of industry participants indicated that the on-going development of information resources for the industry to be worthwhile (Cotton CRC Extension Network, 2002). CottonTales newsletters are valued as *"a very valuable source of current, valley specific information. Please keep them coming."* 100% of respondents to a survey of the Central Queensland CottonTales indicated they are useful with 63% ranking them as very useful (Kelly 2001). Similar views are held in the Gwydir valley where 82% indicated that they read every issue *"a fantastic snapshot of relevant issues"* (O'Halloran 2002) and elsewhere in the industry (Figure 2).

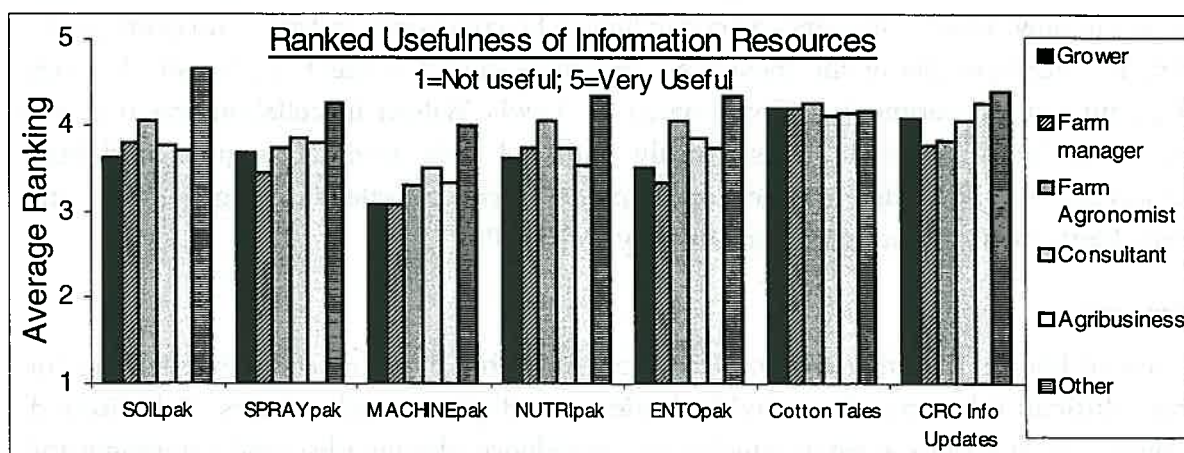


Figure 2: Usefulness of Some of the Information Resources provided to industry.
Source: Cotton Information Resources Survey 2002.

INFORMATIONpaks are utilised predominantly as an easily accessible reference. *"I have always found publications to be very informative and definitely worthwhile. I definitely prefer receiving the information as a comprehensive book that is easy to refer to at a later date."* Finding the time to utilize available resources was a problem raised by many respondents to the recent survey (Cotton Extension Network 2002). To help overcome this problem, IDOs utilize the paks in planning field days, meeting notes and newsletters.

Independent evaluation (van Beek 2000) of CottonLOGIC indicates stakeholders value it for its scientific basis. It is utilised for a range of purposes including: supporting decisions about insect control, recording farm operations, chemical use, insect identification, estimating yields, learning about pest management and informing neighbours. Consultants indicated that the time taken to enter data was one of the main reasons behind not using all the functions of CottonLOGIC, a difficulty that some expect will be overcome with the PalmOS® version. *"CottonLOGIC is a good back-up and verification tool. I would be very upset if it was not regularly upgraded"*.

Trials and Demonstrations

Conducting on-farm, regional trials has been a key part of the Cotton Extension effort from the outset. The initial IDO positions were established for the purpose of conducting regional trials to test how the science undertaken at Myall Vale and other regions applied elsewhere in the industry. Trials can be utilised for the purpose of groundtruthing and gathering local data, building confidence in recommendations or techniques, benchmarking and for developing technologies. Trials, and a strong technical base continue to be an important role for the extension team. IDOs conduct nationally coordinated trials to gain information from all regions on priority issues. They also conduct local trials developed in collaboration with growers and consultants. Water Use Efficiency officers undertake a range of benchmarking and developmental trials.

Trial results are communicated to growers and consultants via regional trial books, field days and newsletters. Growers and consultants who collaborate in trials gain even greater benefit. Perhaps one of the most well known examples is the Early Season Damage (Tipping Out) experiments. Coordinated by Lewis Wilson in collaboration with the Extension Network, these trials rapidly gathered data from all regions and built confidence in the ability of the cotton plant to compensate allowing growers and consultants to more readily implement early season IPM.

Groups

It is well known within circles of extension theory that the more complex the issue, the more difficult it becomes for individuals alone to adopt new technologies. Self directed, grower driven groups assist in building the confidence, sharing ideas and equipment and communicating results that assist in the implementation of both new and old technologies. Area wide management groups have rapidly gained momentum across the cotton industry as growers look to each other for support in implementing IPM. Recognising that pest populations don't know farm boundaries, the communication, debate and shared learning between neighbours facilitated by AWM groups is allowing greater opportunities in the management of insect pests (Christiansen and Dalton 2002).

A range of studies have indicated a high level of support for Area Wide Management, Water Use Efficiency and similar groups in the industry (Coutts et al 2002). Even in those regions where groups are less active there is much enthusiasm and interest in AWM groups. The most effective groups are those that are grower led and driven. The role of Extension in these groups is largely regarded as one of support and coordination. *"Having an IDO in the region makes leading AWM as a grower just so easy."*

Benchmarking

Benchmarking through physical trials or desktop data interrogation allow growers to view themselves on a continuum amongst their peers. Ultimately, profitability is a key driver for changed practices and benchmarking has allowed variations in gross margin returns under different practices to be explored. The Australian Cotton Comparative analysis (Boyce and CRDC 2002) presents the variation in costs of production and

participants to review how they managed their crop, what they have learnt and incorporate that into their plans for the future. Restricting enrolments to a maximum 15 participants per course allows it to be very interactive. The three pilot groups have indicated a desire to meet again on a regular basis.

Participants receive a resource kit with a comprehensive reference manual, a course workbook and several handbooks. The feedback from participants in the three pilot courses held in the 2001-02 season has been greatly appreciated and has refined the course. The IPM short course is now offered in all valleys on demand through discussion with IDOs. *"I think the course was the single most important thing I have done to improve my farming practices in the 30+ years I have been in business."*

Is Extension Delivering Profitability and Sustainability?

With the significant investment made in extension, it is worthwhile asking whether the program is delivering outcomes for the industry. With this in mind, and for the sake of on-going improvement, the extension network regularly conduct evaluation of their activities and maintain close contact with industry groups to set priorities.

Focussing on key priorities for the local industry

Close contact with industry is a key element of the mode in which the extension network operates. Regular participation in local meetings, events and forums along with individual contact allows the extension officers to keep in touch with local issues and give feedback to research programs. Industry reference groups operate for the Industry Development Officers, Queensland Rural Water Use Efficiency Officers, Decision Support Program, IPM Training Course and during the development stage of the Cotton Production Course. In some cases these are independent groups, in others the already active technical committees of the Cotton Growers' Associations take on the role. These groups provide a forum for growers and consultants to provide direction and priorities for the extension effort – growers and consultants are encouraged to actively contribute. They also provide a forum for support and bouncing of ideas for the extension officer.

The National Extension Network allows extension officers to draw on knowledge and experience from other regions. It also allows key national priorities to be addressed. A key example of this has been the *"Come Clean – Go Clean"* farm hygiene message that has been promoted uniformly across all regions (regardless of whether or not Fusarium Wilt was highlighted as a priority at a regional level) by the extension team under the leadership of the Diseases Focus Team. The recent review undertaken by Pat Colyer (CRDC 2002) indicates that the adoption of farm hygiene practices has significantly slowed the spread of this disease. Whilst it is recognised that management approaches need be the focus for the longer term, the profitability returns from slowing the spread of Fusarium wilt, even if only for a few years, are substantial.

Along with industry, State and Federal governments are key contributors to research funding. Greater focus on sustainable natural resource management in a broader sense is likely to be required in the future to meet the objectives of this group.

Meeting Core Outcomes

The key outcome from CRDC's research investment, identified by industry and government is: "A more sustainable, competitive and profitable cotton industry providing increased economic, environmental and social benefits to regional communities and the nation". Table 1 lists the strategies developed as a part of CRDC's strategic planning process together with a few examples of extension activities addressing these priorities.

Table 1: Core strategies of CRDC and some examples of related extension activities.

Strategy	Example of some Extension and Research activity
Improve chemical and non-chemical management of insects	<ul style="list-style-type: none"> ▪ Support for Area Wide Management Groups ▪ Early season damage trials
Improve chemical and non-chemical management of diseases and weeds.	<ul style="list-style-type: none"> ▪ Farm hygiene – <i>Come Clean – Go Clean</i> ▪ WEEDpak
Environmental management systems encompassing relevant catchment management strategies	<ul style="list-style-type: none"> ▪ Water Use Efficiency trials and extension
Improve farm management strategies	<ul style="list-style-type: none"> ▪ Rotation options and impacts ▪ NUTRIpak ▪ Herbicide drift damage trials
Improve potential for returns throughout the production chain and assist in development of market opportunities	<ul style="list-style-type: none"> ▪ Fibre quality trials and communication of information – Neps, Micronaire
Assess economic, environmental and social impacts on regional communities and the nation; identify and develop appropriate involvement opportunities.	<ul style="list-style-type: none"> ▪ Community education – including school visits and public events.
Involve industry personnel in regional adaptation of research and effectively transfer new techniques, strategies and discoveries	<ul style="list-style-type: none"> ▪ Key focus of all extension activities <ul style="list-style-type: none"> - Information transfer, Reference groups, AWM groups, WUE groups, Regional trials ▪ Computerised Decision Support tools
Develop and engage creative, innovative and highly trained human resources	<ul style="list-style-type: none"> ▪ Cotton Production Course ▪ IPM Short Course ▪ Trainee Industry Development Officers

Industry Attitudes Towards IPM

As insect pest management is such a significant focus for the industry, focus group studies conducted by the extension team in 1997 and 2001 have been complemented by independent surveys to assess industry attitudes towards IPM (Christiansen and Dalton, 2002). Key conclusions are that IPM has established a wide level of acceptance throughout the cotton industry with a high level, broad understanding of IPM principles and practices was evident across all industry sectors (Coutts et al 2002). This represents a significant change from 1997 where there appeared to be a lack of understanding and confidence in IPM systems amongst both growers and consultants.

Benchmarking practices

A industry benchmark survey conducted in 1996/97 and 1999/2000 by the cotton extension network allows a comparison of industry practices over time. Some key changes over that period are: General increase to more cotton and less rotation; Increasing Nitrogen (N) usage; Increasing use of N fixing crops in rotations; Increased use

of K fertiliser on some farms; 78% practicing farm hygiene for disease control and an increased usage of CottonLOGIC (McIntyre, et al 2002). This survey allows the extension network to assess change over time and to focus extension activities.

Key Changes in Information Transfer in the Future

As in all other facets of the community, information transfer technologies will continue to evolve and most likely be adopted at a rate far exceeding expectations. For example, in the month December 2001 Telstra customers sent 81 million Short Message Service (SMS) messages with a continuing uptake of 8-9% per month. Thinking beyond our current square is crucial to ensure we meet the needs of tomorrow's industry. Development of decision support software for the Palm hand held computers has perhaps been regarded by some in the industry as too advanced – perhaps this is a similar vein to the former CEO of IBM now famous for once predicting that there would only ever be a market for 3 computers worldwide!

We can expect communication technologies to be more readily accessible, utilised for a range of purposes and extend into the field. Results of a recent survey by the Extension Network indicate that 90.8% of industry participants currently have access to the internet. Of these, 95% utilise the internet at least weekly (Figure 4). Electronic media will move from paper-based formats pasted on the web to highly interactive formats – utilising the capacity of the technology.

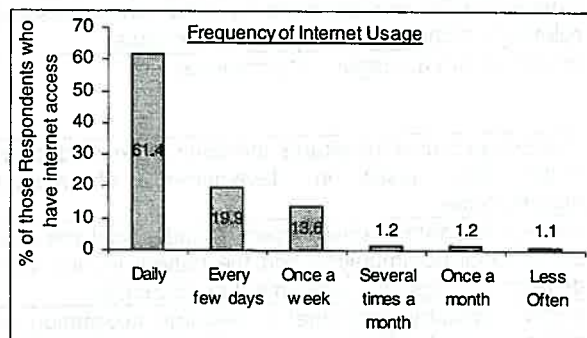


Figure 4: Frequency of internet usage amongst the 90.8% of industry participants who have internet access.

Source: Cotton Information Resources Survey 2002

However, the bombardment of information “clutter” in a range of formats is also likely to increase. The challenge for the extension effort is to provide information resources in a short, sharp format that is timely, relevant and useful. People contact will perhaps increase in importance as growers look to each other for support in finding practical application for all the information being received.

True area wide management may be the only profitable means to achieve management of pest populations – requiring increased communication between neighbours. Some AWM groups are already developing websites for communication within their group. There is a strong interest in returning to centralised databases to follow daily pest pressure within some regions. Whilst futurists may envisage communication relying on advanced telecommunications, it's unlikely that the social aspects of communication and the desire to “have a beer together” will be entirely superseded by technology.

Challenges

"I nearly lost control of a field [and so chose to take a new approach]...I have learnt more in the last 3 years than the previous twenty." This statement captures the concept that until someone chooses to take a new approach it is difficult to implement new ideas. A challenge for the extension network is in keeping ahead of the needs of the progressive, innovative sector of the industry whilst also working to encourage those less actively participating.

Extension activities aim to target the whole industry – with a range of trials and information activities for those who are interested in learning more, through to awareness level activities for those less interested. Groups assist with this process as many of those less active in seeking new technologies are often attracted to the informal, local and social nature of their meetings. They also provide a support for sharing of ideas and equipment needed to implement new ideas.

The turnover of industry participants also poses a significant challenge. It is necessary to constantly reinforce messages and repeat activities as many new agronomists and growers are entering the industry all the time. The cotton production course and IPM short course contribute towards developing the skills and confidence of new players. AWM and WUE groups assist in helping all participants to learn from each other's experience.

Optimising on-going profitability and sustainability at a farm level requires a long term approach taking into consideration each farm's specific set of circumstances, attitudes and approaches. The role of extension lies in facilitating communication and information transfer to ensure that growers and consultants are in the best position to make decisions to suit their unique situation. The Cotton Extension network utilises a range of approaches to transfer information, build the confidence and facilitate communication to enhance the adoption of profitable and sustainable practices across the entire industry. Despite this broad focus, it is those people who are open to and actively seek new ideas, who choose to learn and take the risks that will gain most benefit from the extension network and research investment.

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