

All for one and one for all: the story of 'Harcourt' and the Dawson Valley cotton growers

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Abstract. Extension theory suggests an unsafe or threatening environment detracts from the ability of adults to learn and that lack of financial viability inhibits the adoption of new practices. What role then does extension play in supporting communities experiencing extraordinary financial stress and psychological trauma following natural disaster? The Dawson River received record breaking floods in 2010 causing more than A\$36 million in lost income and damaged infrastructure to 22 irrigated cotton farms. The Dawson Valley Cotton Growers Association (DVCGA) had a strong history of environmental stewardship. Between June 2011 and December 2012, the DVCGA members attended workshops covering environmental and agronomic practices, supported by a comprehensive monitoring and evaluation framework. Growers identified actions to improve practices and infrastructure design using the industry's voluntary Best Management Practice (myBMP) program and were supported with incentive funding by the Fitzroy Basin Association and the Australian Government. By December 2012 growers had undertaken significant repairs and improvements to their farming systems and achieved the highest rate of adoption of myBMP of any Australian cotton growing region. Highlights included: Strong integrated coordination of extension and industry activities; Genuine engagement; Building long term, local support networks for growers; Regular scheduling of workshops.

Keywords: Best Management Practice, Community, Floods, myBMP, Natural resource management, Resilience

Introduction

Documented extension theory suggests an unsafe or threatening environment detracts from the ability of adults to learn and that lack of financial viability inhibits the adoption of new practices. This paper shares the experience of both the extensionist and landholders in the Dawson Valley, Central Queensland following record flooding in the region in December 2010. The programme of extension discussed includes workshops and incentive funding primarily supported by the Fitzroy Basin Association (FBA) through funding from the Australian Government's Caring for our Country (CFOC) Reef Rescue program (June 2010 to June 2013), the Australian Government's CFOC Disaster Recovery program; and also activities supported by the Cotton Research Development Corporation (CRDC) and funded through the Australian Government's CFOC Landcare program (October 2012 – October 2013). By reflecting on the process and results from both points of view, we seek to build a greater understanding of what role extension and the extensionist may play in supporting communities experiencing extraordinary financial stress and psychological trauma following natural disaster.

Background

In October 2010, Blue Dog Agribusiness was contracted by the Natural Resource Management group, the FBA, to identify and develop projects with cotton growers and irrigators in Central Queensland that would improve water quality outcomes in the catchment under the Federal Government's Reef Rescue incentives program. Growers were to identify these improvements through undertaking the cotton industry's voluntary best management practices program (myBMP).

Cotton industry myBMP

myBMP is a voluntary farm management system that provides self-assessment mechanisms, practical tools and auditing processes to ensure that cotton is produced with best practice across a range of focus areas. The first edition of myBMP was released in Australia as a paper-based Manual in December 1997. Its key aim was to help growers minimise environmental risks associated with pesticide use. Second and third editions were published in 2000 and 2002 to include provide updates and guidance on farm hygiene and safety, land and water management and petrochemicals (CRDC 2000; 2002). The program was then developed into a web-based system and launched in August 2010. There are currently 585 individual practices across all farm management areas against which growers benchmark their operations. These include:

- Biosecurity (avoidance, management and control of pests and diseases)
- Biotechnology (stewardship of Genetically Modified cotton varieties)
- Energy and Greenhouse Gases (efficient use of energy inputs such as fuel and fertilizers)

- Fibre Quality (growing the best quality cotton)
- Human Resources (best management practices for staff and contractors)
- Integrated Pest Management (weeds, pests and diseases)
- Natural Assets (property planning, stewardship of vegetative and riparian assets on-farm)
- Pesticide Management (all aspects of pesticide storage and use)
- Petrochemical Storage and Handling (all aspects of petrochemical storage and use)
- Soil Health
- Water Management (covering water quality, efficiency of storage and distribution as well as both dryland and irrigated farming practices) (www.mybmp.com.au 2013).

The online system offered a number of benefits compared to the hard copy system, including the ability to be constantly up-dated, as well as providing direct links from each practice to related research and extension tools. With the new extension focus, it retained its role as a simple Environmental Management System incorporating the 'plan, do, check and review' process. From 2010, the FBA supported the adoption of the revised online myBMP system for irrigated cotton growers across Central Queensland. Using the tools provided by Cotton myBMP, growers were encouraged to assess their current practices and identify and manage areas of possible risk to water quality. The FBA provided funding for projects developed through myBMP on-farm assessments.

About the Dawson Valley

The Dawson Valley catchment is one of three key cotton growing regions located in Central Queensland, running north from Duaringa approximately 120 km west of Rockhampton, south to Taroom 485km north west of Brisbane. The Dawson River, more than 600 km in length, is one of five major tributaries of the Fitzroy River which flows into the Great Barrier Reef lagoon (FBA 2013). It supports approximately 4,650 ha of irrigated cotton farming centred at the irrigation service industry township of Theodore (Cotton Australia 2012).

The Theodore Irrigation Scheme was the first of its kind in Queensland and has been operating continuously since 1926 (Sunwater 2013). All of the 22 irrigated cotton farms in the Dawson Valley are family-owned and operated. They are relatively small in scale ranging in size from 40 to 830 ha; the average irrigated farm size is 360 ha compared to the national average of around 400 ha (Cotton Australia 2013) and nearly all operate mixed enterprises which grow other rain grown crops and raise cattle.

The Dawson Valley Cotton Growers have a strong history of environmental stewardship. In 1999, Dawson Valley property 'Badminton', Moura, was the first cotton farm in Australia to be audited under the cotton industry's BMP program. By 2002, 95% of all DVCGA properties were actively using BMP to benchmark and improve practices on their farms. Over the last two decades, the DVCGA had engaged in several NRM initiatives to reduce soil and water borne contaminants chemical and soil loss. This had required significant financial and labour investment over the last decade, all of which has been contributed by the families themselves, with no or very minor grant assistance.

Impact of the 2010 Floods

At the end of December 2010 record flooding occurred in the Dawson River. The river levels were the highest in recorded history; final heights are recorded as 14.7 m (Bureau of Meteorology 2011) but were estimated at the time as SES personnel were unable to access facilities to undertake monitoring during its numerous peaks (CQ Telegraph 2010). The small town of Theodore was declared a disaster zone and the 300 residents were air-lifted by the army, RACQ and locally operated helicopters. Theodore was the first town in Queensland's history to be mandatorily evacuated by the Queensland Government (Queensland Floods Commission 2011).

The flooding caused more than A\$36 million in losses to the 22 irrigated cotton enterprises – more than an average of A\$1.5 million each business. At the time it was estimated that A\$5.25 million was damage to infrastructure, however it is now clear that this figure was drastically understated. Of the 22, 14 lost more than half their cotton crop and of those, 7 lost 100%. As is normal practice in the Australian cotton industry, growers had forward sold their cotton crops on fixed bale contracts and were now liable for their value also as they were unable to supply cotton to fill their contracts (Fisher Financial Solutions 2011). This compounded the impact of earlier and lesser floods which the irrigators encountered in March 2010.

While other regions experienced tragic loss of life and extreme trauma, this small community attempted to cope emotionally with the disruption, crushing financial effects and the overwhelming experience of being flooded for the second time in 12 months.

Extension response to natural disaster

The changed role of extension

Before the flooding, the aim of the extension component of the devolved grants was simple. The extensionist would help growers use the new myBMP system, assist growers with their on-farm assessments and guide growers on the eligibility of projects relevant for incentive funding. During the flooding across Central Queensland, but particularly in the Dawson Valley, it was clear that the extension role and program of activities required extensive revision.

Initially, an informal discussion with undertaken with the CGA President Fleur Anderson as to whether to continue. The contract required the development of projects with 31 irrigators across Central Queensland; many now were devastated financially and emotionally, particularly those businesses from the Dawson Valley. Adopting BMP may not provide immediate financial benefits to a grower because achieving industry certification (well over and above minimum legal requirements) can be costly, particularly in regards to infrastructure. It was possible that the additional costs of myBMP investment would not be perceived by growers as a priority, or even possible, for some at this time. Upon support from the CGA President for a revised approach, the following activities were undertaken by the extensionist to support the irrigators in the two and a half year period following the flooding up until June 2013, in addition to the original contracted extension work.

Additional funding The extensionist initiated and brokered a second funding proposal which provided the basis of the FBA's Flood Recovery funding and provided an additional A\$600,000 in funding for all Central Queensland irrigators, as well as sourcing devolved funding and technical support through the CRDC partnership for growers to address riverine environmental weed incursions resulting from flooding.

Revision of the existing delivery program Incentive guidelines and delivery time frames for Reef Rescue funding were re-negotiated by the extensionist. FBA responded quickly to provide flexibility in doubling the cap for incentive projects to support the redesign and rebuilding of farms to BMP standard. Extension products and delivery were designed anew to address flood impacts and the growers' changed circumstances. This included sourcing technical specialists to provide specific information to target post-flood challenges that had not been encountered beforehand.

Keeping things simple Given the multiple sources of funding now being directed into the region, the organisational requirements of different extension and funding contracts needed additional management and coordination. The aim was to ensure that landholders perceived all activities as a simple, single extension and delivery programme, with minimal administrative requirements.

Stakeholder liaison and gatekeeping role Throughout the process, the extensionist continued to liaise with the CGA president to review growers' health, wellbeing and the damage to crops and property during and after the floods and to seek feedback and guidance on acceptable steps forward. Given the multiple sources of funding now being made available, another important role was as informal 'gatekeeper' with other industry, natural resource management and extension organisations to avoid duplication of services and minimise demands on irrigators' time.

As per the original programme requirements, the extensionist undertook property visits with all growers to develop funding applications. However the function these visits played differed greatly from its original intent, with all landholders to varying extent, used the opportunity to debrief their personal and financial experiences during these visits and in phonecalls.

Design of extension products

Between June 2011 and December 2012, growers, family and community members attended four Cotton myBMP workshops covering the areas of natural assets, soil health, water management, pesticide and petrochemical storage and application and integrated pest management at Theodore. 5 local service industry members attended a myBMP Adviser workshop.

Each workshop was different and specifically tailored to the requirements of the growers. They combined elements of field exercises, technical guest speakers, decision-making tools, but were underpinned by the use of the myBMP program at the conclusion of each workshop. With a bank of 20 laptops with wireless internet access, loaned for each workshop from the Queensland Department of Agriculture, Food & Fisheries (QDAFF) Grains BMP program, growers progressively learnt to use the system. They were made aware of links to further research and

extension information, benchmarked their operations against the myBMP practices and created action plans.

At each workshop all participants routinely undertook qualitative evaluation either by written survey or using TurningPoint® Audience Response system (Keepad Interactive, Sydney). This cumulatively collected demographic information, levels of knowledge, competence and farm practices, attitudes and evaluated the workshop experience. The evaluation tools allowed the growers to direct their training experience by selecting topics, dates, times and guest technical speakers for their next training event, as well as identifying areas where additional information would be helpful. Technical, extension and natural resource management staff also contributed their observations which were incorporated into the evaluation. This was used to fine-tune and improve each workshop in the series.

Quantitative data on practice adoption and change was digitised spatially on maps and financial contributions recorded for FBA, as well as individual practices documented via the online myBMP program.

The Action Plans for improved practices and farm infrastructure design generated through the workshop process, where demonstrating significant water quality outcomes, were used as the basis of project applications for the incentive funding provided through the Australian Government's Reef Rescue Caring for Our Country initiative and Flood Recovery Fund.

Extension and program outcomes

The outcomes from the FBA's Reef Rescue & Flood Recovery program, plus the CRDC's Caring for Country contribution have been clearly successful on a number of levels.

- Twelve technical specialists from the CRDC, CSIRO, Cotton Australia, QDAFF, FBA and the DCCA Dawson Catchment Coordinating Association, Banana Regional Council and private researchers provided tailored information at the workshops. A number of these dedicated people attended all of the workshops.
- Grower and service industry attendance for each workshop remained at 95% of all cotton businesses in the Dawson Valley. Numbers attending ranged from 18 to 27 growers for any one workshop. For some enterprises, the whole family would attend; other families made sure there was always one person participating, regardless of what was happening on the farm. Only one business did not attend, but has since registered their interest in starting the *myBMP* process individually.
- At the start of the workshop series, growers' skill with computers was measured (Table 1), as well as their comfort with using the online *myBMP* program at home without assistance (Table 2). Computer skills varied across the group with one grower reporting that they had never used a mouse prior to the first workshop. This provided significant challenges in facilitation with a group this size, but was managed by the many service industry members attending who provided one-on-one support to growers as required. Only 22% of the growers had viewed or used the online programme prior to June 2011. At the end of the workshop series, despite 30% of the growers describing their computer skills as less than average, 67% felt comfortable using *myBMP* unassisted and 33% with some help.

Table 1. Cotton Growers' rating of their computer skills

Level of knowledge/experience	Jun 2011 (%)	Aug 2012 (%)
Awful - I hate computers	13	12
Introductory level knowledge	17	12
Some knowledge	9	6
Average level of knowledge/experience	22	23
Good knowledge/experience	22	29
Very good knowledge/experience	17	18

Source: Alexander 2011, 2012, personal file.

Table 2. Cotton Growers' rating of their confidence to use myBMP unassisted

Confidence to use myBMP website at home	Jun 2011 (%)	Aug 2012 (%)
Yes, confident	57	67
Maybe but I'd like a bit more help	43	33
No, not confident	0	0

Source: Alexander 2011, 2012, personal file.

- Growers are using the myBMP program at home and service industry members are providing support. A smaller sub-set of growers have met after the workshops to help each other and work together on the program. By July 2013, four growers will have undertaken an external audit of all 11 modules on their farm (Roth, G, 2013, myBMP Audit Office, pers. comm., 29 May). This is a voluntary exercise, undertaken at the grower's cost and well beyond what was required to qualify for the Reef Rescue incentives.
- Significant on-ground action and grower investment occurred in the Dawson Valley. A total of 22 businesses developed and completed projects across a total property area of 31,103 ha and a total irrigated area of 6,048 ha. Substantial water quality improvements were made across a number of practices including nutrient management 5746ha, soil management 4874 ha, pesticide management 5,745 ha and irrigation & storm water improvements 3554 ha. For the Reef Rescue component alone, a combined investment in improved practises and infrastructure was made of A\$3.25 million comprised of FBA funding of A\$389,444 (12%) and grower contribution of A\$2,860,589 (88%) cash and in-kind (FBA 2013). The flexibility in incentive guidelines and group workshop format promoted innovative and collaborative approaches to farm design evidenced by neighbours who significantly redesigned their properties together as single design area and many growers undertaking substantial farm redesign to mitigate potential impacts from future flood events.

Lessons from the process

From the observations and comments made by all of those attending, there were a number of key strategies which were identified as being particularly important in the success of the workshops.

A partnership approach At last count, more than 40 individuals and many organisations have helped with the extension program. Workshops were delivered by a partnership of DAFF, Cotton Australia, agronomists and catchment group staff. Integration and coordination of all extension and industry activities reduced the impost on grower time and provided greater depth and interest to myBMP practices.

Genuine engagement with the community The Dawson Valley CGA was an existing local group, small in scale with common interests and issues. Workshops were held on properties or at the local hotel, all family members and staff were encouraged to attend and each workshop was followed by a social event. A level of familiarity and trust encouraged networking, open discussion and cooperation on area-wide issues. At each workshop the group was invited to choose their next topic, date and suggest guest presenters of interest.

Building a long term, local support network for the growers Supported by Cotton Australia and the CDRC, myBMP training for advisers aimed to provide growers with ongoing access to information and support, which would be in place without reliance on externally funded extension. Like my own business, some of the consultants had suffered two months without income so this was also a way to support them.

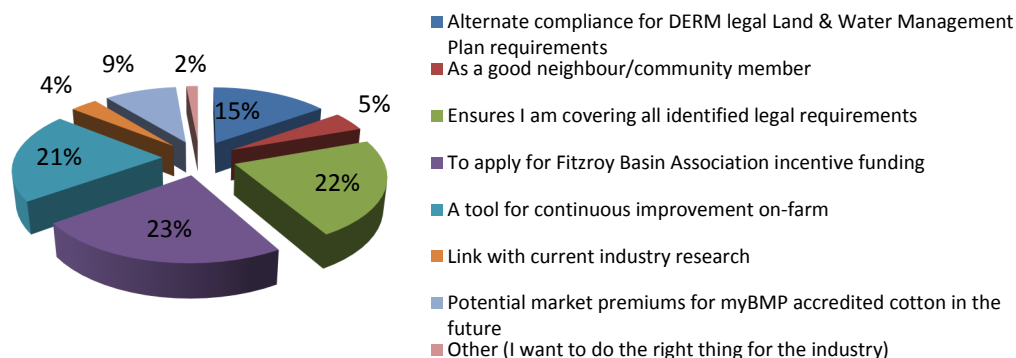
Using myBMP as a tool to provide measurable gains over time Each module of the myBMP program was used as a building block to underpin the extension activities at each workshop. If a grower attended a workshop they left knowing they'd completed something that day. Over five workshops, growers completed six modules and more than 300 individual practices together and gained confidence in using the system.

A mechanism for government support following natural disaster Clearly the incentives, when linked to best practice, were a successful mechanism for financial support for growers following natural disaster. Rather than providing charity for this stricken community, the money provided growers with the opportunity to redesign, rebuild and replace existing infrastructure according to industry best practice. It is possible that without the integrated support of incentives and extension, many growers would have rebuilt basic infrastructure to produce crops as quickly as

possible with least cost; best practice would not have been a priority. Figure 1 demonstrates demonstrate the role that economic incentives played as an effective motivator for change.

A key limitation for this mechanism was the inability to renegotiate funding and project completion dates beyond the end of the official Reef Rescue program conclusion; growers' resulting poor financial position and continuing adverse climatic conditions have seen a small number of growers not able to conclude their planned works, who would have, given more time.

Figure 1. Motivation of Dawson Valley cotton growers to participate in myBMP extension workshops



Source: Alexander 2011, personal file.

Conclusion

While the discussion has focused on the extension delivered post-flooding, it is very important to recognise that many individuals and organisations provided services and support to the Dawson community after the 2010 Floods; this is just one example.

In a series of many small steps, now the Dawson Valley CGA aims to be the first cotton growing valley in Australia to produce and process cotton which could be marketed as a 100% Australian BMP product. This is hugely ambitious given the state of growers' properties, finances, health and social wellbeing only two and a half years ago. Numerous members of the industry are quietly seeking partnerships at a producer, processor, corporate and marketing level towards this goal.

While many theories of adult learning practice were applied to make the workshop experience a positive one, no single principle explains or is responsible for the outcomes following the activities. The purpose of this discussion has been to document and recognise the group and individuals' achievements and share some of the lessons that underpinned the process and outcomes. Other important factors such as the resilience of the community pre-flooding and the relationship of the extensionist with the growers, have not been discussed in this paper, but can be assumed to contribute to the outcomes. Although not measured or initially intended, we observed that the social support provided by the workshop events and the scheduling of these throughout the two years, played an important mitigating role on the development of trauma amongst some of the community.

For the extensionist, the experience as a guide for others could be viewed as high risk, high responsibility and challenging emotionally and intellectually. Extension must be wanted and guided by landholders, the learning activities must be bespoke and highly effective and the extensionist(s) must be flexible in their role and actively listening and aware to respond to landholder needs identified as the activities progress. The Dawson Valley cotton growers are still on a long path to financial and emotional recovery. However, our experience indicates that extension can play an important and valuable role in assisting landholders to address natural resource issues after a natural disaster.

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