MANAGING THE ENVIRONMENTAL IMPACTS OF COTTON GROWING — AN AUSTRALIAN PERSPECTIVE

Allan Williams – *Executive Officer, Australian Cotton Growers Research Association*

Abstract

The Australian cotton industry has had in place since 1997 a voluntary environmental management system – its Best Management Practice (BMP) Program – that has successfully overcome the limitations of a purely regulatory approach to natural resource management. The BMP Program focuses on the management of pesticides and petrochemicals, soil and water, and native vegetation.

The industry is looking to build on the success of the BMP Program, and is in the process of negotiating for it to provide an alternative means for cotton farmers to comply with any existing or new regulations governing how land and water is managed in Queensland.

Reviews of the BMP Program and of its outcomes highlight that it has led to a decline in pesticides used on cotton farms, a decline in pesticides found in riverine environments, improved stormwater management, improved farm management and a reduction in the regulatory burden on cotton farmers.

This paper will outline the structure of the cotton industry's BMP Program, highlighting the factors that have been critical to its success, including a detailed discussion on the rationale behind the partnership approach, between the industry and regulators, seen as necessary to achieve on-ground change. The paper will then touch on the benefits the Australian cotton industry sees in working with the World Wide Fund for Nature (WWF) on its 'Better Cotton' initiative.

Introduction

Cotton has long suffered bad publicity — it has been associated with oppressive working conditions in the spinning mills that heralded the first industrial revolution, the use of forced labour, overuse of and pollution by agrochemicals, overuse of water and the introduction of biotechnology. Yet cotton remains a popular fibre with consumers; and although its share of the world's fibre market is decreasing, total consumption continues to rise despite these concerns.

So does anything really need to change?

Certainly the view in Australia was yes, things did need to change, for a number of reasons:

- To address environmental impacts that were associated with cotton growing
- To demonstrate that the industry was willing, and able, to take responsibility for its actions
- To help overcome negative perceptions held about the impacts of cotton farming (and thereby maintain the industry's 'social licence' to operate
- To maintain access to chemical inputs
- To minimise additional regulation of farming activities.

How that change was effected is described below.

Background to the development of the BMP Program

As a result of increasing concerns about the levels of pesticides detected in the rivers in cotton growing regions, the Cotton Research and Development Corporation[1] (CRDC) instituted a major research program in collaboration with the Murray-Darling Basin Commission and the Land & Water Resources Research and Development Corporation that studied the fate and transport of pesticides in the riverine environment. One of the major aims of the program was to develop management solutions to minimise the transport of pesticides off-farm and the Best Management Practices Manual ("BMP") was developed as the tool to achieve this goal. However, it soon became apparent that further support for the BMP Manual was required, in the form of a dedicated implementation effort and an audit process to verify adoption of improved practices. Collectively these 3 components form the industry's BMP Program.

Components of the BMP Program

The BMP Program consists of three components:

BMP Manual[2]

The Best Management Practices Manual is designed to help cotton growers identify and manage the risks associated with the use of pesticides and petrochemicals, and to manage their soil, water and vegetation.

It addresses the following topic areas:

1. Application of Pesticides
2. Storage and Handling of Pesticides
3. Integrated Pest Management
4. Farm Design and Management
5. Land and Water Management
6. Storage and Handling of Petrochemicals
7. Farm Hygiene.

A companion manual covers occupational health and safety.

Each of these modules consists of:

- Best Management Practice Booklets that explain what the practices are for the topic, and why they are important. Legal obligations are outlined, and practices recommended to help meet these responsibilities are described
- Self-assessment worksheets that help cotton growers assess their own operation against recommended best practices. Lists of resources to help plan and implement best management practices are included.
- Action plans are developed (on the blank templates if desired) to address those areas identified during the self-assessment process.

[1] CRDC is funded by a compulsory per-bale levy on cotton growers, which is then matched (up to certain prescribed limits) by the federal government

[2] The BMP Manual is based on the self-assessment concept developed by Farm*A*Syst, with additional ideas contributed by the Ontario Environmental Farm Plan documentation

The BMP Manual provides both a risk-assessment process, as well as suggested best practice solutions. Many documents, strategies, action plans and publications raising awareness of issues that need to be addressed highlight the risks that may arise from carrying out an activity, but go no further. It is fundamentally important that the solutions are also explicitly identified and provided (and not simply referenced in another document or location).

Implementation

The modern farmer faces an ever-increasing list of management issues. The conjunction of generally declining terms of trade for agricultural commodities with greater community expectation regarding how the environment should be managed has placed additional burdens on all farmers. Unfortunately, this conjunction also often coincides with a greatly reduced presence 'in the field' by those traditionally providing advice to farmers, the extension agents of a relevant jurisdiction's department of agriculture. Furthermore, the move towards (and need for) more formal management systems for farmers is colliding head-on with a traditional and still very strong 'informal' management style. Even in the Australian cotton industry, generally viewed as a progressive and leading industry, the majority of cotton growers do not have dedicated office or secretarial support available. A survey of cotton growers conducted as part of a study (Williams 2001) found the following:

- About 50% of growers surveyed did not employ full time administrative staff
- 65% of growers surveyed employed 4 or fewer full time production staff
- Over 70% of growers surveyed did not employ full-time maintenance staff.
- 45% of growers surveyed did not have written procedures for their operations
- Less than 30% of growers surveyed held formal meetings with their employees
- About 65% of growers surveyed spent less than 10 hours per week on record keeping.

These survey results reflect that many cotton farms are small to medium sized businesses, operating with small numbers of full time staff, under informal styles of management. Successfully implementing an environmental management system on such enterprises requires an approach that is 'issue-focussed', practical, and underpinned by strong, ongoing industry support.

These factors combined to make it essential that the BMP Manual is delivered by direct support. All surveys conducted of participants in the BMP Program have indicated that this has been critical to the success of the BMP Program.

Implementation of the BMP Manual is the responsibility of Cotton Australia, the peak cotton grower representative organisation. A dedicated team of 8 grower services managers, located throughout the various cotton growing regions, provide assistance and advice to cotton growers on adoption of practices contained in the BMP Manual, through workshops and individual farm visits. This provision of dedicated support, especially the individual assistance, has been critical to the success of the BMP Program. Current participation in the BMP Program is estimated at 75% of all cotton growers.

Audit program

A voluntary audit program, based on compliance with the BMP Manual, has been established to help objectively verify the on-farm implementation of best management practices. Audits not only provide an objective assessment for the grower and advice on areas where improvements can be made; they also allow for compilation of information on the industry-wide adoption of best management practices. Industry auditors are required to complete an environmental systems auditor's course. The course has been tailored to the BMP program, and is recognised by both

the Australian Auditors' Association and the international Environmental Auditors Association. The Cotton Research & Development Corporation has provided this specialist environmental auditing training to some 20 people with expertise in cotton production. Auditors are therefore well trained in environmental management and are familiar with cotton farming activities. The auditors' practical experience has been greatly beneficial to the efficacy and credibility of the program, and greatly appreciated by the audited cotton growers. A dedicated audit office has been established to oversee the administration of the audit program. As at July 2005, approximately 360 cotton growers had undertaken, at their own expense, an audit of their compliance with the BMP Manual. This represents over 40% of Australian cotton farmers, and approximately 60% of the land cultivated to cotton.

A recent review of the BMP Program (Macarthur 2003) has highlighted the importance of the audit program to its external stakeholders, with over 90 % of external stakeholders surveyed indicated that they agreed (and over 80% strongly agreeing) that the audit program was 'critical' to its success.

BMP Program Achievements

Monitoring Outcomes

Setting meaningful performance goals and measuring progress toward those goals is crucial to the success of any environmental initiative such as the BMP Program. Broadly classified, there are three types of indicators that can be used to measure progress towards goals:

- Management Performance Indicators (MPI's). These are aimed at assessing the steps taken by farm management to improve performance, such as the implementation of BMP's, or the number of cotton growers audited under the BMP Program
- Operational Performance Indicators (OPI's). These look at the inputs or outputs as a means of measuring change over time of the quantity in question, for example measuring water use to determine whether water use efficiency is improving as a result of changed irrigation practices
- Environmental Condition Indicators (ECI's). These provide information about the state of the environment, such as water quality in rivers, soil condition or the state of native vegetation.

Many of the outcomes that are being sought in Australia, such as 'healthy rivers' and 'biodiversity' ultimately need to be assessed through measuring ECI's, and are most appropriately monitored and assessed at a catchment scale[3]: yet efforts to improve management practices are necessarily undertaken at the farm level. Monitoring the specific resource outcomes sought to be achieved by the implementation of best practices at the farm level is still problematic. Apart from the sheer cost and feasibility involved in individual farms or even an industry monitoring environmental conditions at the necessary scale, there is still considerable work required to make the explicit links between many of the on-farm practices and the anticipated environmental outcomes.

Outcomes from the BMP Program have therefore generally been monitored focussing on MPI's and, to a lesser extent OPI's at the farm scale. This has been conducted primarily via the auditing process, but also through surveys and questionnaires of audited cotton growers, the second industry environmental audit (GHD 2003) and the review of the BMP Program (Macarthur 2003). ECI's have been generally only been measured indirectly and informally through the monitoring of pesticides monitoring (in beef cattle and rivers), although the recently introduced

[3] Catchment is the Australian terminology for watershed

land and water management module contains detailed requirements for monitoring soil and water.

Nevertheless, the industry accepts the importance of clearly defined targets as contemplated by WWF's Better Cotton initiative, which are a combination of farm-scale OPI's and ECI's. Gunningham (2004) explains the industry's situation well:

> "… in order to convince skeptical third parties that claimed improvements in performance are genuine, it is crucial that a self-regulatory initiative develop clearly defined targets. It can be argued that concrete targets are impossible to achieve in the early stages and that it is better for participants to feel their way, rather than resisting (and perhaps refusing to enter) a program which might commit them to non-attainable targets, or ones which, in retrospect, it is uneconomic to achieve. It is far better in these circumstances to begin with good faith obligations of a general nature and process based obligations (for example in terms of developing and implementing BMPs)."

Thus involvement in the Better Cotton process represents a next logical in the development of the industry's BMP Program: demonstrating the actual improvements being made as a result of the adoption of better management practices. The challenge will be to find targets / indicators that are relatively easy to measure and have a direct benefit for the cotton grower, and that also monitor the improved environmental conditions being sought by WWF.

On-Farm Outcomes

Any move to more explicit targets does not mean that the adoption of BMP's has not lead to an improvement in various natural resource conditions in cotton growing areas of Australia. Rather, it is a recognition of the need that if the industry desires further external credibility for its efforts, it needs to involve environmental groups in the standard setting process (Gunningham 2004), and that it needs to make a commitment to demonstrating that the ultimate aim of better management practices, i.e. improved natural resource conditions, is actually been achieved.

As noted in GHD (2003), "The BMP Program has been a driving factor for the improved environmental management observed on cotton farms [since the first environmental audit of the industry in 1991]", noting further that "The BMP Manual is an excellent tool for systematic and detailed evaluation of environmental issues and implementation of continuous improvement action plans. The audit identified a direct link between the areas of improvement observed on the properties and the BMP modules available to the growers at the time of the audit". The recent assessment of natural resources conducted by the National Land & Water Audit (2001) noted to that "Adoption of these practices (i.e. those contained in the BMP Manual) is progressing well".

Some of the changes as a result of the BMP Program include:

- Improved communication, both internally (with farm workers and contractors) and externally (with neighbours)
- A significant increase in the use of weather monitoring equipment for planning and managing pesticide applications
- Improved storm water retention and re-use
- Reduced detections of pesticides in rivers in cotton growing regions
- An improved understanding of the legal requirements associated with using pesticides
- Significant capital expenditure on upgrading and improving chemical storage facilities
- Increased chemical container recycling.

Related initiatives of the cotton industry have also resulted in:

- Improved land management through minimising erosion, identifying and managing salinity and reduced soil compaction (GHD 2003)
- On-going increases in water use efficiency (GHD 2003)
- High adoption of integrated pest management practices (GHD 2003).

Characteristics of a successful environmental program

The experiences of the Australian cotton industry have highlighted the following important characteristics for a successful environmental program:

- A clear, practical focus (preferably with a specific driver)
- A solutions based process
- Strong industry support
- A staged or gradual introduction
- Dedicated support for implementation.

One point that needs to be stressed is that a lack of information (eg. on how to manage a particular issue) has not generally been a constraint; indeed, as argued above, a surfeit of knowledge has often been the problem.

Partnerships

The cotton industry has argued for some time that a partnership approach was required that incorporated the strengths of the traditional 'self regulation' and 'external regulation' models (Williams 1999), whilst simultaneously addressing their respective weaknesses. This call has been supported in recent times by various commentators, for example Gunningham (2002) who notes "Environmental partnerships can provide equitable and effective solutions to some environmental problems ... and they offer an attractive, and as-yet under-utilised, policy option".

There are a number of reasons that make a partnership approach attractive. The (almost overwhelming) plethora of new regulations continually being introduced requires a filtering process. The flood of information available is reaching the point where it is becoming unmanageable for farmers, who, as evidenced above, generally place a low priority on paper work and office related tasks and often use informal management styles. A brief list of issues confronting farmers in Australia includes pesticide management, land and water management plans, catchment management plans, vegetation management plans, greenhouse gas emissions, salinity action plans, codes of practice and quality assurance programs—all before reaching the field!

Gunningham (2004) notes

> "Uniform standards, while less costly to develop and to administer, fail to account for variations in the robustness of ecosystems, or changing climatic conditions. In circumstances where what is needed are positive measures to reverse degradation in conjunction with the development of an ethic of environmental stewardship, then traditional regulation has little to contribute. It neither encourages a sense of ownership of environmental problems and solutions nor is it conducive to changing attitudes to environmental management and engendering a 'custodianship ethic'".

As a result, many legal obligations are expressed in general terms and do not give practical guidance on how the relevant duty can be satisfied, leaving decisions as to the means to achieve the standard up to the individual. Whilst not specifying the ways that compliance must be achieved avoids the risk of having laws with very narrow application, or that stifle innovation and the use of appropriate, site-specific solutions, the lack of specificity also means that practical guidance needs to be provided to farmers on the options available to meet those general legal duties.

Complying with legislation demands considerable effort and expense, and this has been the cotton industry's experience in relation to the obligations contained in the legislative instruments relevant to the use of pesticides — some 5 different pieces of legislation across 2 jurisdictions. The industry's BMP Manual lists practices for the safe storage, handling, and use of pesticides. Reduced to their essential elements, the obligations contained in the relevant Acts are simple: they require that users of pesticides avoid spills, leaks, accidents, and off-target damage. This sounds reasonable and relatively straightforward. To ensure compliance with these Acts, however, the industry asks growers to adopt around eighty practices and procedures. The achievement of relatively simple, non-contentious environmental goals can demand significant effort on the part of landowners. There is an obvious difference between the expression of a legal duty and the practical satisfaction of that duty.

Industry therefore has a major role to play in ensuring that information reaches landholders in a simple, practical and meaningful way (and it also makes sense that rather than individual farmers each undergoing the same consideration and interpretation of the information, it be centralised as much as possible through industry organisations). However, the cost involved for industry to continue to provide the level of support to ensure the successful implementation of an environmental program such as the BMP Program also requires that the industry receive the committed support of the relevant jurisdiction(s).

There are other inherent flaws in a purely legal approach to managing natural resource, or environmental issues. Legal compulsion is a blunt and generally unappealing policy tool. While passing laws is a relatively inexpensive way of expressing a policy position, enforcing that policy can be expensive, inefficient, or logistically difficult. With respect to the legislation affecting rural landowners there is generally a conspicuous lack of enforcement activity in rural areas. Legislation generally follows rather than determines community attitudes. The BMP Program was created as a response to concerns that pesticide residues were ending up in rivers. And although the presence of residues in rivers suggested that breaches of legislation had occurred, it was not the threat of prosecution but the desire to be – and to be seen to be – a responsible 'citizen' that caused the cotton industry to investigate and develop solutions to the problem.

A partnership will be equally critical to overcome the flaws seen to exist in industry programs. Gunningham, (2004) lists the various strengths and weaknesses of self-regulation and traditional regulation, noting that, in favour of self-regulation: "coercion is a particularly blunt instrument", and that "enforcement … is highly problematic", and that regulation may stifle the development of a 'custodianship ethic'. Similarly, against self-regulation is its lack of credibility, the inability of industry groups to sanction members, problems with 'free-riders' and a lack of transparency and accountability. Industry alone does not have the means or authority to reach every single one of its members, nor does it have the ability to deal with individuals determined to remain 'outside' the system. Pursuing these individuals is a role for government, not industry organisations that in Agriculture especially are generally voluntary, and not in position (nor inclined) to compel their members to act in a particular way.

Thus Gunningham argues forcefully for what he calls 'Co-regulation' (or partnerships by another name) as a means of maintaining the strengths, and eliminating the weaknesses of the two approaches:

> "the best solution is to design complementary combinations using a number of different instruments, thus: self regulation; government regulation; and third party oversight may be capable of being combined in complementary combinations that work better than any one or even two of these instruments acting together".

He further notes that while "the Australian cotton industry arguably has a number of characteristics that are conducive to the success of that (i.e. self-regulatory) approach", ultimately the inability to "engage with the 'bottom-end' of the industry" means that more than just a self-regulatory approach is required.

Government (Regulatory) Partnerships

In the initial development of the BMP Program, this partnership approach consisted of involving the relevant regulatory agencies in the drafting of the BMP Manual, i.e. providing them with the opportunity to have a say in the technical recommendations / guidelines to be included as 'best practices'. More recently, the industry has been seeking to develop the partnership approach, and is actively negotiating with the Queensland government, through Cotton Australia, to have the BMP Program recognised as an alternative means for cotton growers to formally comply with any relevant planning requirements. To this end, the Water Act (2000) has been amended to explicitly allow an approved industry program, such as the BMP Program, to satisfy the regulatory requirement that a land and water management plan is required whenever 'new' (i.e. additional entitlement) permanent water is acquired by an existing irrigator, or when water is transferred temporarily to an existing irrigation farm more than once every three years. Work has commenced on the regulation[4] that will govern the process for applying for and achieving recognition for an industry program such that growers can use it as an alternative means of complying with legislative responsibilities

While it has been a relatively slow process, the cotton industry believes a number of advantages will result from providing this alternative means of regulatory compliance:

1. It provides an alternative, more flexible (better?) means for cotton growers to comply with their regulatory requirements
2. It helps maintain a degree of control or at least involvement in the details of how farmers are expected to manage their natural resources
3. It minimises the risk of duplication, and the attendant risk of reduced adoption of the BMP Manual; i.e. if a grower has to do a land and water management plan through the formal regulatory process, then there would be little incentive for the grower to undergo the land and water management components of the BMP Manual; this could then have a flow-on effect to the other components of the Manual
4. It helps develop better working relationships with the relevant regulatory authorities
5. It positions the industry for any similar developments for other natural resource management issues.

[4] Broadly, the regulation will cover how an industry program is to be accredited so that farmers certified under that industry program are then eligible to have that certification recognised for regulatory purposes. The details to be included will cover the application by an industry for accreditation, assessment of the industry program, the form of agreement to be entered into by the industry with the relevant regulatory agency, and the on-going management and maintenance of that accreditation.

As stated in the framework document for the accreditation of industry programs,

> "Accreditation is intended to provide industry and individual farmers with more flexibility to take various, reasonable and practical approaches to satisfy specific regulatory requirements thereby minimising the complexity, burden and costs to farmers of complying with regulations. Accreditation should facilitate more industry involvement in ensuring that government requirements are relevant and as efficient as possible with respect to farming enterprises".

Non-Government Organisation Partnerships

For the industry, partnerships with non-government organisations may offer additional political and commercial advantages to those outlined above:

- Political, i.e. the provision of external credibility for the BMP Program and the efforts of the industry, which in turn would enhance the ability of the industry to promote its position and achievements in relevant policy debates
- Commercial, i.e. the provision of a "strategic bridge" between the industry and environmentally-orientated consumers (Cary et al, 2004), and the possibility of being able to access new or niche markets, and perhaps more importantly the ability to maintain market access.

To develop a successful partnership between industry and NGO's, the following list of requirements from Gunningham (2002) provides a useful starting point:

- Early engagement
- Identification of the correct stakeholders
- Development of trust
- Flexibility
- Open sharing of information
- Appropriate time frames
- Realistic expectations
- Meaningful indicators
- Reporting of results, accountability.

Ultimately, there needs to be adequate incentives for involvement (for all parties), clear, realistic, and achievable targets, adequate accountability and transparency, and appropriate monitoring, with all this being done in a cost effective way. A solid start has been made, and time will tell whether Better Cotton can meet these criteria.

While the Australian cotton industry has made significant improvements in the way that it manages its natural resources, there are still many challenges to be faced to ensure that the industry, as a whole, continues to implement improved natural resource management practices. Some of these challenges can only be addressed through a genuine collaboration between industry and government, a collaboration that may require significant changes in policy — such as formally recognising a voluntary industry scheme as an alternative means of complying with regulatory requirements — if the BMP Program is to remain as an effective tool for improvement and agent of change for Australian cotton growers. Other challenges, such as the provision of genuine incentives, can hopefully be addressed in partnership with progressive NGO's such as WWF.

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