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Cotton, Health and Environment: A Case Study of Self-Regulation

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ABSTRACT

The Australian cotton industry confronts a range of serious occupational health and environmental challenges, many of which relate to the use and misuse of agricultural chemicals. This article asks which policy instruments are likely to be most effective and efficient in addressing those challenges? Is government regulation a credible option or would industry self-regulation achieve better results? Is there a role for safety. Health and environmental management systems or is some other option, or combination of options, likely to achieve better economic and health and environmental outcomes? More broadly, given the substantial threats to the cotton industry's legitimacy (and indirectly to its economic viability) resulting from its tarnished environmental image, how might the industry best preserve its 'social license' and rebuild trust and credibility with key stakeholders? The answers to these questions will have broader resonance than to the cotton industry alone. The industry provides a classic example of the health and environmental challenges that confront high input, intensively irrigated agriculture and other industries that have aroused a high degree of public concern concerning their health and environmental impact. The ways it has reacted to the pressures it faced and sought through voluntary environmental management arrangements (VEMAs), to protect both its 'social license' and its economic viability, contain important lessons for many other industry sectors that will, sooner or later, confront similar health, environmental and economic challenges.

I. INTRODUCTION¹

In a little over three decades, Australian cotton farming had developed into a \$1.5 billion dollar industry and the third largest exporter of cotton in the world. But that growth has come at a substantial cost to the environment and to workers' health. Of greatest concern have been the risks associated with agricultural chemicals. In the late 1990s the use of endosulfan in particular, posed a serious threat not only to the environment, but also to the adjoining cattle industry, whose export markets were threatened by high pesticide residues found in export beef. Cotton related pesticides have also been connected with fish kills and other damage to aquatic life, raised occupational health concerns amongst agricultural workers, and community concerns regarding pesticide residues found in domestic water tanks and elsewhere.

Against this backdrop, we must consider which policy instruments are likely to be most effective and efficient in addressing the occupational health and environmental challenges the industry faces? Is government regulation a credible option or would industry self-regulation achieve better results? Is there a role for environmental management systems (EMS) or is some other option, or combination of options, likely to achieve better economic health and environmental outcomes? More broadly, given the substantial threats to the cotton industry's legitimacy (and indirectly to its economic

¹ The author gratefully acknowledges the comments of Patricia Healy and Allan Williams and the contribution of the various interviewees who must remain anonymous.

viability) resulting from its tarnished environmental image, how might the industry best preserve its ‘social licence’ (i.e. the expectations of local communities, the wider society, and various constituent groups) and rebuild trust and credibility with key stakeholders?²

The answers to these questions will have broader resonance than to the cotton industry alone. The industry provides a classic example of the health and environmental challenges that confront high input, intensively irrigated agriculture and other industries that have aroused a high degree of public concern concerning their environmental impact. The ways it has reacted to the pressures it faced and sought through voluntary environmental management arrangements (VEMAs), to protect both its ‘social license’ and its economic viability, contain important lessons for many other industry sectors which will, sooner or later, confront similar health, environmental and economic challenges. As we will see, the cotton industry responded to these threats by producing what it terms an “industry –wide ems”³ and by developing a variety of industry level self-regulatory initiatives through its Best Management Practices (BMP) program. In effect, the industry association sought to develop an industry-wide VEMA, with heavy reliance on codes of practice, BMPs and (in a broad sense) EMS.

This article draws on interviews with a diversity of stakeholders,⁴ the evolving literature on the cotton industry (including the 2003 external audit of the industry⁵) and the wider international experience of self-regulatory initiatives. Its focus is the occupational health and environmental impact of agricultural chemicals, and the lessons that can be learned from the cotton industry experience in terms of designing better policy mixes, and integrating voluntary environmental management arrangements with government and third party oversight. It does not examine, nor take any position on, the cotton industry’s use of scarce water resources, or the broader issue of whether the cotton industry can even be made sustainable in Australian conditions, given its levels of resource consumption and chemical use.

A. Cotton, Health and Environment

The modern Australian cotton industry was established with the introduction of irrigated cotton production during the 1960s.⁶ Today, 70% of cotton production is in central and north-western NSW, stretching south from the Macintyre River through to the Gwydir, Namoi and Macquarie and Lachlan valleys, as well as along the Barwon and Darling Rivers. Australia’s remaining cotton production occurs in central and southern Queensland – in the Darling Downs, St George, Dirranbandi and Macintyre Valley in the

² We define social license as the demands and expectations vis-à-vis a business enterprise that emerge from neighborhoods, environmental groups, community members, and other elements of the surrounding civil society.

³ See William (et al), 2004.

⁴ A total of 22 open-ended interviews were conducted with cotton industry association representatives, cotton growers, environmental groups, government agencies, farmers’ federations and other significant stakeholders.

⁵ Cotton Research and Development Corporation (August 2003) *Second Australian Cotton Industry Environmental Audit* <http://www.crdc.com.au/> accessed 28 August 2003.

⁶ Gibb Environmental Sciences & Arbour International (Gibb) (1991) *An Environmental Audit of the Australian Cotton Industry: Executive Summary*, Gibb Environmental Sciences & Arbour International.

south and Emerald, Theodore and Biloela in the central region. Overall, Australian cotton production covers an area of over 400,000 hectares, with production of just over 3 million bales each year⁷.

Many cotton farms are owned and independently operated by family farmers, who also practice other forms of agriculture, including sheep and cattle grazing. However, there are also an increasing number of large corporate farms. The latter have large amounts of capital available, and are progressive in their utilisation of technology and advanced farming practices.

Cotton production requires intensive management including irrigation, weed control, and insect control.⁸ Insect management is particularly important, as cotton is susceptible to a wide range of insect pests throughout its 180-200 day growing period, and poor management may cause significant economic damage. Substantial quantities of pesticides including herbicides, insecticides and defoliant are used to manage the impacts of insects on cotton crops (conventional cotton is sprayed 6-12 times). Defoliation is also necessary as a precursor to harvesting and conditioners are also applied before harvest, to speed and even up boll opening and reduce 'trash' in the cotton fibre. Seed that is to be reused for planting is treated with fungicide and systemic insecticide. According to one environmental group, "conventionally grown cotton uses more insecticides than any other single crop and epitomizes the worst effects of chemically dependent agriculture. Each year cotton producers around the world use nearly [US]\$2.6 billion worth of pesticides – more than 10% of the world's pesticides and nearly 25% of the world's insecticides."⁹

Within Australia, agricultural cotton industry chemical use has been identified as causing off-site environmental damage to terrestrial and aquatic ecosystems, as well as to surrounding communities, and agricultural properties. Not only do some of the individual chemicals used cause environmental, occupational health and safety impacts, but there is a potential for cumulative impact to arise from a combination of chemicals applied. Of particular concern is the use of the organochlorine (endosulfan), which is used for the control of heliothis and may also be used to control rough bollworms, mirids, thrips, aphids and tipworm.¹⁰ Endosulfan has a high acute or immediate toxicity to humans and can reach concentrations in waterways that are lethal to various forms of aquatic life. The use of endosulfan in cotton production came into particularly sharp focus in 1999 when cattle graziers found endosulfan residue accumulation in their cattle. The residues not only lowered their sale price but threatening international beef exports: most dramatically when a shipment of Australian beef was rejected by South Korea because it contained

⁷ Cotton Australia, 2003. Yields for the last two seasons have been substantially below average.

⁸ Gibb Environmental Sciences & Arbour International (Gibb) (1991) *An Environmental Audit of the Australian Cotton Industry: Executive Summary*, Gibb Environmental Sciences & Arbour International.

⁹ Pesticide Action Network North America (2003) *Problems with Conventional Cotton Production* <http://www.panna.org/resources/documents/conventionalCotton.dv.html> accessed on 25 April 2003.

¹⁰ Barrett, JWH., Peterson, SM., & Batley, GE, (1991) *Impact of Pesticides on the riverine environment with specific reference to cotton growing* Report to the Cotton Research and Development Corporation and the Land and Water Resources Research and Development Corporation, Narrabri.

unacceptable residue levels.¹¹ Property prices of cattle farms close to cotton areas were also perceived to be threatened.

Many insecticides are also toxic to aquatic organisms, bees and birds. If applied carelessly, they can enter the local waterway killing a variety of species and damaging ecosystems.¹² A major monitoring program conducted by the NSW Department of Land and Water Conservation from the mid 1990s onward revealed the presence of several pesticides in rivers near and downstream of cotton growing areas during the growing season. The program found endosulfan at amounts significantly in excess of environmental guidelines for the protection of ecosystems¹³. Spray drift, and runoff are significant pathways.¹⁴ Chemical contamination has led to a range of impacts including fish kills and changes in species composition downstream from cotton areas. For example, thousands of dead fish were found in the Boomi River in north-west New South Wales which was later linked to endosulfan water contamination.¹⁵

The Occupational Health and Safety (OHS) impacts of agricultural chemicals in the cotton industry are less well documented. In one study, cotton ranked third among Californian crops for total number of worker illnesses caused by pesticides.¹⁶ Unfortunately, no comparable and reliable Australian figures are available. However, a 1991 report on the Australian cotton industry concluded that “occupational exposure to pesticides is a more significant health problem and there is evidence that this is not taken sufficiently seriously. The use of proper protective clothing and equipment is of paramount importance as well as a general vigilance against poor practice.”¹⁷ Anecdotal evidence derived from interviews suggest that at least until recently, OHS had indeed been an important, if underestimated, problem. For example, respondents described the common past practices as including: workers marking for pesticide spraying aircraft with flags (exposing them directly to pesticides), failing to wear protective clothing, chippers being sent back into the fields too soon after they had been sprayed, and mixing chemicals without wearing a mask.

Finally, there has been some concern about the impact of cotton industry pesticides on local communities adjacent to cotton growing areas.¹⁸ A 2000 report by the NSW Environment Protection Authority and New England Health confirmed that endosulfan

¹¹ Australian Associated Press (AAP) (1999) *Cotton Industry Calls for Endosulfan Compo Claims*, 15 January 1999, Canberra.

¹² See “Clearing the Air: Pesticide Spray Drift” Total Environment Centre, Sydney, 2000.

¹³ Muschal, M. (1997) *Central and north west regions water quality program: 1996/97 report on pesticides monitoring* CBR 97.063. NSW Department of Land and Water Conservation, Paramatta, Australia.

¹⁴ Raupach, MR., Briggs, PR., Ford, PW., Leys JF. (et al) (2001) *Endosulfan transport: I. Integrative assessment of airborne and waterborne* Journal of Environmental Quality, Madison, May/June.

¹⁵ “Cotton chemical linked to dead fish” Sydney Morning Herald, 21 January 1998.

¹⁶ Pesticide Action Network North America, 2003 and references therein.

¹⁷ Gibb, 1991 op cit p 130. See also Franklin, RC., Fragar, LJ., Houlahan, J., Brown, P., & Burcham, J. (2001) *Health and Safety Risks Associated with Cotton Production On-Farm* Australian Centre for Agricultural Health and Safety, and Rural Industries Research and Development Corporation, Moree.

¹⁸ See “Gunnedah: A community in crisis over pesticides” Total Environment Centre, Sydney, 1997.

spray drift was detectable in the water that communities drink, cook and bath in.¹⁹ Although no damaging health impact was established further monitoring was regarded as desirable.²⁰ However, some members of local communities strongly believe that there has been a high incidence of certain diseases, and that these are directly connected to spray drift from the industry. They also complain that there has been insufficient monitoring and that test results themselves may be suspect.

By the late 1990s the cotton industry was confronting an environmental crisis. Endosulfan had been detected in cattle (and traced back to its origins in spray drift from cotton farms), putting the beef export trade under threat. Fish kills downstream from cotton areas, connected to pesticides used in cotton production, had also been well documented. Communities were concerned about levels of pesticides from spray drift, especially in tank water and complained about the rank odour attributed to chemicals used in cotton production. Pesticides used in cotton production were also suspected of causing a high incidence of certain diseases among communities in cotton growing areas, and of threatening workers' health. Environmental groups added their voice to that of other critics and targeted the industry as an environmental priority. By 1998 the Total Environment Centre, along with various rural-based environment groups, was lobbying government to introduce regulatory controls to protect people and the environment from pesticide pollution generated by the cotton industry due to their heavy use of pesticides. They alleged that "[it is] now blatantly obvious that the cotton industry can't stop pesticides trespassing on other people's property or the environment".²¹

There was by this time, according to both industry and other respondents, a widespread perception that cotton farmers were guilty of "environmental rape and pillage", and that the cotton industry had become, as one industry insider put it: "the signature villain". This perception also had political repercussions. Responding to the endosulfan crisis in early 1999, Federal Agriculture Minister Mark Vaile warned that sanctions, including severe fines, could face cotton growers who flouted agreements on the use of chemical sprays in the summer season. "We are not prepared to allow the good reputation of Australia's export beef industry to be put at risk" Vaile told reporters, "the majority of operators in the cotton industry are abiding by codes of management and practice but there are some who aren't and they must be brought into line".²² Farmers feared that tougher regulation would restrict their farming practices, curtail or prohibit aerial spraying and inhibit or prevent them from using particular chemicals. The threat of a total ban on endosulfan, which would have caused very considerable economic loss, remained uppermost in their minds.

¹⁹ NSW Environment Protection Authority and New England Health (2000) *Pesticides in Rainwater tanks* Namoi Valley NSW.

²⁰ "Numerous scientific studies have not found any evidence of involvement in cancer, birth defects, damage to genetic material [or any other long-term effects] due to chronic low level exposure" in Review of Endosulfan: National Registration Authority ECRP, Aug 1998.

²¹ Total Environment Centre (2003) Cotton Industry's Secret Anti-Environment Campaign Plan Released" accessed at http://www.nccnsw.org.au/member/tec/news/media/19980626_cotman.html on 25 April 2003. See also "Gunnedah: A community in crisis over pesticides" Total Environment Centre, Sydney, 1997 p 23.

²² Australian Associated Press, "Govt warns it is cracking down on cotton chemical use", 10 Feb 1999.

To make matters worse, the Total Environment Centre unearthed a confidential consultancy report commissioned by the cotton industry that allegedly revealed a “secret anti-environment campaign”.²³ The report not only contained admissions about serious environmental and community problems but also a series of suggestions about how these groups should be managed. For example, the document stated “it is not conducive to establishing good relations to refer to withholding advertising from newspapers or support from various groups if they dare to criticize cotton. If this is done it should be done subtly”.²⁴ It also contained tips on how to denigrate environmentalists: “Farmers should be seen as ‘conservationists’, the environmentalists as ‘extremists’. Practical versus professional conservationists...Environmentalists do not practice what they preach. They are hypocritical, self-centred, publicity seekers not involved in agriculture. They are dangerous and invite political subversion”.²⁵ The revelation of this document served to further damage the industry’s credibility on health and environmental issues.

Thus by the turn of the century the industry faced a variety of pressures and drivers for change: the demands of the beef industry, community concerns over the impact of pesticide spraying on their health and the environment and environmental group pressure. Increasingly stringent environmental and OHS legislation continued to be introduced in the Parliament while the increased cost and decreasing efficacy of pesticides due to pest resistance made life increasingly difficult for cotton growers around the nation. How then, has the industry reacted to the environmental crisis, to the threat to its social license and to the various drivers of health and environmental improvement?

B. Industry Initiatives

Fearing that continuing pressure might result in draconian regulation or the banning of certain chemicals and practices, and that the industry’s tarnished image might damage export markets and its “license to operate”, the industry has responded by taking action to put its own house in order. By taking the initiative, according to one senior Cotton Research and Development Corporation (CRDC) official, the industry created “an opportunity for growers to manage risks without being told by an ignorant bureaucrat, what to do...So the only way to combat this perception runs on the board - to be as far ahead of societal pressures as possible”.

However, CRDC and the industry association (Cotton Australia)²⁶ faced considerable challenges in achieving substantially improved health and environmental performance. Notwithstanding that the latter association is notably well financed and well organised it was, as another respondent described it, “caught in the middle with regulatory pressures

²³ Total Environment Centre (2003) Cotton Industry’s Secret Anti-Environment Campaign Plan Released” accessed at http://www.nccnsw.org.au/member/tec/news/media/19980626_cotman.html on 25 April 2003.

²⁴ Total Environment Centre (2003) Cotton Industry’s Secret Anti-Environment Campaign Plan Released” accessed at http://www.nccnsw.org.au/member/tec/news/media/19980626_cotman.html on 25 April 2003.

²⁵ Total Environment Centre (2003) Cotton Industry’s Secret Anti-Environment Campaign Plan Released” accessed at http://www.nccnsw.org.au/member/tec/news/media/19980626_cotman.html on 25 April 2003.

²⁶ Cotton Australia is the peak industry body for Australia’s cotton growing industry, responsible for advancing the interests of the industry to governments, non-government organizations, the media and the community.

on one side and unwilling growers on the other”. In this context, how successful has the industry been, in achieving its environmental and OHS goals? Will this response be sufficient to win it back its credibility and to protect its social license: regaining the trust and meeting the expectations of local communities, the wider society and various constituent groups? How effective, has been its heavy reliance on VEMAs?

To answer these questions we begin by examining how the cotton industry chose to respond to the substantial environmental challenge that it faced. Its principal initiative has been the Best Management Practice (BMP) program. This is concerned primarily with agricultural chemicals and in particular with reducing pesticide transport off farm, bringing greater accountability in the use of pesticides, improving on-farm application of pesticides (including integrated pest management) and minimising the impact of pesticides on the environment, and on occupational health.²⁷ It was anticipated that the industry’s environmental image would be improved and that this would reduce pressure from regulators, the community, environmental groups and others. Put differently, BMP was intended in the words of one industry official, to “demonstrate a responsible approach to quality and environmental risk management”.

Following a modular approach, the industry first developed BMP booklets on a number of issues, including pesticide application management, integrated pest management, and pesticide storage and handling. Subsequently these were integrated into a BMP Manual for growers that also included a risk assessment process for prioritizing issues for action and a framework for implementing BMP as well as the suggested best practice solutions. Further modules have been developed for OHS and land and water management and petrochemical storage and handling. Grower workshops were introduced, to train growers in using the manual and implementing BMP, a responsibility that was transferred from the Cotton Research and Development Corporation to Cotton Australia.

Underpinning the industry’s approach was a belief in the necessity of: A staged approach; engaging and directly involving producers locally; realistic time frames for adoption of new practices and systems; demonstrating the practicality and feasibility of recommended practices; being flexible and adaptable to local needs; demonstrating the tangible benefits to farmers; and engaging strong government support.²⁸

A subsequent and important development was the introduction of the BMP Audit Program. Common concerns had been whether growers would be able to verify their compliance to BMP, and what type of recognition they would receive for implementing BMP. Some took the view that there would be no point implementing BMP unless there was some sort of check system in place. In essence, many believed that an audit program was necessary to make the process credible and meaningful.²⁹ The audit program that was

²⁷ The integrated pest management plan involves reduced use of more selective and less toxic chemicals, growing of genetically modified cotton, non-chemical pest controls and changed farm practices to reduce habitat for pests.

²⁸ Williams, A. (2000) *Best Management Practices: The Cotton Model* Paper delivered to Australian National Pesticide Risk Reduction Workshop.

²⁹ See Best Management Practices Audit Program, Agency Information Pack, Overview of BMP Program, AOD 17, Agency Information Pack, Sept 2000.

subsequently developed has two components: the operational system that relates directly to growers, and the management system that supports the operational component and meets the requirement of an industry-wide accreditation program. The former contains three types of audit: an initial Compliance Audit, the Industry Certification Audit, and the Surveillance Audit. The audit provides “an objective assessment for growers on where improvements can be made to ensure they are meeting their environmental legal obligations as well as industry best practices.”³⁰ The underlying philosophy is that of continual improvement.

The first audit can be conducted after a grower has completed their BMP manual, which involves completion of self-assessment worksheets and the development of documented action plans to address issues identified as of concern. This initial audit is concerned with establishing a benchmark specific for individual farms, and involves the auditor going through the BMP manual and the audit checklist to verify compliance with the manual, and documenting both strengths and opportunities for improvement. The subsequent Industry Certification Audit (to be conducted within the next 14 months) verifies compliance against the BMP manual but also verifies progress on the action plans and on the opportunities identified in the initial audit. The Surveillance Audit (within 18 months of the Certification Audit) is intended to ensure continual improvement of farm practices, and of a grower’s certification to BMP. The audit itself is conducted by environmental auditors trained to conduct BMP audits for the industry, and meeting the standards of the Quality Society of Australasia and the International Environmental Auditors Association.

However, audited BMPs are not the end of the health or environmental journey, as the industry conceives it. The industry’s ambition is to develop what might broadly be termed an environmental management system. If successful, the virtue of this approach is to bring about a cultural change within participant organizations, and a “way of going about business activities that considers and addresses environmental issues at every step”.³¹ It would incorporate the familiar ‘plan, do, check, act’ approach on which most environmental management systems are built, and a commitment to continuous improvement. It would also result in the creation of new roles and responsibilities for both management and workers and result in the ‘formalisation’ of management styles.³²

However, an industry survey suggested that there would be considerable, possibly insuperable, challenges in introducing a conventional environmental management system such as ISO 14001.³³ For example about 50% of growers surveyed did not employ full time administrative staff, 65% employed 4 or fewer full time staff, over 70% did not employ full-time maintenance staff and about 65% spent less than 10 hours per week on

³⁰ Holloway, R., & Roth, G. (2003) *Grower feedback on cotton BMP auditing* The Australian Cotton Grower, Feb- March, p20.

³¹Williams, A., Thomas, R., Pyke B. & Williams, J. (2001) *Environmental Management Systems and Agriculture- Theory, Practices and Reality- Experiences from the Cotton Industry* paper delivered to conference on EMS in Australian Agriculture <http://www.agric.nsw.gov.au>, p 2.

³² Williams et al, 2001 op cit p 2.

³³ Significantly, the first farmer in Australia to obtain ISO 14001 certification, cotton farmer Mike Logan, no longer maintains such certification citing the excessive costs of ISO 14001 and the lack of compensating benefits such as discounts on licence fees or other regulatory relief.

record keeping.³⁴ Moreover, “given that different farmers within an industry or catchment will have a diverse range of skills, attitudes, available resources and issues that need managing...it is unrealistic to expect all farmers to be able to implement, at the same rate (if at all) all the requirements of a formal EMS”.³⁵

Thus the concept the industry has in mind (and one that is ‘poles apart from government thinking’) is not a ‘formal EMS’ such as ISO 14001 but rather a form of voluntary environmental management arrangement based on the general principles of an EMS.³⁶ The next step then, is developing the BMP program into a more comprehensive environmental management program, gradually introducing many of the ‘formal’ components of an EMS. This must be done in a manner that individual small farmers would be capable of engaging with, and which relies largely on the approach of existing BMPs.³⁷ It would also expand the concept to a ‘whole of farm’ approach rather than confining it to one particular issue such as pesticides.³⁸

Another sub-plot, the use of Genetically Modified (GM) cotton, is still being played out. While the use of Ingard cotton (genetically modified to secrete a particular pesticide) had undoubtedly brought about a reduction in overall spraying, critics of Genetically modified organisms (GMOs) allege that there remains a danger of cross-fertilisation, and of the development of pesticide resistant insects. This is the very reason that Ingard is confined to 30% of the overall crop, a restriction developed and strongly supported by the cotton industry to ensure the long term viability of the technology.³⁹ There is little constituency for another option - a switch to organic cotton - not least because the industry sees little market demand for it, because it would be more expensive to grow and of variable quality, and because it would also require substantial changes to the processing operation. Arguably, the reduced yields associated with organic cotton are a negative from a water efficiency perspective.⁴⁰

C. Government Initiatives

The industry’s self-regulatory initiatives do not operate in isolation from broader public policy. The cotton industry is subject not only to the general environmental and OHS legislation which apply to all industries in a particular jurisdiction, but also to a number of specific pieces or legislation, regulations and codes of practice. These are targeted

³⁴ Williams, 2001op cit.

³⁵ Williams, A., Thomas, R., Pyke B. & Williams, J. Environmental Management Systems and Agriculture-theory, practice and reality- experiences from the cotton industry undated.

³⁶ Williams, A. & Williams, J. (2000) *Australian Cotton Industry Best Management Practices Manual* Cotton Research and Development Corporation, Narrabri, NSW.

³⁷ Williams, A., Thomas, R., Pyke B. & Williams, J. Environmental Management Systems and Agriculture-theory, practice and reality- experiences from the cotton industry undated.

³⁸ As such, the goal is high adherence to audited accredited properties working in collaboration with colleague industries integrated into an area wide management sub-catchment.

³⁹ The APVMA monitors the area planted and figures are crossed checked with Monsanto audited sales figures for particular areas.

⁴⁰ However, on the virtues of organic cotton see the Sustainable Cotton Project: <http://www.sustainablecotton.org/SUScP/index.html> accessed 21 August 2003.

either at cotton directly or at issues which have been major problems within the cotton industry such as pesticide exposure and management.

In broad terms, the cotton industry's principal environmental obligations include⁴¹ a general environmental duty on every person not to undertake an activity that pollutes or might pollute the environment unless they take all reasonable and practicable measures to prevent or minimize environmental harm.⁴² In both Queensland and New South Wales, a range of specific obligations in relation to air and water quality must be undertaken.⁴³ For example, section 120 of the New South Wales Protection of the Environment Operations Act specifies (subject to certain defences) that a person must not pollute waters or cause or permit waters to be polluted. The New South Wales Pesticides Act and regulations are also important, particularly with regard to obligations to keep records on pesticides applications, and in terms of handling and use practices.⁴⁴ The Act creates offences for off-farm damage to people, property, plants and animals. At federal level, the National Registration Authority for Agricultural and Veterinary Chemicals, (now the AVPMA) sets maximum residue levels for chemicals that are adopted by State Authorities responsible for agriculture⁴⁵. It is also responsible for approving and registering chemicals. Following the endosulfan crisis it suspended registration of ultra low volume (ULV) formulations of endosulfan and imposed strict conditions on use of remaining stocks.⁴⁶ However, Australia still has no systematic process for capturing pesticide use data or recording adverse incidents with pesticides and this in turn severely limits responsive pesticide management.

In regards to occupational health and safety, employers in New South Wales have a broad general duty to ensure the safety, health and welfare of employees at work (subject to a defence of reasonable practicability).⁴⁷ In Queensland, a somewhat different route achieves a broadly similar result.⁴⁸ A variety of other duty holders have comparable general duties. These duties are underpinned by regulations, advisory standards, codes of practice and ministerial notices. In this regard, the *Code of practice for the safe use and storage of chemicals (including pesticides and herbicides) in agriculture* is of particular importance.⁴⁹ There is a particular emphasis (particularly in the New South Wales legislation) on hazard assessment, risk analysis and control.⁵⁰ The broad range of environmental, OHS and related regulatory obligations imposed on the cotton industry is indicated in Appendix 1.

⁴¹ In Queensland but not New South Wales.

⁴² s 36, *Environment Protection Act 1994* (Qld).

⁴³ For example s 120, *Protection of the Environment Operations Act* (NSW). See generally Bates G *Environmental Law in Australia* 5th Edition, (2002) Ch 15, Butterworths, Sydney.

⁴⁴ Pesticides Amendment (Records) Regulation under the *Pesticides Act 1999* (NSW).

⁴⁵ A MRL for endosulfan is measured in meat, not in pasture or on the crop itself.

⁴⁶ Other restrictions contemplated include limiting application to three sprays per season, mandatory prior notice to neighbours before spraying within specified buffer zones and restricting use to the months between November and January, mandatory downwind buffer zones and adoption of technology that will reduce spray drift.

⁴⁷ *Part 2, Div 1 Occupational Health and Safety Act 2000* (NSW).

⁴⁸ See s 24, *Workplace Health and Safety Act 1995* (Qld); Johnstone, 1997.

⁴⁹ <http://www.workcover.nsw.gov.au> accessed 10/08/03.

⁵⁰ Johnstone, R. (1997) *Occupational Health and Safety Law and Policy* LBC, Sydney Ch 5.

D. Self-Regulation vs. Government Regulation?

It is common for policy analysts, regulators, industry associations, and other stakeholders to view self-regulation and government regulation as the main policy alternatives and to ask which of those two approaches is the most appropriate to the circumstances of a particular industry. Needless to say, different stakeholder groups tend to take up widely differing but somewhat predictable positions on this issue.

Each approach has both strengths and weaknesses. For example, traditional regulation carries a strong moral message (it is wrong to disobey the law) and has a high credibility rating amongst the wider community because its health and environmental improvement targets are perceived as independently imposed and enforced. It usually sets out well-defined and measurable requirements, which, having the force of law, can compel change. Crucially, in most surveys, legislation is identified as the single most important reason given by business for improving its health or environmental performance. For example, a 1997 survey found legal requirements were the dominant reason for making environmental improvements by both primary and secondary industry.⁵¹

However, in respect of the rural sector in general, coercion is a particularly blunt instrument, a problem compounded by the poor design of many regulatory regimes. Enforcement in particular is highly problematic. The cotton industry includes a substantial number of relatively small farms spread over a significant geographical area, making it difficult to police the law effectively. Monitoring and inspection are resource intensive activities yet the various regulatory authorities have serious resource limitations and numerous other responsibilities. Except for those periods when the cotton industry has been the focus of public and political attention (especially the endosulfan crisis) the relevant regulatory agencies, including the Environmental Protection Agency and WorkCover, devote only very limited attention to the industry. NSW EPA for example, reports that it is in enforcement terms, entirely reactive, responding only to substantial incidents that are brought to its attention (usually informally or with administrative notices) but not initiating action. Enforcement problems are exacerbated by difficulties of monitoring and identifying the source of much agricultural chemical pollution. The result is that the gap between the law on the books, and the law in action, is a substantial one, and from day to day, regulation has only a very modest impact on the practices of individual cotton farmers.

Even where direct regulation is practicable, it is not necessarily desirable. Some regulations may inhibit innovation and discourage people from searching for more efficient ways to use a resource.⁵² 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

⁵¹ Environment Protection Authority NSW, 1997, p 61.

⁵² For example a 10 year lease may inhibit long term planning and encourage the pursuit of short-term profit.

sense of ownership of environmental problems and solutions or is conducive to changing attitudes to environmental management and engendering a ‘custodianship ethic’.

Moreover, such regulatory standards as do govern agricultural practices can themselves be unwieldy. Agricultural practices that are damaging in some contexts may be relatively harmless in others. Differentiated standards on the other hand, entail greater administrative and enforcement costs. Relevant regulatory responsibilities may be distributed across a number of agencies, including those responsible for air quality, water quality and food safety. Finally, the sheer volume of regulation makes it very difficult for small farmers to assimilate. As Williams points out: “a brief list of issues confronting farmers 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 the tractor is started!”⁵³

At the other end of the policy spectrum to traditional regulation lies self-regulation applied under the auspices of an industry association, such as the cotton industry BMP initiative described above. There are a number of attractions to self-regulation, many of which are the converse of the problems of traditional regulation. That is, self-regulation is not dependent on external regulatory inspectorates, is more acceptable to many (although by no means all) farmers and so less likely to induce regulatory resistance. Furthermore, self regulation is much more likely to be tailored to the individual circumstances and needs of individual agricultural enterprises while being introduced at much lower cost than government regulation and providing a much greater degree of ownership amongst those enterprises.

Not only do self-regulatory initiatives nurture greater ownership of outcomes than do external interventions, but the industry has informal means of bringing pressure to bear on those who are unwilling to participate in industry initiatives. For example, the power of peer group pressure can be considerable. Thus it was pointed out that: “your neighbours aren’t thrilled if they are investing in practices which improve the image of the entire industry, only to see over the fence, the old, and environmentally careless approach being adopted.” Some even suggested that industry-led initiatives such as BMP, can lead to a ‘race to the top’. One proactive farmer argued that: “now they want to out-compete each other to achieve their environmental targets - after the fish kills people they finally recognized ‘it was us’. Then the industry asked people to accept responsibility [and now] its almost a competition to be the most environmental cotton farm-it’s a self-perpetuating thing - we know we can do it - and people are proving it by making money out of it”.

However unlike government regulation, self-regulation lacks credibility with external stakeholders. It is widely regarded as a sham, and as a cynical attempt to give the appearance of regulation while serving private interests at the expense of the public, thereby avoiding more direct and effective forms of environmental control such as direct

⁵³ Williams, A., Thomas, R., Pyke B. & Williams, J. Environmental Management Systems and Agriculture-theory, practice and reality- experiences from the cotton industry undated.

government regulation. Sceptics of self-regulation may reside in environmental organisations, government agencies and/or the general community. The experience of self-regulation in a number of industries operating in a variety of jurisdictions points to the following failings that have given rise to this credibility problem:

- An inherent incentive for unmotivated members to “free ride” on the efforts of others;
- An unwillingness and/or incapacity on the part of the responsible industry association to impose sanctions on recalcitrant members;
- A lack of transparency and accountability, making it difficult for external parties to determine if genuine environmental progress has been achieved; and
- A potential conflict between short term, profit driven self-interest and the need for long term investments in environmental improvement.⁵⁴

Notwithstanding the challenges to effective self-regulation, the Australian cotton industry arguably has a number of characteristics that are conducive to the success of that approach. Not least, the industry association is well resourced (having a substantial industry levy), highly organised and has the capacity to approach, negotiate and work with individual cotton farmers with a united and coherent voice. For example, industry representatives argued that the BMP program has been successful because:

we have people dedicated to putting it into place. If you just throw the documents at farmers, and they're just process based documents, then its useless because farmers are more interested in getting their hands dirty than in going through processes. The documents just identify processes, but not solutions. We help them go through the process and our documents have solutions to high-risk situations. If they just tick boxes, there is no ownership, no implementation; its essential to have somebody on the ground, telling them what it means on their land.

The industry itself is also technologically sophisticated, less conservative than most and more open to change. Growers are relatively young (the average age of cotton farmers is approximately ten years younger than in the dairy industry), as is the industry itself (just over 40 years old). As such, there is considerable scope for achieving shifts in behaviour. Much however, depends upon how this task is approached, with farmers and industry representatives arguing strongly that what is needed is a co-operative approach from within. As one cotton farmer argued, “the key is giving farmers room to develop their own solutions - everybody goes wrong by not giving people who need to develop their own solutions, the power to develop them - and its going to make more money ... but the bureaucrats can't come up with any creative incentives- they can't dis-empower themselves!”.

Most important of all, the industry has experienced very considerable pressure relating to its health and environmental performance. Especially in relation to pesticide use, its social license has been placed under threat, and it has a strong self-interest in protecting its reputation and public image. A failure to do so would threaten its prosperity and possibly, its very survival. As one farmer pointed out: “Fear [of being closed down] is a

⁵⁴Priest, M., (1998-1999) The privatization of regulation: Five models of self-regulation Ottawa Law Review Volume 29.

blunt instrument but out of it we became self-driven. Now we are off the EPA radar but we're still doing things. It's become a race: who can become the most sustainable?" For another "the outside pressure triggers something that is already there- farmers are not vandals- they want to do the right thing- and they understand nature better than most – and they understand that if they do something wrong it will backfire".

Finally, many of the measures it is seeking to persuade its members to adopt under its BMP initiative, promise economic benefits to those members. Specifically, the industry is highly competitive, strongly export-oriented and, with tight profit margins, must focus on smart means of protecting or expanding those margins. BMP offers one such means. Thus a common view was that: "BMP focused people on managing expensive inputs better". As another respondent pointed out: "if we hadn't shifted to BMP we'd be broke- the margins are so slim, you've got to manage properly to survive. If you spray too often you don't make money because it costs and if you damage the soils your yield declines." However, not all that cotton farmers are exhorted to do in the name of BMP, is win-win. There are, for example, few direct costs from spraying off-target, although the environmental consequences may be substantial.

Yet notwithstanding that the cotton industry has considerable incentives to self-regulate effectively, and that a number of circumstances are conducive to achieving that result, progress has been mixed. On the positive side, there is evidence that practices in relation to some pesticides improved substantially after the endosulfan crisis and the introduction of the BMP program. According to industry consultant Ecos "the results were staggering—from having multiple Endosulfan incidents, the industry went to having none the next year".⁵⁵ Ecos attributed this result to "champions among Cotton Australia's board" and "a new Cotton Australia management team dedicated to self-regulating the industry and improving its chemical and safety performance thorough the best management practices system". Cotton Australia subsequently claimed that endosulfan use has dropped 57% over a six year period,⁵⁶ although industry critics claim that there is no independent corroboration of this figure.⁵⁷

Industry respondents interviewed for this project similarly claimed substantial gains from the BMP initiative. For example good environmental outcomes "come from getting BMP and asking: what are the risks?". In contrast "there used to be chemicals just poured out of drums and the drum then burned or buried" and "there used to be chippers who went straight back into the crop after spraying" but these were reported to be things of the past. "You won't see a person in the paddocks mixing chemicals with no mask any more". Now, "the cotton BMP people have made people aware of the whole growing chain – [of

⁵⁵ Ecos Corporation: Cotton Australia <http://www.ecoscorporation.com/clients/cotton.htm> accessed 10 Aug 2003.

⁵⁶ Cotton Australia Fact Sheets, Environment (2003) <http://www.cottonaustralia.com.au/aboutindex.html> accessed 23 August 2003. This figure is based on chemicals sales figures that are a reasonable approximation for chemical use. However, industry representatives concede that in part, the reduction may reflect particularly low chemical density in one particular season.

⁵⁷ Industry association officials report that the figure is based on reports and records of pesticide use of a selection of users and from information supplied by other industry associations (e.g. AAAA, Cotton Consultants Association, CAPA).

the benefits associated with] BMP and ploughing back...BMP is good at making you look at the whole year's production and the whole year's planning". The introduction of specific technology was also said to have made a substantial difference to health and environmental performance: air monitors with regard to aerial spraying, closed systems for chemicals distribution and container management were amongst the examples given. "Moderate" environmental groups broadly concurred with this assessment, regarding the BMP program as having 'huge potential' and as already being "pretty good". However, other environmental groups and community activists, remained sceptical. As one environmentalist put it: "they've been real bastards in the past. They have treated people appallingly. Of course people have no trust, no faith in them now".

Most recently, the second environmental audit of the cotton industry (by consultants GHD) found evidence of considerable environmental improvement across a range of issues, including "a high level of compliance ...with respect to aerial spraying, chemical use and OHS, pesticide storage, spray drift management, integrated pest management and research. A lower level of compliance was found for nuisance odour and the disposal and recycling of pesticide containers".⁵⁸ However, it found that there were still areas where significant environmental improvements could be achieved (including pest management and pesticide use). Stakeholders interviewed also agreed that there had been a general reduction in pesticide usage (although it still remains substantial) and environmental and community groups still viewed spray drift with concern and regarded pesticide use as one of the two top environmental priorities for the industry. The audit also confirmed that, while there was considerable variation in the standard of OHS practices across farms, "there appeared to be greater progress made towards good OH&S practices on farms which had implemented BMP guidelines. A number of farmers are currently addressing OH&S issues and improved practices were observed. However, not all farms employed these good practices".⁵⁹

Substantial progress has also been made in terms of auditing the BMP program – something essential not only to its longer-term success but also to its credibility with external stakeholders. By January 2002 initial compliance audits had been conducted on 20% of cotton growers in the industry, covering 45% of the cotton areas grown in 2001-2002. Over 90% of respondents to a subsequent survey felt the audit was of significant benefit, while only 1% believed the audit was not worthwhile.⁶⁰ The second cotton industry environmental audit moreover, found that:

the [BMP] 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. Farmers that had undertaken their second BMP audit showed real improvements in environmental management, and the auditing process provided a benchmark to indicate that progress had

⁵⁸ Cotton Research and Development Corporation (August 2003) *Second Australian Cotton Industry Environmental Audit* <http://www.crdc.com.au/> accessed 28 August 2003.p 2.

⁵⁹ Cotton Research and Development Corporation (August 2003) *Second Australian Cotton Industry Environmental Audit* <http://www.crdc.com.au/> accessed 28 August 2003.p 5.

⁶⁰ Holloway, R., & Roth, G. (2003) *Grower feedback on cotton BMP auditing* The Australian Cotton Grower, Feb- March.

p 20. The response rate in the survey was approximately 50%.

been made. It was observed that farms practicing BMP generally had better environmental management practices, as well as superior documentation and records management.⁶¹

However, the most obvious limitation to the BMP program, even in its most recent manifestation, is its inability to engage with the ‘bottom end’ of the industry. Even after six years or more, there remain a substantial minority who are as yet untouched, by the BMP program. Quite how large this group may be, or how resistant they may be to change, can only be matters of speculation as the present researcher was unable to glean significant information from this group. Just as some cotton farmers refuse to allow an auditor on their property they can also show no inclination to discuss their practices with external researchers. Certainly some farmers may be well advanced in terms of achieving their responsibilities under the BMP program, albeit reluctant for a variety of reasons to have a formal assessment. However, there are likely to be substantial numbers of others who have made very little progress, and indeed are not part of the program at all. Over this group, the industry association has little if any influence. As one report pointed out: “the diversity of different organisations involved in the industry also has implications for any moves to improve its environmental performance. In contrast to a single company the cotton industry cannot dictate absolute requirements for individual members”.⁶² One industry leader acknowledged the limitation of the industry association role in blunter terms: “it’s not the industry’s job to police the laggards, it’s just a voluntary association working for the common interest. It has no means of compelling people to do things: they will tell you to get stuffed”.

Yet if the industry is unsuccessful in dealing with recalcitrance, it may, in the longer term, be unsuccessful in protecting its social license and in achieving its broader environmental ambitions. Certainly the industry association has to move gradually. As Waskom and Walker argue: “The local, voluntary approach to solving [environmental] problems related to agriculture may progress more slowly than many in the environmental community deem acceptable. However, it should be understood that change occurs somewhat slowly in agriculture due to the extremely risky nature of farming- allowing the users of agricultural chemicals to (in a sense) self regulate their activities produces an innovative and acceptable method of solving a problem that would be very difficult for the state to effectively regulate”.⁶³

Yet there is reason to doubt whether even a gradual ‘softly softly’ approach, will, even over the long term, penetrate to the poorer environmental performers. First, it is now nearly 4 years since the first audit, and, for whatever reasons, still only 30% of the 900-1000 growers in the industry (50% by area) have submitted to an independent audit. While a significant number of the others may be well on their way to compliance with BMPs, there is no evidence to suggest and no reason to believe that this will be the case for those at the bottom end. (Industry insiders guess some 70% may formally or

⁶¹ Cotton Research and Development Corporation, op cit pp 3-4.

⁶² Gibb Environmental Services and Arbour (1991) *An Environmental Audit of the Australian Cotton Industry*, p 129.

⁶³ Waskom, RM., & Walker, LR. (undated) *Involving agricultural producers in development of localized best management practices* Colorado State University, Fort Collins, Colorado.

informally be heading down the BMP route, and feel that shifting the remainder will be very difficult). The perception is that: “it would take something fairly big to move them” and “we can only speculate what these guys are doing”. If we turn to the evidence concerning the effectiveness of other advanced, sophisticated industry self-regulatory initiatives, even the best fail to deal with a substantial number of laggards.⁶⁴

II. WHERE NEXT?

One might reasonably conclude that direct government regulation will be very unattractive to members of the industry (who point to the virtues and achievements of self-regulation) while self-regulation will be equally unconvincing to external stakeholders (who doubt the industry’s claims and point in particular to the manifest bad practices at the ‘bottom end’). While the industry may have done enough to ward off further government regulation in the absence of a new environmental crisis, this may not be sufficient to achieve its broader aspirations. In particular, to protect its social license; something it needs to do not only to maintain its credibility within Australia, but also to protect its export markets. How could the cotton industry self-regulatory initiative be modified so as to both achieve further improvements in the industry’s environmental performance and to protect its social licence? Two discrete questions are involved. First, what internal characteristics are most likely to make self-regulation both effective and credible to the industry’s critics? Second, how can self-regulation be linked with other policy instruments or external pressures in order to increase its effectiveness and credibility?

A. Internal Design Features

(i) *Health and environmental targets*

In order to ‘test by results’ and equally important, 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).

This is essentially the current stage of the BMP program, although some of the BMPs at least, are capable of being quantified in objective terms.⁶⁵ But the object to date has not been to give a pass/fail mark, or to compare one farm with another. On the contrary, the

⁶⁴ Haufler, V (2001) *The Public Role of the Private Sector, Industry Self-regulation in a Global Economy* Carnegie Endowment, Washington DC.

⁶⁵ For example, in terms of application of pesticides, while most of the practices specified in the BMP Manual are process based (e.g. establishing good pre-season communication with neighbours, using integrated pest management) some are outcome based, to the extent for example, that level 3 (of the 4 levels on which the audit is scaled- 1 being the highest) would satisfy current regulatory standards.

goal has been to deliver “an individual management tool for growers that provides them with an objective and external verification of their progress, improvement and also areas where improvement can be made”.⁶⁶ However, such an approach focuses on systems rather than outcome-based standards, leaving the setting of goals to individual participants. In the case of mature self-regulatory initiatives, the adoption of identified outcomes and targets is highly desirable.⁶⁷ Without them, there is the risk that the initiative may become vacuous, degenerate into “greenwash”, and lose credibility.

A desirable next step therefore is to develop performance indicators on key criteria, and to require self-assessment and disclosure subject to random and independent third party audit (for example, monitoring and testing of water quality and pesticide residue in any water running off the property). Precisely such an approach was urged by the second cotton industry environmental audit: “Key environmental performance indicators, by which the performance of the cotton industry as a whole, and at individual farms can be objectively assessed, need to be developed by the cotton industry”.⁶⁸ The 2001 document on *Fostering Best Management Practices*, proposed a range of performance indicators: (management performance indicators, operational performance indicators, and environment condition indicators) and identified in some detail what those indicators might be.⁶⁹ What has not so far been contemplated however, is the direct involvement of third parties, such as environmental groups in the standard setting process itself, yet without this, the credibility of the standards themselves may be in doubt. For example, there remains a serious danger that the industry association will ‘self-select’ the risks, measures and targets.⁷⁰

(ii) *Monitoring, audit and verification*

To the extent that a code relies on self-reporting as the principal means of monitoring, it will lack credibility with external stakeholders and the public in general. For example, some environmental groups dispute the industry’s claim to have reduced endosulfan use by 57%, and maintain, even it is accurate, it might well be accounted for by changing weather conditions or regulatory pressure rather than by the success of the industry’s own efforts. The cotton industry has clearly recognised its credibility problems and the development of the audit program goes some way to meet the critics’ concerns. However, while auditors are ‘third parties’ in relation to the farmer being audited, the auditors are ‘second parties’ associated with the industry, in that they are industry trained and supported, and with industry experience. Whilst this gives them insight, understanding, and a rapport with those they are auditing, the downside is that they are not perceived to

⁶⁶ Best Management Practices Audit Program (Sept 2000) *Agency Information Pack*, Overview of BMP Program, AOD 17, Agency Information Pack., 2000 p 6.

⁶⁷ For example, a chemical concentration below x% within 100 meters of a watercourse.

⁶⁸ Cotton Research and Development Corporation (August 2003) *Second Australian Cotton Industry Environmental Audit* <http://www.crdc.com.au/> accessed 28 August 2003. p 4.

⁶⁹ Williams, A. (2001a) *Fostering best management practices in natural resource management- toward an environmental management system in the cotton industry* Australian Cotton Growers Association, Cotton Research and Development Corporation and Murray-Darling Basin Commission..

⁷⁰ Heinz, K., (2000) *Credible ‘Clean and Green: Investigation of the International Framework and Critical Design Features of a Credible EMS for Australian Agriculture* CSIRO Land and Water, Canberra.p 8.

be at “arms length” and as such their credibility is may be undermined in the eyes of critical third parties.

In the long term, even environmental groups who credit the cotton industry with considerable environmental improvement believe that independent third party verification (of at least a random sample of industry audits) will be essential to maintain the credibility of the BMP program.⁷¹ As one NGO representative put it: “whether they have 50% participation in audits or 90% it doesn’t make any difference- the question is what does it do for the environment, and unless they can demonstrate that [we remain unconvinced]”. Independent verification will also be important to the cotton industry if it wants to build market confidence that the health and environmental claims are actually being delivered. Suppliers and other commercial third parties will want the reassurance that comes from subjecting the measuring/monitoring/auditing arrangements to outside scrutiny. The need for independent external audits was recognized by the 2001 document on *Fostering Best Management Practices* but its recommendation has not so far been acted upon.⁷² However, industry leaders recognise the compelling case for heading down this path in the future.

Other industry associations who have introduced self-regulatory initiatives have similarly been reluctant to adopt third party audits, but have paid the price. For example, when the chemical industry associations responsible for administering Responsible Care announced yearly compliance figures based on their member companies ‘ticking the boxes’ and returning questionnaires, these statistics were greeted with great skepticism by external audiences, and as tantamount to students grading their own exam papers. Only very belatedly is Responsible Care turning to external verification and independent audit as a means of providing credible monitoring and reporting. The leader in this respect is Canada, where an external team comprising two industry and two non-industry representatives (one from the local community) conduct such audits.

(iii) Dealing with free-riders

A problem arises with self-regulation because, although each individual enterprise may benefit from its success (as when a BMP program will enhance the reputation and competitive position of the entire industry), each will benefit even if it does not participate, provided that others do. It is rational therefore, for individual enterprises to “free ride”; to defect or engage only in token compliance, in effect seeking to benefit from the collective scheme without paying. For example, 80% of the industry may agree to comply with a code of practice, or BMPs, but 20% may simply refuse to sign on. If so, a failure to address the misconduct of the latter (which since they are outside of the code, is beyond the scope of the self regulatory scheme) will almost certainly result in the failure of the code. This is because those who sign the code cannot afford to be put at a competitive disadvantage as against those who do not. In such circumstances, if the 20%

⁷¹ This is consistent with the view of the Second Australian Cotton Industry Environmental Audit, Cotton Research and Development Corporation, August 2003, <http://www.crdc.com.au/> accessed 28 August 2003, p 4.

⁷² Williams, A. *Fostering Best Management Practices In Natural Resource Management- Towards An Environmental Management System in the Cotton Industry* Australian Cotton Research Council, 2001a.

cannot be induced to participate by threats or incentives provided by other players, then self-regulation can only work if government intervenes directly curb the activities of non-participants.

In the case of the cotton industry, the industry association lacks the power to impose credible sanctions on non-participants. For example, expulsion from the industry association for non-compliance would have little impact. This is a major reason why "pure" self-regulation is rarely successful, and why there is a compelling need, even with many of the best of self-regulatory programs, to complement self-regulation with some form of government or third party involvement. We explore this issue further in the next section below.

(iv) Transparency

Transparency will be a critical feature of a code's credibility with the general public. Transparency can take a number of forms. In part, it implies that the decision-making process itself (for example, how BMP standards are determined, by what criteria etc) should itself be open to scrutiny. So far this has been the case only to the extent that: a) all relevant legislation was used as the fundamental starting point for determining the best practices, and b) all relevant regulatory authorities were given ample opportunity to comment on a draft of the second edition.

Transparency also implies not only the establishment of a workable set of performance indicators, taking the form of quantifiable or qualitative measurements, but also periodic independent and accessible reports on progress in achieving these objectives. If the principle of transparency is taken to its logical conclusion then it would require considerable disclosure of practices on individual farms. One important development required both by regulation and BMPs is for growers to notify their neighbours in advance of spraying, disclosing details of pesticides to be used, the areas to be sprayed and other relevant health and environmental considerations. This has already resulted in a considerable lessening of tension between growers and neighbouring farms.

If such performance indicators are developed in negotiation with third parties such as environmental groups (as recommended above), they will provide important and credible measures for evaluating and criticising its performance. At present, the industry has not placed any emphasis on transparency, preferring to continue developing its BMP program in-house to a higher standard. However, the 2003 Cotton Industry Second Environmental Audit is an important publicly available document produced by external industry consultants, and could form the basis for continued, more systemic public reporting.

(v) Whole of property approach

Although focus of this paper is on pesticide use, it is important to emphasise that in the longer term, an effective BMP or EMS should address key environmental issues across the entire property. This would include land and water use, quality and biodiversity, as well as pesticide use and management (as is indeed the case). To do otherwise would be to invite farmers to confine their efforts to areas that they find easiest to manage (and claim credit for), while remaining silent on others. It is also the case that cotton farms

form part of broader catchments and that many environmental problems are best dealt with at catchment level. If catchment boards set regional targets, and if targets under the BMP program (and in the future under an industry wide EMS) are designed to integrate with those regional targets, far greater environmental progress will be achieved. However, persuading farmers to enter into a property wide plan remains a substantial challenge since many farms have multiple crops and so are not under the influence of a single industry association or a single self-regulatory initiative.

B. Combining Self-Regulation With Other Policy Instruments and External Pressures?

The policy debate about the relative virtues of government and self-regulation tends to be conducted in dualistic terms - public regulation versus private regulation – as if it were inevitable to have to choose between them. This way of thinking about regulation obscures the continuities and dynamic connections between public and private regulation, and overlooks how these regulatory spheres coexist and interact. As Ayres & Braithwaite) put it:

Good policy analysis is not about choosing between the free market and government regulation...If we accept that sound policy analysis is about understanding private regulation....and how it is interdependent with state regulation, then interesting possibilities open up to steer the mix of private and public regulation. It is this mix, this interplay, that works to assist or impede solution of the policy problem.⁷³

Rather than thinking about self-regulation and government regulation as alternatives, it is more productive to explore ways in which they can be combined in a complementary manner (and often in conjunction with other mechanisms), so that the strengths of each can be maximised and their weaknesses compensated for. Achieving this result however, is likely to be a major challenge which the cotton industry, like many other industry sectors, has not yet addressed successfully.

A starting point may be to think in terms not of self-regulation, but of co-regulation. This need not be a radical shift. Indeed, the leading examples of what purport to be industry self-regulation, actually involve varying degrees of interaction with government regulation, and might more accurately be described as such.⁷⁴ For present purposes, the use the term co-regulation is used to refer to a hybrid policy instrument involving a combination of government set targets and industry-based implementation, with the latter element being underpinned by government controls.⁷⁵ This use of the term co-regulation resonates strongly with the concept of “industry self-management” which describes the transfer of the responsibility for administering legislation and regulations from government to industry, and involves industry councils or similar bodies delivering

⁷³ Ayres, I., & Braithwaite, J. (1992) *Responsive Regulation: Transcending the Deregulation Debate* Oxford University Press, New York. p 102-103.

⁷⁴ For a fuller discussion of these issues, see Gunningham and Rees, 1997.

⁷⁵ Gunningham, N., & Grabosky, P. (1998) *Smart Regulation: Designing Environmental Policy* Ch 4 OUP United Kingdom.p 50-56.

services and programs in specific markets.⁷⁶ Ideally, this is a policy strategy that leaves the government free to focus on its core business of setting policy directions and establishing environmental and safety standards. It means tapping into sectoral best practices and letting industry deliver the services themselves.

But how should co-regulatory mechanisms best be designed, in order to take advantage of the strengths and virtues of industry self-regulation, while compensating for its weaknesses as a stand-alone mechanism? It will be argued that this implies an underpinning of state intervention sufficient to ensure that it does operate in the public interest, that it is effective in achieving its purported social and economic goals and has credibility in the eyes of the public or its intended audience. But what does this mean?

It is crucial that the cotton industry's own initiatives operate in the shadow of rules and sanctions provided by the general law, for it is these which are the most obvious and visible (but not the only) means of giving cotton growers themselves the incentive to comply with the self-regulatory program. For example, farmers, including cotton farmers, are highly resistant to documenting their activities. Yet doing so is an important part of developing a systematic approach to safety, health and environmental issues and an integral part of a BMP program. The New South Wales Pesticide Regulations, for example, require the keeping of formal records concerning pesticide use and application, which serve in practice, to encourage and reinforce the industry's BMP initiative. As a result, those who have adopted BMP will find it considerably easier to satisfy the regulatory requirements, and this documentation in turn will demonstrate how BMP actually leads to less pesticide use, and with it, tangible economic benefits as well as safety, health and environmental improvements. Beyond this, the stricter monitoring of chemicals and documenting their health and environmental impact on a broader scale, is something that only government has the resources and power to do. However, it seems that this undertaking has so far failed, there being "no systematic process for capturing pesticide use data or recording adverse incidents with pesticides".⁷⁷

The general law can make other important contributions to reinforcing the industry's own initiatives. For example, the BMP program now includes regular audits, but if farmers fear that such audits might be accessed by government, and used as a basis for prosecution, they will be reluctant to participate in the audit program. It is here that legislation can play an important role by stipulating very clearly that documents prepared for the sole purpose of a voluntary environmental audit are protected. As a result, they may not be obtained by any regulatory authority or used in evidence against any person in any proceedings connected with the enforcement of the regulation in question. This has already been done under New South Wales environment protection legislation⁷⁸, but only to a lesser extent in Queensland.⁷⁹

⁷⁶ Lonti, Z., & Verma, A., (1999) *Industry Self-Management as a Strategy for Restructuring Government* Discussion Paper, W 07, Human Resources in Government Series, Canadian Policy Research Networks, Ottawa www.cprn.org/docs/work/cfg_e.pdf

⁷⁷ Immig, J. (2003) *ULV Endosulfan Formulations Banned... Cows Save the Day!* NTN Recent Developments <http://www.oztoxics.org/ntn/ozstory1.htm> (accessed 24 August).

⁷⁸ ss 180-182, *Protection of the Environment Operations Act, 1997* (NSW).

⁷⁹ ss101-108, *Environment Protection Act 1994 (Qld)*. See also Bates op cit, p 456.

Government can also adopt the type of regulatory standards that complement rather than conflict with industry self-regulatory initiatives. In particular, performance standards (which specify the environmental outcome to be achieved, but not the specific process or technology through which to achieve it) allow for much greater flexibility and complementary industry initiatives, than do specification standards, which are highly prescriptive, and leave little room for innovation and initiative.⁸⁰ Under the more modern style of legislation, government can go further, not only setting out general duties of employers and others in very broad terms, but also providing these duties to be clarified through endorsed codes of practice. This may leave the door open for negotiation between an industry association, government and perhaps third parties as to what the code of practice might involve. It also enables these parties to embed in legislation initiatives which until then had been voluntarily applied by the industry association, and adopted only by those who chose to do so.⁸¹ Certainly when a government indicates that it expects all firms within a sector to comply with what was previously a voluntary code, that is likely to carry considerable weight, given the state's authority to levy fines and revoke business licenses. In this way, self-regulation can 'raise the regulatory floor' by first demonstrating what can be achieved by good industry performers. Subsequently government regulation can endorse this standard (as in endorsed codes of practice), making it compulsory for all in the industry and thus curbing free riding.⁸² Similarly, compliance with a voluntary code might be taken as evidence of "due diligence", where this is a defence to a penal charge.⁸³

Most important of all, co-regulation works best if there is a credible threat – either of the enforcement of existing legislation or of the imposition of stringent new legislation if substantial improvement is not achieved voluntarily. This has been recognised for some time by the industry itself, which as far back as 1991, argued that “poor performers...should be removed from the industry”. Thus the Australian Cotton Foundation in its response to an audit in that year, asserted that “regulatory authorities should maintain tighter control of pesticide use as a disincentive against poor standards” and urged governments to implement sophisticated monitoring programs.⁸⁴

However traditional antipathy to regulation in the rural sector generally, the difficulties of enforcement in rural areas, and the serious under-resourcing of regulatory agencies have

⁸⁰ See generally Gunningham and Johnstone, 1999 Ch 2.

⁸¹ For environment see generally, Bates, G. (2002) *Environmental Law in Australia* 5th Edition, Ch 15, Butterworths, Sydney.

pp 431-435; for Occupational Health and Safety, see Johnstone, R. (1997) *Occupational Health and Safety Law and Policy* LBC, Sydney Ch 5.

⁸² Surprisingly, Cotton Australia has elected not to seek endorsement of part of its BMP program under Queensland's code of practice approach.

⁸³“ In NSW the adoption of best practice does not provide a person or commercial entity with protection from prosecution should the legislation be breached. However, the adherence to best practice may be relevant to mitigation in any court proceedings and most likely avoid breaches in the first place”: Whyte, R. *Science, best practice, legislation and environmental performance* in Land and Water Resources Research and Development Corporation (1998 Conference) Minimising the impact of pesticides on the riverine environment: key findings from research within the cotton industry.

⁸⁴ Australian Cotton Foundation, undated.

resulted in minimal regulation ‘on the ground’. Thus, despite concerns from industry leaders and the industry association itself, government has consistently failed to enforce the law with any conviction. As one influential grower put it: “it doesn’t make our job easy that EPA walks away from responsibility”. And a second confirmed that: “if people are caught doing the wrong thing we push for them to cop it - we want them to cop it- but EPA has been very quiet”. Another endorsed the same view: “we know agencies are fiscally challenged – the word is the DWLC only has two cars – there’s rhetoric on the environment but no government resources” and “we wish they would hit the bad guys- we’ve begged them for years to prosecute people who let tail waters off their land”. Only in conditions of crisis is this situation likely to change but even then, a credible regulatory response is by no means guaranteed. For example, one industry leader complained that: “during the endosulfan crisis a ... grower was caught but let off- it’s a bad signal”. Interviews with EPA staff suggested that this situation is unlikely to change and that the agency remains almost entirely reactive in its approach to the industry.

Nevertheless, there is very considerable evidence from other industries to suggest that an underpinning of government regulation, coupled with (at least a perceived) credible threat of inspection and enforcement, is necessary to persuade the reluctant, the recalcitrant and the incompetent that other, less coercive, approaches are worth adopting. Yet it must be conceded that the numbers of cotton growers so vastly overwhelm the number of inspectors that it is wholly impractical to inspect, let alone enforce, against a significant number of them. Even so, a significant injection of regulatory resources can achieve a great deal and the *impression* of enforcement can be maintained (in contrast to the current what industry insiders characterize as the current ‘regulation by wet lettuce’ approach) through a judicious use of targeted enforcement, occasional prosecutions accompanied by broad publicity, industry blitzes, and the use of less resource intensive instruments such as on-the-spot fines and administrative notices.⁸⁵

The EPA should reassess its enforcement strategy in the light of these opportunities, particularly if Cotton Australia itself is prepared to lend its political support to such initiatives rather than seeking to protect recalcitrants within the ranks of its members. This point cannot be overemphasized. While privatization and the retreat of the regulatory state have been dominant trends in the last two decades, the adverse social and environmental consequences of these approaches are too often ignored. This is not to advocate a return to traditional ‘command and control’ regulation across the board, but rather the need for a more nuanced and cooperative co-regulatory strategy. However, the overwhelming majority of evidence-based research suggests that such a strategy, to be successful, *must* be underpinned by regulation and its enforcement and that voluntarism alone is almost invariably inadequate.⁸⁶

⁸⁵ See generally Gunningham, N., & Sinclair, D. (2002) *Leaders and Laggards: Next Generation Environmental Regulation* Greenleaf Publishers, United Kingdom.Ch 2.

⁸⁶ See Harrison, K., (2002) *Voluntarism and Environmental Governance* in Parson, E., (ed) *Governing the Environment*, ch5., OECD (2003) *Voluntary Approaches to Environmental Policy: Effectiveness, Efficiency and Usage in Policy Mixes* OECD, Paris.

At present, the failure of government regulation to reinforce the efforts of the industry to self-regulate remains a serious obstacle to effective co-regulation, and makes it essential that the industry sector and/or government provides positive incentives for farmers to participate in the industry's initiative. There are a variety of options for doing so. For example, in Queensland, growers entering the BMP program get 50% off the cost of their initial audit with the support of the federal government's FarmBi\$ program. There are also incentives under workers' compensation legislation in New South Wales, whereby the cotton industry's development of an OHS program has enabled it to participate in the NSW WorkCover Small Business Premium Discount Scheme.⁸⁷ However, these incentives are relatively modest and Cotton Australia argues that the industry has gained no real recognition from government agencies for the considerable work they have done in raising health and environmental standards by virtue of the BMP program. As one representative put it: "we've got no credit for how far we've got- nobody in government publicly recognises the cotton industry's progress".

A much more powerful means for government to reinforce and reward industry self-regulation would be through 'fast track' or 'performance track' regulation. This approach involves offering incentives to those firms that adopt an environmental management system- or arguably best management practices. These incentives can include fast-tracking of various licenses or permits⁸⁸, reduced fees, public recognition, reduced burdens from routine inspections and greater flexibility in means permitted to achieve compliance. A central quid pro quo for such regulatory rewards is the agreement to have the EMS or BMP certified and externally verified (i.e. by a third party audit).⁸⁹ In the United States, a good example of how government can help foster successful self-regulation is two-track regulation.

However, the industry remains firmly opposed to the one form of federal government support for industry self-regulation currently available- namely the \$3000 rebate to a farmer adopting an environmental management system, with a cut off for farmers earning more than \$35,000. As one cotton farmer with considerable experience of the issue put it: "it's a waste of money-there are no outcome based things required -just doing a course and developing a plan- and in any event, anyone earning only 35K a year should not be on a farm - its not even a tractor driver's wages - if I only earn 35K its barely survival - am I going to spend 10% of my income on EMS?". Strikingly, the first farmer in Australia to obtain ISO 14001 certification, Mike Logan, has discontinued participation, citing excessive costs and the absence of compensating benefits. He particularly points to the absence of significant rewards for EMS participants such as license discounts or other forms of regulatory relief.

⁸⁷ More than 150 cotton producers in NSW now participate, qualifying for a 10% reduction in their workers compensation premiums.

⁸⁸ For example, water licence, chemicals licence, vegetation management plans.

⁸⁹ See generally Gunningham, N., & Sinclair, D. (2002) *Leaders and Laggards: Next Generation Environmental Regulation* Greenleaf Publishers, United Kingdom, pp 110-115.

C. The Role of Third Parties

The state is not the only possible institution capable of compensating for the weaknesses of self-regulation in its pure form. Sometimes, there may also be a possibility of harnessing third parties to act as surrogate regulators; monitoring or policing industry initiatives as a complement or alternative to government involvement. It is indeed arguable that self-regulation is rarely effective without such involvement. Thus Webb, summarising the experience of the 1996 Canadian Symposium of Voluntary Codes, concludes:

Meaningful involvement by consumer and other public interest groups is often what sets apart the successful codes from those which have received less support from government and the general public. At a time when citizens are better informed, more demanding and more skeptical of so-called "elites" (government, industry, the academic and scientific communities etc) it is difficult to imagine a situation where a voluntary arrangement could succeed without meaningful community, consumer and/or other third party involvement.⁹⁰

The most obvious third parties with an interest in playing this role are sectoral interest groups such as environmental and community groups or NGOs generally, or even rival industries such as beef, who can be directly impacted on by the failure of industry self-regulation. This contribution may be through their direct involvement in administration of the code itself (in which case it has greater credibility as a genuinely self regulatory scheme) or in their capacity as potential victims of code malpractice (as with local communities or the beef industry), in taking direct action against firms that breach the self-regulatory program. Other commercial third parties, such as insurance companies, lenders, or suppliers of chemicals may also be utilised as surrogate regulators. For example, insurance companies have a considerable self-interest in ensuring that they do not insure bad risks (and may provide better premiums to those who participate in self-regulation).

One major consequence of self-regulatory programs that can be made self enforcing - whether through harnessing NGOs or others - is that there is consequently far less need for direct involvement of government regulators. This force may take a back seat, intervening only to the extent that the self enforcing mechanisms break down in practice, or need external support in order to make them effective. Indeed, a major role for government in these circumstances may be that of facilitator or broker (ensuring the effective involvement of appropriate third parties) rather than that of direct participant.

Turning to specifics, it is important to identify the points of greatest leverage over the cotton industry. Perhaps the most important of these is the threat the cotton industry faces to its social license. Firms who lose their social license face adverse publicity, hostility from various constituent groups within civil society, tougher regulation, and a total ban on certain activities. That license can only be retained by building the trust of, and establishing credibility not only with government, but more important with a wide range of groups within civil society, including environmental NGOs and local communities. Indeed, according to 'green' industry consultants Ecos: "The best people to help Cotton

⁹⁰ Office of Consumer Affairs, 1996 p 6.

Australia build their Code were those most opposed to the industry's farming practices-Australia's leading environmental organizations". Potentially at least, developing partnerships with such groups offers considerable benefits to both sides.⁹¹ If partnerships can be successfully negotiated with key external stakeholders and would-be critics of the industry, this will provide the cotton industry with far greater environmental credibility. Necessarily, as a condition of entering such partnerships, the industry would have to take demonstrable action to improve their environmental performance. This would include the issues of environmental targets, transparency, independent monitoring and third party auditing and verification raised above providing a credibility in negotiations which may otherwise be lacking. If such a partnership involved some form of formal environmental group endorsement, there might also be commercial benefits described below. The broader attractions of environmental partnerships have been explored elsewhere, and will not be rehearsed here.⁹²

The cotton industry has already advanced some way down this path towards collaboration with moderate national environmental groups. In particular, the WWF and Australian Conservation Foundation, have entered a dialogue with the cotton industry and have participated in various round tables and other meetings providing input into particular processes. For example, WWF has participated on the steering committee in the proposed Land and Water BMP module and have acted as sounding boards for proposed cotton industry environmental initiatives. From the industry's point of view, the value is in "having parties independent of the industry saying 'yes', what they are doing is good". Indeed, it is now the formal policy of Cotton Australia to engage in a "wide consultative process with communities [such as] local government, researchers, the conservation movement ...[and to] facilitate open dialogue on the long term sustainability and profitability of the industry".⁹³

However, formal partnerships have not been successfully negotiated, although this situation could possibly change in the future. A draft agreement between environmental groups and Cotton Australia was developed in 2001. Under the contemplated agreement, key environmental groups were to provide advice to Cotton Australia on developing and implementing the industry's Code of Sustainability. This in turn was intended "to lead to positive marketing and branding of Australian cotton internationally".⁹⁴ However, the agreement was not proceeded with because of concern from members of some of those groups about the risks of co-option and compromise. Other environmental groups, including the Total Environment Centre declined to participate in negotiations, similarly fearing that they would be co-opted by doing so and doubting the industry's commitment to self-regulation or to the environmental outcomes they regarded as bottom lines.

⁹¹ We define a partnership as a cooperative agreement between, on the one hand, business, and, on the other hand, one or more second parties (government) and/or third parties (eg environmental organisations or commercial entities), whereby business voluntarily undertakes to achieve certain environmental improvements in exchange for some benefit provided by one or more of the other partnership participants.

⁹² See Gunningham, N., & Sinclair, D. (2001) *Environmental Partnerships: Combining Sustainability and Commercial Advantage in the Agriculture Sector* RIRDC, Canberra

⁹³ Cotton Australia *Policy Position* 3rd Edition, January 2003.

⁹⁴ Ecos Corporation: Cotton Australia <http://www.ecoscorporation.com/clients/cotton.htm> accessed 10 Aug 2003.

According to one environmentalist: “even if they do it by the book, even if they adopt BMPs, there will still be spray drift and unacceptable contamination of rivers, land and water tanks... you’ve got to take the health effects of pesticides seriously. There is no reporting database, no data on their impact on workers or the public...and when they have pest infestations the economic pressure for hazardous spraying is too much”.

Whether the industry can ever answer its more strident and uncompromising environmental critics or whether there is sufficient common ground and ‘win-win’ outcomes to develop partnerships remains doubtful. For example one environmentalist interviewed stated: “this must be one of the most environmentally unsustainable industries on the second driest continent- and for it to try to be sustainable is unsustainable. You can’t justify the industry’s environmental impact on the country. If they had to internalize their costs, likely there would not be a viable industry. What they are doing with BMPs is deckchairs on the titanic”. Some members of local communities in cotton growing areas, who believe they have been subjected to high levels of pesticides and as a result have suffered serious health damage, take a similar position.

Another point of leverage is market pressure. At first sight this might seem unlikely. After all, cotton gives rise to none of the consumer health concerns that have inclined large supermarket chains to impose stringent environmental controls on those who supply them with food products. It is also conceded by all concerned that there is no opportunity for gaining a price premium on the basis of higher environmental performance or a certified environmental management system. However, what remains is the opportunity to position the Australian cotton industry so that it is (apart from the very small market niche occupied by organically grown cotton) the world’s cleanest and best quality product. Since the industry exports 90% of its crop this is, potentially, a very important consideration. Industry representatives believe it will be possible, by advancing the BMP program to the point where it becomes a certified industry-wide EMS, to gain “first cab off the rank” status with international purchasers. International clothes retailers and others it is believed, prefer to buy Australian cotton (although not at a price premium) because of the higher environmental standards involved in its production, thereby reducing the risk of their being criticized by NGOs and other industry critics. The key here is to establish some form of independent certification (and label) that is recognized by the market. Since ISO 14001 seems outside the reach of most growers for reasons described above, what might this alternative look like? This is as yet unclear.⁹⁵ Certainly without ‘walking the talk’ it is unlikely the industry would achieve its goal of expanding market share, or perhaps even of market maintenance.

A further point of leverage concerns commercial third parties. The chemical industry, which of course supplies the cotton farmers with their principal input, already provides a rebate to farmers who have an audited BMP. This reportedly produced a substantial jump in the numbers going through the audit process but has since been discontinued.

⁹⁵ Although WWF is currently using Australian cotton BMPs as a benchmark when comparing practices in parts of Asia

Finally, the best solution is to design complementary combinations using a number of different instruments. As a result, 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. For example, in the case of the chemical industry's Responsible Care program, even though the industry as a whole has a self interest in improving its health and environmental performance, collective action problems and the temptation to free ride mean that self-regulation and its related codes of practice alone, have not been insufficient to achieve that goal. However, a tripartite approach, involving co-regulation and a range of third party oversight mechanisms, may well be a viable option. This might involve the creation of:

- Greater transparency through a community right-to-know about chemical emissions program, which in turn enables the community to act as a more effective countervailing force;
- Greater accountability through the introduction of independent third party audits which identify whether code participants are living up to their commitments under the code, and which involve methodologies for checking and verifying that responsibilities are being met; and
- Government regulation which, in the case of companies which are part of the scheme, need only "kick in" to the extent that the code itself is failing or when individual companies seek to defect from their obligations under it and free ride.⁹⁶

⁹⁶ Gunningham, N., (1995) Environment, Self regulation and the Chemical Industry: Assessing responsible Care *Law and Policy* Number 17.

III. CONCLUSION

What role should industry self-regulation play in improving the health and environmental performance of the cotton industry? Will this role be effective not only in achieving this goal but also in protecting the industry's 'licence to operate'? Achieving effective industry self-regulation is never easy, as the large number of failed self-regulatory initiatives bears witness.⁹⁷ Yet in the case of the cotton industry there are considerable arguments in its favour: not as a stand-alone mechanism, but in combination with a regulatory underpinning and third-party oversight.

The industry has a number of characteristics that lend themselves to this approach, not least being a well funded and sophisticated industry association, a relatively young and adaptable workforce, and an economic self-interest in finding ways to reduce inputs, including pesticides. Beyond all else, the industry has a compelling self-interest in responding effectively to a perceived environmental crisis and to external stakeholder pressure, in order to protect its social license and avoid economically damaging restrictions on its activities. Its response has been to develop a BMP program that is practical and accessible to growers, that provides 'ownership', and that seeks to nurture a 'custodianship ethic'.

It has already achieved considerable progress. Testing by results, pesticide residues are down, as are other indicators such as the number of fish kills and external complaints. Some environmental groups at least, no longer regard the industry as an environmental pariah, and it is some considerable time since it has received adverse publicity in the media. A substantial and increasing number of growers are participating in the BMP audit program (50% of the industry by volume, 30% of all growers). Further initiatives to add new modules and to expand the BMP program into an industry-wide EMS, are in progress.

And yet despite all this, the program still has important limitations. A substantial minority of growers still does not participate and there seems no credible way in which the industry association alone can persuade this group to improve its health and environmental performance. While shaming and peer pressure can have some impact, only government regulation has the capacity to directly influence the behaviour of this group on any scale. Co-regulation rather than self-regulation seems the only credible option, with government regulation (including credible enforcement) underpinning the industry's self-regulatory approach. Yet the current approach of government regulators has been characterized as "regulation by wet lettuce" with very few resources being

⁹⁷ While little research has been conducted on the effectiveness of BMPs, a recent Productivity Commission report (Industries, Land Use and Water Quality in the Great Barrier Reef Catchment, Productivity Commission, 2003) suggests that BMPs aimed to reduce nutrient and chemical losses to the environment within and across catchments found a vary variable response. For example a survey of cane growers since 1998 found that about 90 per cent conducted soil testing, but that alternating the use of different crops across seasons had a lower adoption rate, that there was variability in the uptake of various 'desirable' practices in horticultural industries and that 'scope for improving the adoption (and ongoing development) of BMPs ...clearly remains" (p 207).

committed to the industry, an almost entirely reactive approach, and no credible enforcement policy.

Even in relation to participants in the BMP program, there is much that remains to be done in terms of protecting the industry's social licence and convincing critics that it is really 'walking the talk'. A particular concern voiced by some (not unsympathetic) environmental groups and others, is that now that the immediate crisis has receded, the BMP program is "running out of legs" and that progress is slowing considerably. Independent and credible environmental targets, monitoring, reporting and external auditing, increased transparency and a greater participatory role for third parties are amongst the most compelling issues that the industry needs to address in order to move onto the next stage of its self-regulatory initiative. It also needs to engage more directly with a range of third parties. Collaboration with moderate environmental groups is already bringing greater trust and credibility, but others, and local community groups, remain highly sceptical. Greater transparency, direct involvement of outsiders in decision-making and external verification are priorities. There are also opportunities to harness other commercial third parties, such as insurance companies or suppliers of chemicals as surrogate regulators.

Whether however, even these approaches will be sufficient to satisfy its more strident critics seems very doubtful. Parts of the environmental movement remain convinced that the industry is unsustainable in its land use, water use and chemical practices and that the current BMP initiatives amount to 'little more than rearranging the deckchairs on the Titanic'. Certainly, the BMP program to date only relates to a limited number of issues and 'moderate' environmental groups, also point out that the cotton industry is still "a long long way from any concept of sustainable agriculture or a workable model of how on-farm practice should link to catchment resources and targets".

But for those who do believe that the industry can be made sustainable, the question is how best to achieve it? Co-regulation, notwithstanding its flaws, may yet prove to be a more viable vehicle through which to pursue this goal than any of the alternatives. In the context of the cotton industry, where government resources are very limited, problems are complex and do not readily lend themselves to a conventional regulatory solutions, and the industry itself has the capacity and the self-interest to take at least a substantial part of the regulatory burden, there are compelling reasons to embrace it. Even in these circumstances, the industry association faces considerable challenges: if it goes too slowly, it will gain little credibility or external recognition for its efforts yet if it goes too fast, it may generate such a level of resistance from its members that too many withdraw. And if government is unwilling to play its part by providing credible enforcement against recalcitrants, then much of the work of the industry association towards workers health and environmental protection may be undone. How the next phase of the cotton industry's journey towards sustainability, plays out, or whether this is a 'goal too far' remains to be seen.