

Dr Neil Byron
Commissioner
Productivity Commission
Great Barrier Reef Study
gbr@pc.gov.au



Dear Neil,

Please find attached Cotton Australia's comments on the Issues Paper (*August 2002*) on Industries in the Great Barrier Reef Catchment and Measures to Address Declining Water Quality.

Cotton Australia is pleased to be included in the Productivity Commission's consultation in preparing this paper, and we thank you for the opportunity to respond. Please note we have concentrated our comments on providing the Commission with comprehensive information on the industry's environmental management program, Best Management Practices (BMP), and the aspects of the program that specifically address those issues identified that potentially impact on water quality and thus the Reef.

We would be pleased to provide comment on any information contained in this submission if required. Please don't hesitate to contact us if we can help further.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Chadley Ross", written in a cursive style.

for Ralph Leutton

Acting Chief Executive Officer
Cotton Australia

Introduction

Cotton Australia is the peak grower body for the cotton industry in Australia. **Cotton Australia** supports Australia's cotton growers and represents and advances the interests of the industry to governments, non-government organisations and the public. It focuses its efforts in the areas of environmental management, industry standards, occupational health and safety, communications and public affairs and the development of educational and promotional programs.

The Australian cotton industry must be sustainable over time if it is to continue to expand and prosper. **Cotton Australia** supports an Australian cotton industry that manages its on-farm environmental activities according to industry and community accepted best practices, giving rise to enhanced environmental outcomes.

Cotton in Central Queensland

There are three cotton growing regions in Central Queensland – Emerald, Biloela and Theodore (Dawson Valley). Cotton was first grown in Central Queensland more than 50 years ago. Over the past decade, there has generally been an upward trend for both area planted to cotton and production. Recent production figures and number of growers in each region appear below.

Region	Number of growers		Area planted (ha)		Bales produced	
	2000/01	2001/02	2000/01	2001/02	2000/01	2001/02
Emerald	82	64	32,000	22,000	209,000	152,000
DawsonValley	25	23	7,000	5,490	55,000	42,900
Biloela	9	10	1,200	610	7,000	3,100
TOTAL	116	97	40,200	28,100	271,000	198,000

Source: Cotton Australia Annual Report, 2000/2001, 2001/02

Using an average \$450 / bale, the gross value of production for the cotton industry in Central Queensland is approximately \$121 million (2000/01) and \$89.1 million (2001/02). Industry sources in Central Queensland use a conservative post-farm gate multiplier of four.

At least ninety-five percent (95%) of the cotton industry in the Central Queensland region is irrigated. Furrow irrigation is the principal method, with some growers also irrigating with drip systems and centre pivots.

Three cotton gins operate in the region, located at Emerald, Yamala and Moura.

The principal alternative crops for growers if not in cotton at this time would likely be grains or potentially horticulture. The grazing industry is extensive in the catchment, however, with the irrigation development that has occurred, growers would move to utilize capital expenditure with other irrigated crops.

Environmental Management in the Cotton Industry

The Australian Cotton Industry's Best Management Practice (BMP) program is a voluntary environmental management program that seeks to ensure the potential environmental impacts of cotton production are minimised. Adoption of BMP involves the commitment to a process of continuous improvement. Growers develop flexible, practical plans for improving their farm management and environmental performance, and progress is assessed by an independent audit.

The goals of BMP are to see the development of a cotton industry:

- whose participants are committed to improving farm management practices;
- whose participants have developed and follow policies and farm management plans that minimise the risk of any adverse impacts on the environment or human health; and
- which can credibly demonstrate to the community stewardship in the management of natural resources and farming operations.

BMP is a risk assessment process that contains the core elements of a simple environmental management system. Growers involved in the BMP Program therefore already have in place many of the components of an environmental management system.

Industry Commitment

The cotton BMP importantly has the support of the key industry bodies, including Cotton Australia (responsible for implementation), the Cotton Research and Development Corporation (funds the development of the BMP Program) and the Australian Cotton Grower's Research Association (development of the manual). The Australian Cotton Industry Council (ACIC) has endorsed BMP as a core program.

Elements of the BMP Program

The BMP Program is designed to help growers improve their farm management practices. The key tool for growers to undertake BMP is the BMP Manual. The BMP Program involves:

1. Growers reading through the **information booklets** contained in the **BMP Manual** and working through the **self-assessment worksheets** to assess their farm operation;
2. Growers then writing and implementing **action plans** to address issues identified through self-assessment. These action plans require growers to commit to **timeframes**.
3. An independent **audit** is then arranged to assess the implementation of BMP. This provides the grower with **recognition** for the work done, as well as **advice** on areas that can be improved. The audit teams are appropriately skilled to conduct the audit and assist growers with any problems they may have with their planning and implementation.

Modules currently contained in the BMP manual include: **Application of Pesticides, Chemical Storage and Handling, Integrated Pest Management, Farm Design and Management, and Farm Hygiene**. A **Storage and Handling of Petrochemicals** module is currently being printed and a **Land and Water** module is in second draft stage and in the process of being piloted on-farm. In addition to the modules with an environmental focus, the industry also has an Occupational Health and Safety course/module, **Managing Cotton Farm Safety**, which sits beside the BMP Program to address on-farm health and safety issues.

On-farm activities of the BMP Program

The self assessment sheets and workbooks in the BMP manual identify for growers 'best practice' activities that are designed to negate or minimise potential impacts of day-to-day farming activities. Below is an outline of the objectives contained in each module and best practice actions to achieve the objectives.

Farm Design and Management Module

The design and management of a cotton farm plays an important role in minimising the risk of pesticide being transported off the farm. The design and management of the farm can determine:

- how and how much water is transported around a farm, and how much soil is moved by the water;
- how much water can be retained on the farm; and
- where water leaving the farm ends up.

This section highlights practices that can help minimise the off-farm movement of pesticides in irrigation water and stormwater run-off.

Objectives and best practice actions:

- Minimise erosion and control water on-farm
 - Water containment on-farm
 - In-field erosion minimal – furrow lengths designed (where possible) to suit conditions
 - Laser levelling of low spots
- Minimise the impact of storms
 - Written plan for managing storms is in place
 - Run-off from most severe storms contained on-farm
 - First flush of run-off from a treated (chemically) area is retained on-farm
- Erosion and run-off control
 - Groundcover is maintained where possible
 - Strip cropping used in floodplain areas
 - Opportunity cropping used where possible
 - Slope lengths reduced where possible
- Control and clean-up run-off on farm
 - Run-off diverted away from sensitive areas where possible
 - Drains or natural drainage lines used for filtration and sedimentation
 - Buffer zones utilised between cropping and sensitive areas
- Use of buffer zones
 - Vegetative buffer zones used
 - Other methods of controlling pesticide drift utilised

Application of Pesticides Module

When using pesticides the safety of people and the environment is the first consideration. If it is not possible to apply a pesticide safely then the application must be delayed until it is. It is an offence to let a pesticide contaminate another person, their property, or the environment. All parties – growers, applicators and consultants – must act responsibly when making decisions about pesticide applications.

The core best management practice for safe and responsible pesticide use is to develop a Pesticide Application Management Plan (PAMP) for pesticide use on farm.

A PAMP will help ensure that everyone involved in pesticide application has a clear understanding of their responsibilities. It also helps identify the risks associated with pesticide applications so that controls to minimise those risks can be put in place.

Objectives and best practice actions:

- ❑ To develop a Pesticide Application Management Plan (PAMP)
 - Plan developed to cover all pesticides used
- ❑ Establish good pre-season communication
 - Detailed farm map is developed that includes – on-farm and neighbouring buildings, buffer zones, on-farm and neighbouring sensitive areas, neighbouring farming activities, rail and stock routes, aircraft hazards, windsocks
 - All neighbours contacted pre-season to discuss above map and planned season activities
 - Pre-season meetings held with anyone involved in the farming operation eg. consultant, aerial/ground sprayer to determine operating parameters for season
 - All workers aware of operating parameters for season and details on farm map
- ❑ Establish good in-season communication
 - Agreed communication arrangements are followed during the season
 - Application activities are monitored and recorded
 - Crop re-entry protocol is followed
- ❑ Apply pesticides during appropriate weather conditions
 - Pesticide application occurs in appropriate weather conditions for the application method being used
 - Weather prediction tools utilised prior to applications
 - Appropriate conditions and limitations for each area to be treated determined by growers prior to application

- Wind direction and buffer zones considered and used where required
- Weather conditions monitored pre and during applications
- ☐ Appropriate product selection and use
 - Product selections take into account potential for off-target damage
 - All people involved are trained and certified in chemical use
 - All products used are registered for use on the crop
 - Products applied as per label
 - Material Safety Data Sheets available for all products used
- ☐ Equipment selection and maintenance
 - Low drift equipment used where possible
 - Calibration of equipment occurs frequently
- ☐ Record Keeping
 - Comprehensive record keeping of all activities.

Storage and Handling of Pesticides Module

Pesticides are an important component in cotton production. However, they must be stored, used, transported and disposed of safely to ensure that they do not create significant risks to the environment or human health.

Objectives and best practice actions:

- ☐ To locate the storage facility in an appropriate place
 - Facility located a safe distance from sensitive areas, watercourses, houses, property boundary, etc
 - Facility located on a site not prone to flooding, and level so any run-off does not reach sensitive areas
- ☐ An appropriate building for the storage facility
 - Facility is a separate building or room or enclosure
 - Facility has access to running water and emergency shower type conveniences
 - Facility is large enough for quantity of chemical it has to store
 - Facility is constructed of fire and chemical resistant material as far as possible
- ☐ Spill containment
 - Facility floor is impermeable
 - Facility floor is bunded to contain spills
- ☐ Good ventilation
 - Facility is vented or one or more sides open to the atmosphere

- ❑ Good security
 - Facility fitted with lockable doors or gates
 - Facility is locked when not in use
 - Access to facility is controlled
- ❑ Safe work procedures
 - Up to date records exist for facility contents
 - Pesticides stored in original, marked containers
 - All people involved with chemicals are trained and certified in chemical use
 - Appropriate (according to label) protective equipment available and used when handling chemicals
 - First aid kit readily accessible
- ❑ Establish emergency procedures
 - Basic emergency plan has been developed
 - Emergency equipment is readily accessible eg. fire extinguisher
 - Clean up equipment/materials are readily accessible
- ❑ Appropriate signs
 - Facility has clearly visible warning signs
 - An evaporation or disposal pits have clearly visible warning signs
- ❑ An appropriate mixing and loading site
 - Mixing and loading carried out away from watercourses, drains, property boundary, sensitive areas
 - Closed transfer systems used wherever possible
- ❑ Good mixing and loading systems and techniques
 - Closed transfer systems used wherever possible
 - All equipment calibrated and checked regularly
 - Backflow to water source is prevented
- ❑ Worker safety during mixing, loading and application
 - All people involved with chemicals are trained and certified in chemical use
 - Appropriate clothing and protective equipment available and worn
 - First aid kit and supply of clean water available
- ❑ Equipment maintenance and cleaning
 - All equipment checked prior to use
 - All equipment cleaned after use
- ❑ Minimise pesticide waste and dispose of waste properly
 - Containers cleaned and returned as per label instructions
 - Containers triple rinsed and rinsate is not dumped

- Returnable or recyclable containers purchased whenever possible
- ❑ Safe transport of pesticides
 - Pesticides not transported in with people or foodstuffs
 - Containers secured during transport
 - Personal protective equipment available when transporting pesticides

Integrated Pest Management Module

Integrated Pest Management (IMP) integrates all means of managing pest populations with the aim of reducing pesticide use while maintaining profitability. The following are the ideas behind IPM:

- the presence of pests does not automatically require the use of pesticides, as damage may not be significant;
- when pest control measures are necessary, non-chemical pest control methods should be considered before a decision is taken to use pesticides; and
- suitable pest control strategies should be used in an integrated manner and pesticides should be used appropriately.

Although IPM is more a philosophy of management than a set of rules, it contains the following essential components:

- the ability to identify pest and beneficial species;
- an understanding of the biology and ecology of the pests and beneficial insects in question;
- a reliable method of pest and beneficial insect population monitoring and crop damage assessment;
- knowledge of economic or action thresholds for each pest;
- a range of effective control methods from which to choose; and
- an IPM plan for the farm designed to ensure that there is not an over-reliance on any one control method, particularly pesticides.

Objectives and best practice actions:

- ❑ To manage the crop for early maturity
 - Varieties matched to region and likely pests and diseases
 - Fertilizer application is based on soil and/or petiole testing
 - Final irrigation timed to ensure most plant available water is used by estimated defoliation

- Growth regulators used to control excessive growth
- Planting occurs as early as practical for region
- ☐ To regularly monitor fields for insects and damage
 - Crops checked for pests and beneficial insects and crop damage approx. 3 times per week
 - Sampling and monitoring results are kept
 - Pest to predator ratios used as guide to determining whether to apply pesticides
 - Crop growth rates monitored to help determine crop's capacity for compensation
- ☐ To preserve beneficial insects
 - Records kept of beneficial insects in the crop
 - Effect of insecticide application on beneficial population is considered
 - Food sprays considered as an alternative where appropriate
 - Refuge and/or trap crops considered as part of pest management
- ☐ To prevent the development of insect resistance
 - Insect Resistance Management Strategy for region is followed
 - Specific cultivation to eliminate overwintering pupae undertaken if required
 - Application failures not re-sprayed with insecticide from same chemical group
- ☐ Host and trap crops
 - Weeds well controlled on-farm
 - Ability of different crops to host pest and beneficials considered when setting crop rotation strategy
- ☐ Area wide management
 - Active participation in area wide management groups encouraged
 - Decisions on use of broad spectrum insecticides made through consensus
 - Use of spring and summer trap crops considered and coordinated

Farm Hygiene Module

Cotton is susceptible to the adverse effects of a number of diseases, weeds and pests. Once a disease, weed or pest becomes established in a crop, it can be difficult to manage. Preventing the problem is therefore better than attempting to cure full-blown symptoms. Good farm hygiene will help prevent the build-up and movement between farms of disease, weeds and pests.'

Objectives and best practice actions:

- ☐ Early detection and notification
 - All entries to property are made aware of existence of any crop disease and asked to take precautions to prevent its spread

- Ginners and seed companies (where relevant) notified where possible of existence of disease affected cotton to be ginned
- Crops regularly inspected for disease, weeds and pests
- Employees and contractors made aware of disease symptoms and requested to notify manager/owner of suspect plants or areas
- ☐ Clean down all equipment and machinery
 - All vehicles and machinery thoroughly cleaned of soil and crop debris before entering or leaving property
 - Vehicles and machinery thoroughly cleaned after working in affected areas
- ☐ An integrated approach to managing disease, weeds and pests
 - Tailwater and storm run-off are retained on-farm
 - Disease resistant cotton grown where possible
 - Crop rotation strategy used to help reduce crop diseases
 - Weeds well controlled in and around fields
- ☐ Safe destruction of plants affected by Fusarium Wilt
 - Affected plants of a small outbreak within 2 meter radius destroyed on-site
 - Affected area not irrigated and storm water contained on-site if possible
 - Trash collected in tail drains from affected fields and burnt on-site
 - Machinery traffic avoided in affected area where possible

Storage and Handling of Petrochemicals Module **

Efficient cotton production requires petrochemicals to be stored on-farm for use in machinery and farm vehicles. Petrochemicals commonly stored on-farm include fuels (petrol, diesel, and aviation fuel), engine oil and lubricants. Petrochemical storage includes storage in above-ground tanks, underground tanks, mobile tanks, and in drums or other containers. Petrochemicals need to be stored and handled safely to avoid soil or water contamination, fires or explosions.

Objectives and best practice actions:

- ☐ Use an appropriate site for petrochemical storage tanks
 - All tanks on property safe distance from watercourses, drains, houses, areas storing other chemicals, etc
 - Tanks sited to allow safe access to all vehicles that need access
 - Tanks sited aware from flood prone areas or are protected from flood waters
- ☐ Proper design and installation of petrochemical storage tanks
 - Tanks are specifically designed and constructed to hold the liquid stored
 - Tanks are properly installed by qualified or experienced persons

- Tanks maintained in safe working order

Objectives and best practice actions:

- Spill containment
 - Appropriate bunding for large tanks containing greater than 5,000 L petrol, or 10,000 L diesel, or 10,000 L engine oil
 - Spills can be safely drained from the bunded area
 - Smaller and mobile tanks utilise ground slope, diversion channels, low bunds or kerbing to control spills
- Install appropriate signs
 - All tanks have appropriate warning signs
- Ensure safe working conditions
 - All workers aware of proper safety precautions and hazards associated with petrochemicals
 - Material Safety Data Sheets available for petrol
 - Ignition sources kept away from fuel storage areas
 - Tanks are free from fire hazards, rubbish and farm equipment
 - Vehicle engines turned off whilst fuel storage tanks are in use
 - A register is kept for all fuels stored on farm (Qld)
- Establish emergency procedures
 - Fire extinguishers are readily accessible and available
 - An emergency plan has been established and documented
 - All workers aware of emergency plan and actions
- Dispose of waste safely
 - Used engine oil is stored safely until it can be collected for recycling
 - Used engine oil is recycled through licensed waste oil collectors
 - Recyclable or reusable drums used where possible

*** this module is currently being printed for distribution to the industry.*

Demonstrated Success of the BMP Program

The cotton industry officially launched the BMP Program in 1997, with the first draft of the BMP Manual released to the industry. In September 2000, the Manual was updated. Future modules will be added to this Manual if and when they are required.

The industry has achieved significant national milestones with the implementation of BMP. Current industry figures are:

- ❑ Almost 100% of growers introduced to BMP through industry-run workshops or grower visits.
- ❑ **25%** of growers have been **audited** at least once (7% are up to second and third audits).
- ❑ This figure represents **at least 42%** of the area under cotton production.
- ❑ A further **20%** of growers are '**audit ready**' (i.e. have worked through the manual and have required paperwork).
- ❑ A further **45%** of growers have made **on-farm changes** as a result of commencing the program. These growers will continue to progress until audit-ready.

These figures are significant as they clearly demonstrate that the **BMP Program has already encouraged approximately 90% of growers to proactively change their farming practices to better manage the environment and their farm.**

In the context of Central Queensland (Fitzroy Basin) growers, the figures are:

Region	BMP Audited	Audit Ready *	BMP Progressing
Emerald (Central Highlands)	42%	8%	46%
Biloela	30%	60%	10% (1 grower)
Dawson Valley	87%		13% (3 growers)

* *currently registered for an audit with the Industry BMP Audit Office and waiting for an industry accredited auditor to become available. To be completed by Dec 2002.*

Examples of some of the on-farm changes being implemented under the BMP program include:

- ❑ Integrated pest management (IPM) practices that have resulted in a reduction from three litres of pesticide used to produce one bale of cotton in 1997 to 1.2 litres in the 2000/2001 season (taken from actual farm records);
- ❑ IPM combined with the use of biotechnology has reduced the need for chemical application for the first 3-4 months of the season;
- ❑ Variable rate fertilizer application technology, used in conjunction with sophisticated soil testing and yield mapping, allowing growers to precision apply fertilizer that matches crop requirements, thereby eliminating waste and impacts associated with unutilised product;
- ❑ Development of a comprehensive pesticide application plan for the farm, which includes neighbour communication, clear operating guidelines for pesticide activities; weather monitoring and comprehensive record keeping;
- ❑ Development of tailwater structures and recirculation systems that address water run-off issues;

- ❑ Effective storm water management planning that reduces potential pesticides in the riverine environment;
- ❑ Development of area-wide management groups that address pest management on a catchment-wide basis. For example, coordinating spray data to achieve better results with beneficial insects;
- ❑ These area wide groups have also facilitated the transfer of information from grower to grower, ensuring the rapid adoption of research and best practice;
- ❑ Greater communication and understanding between growers, chemical applicators and neighbours;

Other Programs the Industry is Involved With

There are a number of other programs the cotton industry is actively involved with that link into best practice actions and objectives and serve to reduce environmental risk;

- ❑ DrumMuster – national chemical container collection and recycling scheme aimed at reducing the amount of plastic drums requiring on-farm disposal. Cotton Australia has been an active campaigner to encourage as many Shires throughout Qld and NSW to participate in the program. The BMP Program encourages growers to participate in such a collection program, or to use recyclable or returnable containers wherever possible
- ❑ ChemCollect – a free collection, storage and destruction scheme for unwanted agricultural and veterinary chemicals used in primary production. The Environmental Protection Agency is co-ordinating the scheme in Queensland. It is estimated there are 270 tonnes of unwanted and potentially hazardous pesticides on Queensland rural properties. The ChemCollect scheme is targeting organochlorine pesticides. This program is an effective tool to manage the risk of chemical use and storage on-farm, by providing a safe, off-farm method of removal and destruction of unwanted product.
- ❑ Qld Rural Water Use Efficiency (RWUE) Initiative – The RWUE Initiative is a partnership between industry and government to improve the use and management of available irrigation water, thereby improving the competitiveness, profitability, and environmental sustainability of Queensland's rural industries.

Adoption programs have been established to help farmers achieve best practice in irrigation water management on their properties. Cotton Australia has industry

ownership of the Initiative, which is administered by the Australia Cotton Cooperative Research Centre (Cotton CRC). There is a Financial Incentives Scheme component to the Initiative, and this is designed to encourage and assist irrigated cotton and grain producers implement activities identified as improving on-farm water use efficiency. Cotton Australia administers this component of the Initiative. The Financial Incentives Scheme has been exceedingly successful in initiating change for growers, as well as accelerating the rate of change across the industries.

The objective of the RWUE Initiative is to, by June 2003, increase irrigation efficiency in the cotton and grain industries by at least ten percent (10%) and have seventy percent (70%) of growers adopting best management practice guidelines for irrigation.

Program highlights for 2001/2002 include:

- The Program has dramatically improved irrigators' awareness of and access to new technologies to improve irrigation management and system performance. *Grower awareness and participation in the RWUE Initiative exceeded 75% by August 2001, and is now estimated to be greater than 80% in some regions.*
- For the \$1.5 million invested to date through the Financial Incentives Scheme from Government, cotton and grain irrigators have invested between \$3.5 and \$3.6 million. This money has been used to help irrigators implement on-farm changes to their management necessary to achieve best practice irrigation.
- An increasing number of irrigators are now achieving irrigation efficiencies well in advance of the State benchmarks compiled at the commencement of the Program. *These efficiency gains indicate that the 10% Program target increase in efficiency is already being achieved and in many cases exceeded, with 12 months of the Program remaining.*

Source: Rural Water Use Efficiency Initiative.: Cotton and Grains Adoption Program Milestone Three Report, June 2002. Compiled by P.J. Goyne, Joint Adoption Coordinator, Cotton CRC.