Executive summary

In March 1995 the Cotton Research and Development Corporation (CRDC) asked the Centre for International Economics to prepare a report on the cotton industry and its economic impact. This report was to provide a basis for assessment of the key policy, economic, market and environmental issues facing the industry.

Industry development and performance

The modern cotton industry, concentrated in northern New South Wales and southern Queensland, has shown rapid growth over the past 30 years. By 1992, when the industry reached a peak production level of 2.2 million bales, it was Australia's fourth largest rural export earner, with exports valued at around $1 billion. Few other significant rural or manufacturing industries in Australia have achieved such strong export growth over this period.

While government and the industry have worked together effectively in such matters as R&D, the rapid growth of production and exports has been achieved without government assistance and intervention. A federal government bounty on cotton production applied until 1971 but since then the industry has developed despite government taxes on inputs and other imposts. In 1992-93 the effective rate of assistance to the cotton growing and ginning industry was minus two per cent. Furthermore, the industry has had to compete on world markets against heavily subsidised competition. In the US, for example, the cost of the Cotton Program, which supports US cotton growers under the Farm Bill, is equivalent to around US$87 per bale.

The industry's rapid development suggests that cotton growing is more profitable than other alternative enterprises and that it is an efficient way of farming in the irrigation areas of northern NSW and southern Queensland. The net returns from growing cotton have been much higher than for other crops. The levels of investment in cotton growing as well as ginning have also been much higher than for other rural industries in these regions. Cotton farms on average have a net worth of at least twice the average net worth of farms in other rural industries, and in the early 1990s the level of cash operating surplus was several times higher than the average for any other rural industry. The level of inputs, also, has been relatively high as has the level of average debt.

Since 1992 the drought in eastern Australia has taken its toll on the cotton industry. The availability of water for irrigation has been severely depleted in many river valleys, particularly the Gwydir. Growers in this valley have suffered severe losses, with gross industry profits having fallen substantially in 1994-95.

Regional and economic significance

The significance of the cotton industry declines with the level of aggregation. At a regional level the cotton industry tends to be the mainstay of the economies of regions in which cotton is grown. With the expansion of cotton has come a large number of support activities, including labour for cotton growing,machinery suppliers, seed, chemical and fertiliser suppliers, aerial contractors and consulting and management services. Regional economic activity has also been stimulated on the output side as ginning, marketing and byproduct handling activities generally take place in the region. It is estimated that for every one person employed directly in the growing of cotton in the Gwydir Valley, for example, another two people have jobs directly or indirectly associated with cotton in the rest of the region.

At a state level, cotton in NSW accounted for about 8 per cent of the gross value of agricultural production in 1993-94, and 3 per cent in Queensland. At a national level, cotton contributed just over 3 per cent to the gross value of agricultural production in 1993-94 and just over 4 per cent to the value of agricultural exports (nearly 7 per cent in 1991-92). However, developments in the cotton industry have a limited impact on the economy at large (this is true for just about any single industry). For example, estimates from a cotton version of the ORANI general equilibrium model indicate that a 40 per cent reduction in cotton production would reduce real GDP in Australia by 0.09 per cent.

The cotton growing industry has contributed to expansion of the domestic textile industry. Domestic mill cotton consumption has nearly doubled in the last decade with much of the increase destined for export as yarn or textiles.

Industry challenges

The successful development of the cotton industry has also raised a number of problems. After three years of drought, public and private water storage are well depleted and there are increasing claims on the smaller

stock of water. These claims have come from the continuing growth of the cotton industry, the demands from other agricultural users and demands from environmental groups for water for wetlands.

The increased use of chemicals has also meant major challenges for the industry. R&D is still vital to addressing these problems but a challenge here is the allocation of limited funds for R&D to these issues as well as to others to increase the competitive edge of the industry in world markets.

Water

This set of problems is being tackled in a number of ways — for example, the use of shorter season varieties, improved cultural practices, the use of on-farm storage and tailwater recycling, and irrigation methods which conserve water. Cotton is increasingly being produced in a raingrown environment albeit from a small base. However, the problem of water allocations from public storages, access to unregulated water sources, security of supply and price remain pressing matters of the industry.

In the areas where cotton is grown commercially, water regulated by state dams has not been sold by the authorities according to what the market would bear. Rather, there have been block allocations — so much for irrigation, so much for environmental flows and other uses. Water charges have been set to partially reflect costs of regulating supply rather than to reflect demand relative to supply. Access to 'surplus flows' and water on unregulated streams at the cost of pumping has further disguised the strength of demand pressures relative to supply.

Recent changes have seen a tightening of the rationed allocation of water to cotton growing and an increase in the administered charges to include 'water resource management costs' of the Department of Land and Water Conservation, which is seeking greater costs recovery from extractive users.

Higher charges and less water with lower security is not a good outcome. But greater market based access to supply with prices for water reflecting cotton growers' demand for it would also mean paying more for water than through the present water charges. However, provided this was accompanied by increased security of supply there could be gains. Formalisation of a market based access to off-allocation water might be a way forward.

For the cotton industry, security of supply of water is the big issue. While higher prices for water would obviously mean higher costs and lower

incomes, in the long run there would be benefits for the cotton industry in having price play a bigger role in the allocation of water. First, the cotton industry would be the strongest bidder for water and a willingness to pay for water would make clear to governments — local, state and federal — the opportunity costs of meeting demands for water from environmental groups.

Second, higher prices could justify the construction of additional collective water storages. Whether such storages could or would be built is an open question but in principle the economics of constructing them must improve with higher water prices.

Use of chemicals

The other main point of concern for the industry is the reliance on chemicals to protect the crop. The industry is a large user of chemicals. There are concerns that this extensive use of chemicals may have harmful effects which extend beyond the cotton industry. Furthermore, in the past insects have built up resistances to the chemicals which have been used. The further potential build up of resistance remains a serious challenge.

Perhaps the most serious challenge which the industry faces is that of public perception, right or wrong, that the use of chemicals in cotton production is a potential significant source of environmental damage and possibly, through spray drift and other means, a danger to human health.

People in the industry have faced these challenges in several ways. An independent environmental audit has been conducted which found that the industry was responsible in its approach to environmental issues and that no specific community health problems could be linked directly to pesticide use.

Regular water quality monitoring programs are in place, management of tail water is of a high standard and major research efforts are aimed at minimising the use of chemicals.

These challenges remain and, in some cases, may even intensify. But a potential breakthrough is the commercial introduction of transgenic cottons in which resistance to insect attacks has been genetically engineered into the plant. While these cottons offer the potential to significantly reduce the use of chemicals in cotton growing, expectations should not be inflated and their introduction will require a high degree of industry cooperation and self-regulation to ensure that Integrated Pest Management (IPM) programs are effective and that the benefits of

transgenic cottons are not rapidly diluted because of insect resistance build up. These IPM programs will be made all the more difficult as raingrown cotton, in particular, increases.

Research and development

Effective and focused R&D has been a major factor behind the rapid development of the modern cotton industry. A key focus has been the breeding and commercial development of plant varieties suited to Australian conditions. This has led to yield improvements of around 60 per cent since the early 1970s, substantial improvements in the quality of Australian cotton and the use of varieties with greater resistance to insect attack.

Several factors have contributed to the success of R&D and the relatively rapid adoption of research results.

There have been close links between growers, researchers, R&D funders and marketers, facilitated by the geographic compactness of the industry and the location of research facilities in the major growing regions. Growers have been active, through the Australian Cotton Growers' Research Association, in influencing the direction of research and identifying significant areas for research funded by the Cotton Research and Development Corporation. Researchers have had to be accountable to the industry through media such as the biennial Research Conference. There has been substantial private investment in research and, perhaps most important of all, there has been no government involvement in marketing schemes which might otherwise have blurred price signals between customers and growers and also plant breeders.

Given the abovementioned challenges facing the industry, it faces a further continuing challenge of directing R&D funds in areas which will give the best returns to the industry, and community in general, in future years. In this regard, the industry should look carefully at its long term goals.

Cotton growing regions at a glance

Regional and major centres	*Typical production bales*[a]	*Typical value of production*[b]	*Features*
	'000 bales	$ million	
Darling-Riverina (Bourke, Menindee)	70	35	Isolated Darling areas, small areas in the Riverina.
Macquarie Valley (Warren, Trangie, Narromine)	260	130	Relatively stable production but vulnerable to diversion of irrigation water to other uses.
Namoi Valley (Narrabri, Wee Waa, Gunnedah, Walgett)	395	198	Recent expansion of Upper Namoi. Some raingrown production and use of ground water.
Gwydir (Moree, Collarenabri)	490	245	Ideal climate and soils, some raingrown production. Vulnerable to availability of irrigation water.
Macintyre (Goondawindi, Mungindi)	290	145	Similar to the Gwydir.
Darling Downs (Dalby, Cecil Plans)	235	117	Mixed farming and production is sensitive to price variations between crops. Relatively higher proportion of raingrown production.
St George	100	50	Similar to the Gwydir.
Biloela–Theodore	40	20	Production stable at Theodore but shrinking at Biloela.
Emerald	120	60	Relatively stable production. Some raingrown cotton.
AUSTRALIA	**2 000**	**1 000**	

[a] All figures are highly variable depending on seasonal conditions, water availability and so on. In recent years total production has ranged between 1.4 million and 2.2 million bales. Usually over 90% of production comes from irrigated crops and the remainder from raingrown crops. Around 75% of production comes from NSW and 25% from Queensland. [b] Value of production is based on a conservative $500 per bale total for fibre and seed.

Source: Cotton Research & Development Corporation.