

Industrialised Cotton Production:
From California to Australia's Namoi
Valley

by

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B.A. (Hons.) Politics, University of Western Sydney, 2002

A thesis submitted to Charles Sturt University for the
degree of Doctor of Philosophy

August 2012

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CERTIFICATE OF AUTHORSHIP

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ACKNOWLEDGEMENTS

I would like to thank my supervisor, Associate Professor Ian Gray, for his support and encouragement.

I gratefully acknowledge the financial support of Charles Sturt University which made this thesis possible through provision of a Charles Sturt University Postgraduate Research Scholarship.

I would like to thank Professor John Pigram from the University of New England for his generosity in loaning a copy of his Honours thesis.

ETHICS APPROVAL

This thesis gained approval from the Human Research Ethics Committee at Charles Sturt University. The approval protocol number is 2004/251.

ABSTRACT

The industrialisation of agriculture was one of the most important agricultural developments of the twentieth century. The existing political economy literature has indicated the complexity of the process of agricultural industrialisation. Yet, the significant variation between different agricultural commodity systems suggests there is still much to be learned about how such diverse agricultural commodity systems have been affected by the process of industrialisation.

This thesis utilises the case study of cotton production, one of the most highly industrialised agricultural commodity systems, to investigate the process of agricultural industrialisation more deeply. Specifically, this thesis explores the development of industrialised cotton production in California during the first half of the twentieth century and how, during the 1960s, that form of cotton production was introduced to the Namoi Valley in north-western New South Wales by a small group of Californian migrants. It offers a detailed analysis of the process through which industrialised cotton production was established in the Namoi Valley, exploring government involvement and other key factors. It analyses the Namoi Valley's industrialised mode of cotton production, and the social and environmental ramifications of the Namoi Valley's cotton growing industry.

This thesis seeks to contribute to the political economy literature on agricultural industrialisation by providing a detailed, historically-grounded case study through which the process of the internationalisation of industrialised agriculture can be more thoroughly understood. This thesis also aims to provide insights regarding the environmental and social consequences of industrialised agriculture.

INTRODUCTION

Cotton growing has a lengthy and varied history globally. The concept of 'industrialised cotton production' is most commonly associated with British textile mills during the Industrial Revolution, however, the focus of this thesis is not on manufacturing, but a key period of change in the method by which cotton has been grown. That key period was the twentieth century, particularly from the 1940s, when the development of industrialised agriculture occurred.¹ The characteristics of industrialised agriculture have been described as follows:

Increased mechanisation, the development and widespread use of artificial fertilisers, larger field and farm size, the development of pesticides and herbicides, continuous cropping, increasing farm specialisation, developments in livestock and plant breeding and, now biotechnology have transformed the landscape and brought major structural changes within the farming community and within rural society.²

Such summaries are useful in sketching broad tendencies in agriculture, but it is only through detailed analysis of specific agricultural commodity systems that the causes and consequences of the proliferation of industrialised agriculture are illuminated. This thesis attempts to analyse the introduction of an industrialised agricultural commodity system at the local level. It explores the twentieth century transformation of cotton production that occurred in California through the adoption of industrial-style technology and techniques, and the subsequent replication of that model of cotton production in Australia's Namoi Valley.

The central research issues that this thesis seeks to explore include the development of industrialised cotton production in California, the establishment of industrialised cotton growing in the Namoi Valley, the extent of state involvement in

¹ Gyorgy Scrinis, *Colonizing the Seed: Genetic Engineering and Techno-Industrial Agriculture*, Melbourne: Friends of the Earth, 1995, p. 10.

² Tracey Clunies-Ross and Nicholas Hildyard, *The politics of industrial agriculture*, London: Earthscan Publications, 1992, p. 9.

the introduction of industrialised cotton production to the Namoi Valley, and the social and environmental implications of that form of cotton production for the Namoi Valley. While this study is by no means the first to consider cotton growing in California or the Namoi Valley, it is distinguished from existing works on cotton by the application of a political economy perspective and an examination of the mode of production, an approach that was inspired in part by William H. Friedland, Amy E. Barton and Robert J. Thomas' study of lettuce.³

This thesis offers a historical perspective that situates the Namoi Valley in the context of a historical continuum of cotton production that has seen cotton growing evolve from being labour-intensive (as in the case of cotton growing by slaves and sharecroppers in the United States) to a capital-intensive form of production (exemplified by the industrialisation of cotton growing in California, and its reproduction in the Namoi Valley).

Within the framework of Australia's agricultural history, the cotton growing industry is unusual. Unlike the nation's long-standing wool, wheat and beef industries, for example, it was not until the 1960s that a cotton growing industry became firmly established in Australia. Cotton production was fostered in that decade by the provision of a federal government subsidy in the form of a cotton bounty. The establishment of the cotton growing industry occurred at a critical juncture in Australia's policy on agriculture: the following decade saw the cotton bounty eliminated. Cotton growing in Australia was historically entwined with the creation of state-sponsored irrigation schemes and the provision of government subsidies designed to encourage the farming

³ William H. Friedland, Amy E. Barton and Robert J. Thomas, *Manufacturing Green Gold: Capital, Labor, and Technology in the Lettuce Industry*, Cambridge: Cambridge University Press, 1981.

of cotton.⁴ Within Australia, it has been argued that cotton production ‘depended more upon politics than climate or soil.’⁵

The Namoi Valley is not Australia’s only cotton producing region, but it has been selected for this study because it can be seen as the most important with respect to the development of industrialised cotton production in Australia. Before the 1960s, cotton had been grown intermittently in Australia, primarily in Queensland, in a small-scale, labour-intensive fashion.⁶ It was in the Namoi Valley that industrialised, irrigated cotton production was first established within Australia. The model of industrialised cotton growing introduced to the Namoi Valley by Californian migrants was soon reproduced in other rural districts of Australia. A 1999 study of cotton growing in Queensland observed:

The most striking feature of the irrigated cotton industry is the intensive nature of the production system which is characterised by a high level of chemical inputs and high risk capital outlays, with yield and profit dependent on a guaranteed water supply and technological ‘solutions’ to production problems.⁷

The cotton production system described in Queensland originated in California, and demonstrates that the nature of Australia’s contemporary cotton growing industry was shaped indelibly by the form of industrialised production that was developed in the Namoi Valley.

Chapter One of this thesis provides a review of the relevant literature and attempts to contextualise the development of industrialised cotton production by

⁴ Ted Henzell, *Australian Agriculture: Its History and Challenges*, Collingwood: CSIRO Publishing, 2007, pp. 205-226.

⁵ Robin Bromby, *The Farming of Australia*, Sydney: Doubleday, 1986, p. 100.

⁶ J.J. Basinski, ‘The Cotton Growing Industry in Australia’, *The Journal of the Australian Institute of Agricultural Science*, September 1965: 206-222.

⁷ Geoffrey Lawrence, Melissa Meyers, Stewart Lockie and Richard Clark, ‘An Action Learning approach to grower-focussed change: Research among cotton producers in Queensland’, in David Burch, Jasper Goss and Geoffrey Lawrence (eds.) *Restructuring Global and Regional Agricultures: Transformations in Australasian agri-food economies and spaces*, Aldershot: Ashgate, 1999, pp. 289-290.

presenting an overview of pivotal aspects of agriculture in the United States and Australia during the twentieth century.

Chapter Two explores the rise of an industrialised form of cotton production in California. It examines what made California's cotton growing industry different within the United States, a nation that has a long history of producing the fibre crop. The chapter considers the crucial developments that contributed to the emergence of industrialised cotton growing in California, including the construction of irrigation systems, and the commercial availability of the tractor, the spindled mechanical cotton harvester and chemicals such as DDT.

Chapter Three concentrates upon the establishment of industrialised cotton production in the Namoi Valley. It explores the migration of American cotton growers and the reasons for their selection of the Namoi district. The chapter contrasts Australia's history of cotton production with that of the United States, and examines efforts to stimulate Australian cotton growing through the provision of federal cotton bounties.

Chapter Four analyses the industrialised cotton production system established in the Namoi Valley at the beginning of the 1960s. It is argued in this chapter that the system of cotton growing forged in the Namoi Valley constitutes a distinctive 'cotton mode of production'. This chapter examines the characteristics of the Namoi region's industrialised cotton mode, how that style of cotton production has changed over time, and the role of labour in the production of cotton in the Namoi Valley.

Chapter Five focuses on how the numerous inputs required to grow cotton on an industrial scale led to the establishment within the Namoi Valley of a range of businesses that supply and service the cotton growing industry.

Chapter Six explores the environmental consequences that have arisen from industrialised cotton production in the Namoi Valley. The chapter analyses the existing

environmental literature to provide an assessment of cotton's environmental impact within the Namoi district over the decades since the cotton industry was founded.

Chapter Seven examines key aspects of the social dynamics that have emerged from the system of industrialised cotton production in the Namoi Valley. It concentrates upon the cotton industry's implications for the district in relation to population levels, housing and labour. The chapter explores the circumstances of the strike that affected the cotton growing industry in the Namoi Valley in 1973, and examines the issue of cotton farmers' debt levels.

Although it is essentially a study conducted at the local level, this thesis aims to contribute to an understanding of the process of agricultural industrialisation, how the internationalisation of agricultural industrialisation has occurred, and the environmental and social consequences of industrialised agriculture, through the case study of cotton.

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CHAPTER ONE: LITERATURE REVIEW AND METHODOLOGY

This thesis examines industrialised cotton production, but industrialisation is merely one of a number of key developments that have been the subject of research on agriculture, particularly since the 1970s, and which also have a bearing upon this study. This chapter offers a review of the relevant literature and attempts to contextualise the development of industrialised cotton production by providing an overview of pivotal aspects of agriculture in the United States and Australia during the twentieth century. It also outlines the research objectives and the methodology employed in this thesis.

Industrialisation and other changes to agriculture saw a concomitant shift in the nature of research on the sector through the development from the 1970s of what was initially termed ‘the new rural sociology’, and has since been known as the ‘political economy of agriculture’ or ‘agrarian political economy’.¹ The development of this new perspective was prompted by the need for new theories with which to analyse the marked changes in agriculture, such as the rise of capitalist agriculture and agribusiness, the mechanisation and industrialisation of agriculture, and the related changes to rural labour.² Early proponents of this perspective emphasised that research was required on topics that had been accorded little attention by rural sociologists and other researchers prior to the 1970s, including ‘the structure of agriculture in advanced capitalism, state agricultural policy, agricultural labor, regional inequality, and agricultural ecology.’³ Since that period, research on agriculture has burgeoned, with many studies

¹ Frederick H. Buttel, ‘Some Reflections on Late Twentieth Century Agrarian Political Economy’, *Sociologia Ruralis*, Vol. 41, No. 2, April 2001, p. 165.

² Howard Newby, ‘The Rural Sociology of Advanced Capitalist Societies’, in Howard Newby (ed.) *International Perspectives in Rural Sociology*, New York: John Wiley and Sons, 1978, pp. 3-30.

³ Howard Newby and Frederick H. Buttel, ‘Toward a Critical Rural Sociology’, in Frederick H. Buttel and Howard Newby (eds.) *The Rural Sociology of the Advanced Societies: Critical Perspectives*, Croom Helm, London, 1980, p. 15.

emphasising the impact of globalisation and the international or global dimensions of contemporary agricultural production.⁴

The twentieth century industrialisation of agriculture has been interpreted as the subordination of agriculture to industry, as factory-made ‘machinery, chemicals, and feedstuffs became major spheres of capital investment’ and many farmers were made reliant upon credit in order to obtain these industrial inputs.⁵ In the analysis of agriculture from the perspective of political economy, it has been argued that agriculture can no longer be seen as a sector that is separate from industry.⁶ The transformation of agriculture in the twentieth century has been identified as the third in a sequence of agricultural revolutions, the first of which concerned advances in farming practices and pre-dated the Industrial Revolution.⁷ The second of these agricultural revolutions occurred in the nineteenth century and primarily involved progress in the area of fertiliser and soil chemistry.⁸ However, it is the third agricultural revolution that is of particular relevance to this thesis, and that phase in the twentieth century ‘related to mechanisation, genetic improvement of plants and intensive use of agro-chemicals’.⁹

Another interpretation has situated agricultural transformation within the context of three industrial revolutions or industrialisations. According to that analysis, the first industrialisation was concentrated upon textile manufacturing and mechanisation, while the second involved agriculture and other industries in the ‘chemicalization of

⁴ Buttel, ‘Some Reflections on Late Twentieth Century Agrarian Political Economy’, p. 171.

⁵ Harriet Friedmann, ‘Changes in the International Division of Labour: Agri-food Complexes and Export Agriculture’, in William H. Friedland, Lawrence Busch, Frederick H. Buttel, and Alan P. Rudy (eds.) *Towards a New Political Economy of Agriculture*, Boulder: Westview Press, 1991, pp. 65-87.

⁶ Friedmann, ‘Changes in the International Division of Labour: Agri-food Complexes and Export Agriculture’, p. 65.

⁷ George Liodakis, ‘The Role of Biotechnology in the Agro-Food System and the Socialist Horizon’, *Historical Materialism*, Vol. 11, Issue 1, 2003, p. 38.

⁸ Liodakis, ‘The Role of Biotechnology in the Agro-Food System and the Socialist Horizon’, p. 38.

⁹ Liodakis, ‘The Role of Biotechnology in the Agro-Food System and the Socialist Horizon’, p. 38.

processes' and production.¹⁰ The third industrialisation concerns 'the engineering of the life process.'¹¹ This is commonly referred to as 'biotechnology', which has been defined as 'the industrial harnessing of life forms and processes'.¹² In the late twentieth century, agriculture became a crucial sector in the development and application of varied forms of biotechnology.

It has been argued that the 'continuing importance of land and seasonal conditions means that production, even after mechanization, must be carried out sequentially.'¹³ Similarly, it has been demonstrated that 'even some of the most global industries remain profoundly rooted in and shaped in critical ways by the natural production systems on which they depend.'¹⁴ Agriculture's base in nature had curbed and constrained the prospect of the full industrialisation of the agricultural sector, limiting industrialisation to specific aspects of production, such as replacing the horse and manure with the tractor and manufactured fertilisers.¹⁵ This represented the 'transformation of discrete activities into sectors of agri-industrial accumulation and their reincorporation into agriculture as produced inputs'.¹⁶

¹⁰ Vandana Shiva, 'Biotechnological Development and the Conservation of Biodiversity', in Vandana Shiva and Ingunn Moser (eds.) *Biopolitics: A Feminist and Ecological Reader on Biotechnology*, London: Zed Books, 1995, p. 195.

¹¹ Shiva, 'Biotechnological Development and the Conservation of Biodiversity', p. 195.

¹² Henk Hobbelink, 'Biotechnology and the Future of Agriculture', in Vandana Shiva and Ingunn Moser (eds.) *Biopolitics: A Feminist and Ecological Reader on Biotechnology*, London: Zed Books, 1995, p. 226.

¹³ Newby, 'The Rural Sociology of Advanced Capitalist Societies', pp. 20-21.

¹⁴ Paul S. Ciccantell and David A. Smith, 'Nature, Raw Materials, and Political Economy: An Introduction', *Research in Rural Sociology and Development*, Vol. 10, 2005, p. 3.

¹⁵ David Goodman, Bernardo Sorj and John Wilkinson, *From Farming to Biotechnology: A Theory of Agro-Industrial Development*, Oxford: Basil Blackwell, 1987, pp. 1-2.

¹⁶ David Goodman, 'Some Recent Tendencies in the Industrial Reorganisation of the Agri-food System', in William H. Friedland, Lawrence Busch, Frederick H. Buttel, and Alan P. Rudy (eds.) *Towards a New Political Economy of Agriculture*, Boulder: Westview Press, 1991, p. 40.

It has been widely observed that while ‘the practice of farming has become industrialized, its ownership has not.’¹⁷ The persistence of family-owned farms has appeared to restrict or negate the prospect of full industrialisation of agriculture, but some authors have offered a different interpretation. It has been argued that agri-food companies have asserted control over farms in ways other than direct ownership ‘in order to minimise their costs and their exposure to the risks normally associated with farming.’¹⁸ In a process known as ‘subsumption’ and defined as ‘the control of agriculture by outside agencies’, farmers have seen their independence eroded, most commonly through formal contract arrangements, or the reliance upon companies for the supply of inputs, and the processing, marketing and distribution of their produce.¹⁹

Industrialised agriculture is understood to have ‘taken root earliest and most thoroughly in California and other areas of the Sunbelt.’²⁰ Many of the developments and technological innovations that have shaped world agriculture since early in the twentieth century can be traced to the United States, as American agriculture became the model for modern farming in nations across the globe. The industrialisation of American agriculture had its origins in the 1920s and 1930s, when farmers began to be transformed ‘into consumers of mass produced inputs ranging from petrochemical fertilisers to farm machinery.’²¹ From the 1940s, ‘power farming’ emerged as the

¹⁷ Bill Pritchard and David Burch, *Agri-food Globalization in Perspective: International Restructuring in the Processing Tomato Industry*, Aldershot: Ashgate, 2003, p. 26.

¹⁸ David Burch and Roy E. Rickson, ‘Industrialised agriculture: Agribusiness, input-dependency and vertical integration’, in Stewart Lockie and Lisa Bourke (eds.) *Rurality Bites*, Annandale: Pluto Press, 2001, p. 168.

¹⁹ Burch and Rickson, ‘Industrialised agriculture: Agribusiness, input-dependency and vertical integration’, p. 172.

²⁰ Frederick H. Buttel, Olaf F. Larson, and Gilbert W. Gillespie Jr., *The Sociology of Agriculture*, New York: Greenwood Press, 1990, p. 95.

²¹ Martin Kenney, Linda M. Lobao, James Curry, and W. Richard Goe, ‘Agriculture in U.S. Fordism: The Integration of the Productive Consumer’, in William H. Friedland, Lawrence Busch, Frederick H. Buttel, and Alan P. Rudy (eds.) *Towards a New Political Economy of Agriculture*, Boulder: Westview Press, 1991, p. 174.

incorporation of machinery into the farm production process increased after the end of the Second World War, as did the use of insecticides and herbicides such as DDT and 2,4-D.²² The intensification of land use and a growing specialisation within farming 'restructured the rural landscape'.²³ Specialisation was reinforced by the United States government's agricultural subsidies.²⁴ Through specialisation and the sowing of crops as monocultures, farmers become reliant upon the continuing use of pesticides and chemical fertilisers.²⁵ Farmers were encouraged to become market-oriented rather than continue practices from the past that had focused on the self-sufficiency of the farm family, and many small farmers were ensnared in a 'cost-price squeeze'.²⁶

The development of various chemical insecticides, herbicides and fertilisers and the availability of tractors and other farm machinery were not the only factors that led to the industrialisation of agriculture in the United States. It has been suggested that industrialisation was idealised and promoted as a philosophy, and that farmers were urged to modernise, specialise, standardise, mechanise and adopt factory-style efficiency on their farms.²⁷ The export of the American model of industrialised farming to Third World nations through the so-called 'Green Revolution' was, similarly, an ideological process, which resulted in the adoption and application of chemical

²² E.G. Vallianatos, 'American cataclysm', *Race and Class*, Vol. 44, Issue 3, January-March 2003, pp. 47-49.

²³ Lawrence Busch, William B. Lacy, Jeffrey Burkhardt, Douglas Hemken, Jubel Moraga-Rojel, Timothy Koponen, and Jose de Souza Silva, *Making Nature Shaping Culture: Plant Biodiversity in Global Context*, London: University of Nebraska Press, 1995, p. 21.

²⁴ Harriet Friedmann, 'Feeding the Empire: The Pathologies of Globalized Agriculture', in Leo Panitch and Colin Leys, (eds.) *Socialist Register 2005: The Empire Reloaded*, London: Merlin Press, 2004, p. 130.

²⁵ Kenney, et al, 'Agriculture in U.S. Fordism: The Integration of the Productive Consumer', pp. 179-180; Friedmann, 'Changes in the International Division of Labour: Agri-food Complexes and Export Agriculture', p. 79.

²⁶ Geoff Lawrence, 'Agribusiness: The American Example and its Implications for Australia', *The Journal of Australian Political Economy*, No. 7, April 1980, pp. 41-42.

²⁷ Deborah Fitzgerald, *Every Farm a Factory: The Industrial Ideal in American Agriculture*, New Haven: Yale University Press, 2003, pp. 3-12.

fertilisers, pesticides and high-yielding seed varieties.²⁸ The notion that Westernised technology, development and modernisation have been superior in the realm of agriculture can be discerned in relation to the Green Revolution, however, the context of the Cold War cannot be overlooked.²⁹ While the United States model of industrialised agriculture was being promoted and disseminated in Third World countries, small American farmers were instructed by President Richard Nixon's agriculture secretary, Earl Butz, to "get big or get out."³⁰ The rise of industrialised farming and agribusiness drove the exodus of farmers from the land in the United States: from a farm population of 30.5 million people in 1940, America's farm population had declined to around 6 million by 1979.³¹

In the Western world, scientific plant breeding had generally been carried out by state institutions, but in the latter half of the twentieth century, states were largely eclipsed in that field by multinational corporations.³² Biology, or life, has been identified as 'capitalism's latest frontier.'³³ Biotechnology research and development is now primarily conducted and controlled by a relatively small number of multinational corporations, and the largest of these multinationals have dual interests in biotechnology and agrochemical production.³⁴ Under the direction of multinational corporations, plant breeding has evolved from measures aimed at the development and selection of high-yielding cultivars to new means of genetic engineering, such as the modification of

²⁸ Christopher D. Cook, *Diet for a Dead Planet: How the Food Industry Is Killing Us*, New York: The New Press, 2004, p. 84.

²⁹ Shiva, 'Biotechnological Development and the Conservation of Biodiversity', p. 194.

³⁰ Cook, *Diet for a Dead Planet: How the Food Industry Is Killing Us*, p. 83.

³¹ Vallianatos, 'American cataclysm', p. 49.

³² Jerry Buckland, *Ploughing Up the Farm: Neoliberalism, Modern Technology and the State of the World's Farmers*, London: Zed Books, 2004, p. 7.

³³ Vandana Shiva, *Tomorrow's Biodiversity*, London: Thames and Hudson, 2000, p. 28.

³⁴ Hobbelink, 'Biotechnology and the Future of Agriculture', p. 227.

plants in order to make them tolerant to particular herbicides or insecticides.³⁵ The genetic engineering of plants and other aspects of biotechnology have been described as ‘underpinning a process of “bio-industrialisation.”’³⁶ The development and sale of genetically modified seeds, along with pesticides and other agrochemicals, have been fundamental in terms of the control that multinational corporations have increasingly exerted over aspects of agricultural production.³⁷

Since the 1970s and 1980s in the era of globalisation, the value of agricultural products on the world market has been distorted by speculation, credit, the mobility of capital, and the involvement of traders which has meant that agricultural ‘commodity prices are systematically delinked from production costs.’³⁸ It has been argued that, from the 1980s, neoliberalism ‘has narrowed farm policy options, accenting the role of the market, international trade and modern technology’, often to the benefit of the United States, the European Union or multinational corporations.³⁹ The structure of late twentieth century global agriculture has been likened to a continuation of exploitative colonial relations, albeit somewhat ‘more diffused through the mediation of global commodity markets’.⁴⁰

While it has been suggested that all agricultural production can be viewed as ‘unnatural’ to some extent, the sustainability of forms of industrialised agriculture, in

³⁵ Shiva, *Tomorrow’s Biodiversity*, p. 65.

³⁶ Goodman, ‘Some Recent Tendencies in the Industrial Reorganisation of the Agri-food System’, p. 42; Goodman, Sorj and Wilkinson, *From Farming to Biotechnology: A Theory of Agro-Industrial Development*, p. 4.

³⁷ Vandana Shiva, *Stolen Harvest: The Hijacking of the Global Food Supply*, London: Zed Books, 2000, p. 9.

³⁸ Philip McMichael, ‘Virtual capitalism and agri-food restructuring’, in David Burch, Jasper Goss and Geoffrey Lawrence (eds.) *Restructuring Global and Regional Agricultures: Transformations in Australasian agri-food economies and spaces*, Sydney: Ashgate, 1999, pp. 12-17.

³⁹ Buckland, *Ploughing Up the Farm*, pp. 2-10.

⁴⁰ William H. Friedland with the assistance of Frederick H. Buttel and Alan P. Rudy, ‘Introduction: Shaping the New Political Economy of Advanced Capitalist Agriculture’, in William H. Friedland, Lawrence Busch, Frederick H. Buttel, and Alan P. Rudy (eds.) *Towards a New Political Economy of Agriculture*, Boulder: Westview Press, 1991, p. 20.

particular, has been questioned.⁴¹ The use of chemical fertilisers and insecticides in farming has, it is argued, diminished ‘nature’s self-regulatory ability to maintain complex soils, plants and animals leading to ecologies less capable of reproducing their initial wealth of resources.’⁴² Some contend that industrialised agriculture has eroded diversity and created only ‘biologically impoverished chemically intensive monocultures’.⁴³ The dependence on pesticides and manufactured fertilisers to intensify farm production has been deemed ‘a dead-end approach.’⁴⁴ Most types of farm machinery, crucial to power farming, are reliant upon the limited and diminishing supplies of fossil fuels.⁴⁵ In terms of resource use alone, industrialised agriculture is considered to have a relatively low level of productivity.⁴⁶ Some have concluded that industrialised agriculture has created ‘chronic biophysical contradictions’ that are intractable.⁴⁷

Industrialised agriculture has been identified as having contributed substantially to environmental degradation and other ecological problems.⁴⁸ Among the environmental problems attributed to industrialised agricultural production methods are pesticide and fertiliser contamination, soil compaction, and diminished levels of

⁴¹ Helga Olkowski and William Olkowski, ‘Insect Population Management in Agro-Ecosystems’, in Richard Merrill (ed.) *Radical Agriculture*, New York: Harper Colophon Books, 1976, p. 368.

⁴² Friedmann, ‘Changes in the International Division of Labour: Agri-food Complexes and Export Agriculture’, p. 79.

⁴³ Shiva, *Tomorrow’s Biodiversity*, p. 24.

⁴⁴ Nicanor Perlas, ‘The Seven Dimensions of Sustainable Agriculture’, in Vandana Shiva and Ingunn Moser (eds.) *Biopolitics: A Feminist and Ecological Reader on Biotechnology*, London: Zed Books, 1995, p. 234.

⁴⁵ Friedmann, ‘Feeding the Empire: The Pathologies of Globalized Agriculture’, p. 130.

⁴⁶ Shiva, *Tomorrow’s Biodiversity*, p. 66.

⁴⁷ Tony Weis, ‘The Accelerating Biophysical Contradictions of Industrial Capitalist Agriculture’, *Journal of Agrarian Change*, Vol. 10, No. 3, July 2010, p. 315.

⁴⁸ Jan Douwe van der Ploeg, ‘The Food Crisis, Industrialized Farming and the Imperial Regime’, *Journal of Agrarian Change*, Vol. 10, No. 1, January 2010, p. 100.

ecological biodiversity.⁴⁹ In addition to environmental consequences, industrialised agriculture has been found to have had a negative social impact in some circumstances. One aspect of the social consequences of industrialised agriculture has been the human health impact of pesticide and fertiliser use.⁵⁰ The generally higher input and production costs associated with industrialised agriculture have compelled farmers to expand their holdings in an attempt to maintain their profit margins. However, many farmers have had to borrow substantial sums to achieve this expansion, which has meant that their 'indebtedness has grown exponentially.'⁵¹ Apart from indebtedness, the expansionist tendencies of industrialised agriculture have conferred a 'concentration of control of land and increasing landlessness among rural populations, with negative effects on agrarian societies.'⁵²

The Australian Context

The context of Australian agriculture is fundamental to this study, as it explains aspects of the development of industrialised cotton production within the Namoi Valley. The agricultural sector in Australia underwent significant changes during the twentieth century. A key aspect of the structural change in Australian agriculture is that there has been an accelerating decline in the number of farmers since the Second World War.⁵³ Industrialisation was one of a number of factors that were pivotal in the structural modification of Australian agriculture. The industrialisation of agriculture in Australia has been directly linked to agribusiness. While the term 'agribusiness' may be used to

⁴⁹ Philip Woodhouse, 'Beyond Industrial Agriculture? Some Questions about Farm Size, Productivity and Sustainability', *Journal of Agrarian Change*, Vol. 10, No. 3, July 2010, pp. 438-439.

⁵⁰ Stefano Longo and Richard York, 'Agricultural Exports and the Environment: A Cross-National Study of Fertilizer and Pesticide Consumption', *Rural Sociology*, Vol. 73, No. 1, March 2008, p. 82.

⁵¹ Ploeg, 'The Food Crisis, Industrialized Farming and the Imperial Regime', p. 100.

⁵² Woodhouse, 'Beyond Industrial Agriculture? Some Questions about Farm Size, Productivity and Sustainability', p. 439.

⁵³ Geoffrey Lawrence and Ian Gray, 'The Myths of Modern Agriculture: Australian Rural Production in the 21st Century', in Bill Pritchard and Phil McManus (eds.) *Land of Discontent: The Dynamics of Change in Rural and Regional Australia*, Sydney: UNSW Press, 2000, p. 38.

describe a seed or fertiliser company, it has also been used by researchers to denote a more complex system.⁵⁴ Agribusiness has been described as a system ‘composed of a series of closely related activities that together enable agricultural produce to flow from the farm to the market place.’⁵⁵ By means of horizontal and vertical integration, agribusiness ‘is an organisational structure through which corporate firms progressively integrate family-farm agriculture into the wider, urban-industrial economy.’⁵⁶ The processing, transportation, marketing and trading of agricultural commodities, as well as the supply of farming inputs such as ‘seeds, credit, machinery, agrochemicals, fertilisers, insurance’, have increasingly been brought under the control of agribusiness.⁵⁷

From the beginning of the 1960s, the Australian farming sector has experienced the ‘considerable concentration and centralization of agribusiness capital’.⁵⁸ It was that tendency for agribusiness to centralise and consolidate control over aspects of agricultural production that has been so crucial in relation to the industrialisation of agriculture. The industrialisation of farming may not necessarily have had such a marked impact on Australian agriculture had it not occurred virtually in conjunction with the rise of agribusiness. Industrialised agriculture saw farmers incorporate machinery and chemicals into their operations, but agribusiness consolidation meant that a relatively small number of companies, often multinational corporations, controlled the supply of those inputs to farmers. The market dominance exercised by

⁵⁴ Sarah Sargent, *The Foodmakers*, Ringwood: Penguin Books, 1985, p. 1.

⁵⁵ Onko Kingma, ‘Agribusiness, Productivity, Growth and Economic Development in Australian Agriculture’, *Research Monograph No. 22*, Transnational Corporations Research Project, University of Sydney, October 1985, p. 23.

⁵⁶ Geoffrey Lawrence, ‘Agribusiness and Inequality: Changes in the Bush’, in Jan O’Leary and Rachel Sharp (eds.) *Inequality In Australia: Slicing the Cake*, Port Melbourne: William Heinemann, 1991, p. 87.

⁵⁷ Sargent, *The Foodmakers*, p. 4.

⁵⁸ Paul Nankivell, ‘Australian Agribusiness: Structure, Ownership and Control’, *Journal of Australian Political Economy*, No. 5, 1979, p. 3.

the largest multinational agribusiness corporations has proven profitable, although there have been indications that ‘agricultural inputs such as machinery, chemicals and fertilisers have been overpriced by the corporate sector’.⁵⁹ The significance of agribusiness dominance extends, too, beyond the sale of agricultural products and inputs. It has been demonstrated that ‘agribusiness has become skilled in commodity dealing, currency speculation and counter trade.’⁶⁰

The rise of agribusiness and industrialised farming in Australia coincided with changes to government policy on agriculture. Historically, state and federal governments had adopted a protectionist approach to agriculture, instituting subsidies as well as tariffs to support a sector that was seen as being central to the performance of the national economy.⁶¹ In the decades that followed the Second World War, however, the contribution of agriculture to Australia’s gross domestic product (GDP) began to decline, which saw a corresponding decrease in government investment in the agricultural sector.⁶² The tariffs on agricultural imports that had afforded some protection to Australian farmers began to be dismantled from the 1970s. As neo-liberalism became increasingly influential from the 1980s onward, successive Australian governments abandoned the interventionist and protectionist policies of the past in favour of deregulation.⁶³ While Australian farmers were encouraged to engage in ‘free trade’ and compete on international commodity markets, trade on those markets continued to be distorted as other nations maintained trade barriers and subsidies to

⁵⁹ Lawrence, ‘Agribusiness and Inequality: Changes in the Bush’, p. 90.

⁶⁰ Sargent, *The Foodmakers*, p. 4.

⁶¹ Geoff Lawrence and Lynda Cheshire, ‘The social consequences of the rural reform agenda’, in Paul Boreham, Geoffrey Stokes and Richard Hall (eds.) *The Politics of Australian Society: Political Issues for the New Century*, 2nd edition, Frenchs Forest: Pearson Education, 2004, p. 340.

⁶² Lawrence, ‘Agribusiness and Inequality: Changes in the Bush’, p. 86.

⁶³ Lawrence and Cheshire, ‘The social consequences of the rural reform agenda’, pp. 340-342.

protect and support their own farmers.⁶⁴ The United States, Japan and the member nations of the European Union are among those with heavily subsidised and highly protected domestic agricultural sectors.⁶⁵

Within Australia, agriculture has experienced a terms of trade decline in recent decades.⁶⁶ The industrialisation of agriculture has contributed to rising input costs, a trend which has seen the expenses involved in farming increase at a more rapid rate than agricultural commodity prices.⁶⁷ Industrialisation, too, is one of a number of factors that have contributed to population decreases in rural Australia, as technology-driven productivity increases have ‘enabled even larger volumes of food and fibre to be produced with a reduced agricultural workforce.’⁶⁸

Commodity-specific Studies

The numerous published studies that exist on specific agricultural commodity systems have given emphasis to a diverse array of aspects and themes related to agriculture. The analysis of development and change within specific agricultural commodity systems has been approached in different ways by researchers in the field of agrarian political economy. The role of the state and state policy has been emphasised, for example, in Gary P. Green’s work on tobacco in the United States from the New Deal to the late 1980s. Green has explored the political and economic circumstances that saw the introduction of New Deal policies on tobacco and the structural changes that arose from

⁶⁴ Geoffrey Lawrence, ‘Rural Australia: insights and issues from contemporary political economy’, in Geoffrey Lawrence, Kristen Lyons and Salim Momtaz (eds.) *Social Change in Rural Australia*, Rockhampton: Rural Social and Economic Research Centre, Central Queensland University, 1996, p. 334.

⁶⁵ Philip Lewis, Anne Garnett, Peter Drake, Johannes Juttner, Keith Norris and Malcolm Treadgold, (eds.) *Issues, Indicators and Ideas: A guide to the Australian economy*, 2nd edition, South Melbourne: Addison Wesley Longman Australia, 1998, pp. 117-119.

⁶⁶ Lewis, et al, *Issues, Indicators and Ideas*, p. 113; Lawrence, ‘Rural Australia: insights and issues from contemporary political economy’, p. 332.

⁶⁷ Lawrence, ‘Rural Australia: insights and issues from contemporary political economy’, p. 332.

⁶⁸ Lawrence, ‘Rural Australia: insights and issues from contemporary political economy’, p. 340.

those policies.⁶⁹ Green also examined the impact of state policy in relation to the adoption of technology in the tobacco industry.⁷⁰ Similarly, Richard Le Heron focused upon state agricultural policy in his study of the expansion of livestock farming in New Zealand between 1960 and 1984.⁷¹ The influence of state policy upon agriculture is a key theme in the literature on agrarian political economy, and one that merits a deeper exploration with regard to Australia.

Some analyses have concentrated upon the key participants involved directly in agricultural change. Marvin Sundstrom employed such an approach in his study of Canadian involvement in New Zealand's dairy industry from 1880 to 1920.⁷² Sundstrom's study considered the appointment during this period of four Canadians to the leading position of Chief Dairy Expert or Dairy Commissioner in the New Zealand government service. Sundstrom examined the innovations implemented by these individuals in an effort to assess the extent of Canadian influence upon dairying in New Zealand. The involvement and influence of immigrants in agriculture is an important theme in the existing literature on the political economy of agriculture that is worth exploring in the Australian context.

Among the existing agrarian political economy literature on specific agricultural commodities, the issue of industrialisation has been examined in a variety of ways. The question of industrialisation has been explored, for example, in Kristen Lyons' analysis

⁶⁹ Gary P. Green, 'The Political Economy of Flue-cured Tobacco Production', *Rural Sociology*, Vol. 52, No. 2, 1987, pp. 221-241.

⁷⁰ Gary P. Green, 'State, Class, and Technology in Tobacco Production', *Agriculture and Human Values*, Fall 1989, pp. 54-61.

⁷¹ Richard Le Heron, 'A Political Economy Perspective on the Expansion of New Zealand Livestock Farming, 1960-1984 – Part I. Agricultural Policy', *Journal of Rural Studies*, Vol. 5, No. 1, 1989, pp. 17-32.

⁷² Marvin Sundstrom, 'Technological Transfer: the Case of Canadian Involvement in the New Zealand Dairy Industry, 1880-1920', *Journal of Rural Studies*, Vol. 2, No. 2, 1986, pp. 103-116.

of the Australian poultry industry.⁷³ Lyons uses a case study of the industrialisation of poultry farming in Queensland to argue that Fordism remains a relevant tool for interpreting agricultural modes of production.⁷⁴

Other works have been concerned with the level of industrialisation within particular agricultural commodity systems. Douglas B. Jackson-Smith and Frederick H. Buttel's study of dairying in the United States is one that has concentrated upon the extent of industrialisation within that sector.⁷⁵ Jackson-Smith and Buttel observe that industrialisation of the American dairy production sector has been 'neither monolithic, consistent, nor temporally or spatially even.'⁷⁶ The authors offer an analysis of the reasons for the relatively modest levels of industrialisation in the dairying sector, and note the significance of state policies with regard to the industrialisation that had taken place.⁷⁷

A different perspective of dairy industrialisation has been offered by Jess Gilbert and Kevin Wehr, who have provided an account of the origins of that phenomenon in Los Angeles County between 1920 and 1970.⁷⁸ Gilbert and Wehr draw upon a historical sociological perspective in their study, asserting that industrialisation 'is best

⁷³ Kristen Lyons, 'Agro-industrialisation and rural restructuring: A case study of the Australian poultry industry', in Geoffrey Lawrence, Kristen Lyons and Salim Momtaz (eds.) *Social Change in Rural Australia*, Rockhampton: Rural Social and Economic Research Centre, Central Queensland University, 1996, pp. 167-177.

⁷⁴ Lyons, 'Agro-industrialisation and rural restructuring: A case study of the Australian poultry industry', pp. 171-174.

⁷⁵ Douglas B. Jackson-Smith and Frederick H. Buttel, 'Explaining the Uneven Penetration of Industrialization in the U.S. Dairy Sector', *International Journal of Sociology of Agriculture and Food*, Vol. 7/98, pp. 113-150.

⁷⁶ Jackson-Smith and Buttel, 'Explaining the Uneven Penetration of Industrialization in the U.S. Dairy Sector', p. 123.

⁷⁷ Jackson-Smith and Buttel, 'Explaining the Uneven Penetration of Industrialization in the U.S. Dairy Sector', pp. 132-144, especially p. 138.

⁷⁸ Jess Gilbert and Kevin Wehr, 'Dairy Industrialization in the First Place: Urbanization, Immigration, and Political Economy in Los Angeles County, 1920-1970', *Rural Sociology*, Vol. 68, No. 4, 2003, pp. 467-490.

understood in terms of its historical specificities.⁷⁹ The work of Gilbert and Wehr, Jackson-Smith and Buttel, and Lyons demonstrates that aspects of agricultural industrialisation have been explored. However, the existing literature indicates that the internationalisation of industrialisation is one area in particular that requires further investigation.

Research Objectives

This brief review of the literature has demonstrated that, while there is a depth and range of existing research on the political economy of agriculture, there is still much to be learned about the development of forms of industrialised agriculture. There is a need to provide a deeper investigation of the development of different forms of industrialised agriculture, especially as it has been noted that the ‘testimony of recent political economy studies reveals extraordinary variety and singularity to the trajectories of capital penetration in specific contexts’.⁸⁰ It cannot be presumed that the trajectory of industrialised agriculture has been uniform, or even similar, in different contexts or in relation to different agricultural commodity systems.

This thesis attempts to address two central research problems. The first research problem concerns how the global phenomenon of the development and expansion of industrialised agriculture has occurred at the local level. It is known that the development of industrialised agriculture was one of the most significant changes to agriculture in the twentieth century, but how has industrialisation taken place at the local level? What was the process through which industrialised agriculture was introduced at the local or regional level? What interests were involved and who benefited from the development of industrialised agriculture? An analysis of industrialised agriculture at the local level presents an opportunity to investigate in

⁷⁹ Gilbert and Wehr, ‘Dairy Industrialization in the First Place: Urbanization, Immigration, and Political Economy in Los Angeles County, 1920-1970’, p. 468.

⁸⁰ Le Heron, *Globalized Agriculture: Political Choice*, p. 39.

some depth the many factors involved in the development of industrialised agriculture. In the agrarian political economy literature it has been recognised that, for agriculture ‘the primary expression of industrialization involves the adoption of models of economic and technological efficiency based on economies of scale, specialization of production and capital intensification’, but the process of agricultural industrialisation ‘is also one of social and political change.’⁸¹ Evidently, the process of agricultural industrialisation is complex. However, through an examination of a specific case study of agricultural industrialisation, the complexities of that process may be discerned. This thesis seeks to explore this research problem through the following research objective: to investigate the introduction of industrialised cotton production to the Namoi Valley as a case study of the internationalisation of industrialised agriculture. Through this research objective, this thesis will contribute to the existing body of literature on the development and internationalisation of industrialised agriculture.

The second research problem this thesis addresses relates to the adverse environmental and social impact of industrialised agriculture. The issue of social and environmental consequences is the primary reason that industrialised cotton production has been selected for this study. Cotton production was selected, too, because it can be seen to encapsulate a number of the key developments and changes in agriculture that are outlined above, including mechanisation, biotechnology, specialisation, the incorporation of fertilisers, insecticides and herbicides into the production process, and the reliance on multinational corporations for the supply of these inputs. This thesis seeks to address this research problem through the following research objective: to examine the social and environmental implications of industrialised cotton production in the Namoi Valley as a case study that will expand existing knowledge of the environmental and social impact of industrialised agriculture in different contexts.

⁸¹ Michael J. Troughton, ‘The Role of Marketing Boards in the Industrialization of the Canadian Agricultural System’, *Journal of Rural Studies*, Vol. 5, No. 4, 1989, p. 368.

Situating the Thesis in relation to the Literature

The case study of industrialised cotton production in the Namoi Valley presents an opportunity to explore a number of the key themes identified in the agrarian political economy literature. This thesis shares commonalities with Le Heron, Green and Sundstrom's approaches, as state policy and the involvement of immigrants with specialised agricultural knowledge and experience are key themes in this work.⁸²

Where those authors concentrated upon a single aspect of agricultural development in their respective works, however, this thesis aims to offer a broader perspective. By combining an examination of state policy, and the involvement of key individuals with other crucial considerations, such as geographical and agronomic conditions, and social and environmental implications, this thesis seeks to provide a multi-faceted analysis of the process of development of an agricultural commodity system.

This thesis is differentiated from the work of Gilbert and Wehr, Lyons, and Jackson-Smith and Buttel by its approach to the issue of industrialisation.⁸³ Where these authors have, respectively, considered the origins of the process of dairy industrialisation, a Fordist analysis of poultry industrialisation, and the level of dairy industrialisation, this thesis has a different purpose. In this thesis, the process of the industrialisation of cotton production is examined, but it is not the primary focus. Instead, the thesis concentrates upon the introduction of an industrialised form of agricultural production to a region where the commodity system in question was unfamiliar. Through this emphasis, this thesis attempts to contribute to an understanding of how industrialised modes of agriculture have proliferated.

⁸² Le Heron, 'A Political Economy Perspective on the Expansion of New Zealand Livestock Farming', pp. 17-32; Green, 'The Political Economy of Flue-cured Tobacco Production', pp. 221-241; Green, 'State, Class, and Technology in Tobacco Production', pp. 54-61; Sundstrom, 'Technological Transfer: the Case of Canadian Involvement in the New Zealand Dairy Industry', pp. 103-116.

⁸³ Gilbert and Wehr, 'Dairy Industrialization in the First Place: Urbanization, Immigration, and Political Economy in Los Angeles County, 1920-1970', pp. 467-490; Lyons, 'Agro-industrialisation and rural restructuring: A case study of the Australian poultry industry', pp. 167-177; Jackson-Smith and Buttel, 'Explaining the Uneven Penetration of Industrialization in the U.S. Dairy Sector', pp. 113-150.

Theoretical Perspective of the Thesis

The theoretical perspective of ‘commodity systems analysis’ was selected to investigate the research questions identified in this thesis because of the value of that perspective to the study of agricultural production. The perspective of ‘commodity systems analysis’ was developed through William H. Friedland, Amy E. Barton and Robert J. Thomas’ seminal work on the lettuce industry in the United States, *Manufacturing Green Gold: Capital, Labor, and Technology in the Lettuce Industry*.⁸⁴ The theoretical perspective of commodity systems analysis is examined in detail below, but a brief explanation must first be offered to clearly distinguish it from a separate theoretical concept, that of the global commodity chain or global value chain.

Commodity Systems Analysis and Global Commodity Chains: A Clarification

It must be noted for the purpose of clarification that, while Friedland, Barton and Thomas propounded the notion of ‘commodity systems analysis’ in *Manufacturing Green Gold* in 1981, a similar concept, that of a ‘commodity chain’, had emerged in Immanuel Wallerstein’s world systems theory in 1974.⁸⁵ Wallerstein’s notion was reinterpreted and expanded by Gary Gereffi in 1994, with Gereffi’s work establishing the concept of ‘global commodity chains’.⁸⁶ Since the publication of Gereffi’s research in 1994, a substantial body of literature has developed in relation to ‘global commodity chains’ and ‘global value chains’.⁸⁷

⁸⁴ Friedland, Barton and Thomas, *Manufacturing Green Gold*.

⁸⁵ Peter Jackson, Neil Ward and Polly Russell, ‘Mobilising the commodity chain concept in the politics of food and farming’, *Journal of Rural Studies*, Vol. 22, 2006, p. 131.

⁸⁶ Gary Gereffi, ‘The organization of buyer-driven global commodity chains: How U.S. retailers shape overseas production networks’, in G. Gereffi and M. Korzeniewicz (eds.) *Commodity chains and global capitalism*, Westport: Praeger, 1994, pp. 95-122.

⁸⁷ There has been considerable debate, theorisation and revision of ‘global commodity chains’ methodology. See Jennifer Bair, ‘Global Capitalism and Commodity Chains: Looking Back, Going Forward’, *Competition and Change*, Vol. 9, No. 2, June 2005, pp. 153-180; Philip Raikes, Michael Friis Jensen and Stefano Ponte, ‘Global commodity chain analysis and the French *filiere* approach: comparison and critique’, *Economy and Society*, Vol. 29, No. 3, August 2000, pp. 390-417; Paul Ciccantell and David A. Smith, ‘Rethinking Global Commodity Chains: Integrating Extraction, Transport, and Manufacturing’, *International Journal of Comparative Sociology*, Vol. 50, No. 3-4, 2009, pp. 361-384; Jane L. Collins,

Peter Jackson, Neil Ward and Polly Russell have provided a ‘genealogy’ of commodity chains and the dual emergence of the concept in world systems theory and in *Manufacturing Green Gold*.⁸⁸ Jackson, Ward and Russell explain that the commodity systems approach found in *Manufacturing Green Gold* was ‘taken up and developed by those wanting to trace the internationalisation and globalisation of food chains during the 1980s and 1990s’.⁸⁹ This tendency has corresponded with a wider trend observed in agrarian political economy, where researchers investigating capitalist agriculture have ‘shifted the mainstream of research towards scrutiny of the increasingly global features of agriculture in the advanced capitalist economies.’⁹⁰ However, Friedland, Barton and Thomas’ research on ‘commodity systems analysis’ has been largely eclipsed by the proliferation of studies that employ Gereffi’s ‘global commodity chains’ perspective. The influence of ‘global commodity chains’ analysis that has emerged from world systems theory is evident in some notable agrarian political economy studies, such as Philip McMichael’s *Food and Agrarian Orders in the World-Economy*, and Bill Pritchard and David Burch’s work on the processing tomato industry.⁹¹

Jackson, Ward and Russell have observed that Gereffi’s ‘global commodity chains’ and Friedland, Barton and Thomas’ ‘commodity systems analysis’ have been

‘New Directions in Commodity Chain Analysis of Global Development Processes’, *Research in Rural Sociology and Development*, Vol. 11, 2005, pp. 3-17; Edward R.T. Challies, ‘Commodity Chains, Rural Development and the Global Agri-food System’, *Geography Compass*, Vol. 2, No. 2, 2008, pp. 375-394; Peter Gibbon, ‘Upgrading Primary Production: A Global Commodity Chain Approach’, *World Development*, Vol. 29, No. 2, 2001, pp. 345-363; Deborah Leslie and Suzanne Reimer, ‘Spatializing commodity chains’, *Progress in Human Geography*, Vol. 23, No. 3, 1999, pp. 401-420; Anouk Patel-Campillo, ‘Transforming Global Commodity Chains: Actor Strategies, Regulation, and Competitive Relations in the Dutch Cut Flower Sector’, *Economic Geography*, Vol. 87, No. 1, 2010, pp. 79-99.

⁸⁸ Jackson, Ward and Russell, ‘Mobilising the commodity chain concept in the politics of food and farming’, p. 131.

⁸⁹ Jackson, Ward and Russell, ‘Mobilising the commodity chain concept in the politics of food and farming’, p. 131.

⁹⁰ Le Heron, *Globalized Agriculture: Political Choice*, p. 35.

⁹¹ Philip McMichael (ed.) *Food and Agrarian Orders in the World-Economy*, London: Greenwood Press, 1995; Pritchard and Burch, *Agri-food Globalization in Perspective*.

‘wrongly conflated’.⁹² In a later study, Friedland has conflated the two methodologies, contending that the differences between them are merely an issue of nomenclature.⁹³ However, it has been demonstrated by Jackson, Ward and Russell that the two perspectives ‘are distinctly different traditions in their conceptual drivers, objects of study and modes of analysis.’⁹⁴ Friedland, Barton and Thomas’ ‘commodity systems analysis’ was developed in the context of efforts to reinvigorate rural sociological research on agricultural production. In contrast, ‘global commodity chains’ research, reflecting its origins in world systems theory, ‘has been used primarily as a methodology to assess the extent to which globalization is delivering development to the regions and populations of the global south’.⁹⁵ Despite being overshadowed by the ‘global commodity chains’ perspective, this thesis contends that Friedland, Barton and Thomas’ ‘commodity systems analysis’ remains critical because of its concentration on agricultural production.

Commodity Systems Analysis

The theoretical perspective of commodity systems analysis had developed from Friedland, Barton and Thomas’ recognition that the analysis of agricultural production had been neglected by rural sociologists, and they sought to highlight the need for such research through their examination of lettuce.⁹⁶ Friedland, Barton and Thomas sought to investigate agricultural production sociologically, to analyse its social relations and ‘the factors influencing the organization of industrial production.’⁹⁷

⁹² Jackson, Ward and Russell, ‘Mobilising the commodity chain concept in the politics of food and farming’, p. 131.

⁹³ Friedland, ‘Reprise on Commodity Systems Methodology’, p. 82.

⁹⁴ Jackson, Ward and Russell, ‘Mobilising the commodity chain concept in the politics of food and farming’, p. 131.

⁹⁵ Ben Selwyn, ‘Beyond firm-centrism: re-integrating labour and capitalism into global commodity chain analysis’, *Journal of Economic Geography*, Vol. 12, 2012, pp. 205-226.

⁹⁶ Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. ix.

⁹⁷ Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. vii.

As Linda Hungerford has asserted in her study of the Australian sugar industry, the commodity systems perspective ‘provides both a theoretical and methodological framework for research.’⁹⁸ As a theoretical framework, Friedland, Barton and Thomas’ work on lettuce is of crucial importance because of the way in which they conceived of agricultural production. Friedland, Barton and Thomas argued that ‘agriculture must be conceptualized as a system of social organization that includes, among other factors, production and exchange.’⁹⁹ For this reason, labour and the social relations of production are paramount in their analysis of the lettuce commodity system. Central to their study is the issue of mechanisation of the lettuce harvesting process, and the factors that lead to technological change in agricultural production systems.¹⁰⁰

Methodology

This section examines the methodology of commodity systems analysis, how that methodology has been extended, and explains the methodology applied in this thesis.

In *Manufacturing Green Gold*, Friedland, Barton and Thomas used a comparative analysis of empirical case studies of lettuce and tomato production to conceptualise a model for analysing agricultural commodity systems.¹⁰¹ The model they developed ‘focuses on the commodity as the crucial unit of analysis.’¹⁰² This method analyses empirical data on agricultural commodity systems in relation to specific elements of what Friedland, Barton and Thomas described as ‘a model for a

⁹⁸ Linda Hungerford, ‘The Australian sugar industry and commodity systems analysis’, in Geoffrey Lawrence, Kristen Lyons and Salim Momtaz (eds.) *Social Change in Rural Australia*, Rockhampton: Rural Social and Economic Research Centre, Central Queensland University, 1996, p. 179.

⁹⁹ Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. 22.

¹⁰⁰ Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. vii.

¹⁰¹ Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. 13.

¹⁰² Friedland, Barton and Thomas, *Manufacturing Green Gold*, pp. 11-12.

sociology of agriculture'.¹⁰³ These elements were summarised in William H.

Friedland's 1984 article, which explained that commodity systems analysis:

...set out five basic foci for research: production practices or labor process; grower organization and organizations, how growers organize the labor process and organize themselves with respect to other actors; labor, the character of the labor market, labor supply, and the ways in which workers organize themselves with respect to production; science production and application, how scientists are mobilized and conduct their research and how this affects commodity production; and marketing and distribution, how commodities are handled once they pass beyond the farm gate.¹⁰⁴

These five research foci are essentially drawn from the areas of research identified and explored in *Manufacturing Green Gold*.¹⁰⁵

While *Manufacturing Green Gold* remains a landmark study in the analysis of agricultural production, during the years since its publication, some studies have sought to extend and improve the perspective of commodity systems analysis, and to overcome some of its methodological limitations. Jane Dixon's research has, for example, identified shortcomings in commodity systems analysis and has outlined modifications to improve its application as a basis of methodology. Commodity systems analysis, Dixon argued, was 'essentially a supply side perspective'.¹⁰⁶ Dixon asserted that commodity systems analysis could be revised and adapted as a 'cultural economy' methodology that would extend the analysis to include the dimension of consumption.¹⁰⁷ Subsequent to Dixon's work on commodity systems analysis, William H. Friedland has also identified areas for inclusion in a revised version of the

¹⁰³ Friedland, Barton and Thomas, *Manufacturing Green Gold*, pp. 11-22.

¹⁰⁴ William H. Friedland, 'Commodity Systems Analysis: An Approach to the Sociology of Agriculture', in Harry K. Schwarzweller (ed.) *Research in Rural Sociology and Development: A Research Annual*, Greenwich, Connecticut: JAI Press, 1984, pp. 221-235, cited in Friedland, 'Reprise on Commodity Systems Methodology', p. 85.

¹⁰⁵ Friedland, Barton and Thomas, *Manufacturing Green Gold*, pp. 43-95.

¹⁰⁶ Dixon, 'A cultural economy model for studying food systems', p. 151.

¹⁰⁷ Dixon, 'A cultural economy model for studying food systems', pp. 151-160.

methodology.¹⁰⁸ Friedland proposed that commodity systems analysis should include the additional elements of ‘the scale of commodities, sectoral organization and the state, and commodity culture’.¹⁰⁹

Although Friedland and Dixon have expanded and improved commodity systems analysis, this thesis contends that commodity systems analysis may potentially be further improved through attention to the historical dimension of agricultural commodity systems. In *Manufacturing Green Gold*, Friedland, Barton and Thomas asserted that their work had emphasised historical analysis by dedicating a section to the historical evolution of the lettuce commodity system over time.¹¹⁰ The authors described how it was this historical analysis that led them in that study ‘to stress the need to examine the conditions of technological transitions, recognizing that historically such transitions do not simply occur because of the technological state of the art.’¹¹¹ Despite the fact that an historical analysis had offered insights that determined the direction of their study, Friedland, Barton and Thomas only employed an historical analysis for a very brief section of *Manufacturing Green Gold*. Specifically, the authors’ use of an historical analysis was limited to a section of their chapter on the social organisation of lettuce production, where they offered ‘a brief examination of the history of lettuce production to illuminate the present production process.’¹¹²

While Friedland, Barton and Thomas employed a very limited historical analysis, the commodity systems analysis perspective that emerged after the publication of *Manufacturing Green Gold* in 1981 has largely neglected historical analysis and the examination of the historical development of commodity systems. For example, the

¹⁰⁸ Friedland, ‘Reprise on Commodity Systems Methodology’, pp. 82-103.

¹⁰⁹ Friedland, ‘Reprise on Commodity Systems Methodology’, p. 82.

¹¹⁰ Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. 35.

¹¹¹ Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. 35.

¹¹² Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. 65.

five research foci outlined in Friedland's 1984 article, cited above, do not include the historical dimension of commodity systems, which had at least been briefly examined in *Manufacturing Green Gold*.¹¹³ Like Jane Dixon's inclusion of consumption, Friedland's later addition of three further research foci, 'the scale of commodities, sectoral organization and the state, and commodity culture', has not altered the methodological shortcomings of the perspective regarding historical analysis.¹¹⁴ Although Friedland has argued that a commodity 'should be studied historically and its spatial and social relations dimensions must be examined', historical analysis and the historical development of commodity systems remain absent from the research foci of Friedland's revised methodology.¹¹⁵

This thesis uses the methodology of an historical analysis to explore the empirical case study of cotton and reflect on the theoretical perspective of commodity systems analysis. This thesis has developed a method of amassing an array of different kinds of data through a wide-ranging literature analysis and exploring key issues through the reinterpretation of that data. The literature analysis has encompassed a range of primary and secondary sources, including academic theses, academic journals and other academic publications, government surveys, documents and publications, parliamentary debates, archival sources, technical publications and bulletins, reports, industry publications, internet sources, and items from the media including local newspapers. This thesis demonstrates that new knowledge and a more comprehensive scholarly analysis can be generated through the reinterpretation of data from existing

¹¹³ William H. Friedland, 'Commodity Systems Analysis: An Approach to the Sociology of Agriculture', in Harry K. Schwarzweller (ed.) *Research in Rural Sociology and Development: A Research Annual*, Greenwich, Connecticut: JAI Press, 1984, pp. 221-235, cited in Friedland, 'Reprise on Commodity Systems Methodology', p. 85.

¹¹⁴ Friedland, 'Reprise on Commodity Systems Methodology', p. 82.

¹¹⁵ Friedland, 'Reprise on Commodity Systems Methodology', p. 94.

sources. Such reinterpretations are crucial to research of a historical nature, where the collection of new raw data through fieldwork may be precluded.

To supplement documentary historical sources, some oral history work was undertaken. Email interviews were conducted with three people known personally by the author to have experience with, and knowledge of, the history of the cotton industry in the Namoi Valley. The interviewees included a current Namoi Valley cotton industry employee, a former Namoi Valley cotton industry employee with more than two decades of experience, and an agronomist currently employed within the cotton industry in the Namoi Valley. This personal correspondence was undertaken to obtain factual information from the research participants' perspectives on contemporary cotton growing methods in the Namoi Valley to compensate for a gap in the literature on this matter. This oral history work offered some useful perspectives and contributed to the analysis in this thesis of the Namoi Valley's cotton production system.

This chapter has offered a review of the literature, and has outlined the research objectives and methodology of this thesis. This chapter has also sought to explain the position of this thesis in relation to the existing literature on the political economy of agriculture. In the next chapter, the industrialisation of cotton production in California is analysed.

CHAPTER TWO: THE CALIFORNIAN ORIGINS OF THE NAMOI VALLEY'S COTTON INDUSTRY

This thesis seeks to contribute to a deeper understanding of industrialised agriculture through the case study of industrialised cotton production. A central consideration of this thesis is the issue of how industrialisation has impacted upon cotton growing methods and cotton production systems. The purpose of this chapter is to examine the development of industrialised cotton production in California in relation to the historical context of cotton growing in the United States. The historical perspective presented in this chapter enables the significance of the changes to cotton production wrought by industrialisation to be illuminated through comparison with earlier American cotton production systems characterised by slavery and sharecropping. To this end, this chapter offers a historical perspective of cotton growing methods and the role of labour in cotton production in the United States.

Cotton Production in the United States prior to its Industrialisation in the 1920s

When cotton production arose in an industrialised form in California in the early decades of last century, it provided a striking contrast with the method of cotton growing that existed in America's southern states. At the same time as cotton production began to occur on a large scale in California, the cultivation of cotton in the American South was based upon a system of tenancy known as 'sharecropping'. Cotton growing in the southern states of America had originally been sustained through slavery. With the abolition of slavery following the conclusion of the American Civil War, the continuation of the plantation system in the South 'was accompanied by the persistence of forms of labour which were but modifications of slavery.'¹ The labour

¹ James S. Allen, *The Negro Question in the United States*, London: Lawrence and Wishart Ltd, 1936, p. 32.

requirements of the cotton crop were paramount in prolonging the existence of both the slave and sharecropping systems in the southern states of America.

Cotton, it has been argued, gave slavery a ‘political economic *raison d’être*’ in the United States.² Conversely, it was slavery that ensured that cotton growing in the southern states would be profitable. The institution of slavery in the antebellum South propelled the expansion of cotton. The production of cotton increased markedly in the nineteenth century. The proclamation of cotton as ‘king’ in the United States was not without basis: cotton had risen to become America’s single most important export by the 1830s.³ Cotton alone accounted for 61 per cent of the total value of American exports in 1860.⁴ By the mid-nineteenth century, the United States was the source of three-quarters of the world’s supply of raw cotton.⁵ The increased demand for the fibre during this period brought to American cotton farmers, and the nation, great wealth.⁶

Cotton was historically a labour-intensive crop. When grown within the United States under conditions of slavery, the most crucial factor of cotton production was labour. While slavery prevailed, cotton in America’s South required few inputs or implements. Cottonseed was essential, but the use of fertiliser apparently did not begin until the 1870s.⁷ Every aspect of early cotton production in the United States was dependent upon the use of labour. Slaves used basic hand tools, primarily hoes and

² Henry Hobhouse, *Seeds of Change: Five plants that transformed mankind*, London: Sidgwick and Jackson, 1985, p. ix.

³ David B. Danbom, *Born in the Country: A History of Rural America*, Baltimore: Johns Hopkins University Press, 1995, p. 75.

⁴ Danbom, *Born in the Country*, p. 75.

⁵ Craig Canine, *Dream Reaper*, New York: Alfred A. Knopf, 1995, p. 44.

⁶ John William Mallet, *Cotton: The Chemical, Geological, and Meteorological conditions involved in its successful cultivation*, London: Chapman and Hall, 1862, p. 3.

⁷ O.L. May and K.E. Lege, ‘Development of the World Cotton Industry’, in C. Wayne Smith and J. Tom Cothren (eds) *Cotton: Origin, History, Technology and Production*, New York: John Wiley and Sons, 1999, p. 86.

axes, to grow cotton in the South.⁸ Cotton was planted and picked by hand. The hoe was used to manually remove weeds from between the rows of cotton, and to thin cotton plants that were growing too closely together.⁹ The cottonseed was plucked from the lint by hand in this period of American cotton growing. After harvesting cotton during the day, slaves were forced to remove the seeds from the cotton fibre in the evenings.¹⁰ This arduous task was alleviated following the invention of a cotton gin by Yale University law student, Eli Whitney, in 1793.¹¹

Eli Whitney's creation was a substantial improvement upon the roller gin, developed in India, which drew the cotton fibre between two rollers, separating it from the seeds.¹² Whitney's gin functioned quite differently:

The cotton is placed in a large hopper on an iron bed with many interstices. Through these project the teeth of a series of circular "saws". As the saws revolve, their sharp points catch the fibers of cotton and draw them through. The seeds are excluded by their size. The cotton is detached from the saws, and carried from the machine, by an arrangement of brushes.¹³

The cotton plant is not homogenous; there are many different varieties. The lengths of the fibres produced by the cotton plant, known as the 'staple length', are also varied. The importance of Eli Whitney's cotton gin was that it enabled cotton lint of a short staple length to be easily removed from the cottonseed. Cotton with a short staple length could be grown in a period of time that was brief in comparison with other cotton

⁸ Willard W. Cochrane, *The Development of American Agriculture: A Historical Analysis*, Minneapolis: University of Minnesota Press, 1979, p. 69.

⁹ M.B. Hammond, *The Cotton Industry: An Essay in American Economic History*, New York: Macmillan, December 1897, p. 44.

¹⁰ Edward C. Bates, 'The Story of the Cotton Gin', in Stuart Bruchey (ed) *Cotton and the Growth of the American Economy: 1790-1860: Sources and Readings*, New York: Harcourt, Brace and World Inc., 1967, p. 56.

¹¹ Bates, 'The Story of the Cotton Gin', p. 55.

¹² Harry Bates Brown and Jacob Osborn Ware, *Cotton*, 3rd edition, New York: McGraw-Hill Book Company Inc., 1958, pp. 2-3; R. Douglas Hurt, *American Agriculture: A Brief History*, Ames: Iowa State University Press, 1994, p. 92.

¹³ Bates, 'The Story of the Cotton Gin', p. 56.

varieties.¹⁴ Despite its favourable growing time and suitability for the climate and terrain of America's southern states, short-staple cotton was unpopular with farmers because of the difficulties in removing short-staple lint from the cottonseed.¹⁵ The roller gin had proved to be incapable of separating the seed from short-staple cotton, although it was effective with long-staple varieties.¹⁶

As well as enabling for the first time the ginning by machine of short-staple cotton, Eli Whitney's invention caused a dramatic increase in the speed of cotton ginning. While an average worker had been able to manually separate from the seed approximately one pound of cotton fibre per day, Eli Whitney's gin enabled a single worker to produce fifty times that amount in a single day.¹⁷ Whitney's invention was a key factor in the transformation of the United States into a major cotton producing nation. The short-staple cotton variety that could successfully be grown amidst the climatic conditions of the southern states was now able to be easily and rapidly ginned. Eli Whitney's gin made extensive cotton production achievable in the United States.¹⁸ Whitney's cotton gin was a crucial development in the processing of cotton and certainly stimulated production of the crop in the nation's South. However, it was not until more than a century after Whitney's invention of the cotton gin that further developments in the mechanisation of cotton production would occur.¹⁹ Apart from the ginning process, the production of cotton remained labour-intensive and, as a result, the profits of southern plantation owners were contingent upon the exploitation of labour.

¹⁴ Danbom, *Born in the Country*, p. 74.

¹⁵ Hurt, *American Agriculture*, p. 93.

¹⁶ Hurt, *American Agriculture*, p. 92.

¹⁷ Bates, 'The Story of the Cotton Gin', p. 56; Danbom, *Born in the Country*, p. 74.

¹⁸ Bates, 'The Story of the Cotton Gin', p. 56.

¹⁹ David Grigg, *The Transformation of Agriculture in the West*, Oxford: Blackwell, 1992, pp. 55-56.

As cotton growing increased throughout the southern states, it was matched by a corresponding expansion in plantation slavery.²⁰

Slavery provided large landowners in the South with the opportunity to avoid significant labour costs. The transportation of slaves from Africa guaranteed a permanent labour force for America's cotton fields. By transporting their slaves from distant Africa, southern plantation owners eliminated all prospect of the slaves escaping to their homelands. Once in the United States, there was no possibility for slaves to return to Africa. Slaves were the cheapest possible labour force for plantation owners as they were paid no wages and received only food and rudimentary shelter. M.B. Hammond argued that African slaves could be maintained at a far less expensive rate than white indentured servants, but the use of slaves from Africa has a greater significance.²¹ The treatment of African slaves not as humans, but as livestock meant that their superexploitation was unbounded. Slaves could be whipped, beaten and worked to death in the cotton fields of America without ramification. Plantation owners endeavoured to ensure that their slaves were never idle. Slavery proved lucrative for southern landowners because a slave's entire family, including the women and children, could be forcibly engaged in cotton production. For this reason, many slave purchases comprised whole families.²² The children born subsequently to female slaves were automatically deemed the property of the landowning 'master'. Slaves, however, were not merely the property of their owners; they were saleable commodities. Slaves 'could be bought and sold, deeded and willed, put up as collateral for loans, and seized for non-payment of debts.'²³

²⁰ Danbom, *Born in the Country*, p. 75; Hurt, *American Agriculture*, p. 93.

²¹ Hammond, *The Cotton Industry*, p. 36.

²² Robert William Fogel and Stanley L. Engerman, *Time on the Cross: The Economics of American Negro Slavery*, London: Wildwood House, 1974, p. 5; Hammond, *The Cotton Industry*, p. 44.

²³ Danbom, *Born in the Country*, pp. 101-102.

For plantation owners in America's southern states, 'the ultimate objective of slave management was the creation of a highly disciplined, highly specialized, and well-coordinated labor force.'²⁴ The end of slavery within the United States saw a new form of exploitative labour relations created on southern plantations. The sharecropping system was intended to give former slaves their independence by 'inducing them to become self-sustaining.'²⁵ Ostensibly, the sharecropping system had little in common with slavery. Sharecroppers were usually allocated a small tract of land with a cabin and, in exchange, they were to provide the landowner with a portion of the crop produced.²⁶ The cost of ginning the harvested cotton and buying fertiliser and other requirements were to be shared between the sharecropper and the plantation owner.²⁷ Alternatively, the sharecropper may obtain supplies in advance from a cotton merchant or local store.²⁸ Sharecroppers had little or no capital and were usually immersed in debt before they had sown even a single cottonseed. With no source of income until the crop had been harvested and sold, sharecroppers frequently became more indebted, either to the landowner or local store, in order to obtain food.

After the harvest, the landowner, general store and cotton merchant seized the proceeds of the crop as payment for debts accumulated by the sharecropper. The sharecropper commonly received nothing from the sale of the crop and, more importantly, remained indebted. Although no longer formally recognised as the property of plantation owners, as had been the case under slavery, black sharecroppers

²⁴ Fogel and Engerman, *Time on the Cross*, p. 203.

²⁵ Alston Hill Garside, *Cotton Goes to Market: A Graphic Description of a Great Industry*, New York: Frederick A. Stokes Company, 1935, p. 34.

²⁶ Allen, *The Negro Question in the United States*, p. 55.

²⁷ Garside, *Cotton Goes to Market*, p. 34.

²⁸ Charles William Burkett and Clarence Hamilton Poe, *Cotton: its cultivation, marketing, manufacture and the problems of the cotton world*, London: Archibald Constable and Co. Ltd, 1906, p. 38.

were nonetheless ensnared in the ‘vortex of peonage’.²⁹ The perpetual indebtedness of sharecroppers was not coincidental, but a means of guaranteeing a permanent work force for plantation owners. The classification of sharecroppers as tenants, not labourers, meant that, as during the era of slavery, landowners could again avoid the cost of paying wages. Sharecroppers were forced to remain working for plantation owners until their debts were cleared, and the beneficiaries of the sharecropping system in the South were determined that the sharecroppers’ cycle of debt would continue. Pete Daniel observed that in the South the ‘alternatives open to the peon were absurd: remain quietly; run away and be pursued, shot or beaten; or kill the employer and risk lynching.’³⁰ The appropriation of the profits from the toil of sharecroppers was systematic.³¹ The debt mire in which many sharecroppers found themselves was similarly orchestrated. In calculating sharecropper debt after the harvest, the cotton merchant would not permit the balance owing ‘to become more than just large enough to insure the negro’s becoming his bondservant for another year.’³²

In the settlement of the southern states of America, much of the land had been seized ‘in the form of large holdings, thus permitting an organization and combination of labor on a large scale.’³³ Due to the substantial size of southern plantations, slaves were often worked according to a system of gang-labour.³⁴ With the reconfiguration of slavery into sharecropping and the apportioning of small plots of land on large plantations to tenant farmers, the production of cotton became based upon the labour of

²⁹ Pete Daniel, *The Shadow of Slavery: Peonage in the South, 1901-1969*, Urbana: University of Illinois Press, 1972, p. 19.

³⁰ Daniel, *The Shadow of Slavery*, pp. x-xi.

³¹ See Burkett and Poe, *Cotton: its cultivation, marketing, manufacture and the problems of the cotton world*, p. 38.

³² Burkett and Poe, *Cotton: its cultivation*, p. 38.

³³ Hammond, *The Cotton Industry*, p. 36.

³⁴ Hurt, *American Agriculture*, p. 96.

the family unit. The integral role of women and children in cotton production remained unchanged in the transition from slavery to sharecropping. Women and children did not merely supplement the labour of the male sharecropper; their toil was just as essential. In the hoeing of the weeds and the harvesting of the cotton crop in particular, the women and children of the sharecropping family were indispensable. While black sharecroppers worked equally as hard as they had as slaves, they were arguably in a more precarious position under the sharecropping system. Alston Hill Garside observed that sharecroppers, subjected to supervision by plantation managers, were effectively labourers, not independent tenants.³⁵ Sharecroppers, however, were unpaid labourers. While plantation owners received the labour of the sharecropper for free and derived practically all of the proceeds from the crop produced, they also received other benefits from the sharecropping system. As sharecroppers were supposed to receive a portion of the crops they grew, 'they planted as much of their allotted land as possible because the largest possible crop meant more money for the family.'³⁶ In reality, however, while sharecroppers maximised production on southern plantations, the landowner simply seized a greater portion of the crop and further increased their profits.

In the transition from slavery to sharecropping, the method by which cotton was grown and harvested remained largely unchanged. Potentially the most significant modification of southern cotton growing was the introduction of mule-drawn ploughs and implements, which were used to till the soil. While the use of mules in southern sharecropping expanded to incorporate two-row mule-drawn ploughs, the production of cotton remained fundamentally labour-intensive. The system of cotton growing during the era of sharecropping in the South has been described as 'backward' and derided for its lack of mechanisation. The criticism of southern cotton growing methods ignores

³⁵ Garside, *Cotton Goes to Market*, p. 34.

³⁶ Hurt, *American Agriculture*, p. 225.

the profitability of the sharecropping system for landowners. Under sharecropping, cotton production continued to require few inputs aside from the labour of sharecropper families and their mules. As tenants, sharecroppers bore many of the costs of production. The sharecropping system was extremely profitable for plantation owners and, as long as the exploitation of sharecroppers could be maintained, they had no reason to invest in machinery for use in the production of cotton.

The Industrialisation of Cotton Production in California

The emergence of a cotton growing industry in the state of California during the 1920s signalled an important transition phase in the evolution of United States' cotton production. In order for it to flourish, the cotton plant required both hot temperatures and substantial moisture. Without adequate moisture, the stress experienced by the cotton plant may result in 'leaf drop or the premature cracking and opening of cotton bolls.'³⁷ These basic physical requirements ensured that cotton growing was historically confined to the tropical and sub-tropical regions of the world. These zones provided the hot and wet climate in which cotton crops thrived, with moisture delivered to the cotton simply through rainfall. Within the United States, the physical needs of the crop dictated that cotton would be grown in the country's south. In America's southern states, the sub-tropical climate provided the crop with the requisite high temperatures, and the rainfall levels in the South met the cotton's demand for water. When cotton growing emerged in California, it challenged accepted notions regarding where and how cotton could be successfully produced.

Unlike the 'cotton belt' in the South, California's cotton producing territory was not sub-tropical but arid. The construction of expansive irrigation systems in California and the re-direction of vast volumes of water had, by the 1920s, enabled cotton to be grown in areas of the state where the production of most agricultural crops had been an

³⁷ Friedberger, *Farm Families and Change*, p. 37.

impossibility.³⁸ In subsequent decades, California's irrigation structures were further expanded:

Ambitious dams turned river canyons into reservoirs, million-gallon-a-minute ball valves opened, and water went zigzagging down trough-like concrete aqueducts – even *up* aqueducts and over mountains – to the south. The combined projects stand as the greatest system for controlling and transporting water the world has ever known.³⁹

It was only through the creation of irrigation schemes that the production of cotton was able to flourish on lands in California that had been 'previously unfarmable desert.'⁴⁰

The harnessing of immense quantities of water for irrigation, combined with the 'long stretch of warm and rainless and sun-drenched days' established cotton growing in California as a highly productive industry.⁴¹

The construction of irrigation projects in California spurred a cotton boom within that state in the 1920s. From a mere 2,000 acres grown in California in the early 1870s, the state's production of cotton experienced a modest expansion to reach 9,000 acres by 1923.⁴² Just two years later, cotton plantings numbered 95,000 acres within California.⁴³ Cotton production continued to increase exponentially during the latter half of the 1920s. With 106,000 acres sown to cotton in 1926, cotton production rapidly doubled, totalling 247,000 acres in California by 1929.⁴⁴

Throughout the nineteenth century, cotton growing in America's southern states was a phenomenal success, with the crop becoming one of the nation's most important

³⁸ Weber, *Dark Sweat, White Gold*, p. 21.

³⁹ Richard Conniff, 'California: Desert in Disguise', *National Geographic Special Edition: Water*, November 1993, p. 44.

⁴⁰ Friedberger, *Farm Families and Change*, p. 67.

⁴¹ McWilliams, *Factories in the Field*, p. 5.

⁴² Walter Ebeling, *The Fruited Plain: The Story of American Agriculture*, Berkeley: University of California Press, 1979, p. 376; Weber, *Dark Sweat, White Gold*, p. 21.

⁴³ Weber, *Dark Sweat, White Gold*, p. 21.

⁴⁴ Weber, *Dark Sweat, White Gold*, p. 21.

exports. By the beginning of the twentieth century, however, the hot and moist conditions in the South that had fostered the growth of cotton also assisted the rise of a devastating pest. The boll weevil, which damaged or destroyed the ‘boll’ that enclosed the cotton lint, was especially detrimental to the cotton crops of Georgia and Alabama.⁴⁵ Cotton in California, in contrast, was untroubled by the boll weevil or any other major impediment to the production of the crop on a large scale.⁴⁶ Carey McWilliams’ vision of agricultural ‘factories’ was realised in the Californian cotton fields. The ‘forced plant’ of Californian agriculture, which saw the desert bloom white with cotton bolls, represented both the regulation and defiance of nature.⁴⁷ Rainfall is a crucial component in the success or failure of most agricultural crops and with cotton ‘there is a danger that some of the cotton may be beaten to the ground by rain and become discoloured’, thereby devaluing the rain-affected portion of the crop.⁴⁸ In much of California’s arid territory, however, rainfall was largely excluded as a factor of production. Less than fifteen inches of rainfall was received annually in some of the state’s driest zones, and the climatic unpredictability that often accompanies farming ventures was not evident in California.⁴⁹ With hot, dry days guaranteed in California’s desert valleys, and irrigation water available for application when and where it was needed, Californian growers had achieved a standardised, regulated environment for the production of cotton. The Californian heat and irrigation supply provided the basis for the establishment within the state of intensive, industrialised cotton production.

⁴⁵ Hurt, *American Agriculture*, p. 226.

⁴⁶ Friedberger, *Farm Families and Change*, p. 37.

⁴⁷ McWilliams, *Factories in the Field*, p. 5.

⁴⁸ Ernest Goulding, *Cotton and Other Vegetable Fibres: Their Production and Utilisation*, London: John Murray, 1917, p. 22.

⁴⁹ Ebeling, *The Fruited Plain*, p. 282.

A unique feature of Californian cotton production was the involvement of the state legislature in the regulation of the crop. From 1925, the Acala cotton variety was the only strain of cotton that was legally permitted to be grown in California's Sacramento and San Joachin Valleys.⁵⁰ Other strains of cotton were outlawed, not because they were particularly susceptible to pests or disease or posed any kind of quarantine risk; the One Variety Act was predicated solely on the desire to standardise California's production of cotton. The decision for the state to grow a single type of cotton was designed to appeal to cotton mills and, 'by insuring buyers a uniform product, it increased prices for California cotton.'⁵¹ The production of high-grade standardised Acala cotton helped Californian farmers to survive the Great Depression financially.⁵² As growers in the South contemplated burning bales of cotton to relieve the glut and raise abysmally low prices during the Depression, many Californian farmers still 'had a high-quality cash crop to market.'⁵³

While in America's southern states cotton had been intertwined with slavery and the plantation system, in California the production of cotton was neither dependent upon slaves nor sharecroppers. Although labour was important to cotton growing in California, it was not the primary factor of production, as it had been in the South. Particularly after the Second World War, Californian cotton growers substituted machinery and chemicals for labour whenever it was possible.⁵⁴ One of the earliest examples of this was the adoption of the tractor. Within the United States generally, the development of the tractor was pivotal in the mechanisation of many agricultural tasks. The tractor enabled farmers to sow larger acreages while reducing the time and labour

⁵⁰ Weber, *Dark Sweat, White Gold*, p. 31; Ebeling, *The Fruited Plain*, p. 376.

⁵¹ Weber, *Dark Sweat, White Gold*, p. 31.

⁵² Friedberger, *Farm Families and Change*, p. 61.

⁵³ Hurt, *American Agriculture*, p. 226; Friedberger, *Farm Families and Change*, p. 58.

⁵⁴ Cochrane, *The Development of American Agriculture*, p. 137.

that had been required when the planting of crops was undertaken with horse or mule-drawn equipment.⁵⁵

On California's vast irrigated acreages, the tractor was particularly important to the large-scale production of cotton. By 1939, 81 per cent of land tilling prior to the planting of cotton in California, Arizona and New Mexico was being carried out by tractor. The so-called 'tractorization' of American agriculture was, however, far less evident within the nation's southern states. In Arkansas, Mississippi, Louisiana, Tennessee and Missouri during 1939, tractors accounted for a mere 16 per cent of land breaking operations in cotton growing areas. The mechanisation of other cotton operations was also occurring in the Far Western states, while the sharecropper-dominated South remained largely un-mechanised. The tractor was used to perform between 64 and 69 per cent of cotton planting, harrowing and cultivating operations in California, New Mexico and Arizona in 1939. During this same period, only 4 to 13 per cent of these tasks were being undertaken by tractor in Tennessee, Mississippi, Arkansas, Missouri and Louisiana.⁵⁶

Although the tractor quickly became indispensable, labour was nonetheless required for the production of cotton in California. While cotton growers in California could not avoid paying wages as their counterparts in the South had done through slavery and sharecropping, they were able to minimise costs by employing large numbers of labourers only when they were needed. David Eugene Conrad noted of the sharecropping system in the South:

The most unfortunate of Southern farm workers was the day laborer or wage hand who had a precarious existence without any assurance of work, food, or housing from one day to the next. Many planters may have preferred this type

⁵⁵ Robert C. Williams, *Fordson, Farmall and Poppin' Johnny: a history of the farm tractor and its impact on America*, Urbana: University of Illinois Press, 1987, pp. 177-180.

⁵⁶ John Leonard Fulmer, *Agricultural Progress in the Cotton Belt Since 1920*, Chapel Hill: University of North Carolina Press, 1950, p. 63.

of labor except that it required continuous outlays of cash throughout the growing season and allowed less control of workers.⁵⁷

Ironically, the form of wage labour described by Conrad as the most disadvantageous in the South became virtually the standard in Californian cotton growing. The production of cotton, even in its most labour-intensive form, did not demand enormous numbers of workers each day of the cotton growing season. Some periods of the cotton season were significantly more labour-intensive than others. In particular, it was the harvesting of the cotton which required a large workforce to pick the ripe cotton by hand.

Where in the South the domination and exploitation of slaves and sharecroppers had been the key to plantation owners' profiteering from cotton growing, Californian growers adopted a different approach. By maintaining a small permanent workforce and using tractors and, later, other forms of machinery, California's large cotton growers reduced the need for substantial labour to discrete periods, principally the harvest. Continuing a trend that had been established in Californian agriculture for decades, the state's large cotton producers sought labourers from outside of the United States' border.

Californian landholders had recognised by the late nineteenth century that their state lacked an essential component in profitable agriculture: the availability of a 'reserve of cheap and efficient labor' that could be readily exploited.⁵⁸ From the 1880s through to the 1940s, workers from China, Japan, India, Armenia and the Philippines were brought to Californian agriculture as American workers were not sufficiently inexpensive.⁵⁹ The workers from each of these nations were in turn rejected by Californian farmers when they began to demand higher rates of pay or form unions.⁶⁰

⁵⁷ David Eugene Conrad, *The Forgotten Farmers: The Story of Sharecroppers in the New Deal*, Urbana: University of Illinois Press, 1965, pp. 7-8.

⁵⁸ McWilliams, *Factories in the Field*, p. 104.

⁵⁹ McWilliams, *Factories in the Field*, pp. 104-133; Weber, *Dark Sweat, White Gold*, p. 37.

⁶⁰ McWilliams, *Factories in the Field*, pp. 104-133.

Carey McWilliams observed that these foreign workers in California had, by 1940, been ‘recruited, exploited and excluded.’⁶¹ One group of labourers that had first been introduced to California in large numbers during World War I and remained important to the state’s agricultural sector thereafter were from Mexico.⁶² Devra Weber has argued that the expansion of cotton in California during the 1920s was reliant upon workers from Mexico.⁶³ The significance of Mexican labour to Californian agriculture apparently declined only during the 1930s, when the Great Depression saw Mexican workers displaced by impoverished American labourers, many of whom were white Dust Bowl refugees.⁶⁴ The precariousness of the Mexican worker in California exceeded that of the Southern day labourer depicted by David Eugene Conrad.⁶⁵ During the 1920s, the very presence of Mexican labourers in California was uncertain. Californian cotton growers favoured the use of Mexican workers precisely because they could be subject to deportation. Once the harvest was completed, California’s cotton farmers refused any responsibility for their Mexican workers. Employed only seasonally, the Mexican labourers were forced to turn to charities to sustain themselves within California.⁶⁶ From 1929, tens of thousands of Mexicans were repatriated by the state but ‘when the harvest season again came around, the growers dispatched their “emissaries” to Mexico, and again recruited thousands of Mexicans.’⁶⁷

Californian landowners’ use of cheap labour was driven by the profit motive. Although the tractor had permitted Californian cotton producers to sow significant

⁶¹ McWilliams, *Factories in the Field*, p. 104.

⁶² McWilliams, *Factories in the Field*, p. 124.

⁶³ Weber, *Dark Sweat, White Gold*, p. 35.

⁶⁴ McWilliams, *Factories in the Field*, pp. 305-306.

⁶⁵ See Conrad, *The Forgotten Farmers*, pp. 7-8.

⁶⁶ McWilliams, *Factories in the Field*, pp. 124-127.

⁶⁷ McWilliams, *Factories in the Field*, p. 129.

acres of cotton, the harvesting of the crop remained, until the early 1940s, reliant on hand picking. In California during the 1920s, cotton was the state's most labour-intensive agricultural crop, requiring a substantial labour pool.⁶⁸ The expansion of cotton acreages in California was paralleled by an increase in the number of labourers required to harvest the crop. Despite their dependence on labourers for the cotton harvest, Californian cotton producers were determined to keep their workers on low wages and free from union influence.⁶⁹ The employment of Mexican labour was specifically intended to maintain wages at a 'subsistence level'.⁷⁰ In October 1933, however, 18,000 cotton pickers went on strike, refusing to harvest the cotton on Californian ranches until their demand for a wage rise was met.⁷¹ Although three striking workers were murdered, the strike was maintained for 24 days.⁷² The actions of the labourers had immobilised the Californian cotton industry almost entirely and, in the strike's aftermath, farmers from one Californian town apparently 'vowed never to be embarrassed by labor again.'⁷³

Devra Weber explained the problematic circumstances that had arisen from Californian farmers' long-term reliance on low-cost foreign or migratory workers:

Cheap labour became so deeply embedded in the industry that its elimination would have necessitated a readjustment of the entire capital structure of Californian agriculture. Specialized agriculture had also led to a seasonally uneven demand for workers. Large numbers of workers were needed for short periods of intensive work during harvests; when the season ended, those workers were expected to disappear.⁷⁴

⁶⁸ Weber, *Dark Sweat, White Gold*, p. 34.

⁶⁹ Weber, *Dark Sweat, White Gold* 1994, p. 35.

⁷⁰ McWilliams, *Factories in the Field*, p. 126.

⁷¹ McWilliams, *Factories in the Field*, pp. 219-220.

⁷² McWilliams, *Factories in the Field*, pp. 221-224.

⁷³ Friedberger, *Farm Families and Change*, p. 184.

⁷⁴ Weber, *Dark Sweat, White Gold*, p. 37.

Rather than restructuring labour relations within Californian agriculture, landowners' exploitation of Mexican labour was formalised through the establishment of the Bracero Program. Approved by the United States' Congress nine years after the 1933 cotton strike, the Bracero Program allowed the temporary importation of Mexican workers for 'stoop labor' on Californian farms.⁷⁵ The introduction of the Bracero Program was premised upon the labour shortages that prevailed during the Second World War,⁷⁶ but the program continued long after the war had ceased and it had a greater significance:

Although the bracero program enabled growers to schedule workers in an efficient manner, to control expenditures for wages, and engage in long-term planning, in reality it permitted the growers to replace workers they considered problems and keep wages low and housing inadequate.⁷⁷

Through the government-sanctioned Bracero Program, Californian farmers had obtained access to abundant labour from Mexico. Despite the benefits of the Bracero Program, California's cotton farmers were nonetheless keen to mechanise the production of cotton. With the tractor enabling fields to be ploughed and sown easily and the cotton gin providing the speedy processing of the lint, efforts to mechanise cotton growing focused on the most labour-intensive phase of production: the harvesting of the crop. Influenced perhaps by the 1933 cotton strike, which remains the largest agricultural strike in American history, many of California's large cotton growers chose to purchase mechanical cotton harvesters once an efficient model became available commercially.⁷⁸

The mechanisation of the cotton harvest had eluded inventors from the 1870s.⁷⁹

As W. Lawrence Balls explained:

⁷⁵ Hurt, *American Agriculture*, p. 308.

⁷⁶ Hurt, *American Agriculture*, p. 308.

⁷⁷ Hurt, *American Agriculture*, p. 308.

⁷⁸ James A. Henretta, W. Elliot Brownlee, David Brody, Susan Ware, and Marilyn S. Johnson, *America's History: Volume 2, Since 1865*, 3rd edition, New York: Worth Publishers, 1997, p. 786.

⁷⁹ Gilbert C. Fite, *Cotton Fields No More: Southern Agriculture, 1865-1980*, Lexington: University Press of Kentucky, 1984, p. 157.

Essentially, then, cotton is a cheap-labor crop, and a hand-labor crop as well, and will remain so until the dream of a mechanical means of picking has been realized.⁸⁰

In the period from 1850 to the early 1940s, in excess of 1,800 cotton harvesting inventions were patented in the United States.⁸¹ One of these machines was a cotton stripper which removed not only the lint from the cotton plant, but the entire boll that encased the lint.⁸² This type of cotton stripper was adopted by a number of Texan cotton growers from the 1920s, apparently resulting in a reduction in the costs of production.⁸³ Other cotton harvesting models were developed which relied on a variety of methods to extract the cotton fibre, including the use of suction, static electricity and a threshing action.⁸⁴

The most successful cotton harvesting machines, however, were those that incorporated spindles to catch and draw the cotton from the bolls. Inventors John and Mack Rust experimented with spindle cotton harvesters from the mid-1920s but a lack of capital stalled any prospect of commercial production on a significant scale.⁸⁵ In the same period, the International Harvester Company began developing a spindle cotton picker.⁸⁶ International Harvester created both tractor-drawn and self-propelled cotton pickers, but these were not immediately successful. These early machines ‘brushed too much cotton onto the ground, damaged the plants, clogged, and bogged down in muddy

⁸⁰ W. Lawrence Balls, *The Development and Properties of Raw Cotton*, London: A&C Black Ltd, 1915, p. 155.

⁸¹ Hurt, *American Agriculture*, p. 250.

⁸² Pete Daniel, *Breaking the Land: The Transformation of Cotton, Tobacco, and Rice Cultures since 1880*, Urbana: University of Illinois Press, 1985, p. 246.

⁸³ Fite, *Cotton Fields No More*, p. 157; Daniel, *Breaking the Land*, p. 246.

⁸⁴ Hurt, *American Agriculture*, p. 250.

⁸⁵ Hurt, *American Agriculture*, p. 250.

⁸⁶ Fite, *Cotton Fields No More*, p. 157.

fields.⁸⁷ After some refining, an effective single-row cotton harvesting machine was released for commercial sale by International Harvester in 1941.⁸⁸

Until the development of International Harvester's model, cotton that was machine-picked was markedly inferior to cotton harvested by hand. When the cotton plant ripens, its bolls burst open, exposing the white fibre. Plucking the cotton from the bolls by hand delivered fibre that was clean and easy to process at the gin. Early cotton harvesting machines, however, were imprecise and could not gather the cotton lint as cleanly as labourers. Machine harvesting tended to collect leaves from the plant along with the fibre, which made the fibre difficult to clean during ginning.⁸⁹ Following the ginning process, cotton in the United States was graded according to its quality, among other factors, and the value of the cotton was determined by the grade received. The cotton stripping machine used in Texas, for example, accumulated so much leaf litter and dirt amongst the lint that its quality was assessed at one or two grades below what it would have been given had the crop been hand-picked.⁹⁰

The prospects for an efficient cotton harvesting machine had been hampered, too, by the fact that the bolls did not ripen and burst open all at once.⁹¹ Fields were often harvested by hand 'three or four times over a period of three to four months, since the bolls opened progressively.'⁹² Unlike the workers who hand-picked the cotton, earlier harvesting machines such as the cotton stripper could not differentiate between unripe and ripened bolls, and collected all bolls regardless.⁹³ In contrast, the

⁸⁷ Hurt, *American Agriculture*, p. 251.

⁸⁸ Fite, *Cotton Fields No More*, p. 157.

⁸⁹ Burkett and Poe, *Cotton: its cultivation*, p. 48.

⁹⁰ Fite, *Cotton Fields No More*, p. 157.

⁹¹ Burkett and Poe, *Cotton: its cultivation*, p. 48.

⁹² Garside, *Cotton Goes to Market*, p. 19.

⁹³ Danbom, *Born in the Country*, p. 238.

International Harvester invention was capable of harvesting lint from the ripe, open bolls only.⁹⁴

Nevertheless, the harvesting process was further complicated by the fact that the cotton plant produced bolls at varying heights.⁹⁵ This had not been a difficulty when the lint was collected by hand, however, cotton harvesting machines were not as flexible as workers, and the machines did not necessarily harvest the cotton efficiently when the height of the bolls was inconsistent. Rather than refining International Harvester's spindle picker, it was the cotton plant itself that was made to adapt to the needs of the machine. Special breeds of cotton were developed by Agricultural Experiment Station employees in the United States that produced bolls of an almost uniform height.⁹⁶

Although the cotton plants were made more homogenous through breeding, their foliage remained an obstacle to profitable machine harvesting. In West Texas during the 1920s, stripper-style harvesters were favoured over hand-picking because early frosts made the cotton plant drop its leaves.⁹⁷ With the cotton crop devoid of foliage, the machine-stripped cotton lint was virtually free from contamination by leaf litter. While in West Texas this leaf drop occurred naturally, two decades later it was being replicated chemically. Once International Harvester's spindle cotton picker became widely available within the United States, measures were taken to ensure that the quality of the cotton fibre was not adversely affected by the transition from hand-picking to harvesting by machine. Plant breeding was an important component of this effort, as was the introduction of chemical defoliants. From the 1940s, some large American farms applied chemical defoliants to their cotton crop prior to machine-picking. The defoliants denuded the cotton and enabled the fibre to be harvested by

⁹⁴ Ebeling, *The Fruited Plain*, p. 137.

⁹⁵ Burkett and Poe, *Cotton: its cultivation*, p. 48.

⁹⁶ Danbom, *Born in the Country*, p. 238.

⁹⁷ Fite, *Cotton Fields No More*, p. 157.

machine without being tainted by foliage.⁹⁸ By 1949, machine-harvesting in California and Arizona ‘had proved substantially cheaper than handpicking’.⁹⁹

The mechanisation of the cotton harvest has been identified as the ‘last massive phase of capital-for-labor substitution in US agriculture’.¹⁰⁰ By 1969, an estimated 96 per cent of America’s cotton was harvested mechanically.¹⁰¹ Nowhere in the United States was the mechanical cotton picker adopted more rapidly than in California. From the First World War, some Californian cotton growers had begun using cotton strippers to harvest their crop.¹⁰² Many of the International Harvester spindle pickers sold by 1948 were purchased by Californian cotton growers.¹⁰³ When International Harvester increased production of the spindle harvester from 1948, the use of the machines was dominated by farmers from California and Arizona.¹⁰⁴ The topography and climate of these two states made them particularly suitable for cotton harvesting by machine. The dry harvest season and level land in Arizona and California ensured that their cotton crops could be machine-harvested successfully.¹⁰⁵

California’s intensive, large-scale, specialised production of cotton made harvesting by machine economically advantageous.¹⁰⁶ While a lack of capital deterred many Southern cotton farmers from mechanising the harvest, no such hindrance was

⁹⁸ Danbom, *Born in the Country*, p. 238.

⁹⁹ Hurt, *American Agriculture*, p. 310.

¹⁰⁰ Wayne A. Grove, *Farmers at the Technological Crossroads: Post WWII Diffusion of the Mechanical Cotton Harvester*, ASSA January 1997, Cliometric Society Sessions, Date accessed: 22 June 2007, <http://www.eh.net/Clio/Conferences/ASSA/Jan_97/Grove.shtml>

¹⁰¹ Grigg, *The Transformation of Agriculture*, p. 56.

¹⁰² Danbom, *Born in the Country*, p. 238.

¹⁰³ Daniel, *Breaking the Land*, p. 246.

¹⁰⁴ Fite, *Cotton Fields No More*, pp. 185-186.

¹⁰⁵ U.S. Department of Labor, *Cotton Harvest Mechanization: Effect on Seasonal Hired Labor*, Bureau of Employment Security, BES No. 209, June 1962, p. 6.

¹⁰⁶ Henretta, et al. *America’s History*, p. 784; Hurt, *American Agriculture*, p. 306.

encountered by California's large cotton producers.¹⁰⁷ By 1961, only 110 of California's 4,550 cotton harvesting machines were of the inferior cotton stripping variety.¹⁰⁸ More than half of all cotton harvesting machines in California in 1961 were capable of harvesting two rows of cotton simultaneously.¹⁰⁹ Two-row pickers were the most advanced form of cotton harvesting equipment available at that time, reflecting Californian cotton producers' financial capacity and willingness to mechanise. The sizeable cotton acreages planted on California's larger farms had ensured that the move to mechanisation was economically sound.¹¹⁰ The degree of cotton harvest mechanisation in California far exceeded that of any other major cotton producing American state in 1959, with an estimated 86 per cent of Californian cotton being picked by machine.¹¹¹ Two years later, the proportion of Californian cotton that was machine-harvested had risen to approximately 88 per cent.¹¹²

The rapid transition to a predominantly mechanised cotton harvest in California was not only influenced by the invention and availability of International Harvester's spindle picker; the context of the Second World War was also crucial. Within the United States, World War II brought labour shortages, and a greater need and higher prices for agricultural commodities.¹¹³ Many American farmers reacted to the need for accelerated production during the war by substituting 'chemicals and machines for

¹⁰⁷ Fite, *Cotton Fields No More*, p. 181.

¹⁰⁸ U.S. Department of Labor, *Cotton Harvest Mechanization*, Table 2, p. 5. This report is based on a survey of 56 Bureau of Employment Security agricultural reporting areas in 14 major cotton growing states. The survey was limited to areas employing 2,000 or more seasonal hired workers in the cotton harvest during the peak employment period in 1961. Despite this limitation, the areas surveyed accounted for approximately 90 per cent of all cotton produced in the United States in 1961.

¹⁰⁹ U.S. Department of Labor, *Cotton Harvest Mechanization*, Table 2, p. 5.

¹¹⁰ Ebeling, *The Fruited Plain*, p. 137.

¹¹¹ U.S. Department of Labor, *Cotton Harvest Mechanization*, Table 4, p. 14.

¹¹² U.S. Department of Labor, *Cotton Harvest Mechanization*, Table 4, p. 14.

¹¹³ Fite, *Cotton Fields No More*, p. 163.

human labor'.¹¹⁴ The labour shortages and increased mechanisation associated with the Second World War initiated marked structural changes within American agriculture:

Farmers now obtain many of their resources from off the farm. According to some estimates, the fuel, machinery, chemicals, fertilizers, veterinary services, and other inputs obtained from outside farming amount to almost two-thirds of all resources used. Land and the farmer's labor are now scarcely more than one-third.¹¹⁵

In the aftermath of World War II, tractors grew larger and petroleum-based fertilisers and pesticides began to be used extensively on farms in the United States.¹¹⁶

Californian farmers, in particular, have been described as being in the vanguard of the mechanisation and industrialisation of American agriculture.¹¹⁷ These processes were manifested in the production of cotton in California. The sowing of large-scale cotton crops in California was made possible by the tractor, while the mechanical picker reduced the time and labour involved in the harvest. The use of defoliants, however, was just the beginning of the integration of chemicals into the cotton production process.

One of the most important chemicals given an agricultural application after the Second World War was dichlorodiphenyltrichloroethane, or DDT:

During the war it was used by the military to fumigate barracks and delouse troops, but afterward it became available to farmers. DDT was by no means the first chemical insecticide – arsenates had been particularly popular – but it was so effective against such a broad range of insects that it appeared to be the panacea for which entomologists had been searching for a century.¹¹⁸

¹¹⁴ Cochrane, *The Development of American Agriculture*, p. 137.

¹¹⁵ Harold F. Breimyer, 'The Changing American Farm', *The Annals of the American Academy of Political and Social Science*, Volume 429, January 1977, p. 17.

¹¹⁶ Williams, *Fordson, Farmall and Poppin' Johnny*, p. 169; Roger Burbach and Patricia Flynn, *Agribusiness in the Americas*, New York: Monthly Review Press, 1980, p. 28.

¹¹⁷ Burbach and Flynn, *Agribusiness in the Americas*, pp. 27-31.

¹¹⁸ Danbom, *Born in the Country*, p. 237.

In post-war California, crop-dusting aircraft saturated cotton crops with DDT to eliminate insect pests.¹¹⁹ The chemical 2,4-dichlorophenoxyacetic acid, known as 2,4-D, was widely used to kill weeds growing amidst crops.¹²⁰ As well as insecticides and herbicides, the post-war period saw farmers using the fertiliser anhydrous ammonia, a gas that is injected directly into the soil.¹²¹

Although the increased usage of mechanical cotton harvesters and a variety of insecticides and herbicides decreased the need for farm labour, it did not eliminate it entirely. Following the Second World War, the production of cotton in California emerged in a highly industrialised form. Mechanisation of the Californian cotton harvest was adopted and supplemented by cheap wage labour, which was increasingly supplied by labour contractors from the 1950s. The use of labour contractors apparently enabled cotton farmers to evade unemployment insurance and minimum wage requirements that would otherwise have been applicable.¹²² While California's large cotton growers avoided accommodation and other expenses by employing contract labour, they nevertheless maintained a small permanent workforce.¹²³ This permanent workforce was largely devoted to the maintenance and operation of agricultural machinery and irrigation equipment, and was often housed on the farm.¹²⁴

The efficiency of California's intensive irrigated cotton production system – sustained by machinery, chemicals and both contract and permanent labour – was not without its consequences. As V.R. Cardozier explained:

¹¹⁹ Friedberger, *Farm Families and Change*, p. 37.

¹²⁰ Danbom, *Born in the Country*, p. 237.

¹²¹ Danbom, *Born in the Country*, p. 237.

¹²² Friedberger, *Farm Families and Change*, p. 40.

¹²³ Friedberger, *Farm Families and Change*, p. 40.

¹²⁴ Friedberger, *Farm Families and Change*, p. 40.

For many years the number of acres a farmer could grow was limited to how much cotton he could hoe and pick with his own labor or with labor he could hire. He could plant and cultivate many more acres than he could hoe and pick.¹²⁵

While the development of the tractor enabled the expansion of cotton acreages to occur, the absence of a mechanical cotton harvester had restrained this expansion somewhat. The availability of mechanical cotton pickers, insecticides, fertilisers and herbicides, however, meant that virtually the only factor which may have constrained production was the size of farms. The means to accelerate agricultural production, namely chemicals and machinery, became widely available to American farmers in the aftermath of the Second World War. Paradoxically, as America's farmers mechanised operations to maximise agricultural output in the wake of the war, the heightened demand for agricultural products began to decline. Agriculture in post-war America was characterised by a crisis of overproduction, from which cotton was not immune.¹²⁶ Particularly after the end of the Korean War and 'the phasing out of post-World War II relief and rehabilitation activities', agricultural prices in the United States suffered.¹²⁷ The United States government responded to the problem of overproduction by enforcing acreage restrictions and attempting to stabilise prices by storing surplus agricultural produce.¹²⁸ The federal government determined quotas for surfeit agricultural commodities and farmers were paid not to produce those particular crops.¹²⁹ Californian farmers were among those subject to acreage restrictions on cotton in the 1950s.

¹²⁵ V.R. Cardozier, *Growing Cotton*, New York: McGraw-Hill Book Company, 1957, p. 316.

¹²⁶ Hurt, *American Agriculture*, p. 287.

¹²⁷ Cochrane, *The Development of American Agriculture*, p. 139.

¹²⁸ Cochrane, *The Development of American Agriculture*, p. 139.

¹²⁹ Cochrane, *The Development of American Agriculture*, p. 139.

Acreage restrictions on the production of cotton in California were not particularly detrimental because, unlike the Southern states, Californian agriculture was noted for its diversification.¹³⁰ The imposition of acreage restrictions nevertheless signalled that the exponential growth of irrigated cotton in California that began in the 1920s had been temporarily halted. At the same time as acreage restrictions were in place on cotton, a significant change began to occur within Californian agriculture. Migrant farm labourers started to resist their exploitation and agitate for higher wages and better working conditions.¹³¹ Led by Cesar Chavez, the unrest among the predominantly Mexican farm labourers culminated in the establishment of the United Farm Workers movement in 1965.¹³² As the farm workers' campaign began to gain momentum in the early 1960s, a small group of farmers from California's San Joachin Valley departed for Australia.

Settling in the Namoi Valley, this small group began to recreate cotton growing as they had known it in the San Joachin Valley. Cotton production in the San Joachin Valley was a tremendous success from its introduction in the 1920s. By 1924, the Acala cotton variety being grown in the San Joachin Valley was delivering a yield that was almost triple the national average.¹³³ In 1952, the Valley's yield remained high at close to double the national average.¹³⁴ In a 1961 survey by the US Department of Labor, the San Joachin Valley was the most highly mechanised cotton growing area of the United States, with 88 per cent of harvesting being done by machine.¹³⁵ In their

¹³⁰ Henretta, et al, *America's History*, p. 784.

¹³¹ Hurt, *American Agriculture*, pp. 365-366.

¹³² Weber, *Dark Sweat, White Gold*, p. 201; Hurt, *American Agriculture*, pp. 365-369.

¹³³ Weber, *Dark Sweat, White Gold*, p. 20.

¹³⁴ David L. Cohn, *The Life and Times of King Cotton*, New York: Oxford University Press, 1956, pp. 173-174.

¹³⁵ U.S. Department of Labor, *Cotton Harvest Mechanization*, p. 4.

move to the Namoi Valley, the small number of San Joachin farmers transposed a form of cotton production that was mechanised, irrigated, intensive, high-yielding and extremely profitable. Their migration initiated an agricultural transformation that can be seen as the remaking of the Namoi Valley.

This chapter has examined the development of industrialised cotton production in California. The historical perspective presented in this chapter has contrasted industrialised cotton production in California with the slavery and sharecropping cotton production systems that had previously existed in the United States. By investigating industrialised cotton production in California in this manner, this chapter has offered insights on the impact of industrialisation on cotton growing methods, and how it transformed an agricultural industry that was traditionally labour-intensive to one that epitomised capital-intensive production. The next chapter explores the history of cotton production in Australia and the introduction of industrialised cotton production to the Namoi Valley.

CHAPTER THREE: COTTON'S ARRIVAL IN THE NAMOI VALLEY

This chapter examines cotton growing in Australia and how industrialised cotton production was introduced to the Namoi Valley. This chapter presents a historical perspective of cotton growing in Australia which demonstrates that the production of the crop had been only a minor agricultural endeavour until the latter half of the twentieth century. The purpose of the historical analysis of Australian cotton growing in this chapter is to highlight government involvement in the stimulation of cotton growing, both in the Namoi Valley during the 1960s, and in earlier attempts to establish a cotton growing industry, primarily in Queensland. This chapter offers a detailed historical analysis of the factors and the process that led to the introduction of industrialised cotton production in the Namoi Valley. Through that analysis of cotton in the Namoi Valley, it is intended that this chapter will provide a detailed case study of the process by which the internationalisation of industrialised agriculture has occurred.

Cotton Growing in Australia from White Settlement to Federation

The growing of cotton had initially been experimented with soon after the settlement of Australia as a British colony.¹ These early efforts to grow cotton near Sydney in New South Wales were unsuccessful because the area was ill-suited to the raising of the crop.² It was not until 1840 that cotton farming in Queensland's Moreton Bay indicated that Australia had some potential as a cotton-producing colony.³ In 1854, Liverpool received the first seventy bales of cotton that had been grown in Moreton Bay.⁴ Six years later, with Queensland officially deemed a separate colony, inducements were offered for Queensland residents to grow cotton for Britain:

¹ J.J.J. Pigram, *Cotton*, Croydon: Longman Australia Industry in Australia Series, 1970, p. 3.

² Basinski, 'The Cotton Growing Industry in Australia', p. 206.

³ Pigram, *Cotton*, p. 3; Basinski, 'The Cotton Growing Industry in Australia', p. 206.

⁴ Basinski, 'The Cotton Growing Industry in Australia', pp. 206-207.

The Crown Lands Alienation Act of 1860 provided for the issue of land orders up to £10 during the first three years and £5 in the following two years, as a premium for every bale of good cleaned Sea Island Cotton that was exported to England.⁵

During the nineteenth century, cotton production in both Australia and the United States was almost exclusively intended to supply Britain's cotton manufacturing industry.

For the United States, the invention of the cotton gin by Eli Whitney was not the main factor that stimulated the production of cotton within the nation's southern states. Without a substantial demand for cotton fibre, it is unlikely that the growing of cotton would have become so widespread in America's South. Britain's spinning mills were the source of the voracious demand for cotton which led the United States to become the world's largest producer of cotton. In the period between 1858 and 1862, for example, the United Kingdom accounted for 49 per cent of the world's consumption of raw cotton.⁶

Where in the nineteenth century the United States exceeded all other nations in the growing of cotton, Britain was unsurpassed in the manufacturing of cotton goods.⁷ A number of the colonial conquests of the British Empire had been influenced in part by the demand for cotton:

In the nineteenth century cotton was in great demand in the world market as a cash crop. The need for raw cotton during the industrial revolution motivated Great Britain to colonize the rich growing lands in Egypt and India, besides engaging in trade with the slave plantations of the American south.⁸

Charles William Burkett and Clarence Hamilton Poe argued somewhat dramatically that cotton was considerably more important to the British Empire than 'the advance of the

⁵ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, Canberra: Australian Government Publishing Service, 1963, p. 1.

⁶ W.S. Bell, *An Essay on the Peruvian Cotton Industry, 1825-1920*, Centre for Latin American Studies, University of Liverpool, 1985, p. 5.

⁷ J.T. Leverton, *The Natal Cotton Industry, 1845-1875: A Study in Failure*, Pretoria: Communications of the University of South Africa, 1963, p. 3.

⁸ Laxman D. Satya, *Cotton and Famine in Berar, 1850-1900*, New Delhi: Manohar, 1997, p. 15.

Russian army on her Asian outposts.’⁹ Similarly, John Watts asserted that cotton was ‘almost as important and necessary to the well being of Lancashire as even corn itself.’¹⁰

While the expansion of cotton growing in the United States was reliant upon sustained demand from Britain, the British manufacturing industry was no less dependent on the supply of raw cotton from the United States. When the American Civil War began, Britain’s spinning mills were receiving almost 90 per cent of their raw cotton from America’s southern states.¹¹ The disruption to cotton production in the United States caused by the Civil War resulted in a shortfall in raw cotton supplies, which had serious economic consequences for the British manufacturing industry:

Since shortly before the Civil War, England has shipped the bulk of her cotton manufactures to countries in Asia and Africa and to her colonies in the western hemisphere. For the most part, the cloth has gone to those countries where the purchasing-power of the ultimate consumer has been very low. Consequently, in a period such as existed during and following the Civil War, the high prices for cotton goods reduced the demand from the bulk of England’s customers.¹²

Prior to the outbreak of the American Civil War, the achievements of the industrial revolution had enabled Britain’s manufacturing industry to keep the cost of its cotton goods low. In the United States and Europe by 1861, for example, the cost of cotton cloth ‘in terms of gold had fallen to less than 1 per cent of its cost in 1784.’¹³ It was this extraordinary reduction in manufacturing costs that allowed Britain to trade its cotton wares with colonies and countries whose citizenry could not be considered wealthy. Britain’s manufacturing industry attained its ascendancy both ‘through supplies of cheap American raw cotton and the application of inventions for economically

⁹ Burkett and Poe, *Cotton: its cultivation*, p. 3.

¹⁰ John Watts, *The Facts of the Cotton Famine*, London: Simpkin, Marshall and Company, 1866, p. 230.

¹¹ Louis Bader, *World Developments in the Cotton Industry: With Special Reference to the Cotton Piece Goods Industry in the United States*, New York: New York University Press, 1925, p. 3.

¹² Bader, *World Developments in the Cotton Industry*, p. 4.

¹³ Hobhouse, *Seeds of Change*, p. 142.

converting it into fabrics'.¹⁴ However, the American Civil War intervened to bring Britain's supply of ample and low-priced cotton to a temporary halt.

As world cotton prices increased due to the shortages created by the American Civil War, cotton growing expanded in Australia. Prompted by the rise in prices, cotton growing in Australia experienced a temporary upsurge during the 1860s and early 1870s.¹⁵ In Queensland in 1870, 13,000 acres were devoted to the growing of cotton.¹⁶ Although Australia yielded 5,132 bales of cotton in 1871, later in that decade, Australia's production of cotton could not be sustained economically.¹⁷ The decline in prices that followed the end of America's Civil War was paralleled by a reduction in Australia's production of the crop, and by 1887 cotton growing in Australia had effectively come to an end.¹⁸ The United States not only out-competed Australia in growing cotton; in the decades after the Civil War the overproduction of cotton in the US increased, peaking in 1898, eroding cotton prices and perpetuating poverty in the southern states of America.¹⁹ With the United States resuming its position as 'virtually a monopolistic supplier' of cotton following the cessation of the Civil War, there was little opportunity for Australia to become a cotton-producing nation of any significance.²⁰

The failure of cotton growing to become a major industry in Australia before the mid-twentieth century has been attributed to 'considerable labour difficulties'.²¹ In

¹⁴ Bader, *World Developments in the Cotton Industry*, p. 3.

¹⁵ Basinski, 'The Cotton Growing Industry in Australia', p. 207.

¹⁶ Pigram, *Cotton*, p. 3.

¹⁷ Basinski, 'The Cotton Growing Industry in Australia', p. 207.

¹⁸ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 2.

¹⁹ Hurt, *American Agriculture*, p. 170.

²⁰ Leverton, *The Natal Cotton Industry*, p. 3.

²¹ J.J. Basinski, *Cotton Growing in Australia: A Technical and Scientific Survey*, Canberra: CSIRO, Division of Land Research and Regional Survey, 1962, p. 3.

Australia during the 1860s, Queensland was identified as the most suitable region for cotton production, with its sub-tropical climate lauded as ‘infinitely superior to the Confederate States of North America for growing cotton, sugar, and other tropical productions.’²² Despite the appropriateness of its climate for cotton growing, Queensland in that period lacked a large and inexpensive supply of labour for work in potential cotton fields. For some, at least, in the nineteenth and early twentieth century when cotton growing remained labour-intensive, plans for expanding cotton production in Queensland were governed by racist colonial sensibilities.

White labour was unsuitable, it was argued, for field labour in the tropical heat, as the toil would result in the white workers being ‘physically incapacitated’ and ‘debilitated’ by ‘bilious fevers’.²³ According to Erskine Marjoribanks, the provision of non-white labour was essential to the success of a cotton growing industry in Queensland:

The Chinese are an industrious, persevering, temperate race, so, I believe, are the coolies, and these, as South Sea Islanders and other coloured races, could be got in any number that might be required. If the white man cannot stand the field labour in this colony, the black, the brown, and the yellow man must be brought to supply his place.²⁴

The growing of cotton had not been associated with white labour prior to the twentieth century. Cotton production was historically the domain of non-white farmers, labourers and colonial subjects. Before the nineteenth century began, cotton had primarily been grown in India, Brazil, Egypt, the Middle East, the Mediterranean littoral and the West Indies.²⁵ Africa, for example, was a source of interest for colonial planners from France, Germany, Britain, Portugal, Italy and Belgium because of the potential for its

²² Erskine Marjoribanks, *Queensland: A Wide Field for the Safe and profitable investment of British capital, more particularly in the growth of cotton*, Edinburgh: John Maclaren, 1865, p. 6.

²³ Marjoribanks, *Queensland: A Wide Field*, p. 6.

²⁴ Marjoribanks, *Queensland: A Wide Field*, p. 8.

²⁵ Hobhouse, *Seeds of Change*, p. 144.

tropical climate to successfully produce cotton.²⁶ From the end of the eighteenth century, cotton was affiliated with slavery and colonialism.²⁷

The growing of cotton in the nineteenth century was still governed by an implicit racism, from which colonial Queensland was not exempt. Erskine Marjoribanks' conviction that growing cotton in Queensland's tropical heat would physically harm white labourers was disputed by George Wight:

Why is the white man able to do all other kinds of work in the open air, except the cultivation of cotton? How is it that the European plants, and hoes, and hills maize and potatoes in one part of his farm with impunity, while he exposes himself to injury, perhaps to sunstroke, should he attempt the cultivation of cotton on some other part?²⁸

The colonial notion that white labourers were not suited to the farming of cotton was underpinned by a more material concern, acknowledged by both Wight and Marjoribanks: the cost of white labour was relatively high.²⁹ The labour-intensive nature of cotton growing, the comparatively high wage rates for white workers, and racist notions regarding who should plant and pick the crop were all factors which precluded the development of a significant cotton growing industry in nineteenth-century Queensland. The demands for Chinese, South Sea Islander and Indian labour to be brought to Queensland, which apparently attracted considerable support within the colony, arose in the same period as the American Civil War.³⁰ Within the context of that war and the inflated cotton prices it generated, Erskine Marjoribanks, anticipating the abolition of slavery, called for America's emancipated slaves to be transported to

²⁶ Allen Isaacman, *Cotton is the Mother of Poverty: Peasants, Work, and Rural Struggle in Colonial Mozambique, 1938-1961*, Portsmouth: Heinemann, 1996, p. 1.

²⁷ Satya, *Cotton and Famine in Berar, 1850-1900*, p. 15.

²⁸ George Wight, *Queensland: The field for British Labour and Enterprise, and the Source of England's Cotton Supply*, 2nd edition, London: G. Street, Colonial Newspaper Offices, 1862, p. 99.

²⁹ Marjoribanks, *Queensland: A Wide Field*, pp. 6-7; Wight, *Queensland: The field for British Labour*, pp. 95-96;

³⁰ Wight, *Queensland: The field for British Labour*, p. 95; Marjoribanks, *Queensland: A Wide Field*, p. 8.

Queensland to grow cotton.³¹ John Dunmore Lang's argument for white labourers to farm cotton in Queensland as a counterpoise to American slave plantations was largely unheeded, as plans for the employment of coloured labour in Queensland cotton fields persisted in the early twentieth century.³²

One advocate for the use of non-white labour went so far as to propose the creation of a 'Tropical Territory' that would encompass the northern parts of Australia and be separated from the rest of the country by the line of latitude 18 degrees south of the equator.³³ Intended to foster the production of cotton and other tropical crops, the proposal for the 'Tropical Territory' had a more specific purpose: the evasion of the 1901 *Immigration Restriction Act*.³⁴ Through the establishment of the territory and a 'special labour concession', it was argued that the Act, known unofficially as the White Australia Policy, could be bypassed, enabling the importation of 'coloured' labourers from other British colonies.³⁵ Dr David Thomatis, a promoter of the 'Tropical Territory', envisaged the following:

The cotton culture in this proposed new Territory, by the help of capital, will make Australia a great, prosperous, populous country; and surely let us introduce, if found necessary, British coloured subjects to smooth the way, to do the rough work for us for the next few years. We shall then have millions of happy white families in our cotton fields, a race to form a bulwark against foreign invasion.³⁶

³¹ Marjoribanks, *Queensland: A Wide Field*, p. 7.

³² John Dunmore Lang, *Queensland, Australia; A highly eligible field for emigration, and the future cotton-field of Great Britain: with a disquisition on the origin, manners, and customs of the Aborigines*, Second Edition, London: Edward Stanford, 1864, p. vii.

³³ John Bottomley, 'Caravonica – The World's Leading Cotton', in E.W. Cole (ed.) *Cotton Growing in Australia*, Melbourne: Cole, 1905, pp. 1-7.

³⁴ Bottomley, 'Caravonica – The World's Leading Cotton', pp. 1-7.

³⁵ Bottomley, 'Caravonica – The World's Leading Cotton', pp. 4-5.

³⁶ David Thomatis, 'The Cotton Culture: An Opportunity for Permanent and Prosperous Settlement in Tropical Australia', in E.W. Cole (ed.) *Cotton Growing in Australia*, Melbourne: Cole, 1905, p. 14.

Although the ‘Tropical Territory’ never eventuated, thousands of Pacific Islanders were captured and coerced into working cheaply in Queensland, initially in the growing of cotton but primarily on the state’s sugar cane plantations.³⁷

Fundamental to the plan for the Tropical Territory, along with cheap non-white labour, was the determination to grow the variety of cotton known as ‘Caravonica’. The Caravonica variety was quite distinct from the upland cottons which dominated production in the southern United States once Eli Whitney’s cotton gin allowed their short-staple fibres to be processed with ease.³⁸ The Caravonica was a hybrid of a Peruvian and a Mexican variety of cotton, and, grown near Cairns in north Queensland, it was characterised by a high yield.³⁹ The Caravonica hybrid was notable because it grew as a tree, reaching a height of between twelve and fourteen feet.⁴⁰ In contrast to the Caravonica perennial, the upland varieties cultivated in America’s South were grown as annuals.⁴¹ The differences between the Caravonica and the more common upland varieties are interesting in terms of the contrast in production methods. Unlike the upland cottons, which needed to be ploughed up and replanted each year, the Caravonica was pruned and tended in the manner of a fruit tree.⁴² In spite of its potential advantages and suitability to the northern environment, the Caravonica was

³⁷ This practice was known as ‘blackbirding’. See Ross Fitzgerald, *From the Dreaming to 1915: A History of Queensland*, St Lucia: University of Queensland Press, 1982, pp. 126-127, pp. 182-183 and pp. 236-237; Raymond Evans, Kay Saunders and Kathryn Cronin, *Exclusion, Exploitation and Extermination: race relations in colonial Queensland*, Sydney: Australian and New Zealand Book Company, 1975, pp. 150-151, pp. 158-159 and pp. 240-241.

³⁸ Hobhouse, *Seeds of Change*, p. 143.

³⁹ ‘Report by Mr John Bottomley (Cotton Expert) to the Premier of South Australia’, in E.W. Cole (ed) *Cotton Growing in Australia*, Melbourne: Cole, 1905, pp. 4-6.

⁴⁰ Thomatis, ‘The Cotton Culture: An Opportunity for Permanent and Prosperous Settlement in Tropical Australia’, pp. 12-14; ‘Report by Mr John Bottomley (Cotton Expert) to the Premier of South Australia’, pp. 4-6.

⁴¹ Hobhouse, *Seeds of Change*, p. 143.

⁴² Bottomley, ‘Caravonica – The World’s Leading Cotton’, p. 3.

discarded in favour of annual cotton varieties similar to those grown in the United States.

After plans for the Caravonica cotton variety to be grown in a specially-created Tropical Territory had dissipated, and high cotton prices had waned following the conclusion of America's Civil War, interest in the growing of cotton was revived in Queensland through government intervention. In 1890, the Queensland government promised a bonus of £5,000 'to the first person or company who manufactured cotton goods to that value from fibre grown in the colony.'⁴³ The provision of that bonus resulted in the establishment of Queensland's first cotton mill, located at Ipswich.⁴⁴ As well as the erection of the mill, the government's promotion of cotton growing saw West Moreton farmers produce 265,677 pounds of cotton in 1893.⁴⁵ Competition from imported fabrics had, however, forced the mill's closure by 1897.⁴⁶

Australian Cotton Growing from Federation to the 1960s

Queensland remained at the centre of Australian cotton growing after it and the other colonies were federated in 1901. In the first half of the twentieth century, the production of cotton in Queensland was encouraged and sustained by state and federal economic incentives. The first Commonwealth bounty for cotton was introduced under the *Bounties Act 1907*. This initial bounty granted farmers ten per cent 'of the value of ginned cotton and cottonseed supplied for the manufacture of oil.'⁴⁷ The conditions of the bounty specified that it be calculated in terms of 'the market value of cotton 'grown

⁴³ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 2.

⁴⁴ Basinski, 'The Cotton Growing Industry in Australia', p. 207.

⁴⁵ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 2.

⁴⁶ Basinski, 'The Cotton Growing Industry in Australia', p. 207.

⁴⁷ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, Canberra: Australian Government Publishing Service, 1971, p. 1.

and ginned within the Commonwealth by white labour'.⁴⁸ Growers produced a total of 109,294 pounds of cotton in the federal bounty's first year, increasing to 186,894 pounds by 1911.⁴⁹ Cotton growing in Australia was stymied by the First World War, but the original Commonwealth cotton bounty remained in force until 1920.⁵⁰

In the absence of a federal cotton bounty from 1920 to 1923, the Queensland government, which had provided financial incentives for the growing of cotton in that state during 1890 and 1902, instituted its own form of assistance to cotton farmers.⁵¹ Unlike the Commonwealth bounty that had delivered a ten per cent bonus to cotton growers, the Queensland government's arrangements ensured farmers a guaranteed minimum price for the cotton they produced.⁵² An agreement had been reached between the British Cotton Growing Association and the Queensland government to guarantee a rate of one shilling and sixpence per pound 'for Queensland cotton lint of good quality landed at Liverpool' for a period of five years beginning in January 1920.⁵³ Queensland's cotton growers received a guaranteed advance from the Queensland government for seed cotton at a rate of five and a half pence per pound from 1920 until June 1923.⁵⁴

The Australian federal government resumed responsibility for a national cotton bounty from 1923, maintaining the Queensland government's system of a guaranteed

⁴⁸ Robert Longhurst, *Queensland Cotton: Past and Present*, Fortitude Valley: Queensland Cotton Holdings Limited, 1996, p. 28.

⁴⁹ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 2.

⁵⁰ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 2.

⁵¹ Basinski, 'The Cotton Growing Industry in Australia', p. 207; Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁵² Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁵³ Longhurst, *Queensland Cotton: Past and Present*, pp. 27-28.

⁵⁴ Longhurst, *Queensland Cotton: Past and Present*, p. 17.

minimum price.⁵⁵ In 1926, the Commonwealth government discarded the minimum price system, although a federal cotton bounty continued to be paid at fluctuating rates from that year.⁵⁶ This bounty had a crucial role in sustaining cotton production during the years of the Great Depression, which actually marked a period of expansion for the Australian cotton growing industry:

The measures taken in 1926 allowed the cotton industry to survive, and even to expand, in the following years. During the Depression, because of bounty payments, farmers' returns on cotton suffered less than those on other commodities, while unemployment largely eliminated the labour shortage. The peak harvested acreage (68,000) and peak production (17,400 bales) recorded to date were, in fact, achieved in 1933 and 1934.⁵⁷

After the relatively high levels of output achieved during the Great Depression, cotton production in Australia steadied, averaging between 8,000 and 10,000 bales each year until 1942.⁵⁸ Amendments to the *Cotton Bounty Act* in 1935 had allowed for 'compensatory bounties on cotton lint', but with the onset of World War II, the Australian federal government resorted to a guaranteed minimum price to encourage farmers to grow cotton.⁵⁹ The minimum price was established at a rate of 12½ pence per pound of cotton before being increased to 15 pence per pound.⁶⁰

Following the surge in cotton growing that occurred during the Depression, it was not until the restoration of the guaranteed minimum price that production of cotton

⁵⁵ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁵⁶ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁵⁷ Basinski, 'The Cotton Growing Industry in Australia', pp. 209.

⁵⁸ Basinski, 'The Cotton Growing Industry in Australia', p. 209.

⁵⁹ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. i; Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁶⁰ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

began to increase within Australia early in the Second World War.⁶¹ Paradoxically, because the federal government had waited until the outbreak of World War II to re-establish a minimum price for cotton, labour shortages caused by the war actually saw cotton growing decline, despite the existence of the bounty.⁶² The war-time focus on producing food crops rather than fibre compounded the decline of cotton growing in Australia.⁶³ Labour continued to be scarce in the war's aftermath and cotton production in Australia declined to little more than 500 bales in 1949.⁶⁴ The Commonwealth government responded to the waning of cotton growing in Australia by eliminating the guaranteed minimum price for cotton from that year.⁶⁵

The outbreak of the Korean War stimulated the demand for cotton, however, and the *Cotton Bounty Act 1951* reintroduced a guaranteed minimum price, fixed at a rate of 9½ pence per pound.⁶⁶ In the following year, the rate of payment was increased to 14 pence per pound.⁶⁷ Renewed in 1955 and 1958, the guaranteed minimum price for cotton was maintained at that level until the end of 1963.⁶⁸

Although the existence of the Commonwealth cotton bounty was designed to foster production of that crop, there was some debate about

...whether cotton should indeed be grown in Australia at all, on the grounds that encouragement of Cotton growing in Australia might prejudice the growth of our exports of wool and meat to Japan... Alternatively, the reduction of imports of raw cotton from the U.S.A. which would follow the successful establishment of a cotton growing industry in Australia, might prejudice our access to the U.S.

⁶¹ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. i.

⁶² Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. i.

⁶³ Pigram, *Cotton*, p. 3.

⁶⁴ Basinski, 'The Cotton Growing Industry in Australia', p. 209.

⁶⁵ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. ii.

⁶⁶ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 5.

⁶⁷ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁶⁸ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 5.

market for meat, or have a bearing on our continuing requests for abatement of the level of U.S.A. duties against our wool.⁶⁹

In spite of the concern about the potential impact of domestic cotton production upon Australia's other agricultural commodities and the nation's balance of trade, the Commonwealth cotton bounty remained in place. An irrigated cotton growing industry was developed in Australia during the 1960s, and in the latter half of that decade Australia began to export part of its cotton crop. The adverse political and economic consequences that had been predicted if Australia established a cotton growing industry failed to materialise.

The production of cotton in Australia before the 1960s was almost solely confined to Queensland, where the growing of the crop had mostly been a minor endeavour. Prior to the early 1960s, the average acreage per cotton grower in Queensland was a mere 20 acres, while less than ten per cent of farmers planted in excess of 50 acres of cotton.⁷⁰ Cotton was primarily grown in valleys along the Queensland coast.⁷¹ Those who grew the crop were commonly small dairy farmers who considered the production of cotton 'as a sideline enterprise or simply as a chance crop.'⁷²

Cotton growing in Queensland was characteristically small-scale until the 1960s; nevertheless, when it expanded briefly from the 1920s to the mid-1930s, Queensland cotton production 'tended to exceed cotton consumption by the Australian cotton spinning mills.'⁷³ As an amendment to the *Cotton Bounty Act* in 1935, a tariff on imported yarn was introduced by Australia's federal government to

⁶⁹ B.G. Dawson, 'The Past, Present, and Future of Cotton Growing in Australia', Paper presented at the Textile Institute Seminar, Canberra, 29 September 1965, p. 3.

⁷⁰ Basinski, 'The Cotton Growing Industry in Australia', pp. 216-217.

⁷¹ Pigram, *Cotton*, p. 31.

⁷² Basinski, 'The Cotton Growing Industry in Australia', p. 217.

⁷³ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 3.

offer a limited form of protection to the nation's cotton growers, and to compel cotton spinning mills within Australia to make use of the cotton grown domestically:

A marked expansion in Australian cotton spinning followed the inauguration of the new scheme, consumption rising to 23,000 bales within two years and to 40,000 bales in 1939. The onset of the war further stimulated cotton spinning, weaving and knitting and by 1948, mills at Brisbane, Sydney, Melbourne and Adelaide consumed annually a total of approximately 70,000 bales of raw cotton. Cotton production did not increase proportionately because of a sequence of very unfavourable seasons together with the low world price of cotton; the basic Liverpool "spot" price for cotton of the type produced in Queensland was under 5d per lb in April 1939. The bounty was renewed in 1940 but the non-competitive price of cotton caused a further decline in production.⁷⁴

Before the 1960s, cotton produced in Queensland was often treated as surplus to the requirements of Australian spinning mills because of its dubious quality, with many spinners instead favouring imported raw cotton that was of a superior grade.⁷⁵

The mediocrity of Australian cotton growing before the 1960s had been attributed to an absence of stabilisation for the cotton industry: 'The price of cotton fluctuated so much that farmers were not encouraged to plant cotton because they could not be reasonably sure of getting an adequate return.'⁷⁶ Although the price attained for cotton was certainly influential in the decision to plant the crop, the largely unexceptional results of cotton growing in Queensland during the first half of the twentieth century were the consequence of the cotton growing method that was employed in that state. Planted as a supplementary crop, the cotton produced in Queensland was traditionally 'rain-grown' or 'dryland', which meant that the only moisture received by the cotton crop came in the form of rainfall.⁷⁷ This method of

⁷⁴ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. 4.

⁷⁵ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁷⁶ Mr A.S. Hulme, Member for Petrie, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Session 1951, Vol. 215, 14 November 1951, p. 2034.

⁷⁷ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

dryland cotton production was hampered by the nature of the rainfall distribution in Queensland's cotton growing areas, which was described as 'erratic'.⁷⁸

Queensland's rain-grown cotton crops often experienced stress as a result of inconsistent access to moisture 'mainly in the summer months, when adequate water supply for actively fruiting cotton is particularly needed.'⁷⁹ The exposure of dryland cotton crops in Queensland to moisture stress culminated in yields that were almost uniformly low.⁸⁰ The yields of Queensland's rain-dependent cotton failed to increase over decades:

In the 1920s, yields in Australia were comparable to those in the U.S.A. and other leading cotton-producing countries. However, since then the U.S.A. yields have trebled and in other countries they have risen substantially, while in Australia they have shown little, if any, improvement until last season [1963]. Thus the competitive position of the domestic industry has been growing steadily worse.⁸¹

The low yields of cotton produced in Queensland before the 1960s were principally caused by inadequate rainfall; nevertheless, the problem of poor yields was compounded by the very basic manner in which the cotton was farmed. Until the 1960s, very few Queensland cotton growers applied any insecticides or fertilisers to their crops.⁸²

The importance of modernising cotton production in Queensland was emphasised in Australia's federal parliament in 1951. Irrigation, mechanical harvesters and large-scale production were viewed as essential to the success of an Australian

⁷⁸ Pigram, *Cotton*, p. 31.

⁷⁹ Basinski, 'The Cotton Growing Industry in Australia', p. 213.

⁸⁰ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

⁸¹ Basinski, 'The Cotton Growing Industry in Australia', p. 210.

⁸² Basinski, 'The Cotton Growing Industry in Australia', p. 216.

cotton growing industry.⁸³ The Queensland Cotton Marketing Board had, by 1951, purchased 12 mechanical cotton pickers to harvest cotton grown in that state.⁸⁴ The Queensland Department of Agriculture and Stock, too, was experimenting with mechanical harvesting, as well as the chemical defoliation of cotton plants, the growing of cotton under irrigation, and testing which cotton varieties were most successfully harvested by machine.⁸⁵ By 1964, however, Queensland cotton growers on average still only farmed 55 acres of cotton each, while 30 per cent of the state's cotton continued to be harvested by hand, not machine.⁸⁶ Despite the efforts of Queensland's Cotton Marketing Board and Department of Agriculture and Stock, the federal government began to look to Australia's other states to foster a national cotton growing industry in the late 1950s.

In 1959, Australia's federal government agreed to a request from the Western Australian state government to fund an irrigation scheme on the Ord River. The plan for the Ord River Irrigation Area was to involve the construction first of a diversion dam, and later the building of a main dam and the installation of equipment for the generation of hydro-electricity.⁸⁷ Experiments had indicated that the irrigation area would be suitable for the production of rice, cotton, safflower, sugar cane and linseed.⁸⁸

⁸³ See Mr E.J. Harrison, Vice-President of the Executive Council and Minister for Defence Production, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 214, Session 1951, First Session of the Twentieth Parliament, 31 October 1951, p. 1359; Mr J. Francis, Minister for the Army, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 215, Session 1951, First Session of the Twentieth Parliament, 14 November 1951, p. 2024.

⁸⁴ See Mr H.G. Pearce, Member for Capricornia, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 215, Session 1951, First Session of the Twentieth Parliament, 14 November 1951, p. 2028.

⁸⁵ See Mr E.J. Harrison, Vice-President of the Executive Council and Minister for Defence Production, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 214, Session 1951, First Session of the Twentieth Parliament, 31 October 1951, p. 1359.

⁸⁶ Basinski, 'The Cotton Growing Industry in Australia', p. 217.

⁸⁷ *Ord River Irrigation Area Review: 1978: A Joint Commonwealth and Western Australian Review*, Canberra: Australian Government Publishing Service, 1979, p. 21.

⁸⁸ Department of National Resources, *Ord Irrigation Project, Western Australia: An outline of its History, Resources and Progress*, Canberra: Australian Government Publishing Service, 1976, p. 7.

When the Ord River Irrigation Area was being planned, sugar cane was apparently preferred among these crops because it had produced such a high yield.⁸⁹ Further investigation revealed, however, that the production of sugar cane on the Ord River would have contributed to an increase in low-priced sugar exports – economically undermining the existing sugar industry in Queensland – and plans for the Ord to produce sugar cane were abandoned.⁹⁰ Aided by the Commonwealth bounty, it was cotton that became the dominant crop in the Ord River Irrigation Area from 1963.⁹¹

Before irrigated cotton growing was established in the Namoi Valley in north-western New South Wales, some farmers had already embarked upon the production of cotton in the southern portion of the state. In 1959, the growing of cotton had begun commercially within the Murrumbidgee Irrigation Area in southern New South Wales.⁹² A government-sponsored and constructed irrigation scheme, the Murrumbidgee Irrigation Area was known for its production of rice.⁹³ With fewer than fifteen cotton growers who accounted for a mere two per cent of Australia's total cotton production in 1967, the Murrumbidgee Irrigation Area was not a major cotton growing locality.⁹⁴ It was not in the Murrumbidgee Irrigation Area, in Queensland or at Western Australia's

⁸⁹ B.R. Davidson, 'Economic Aspects of the Ord River Project' in B.R. Davidson and Susan Graham-Taylor, *Lessons from the Ord*, St Leonards: Centre for Independent Studies, CIS Policy Monographs 2, August 1982, p. 5.

⁹⁰ Davidson, 'Economic Aspects of the Ord River Project', pp. 6-7.

⁹¹ Information Branch, Western Australian Department of Agriculture, *Ord River Irrigation Area, Kununurra, Western Australia*, 2nd edition, produced by the Department of Agriculture and the Water Authority of Western Australia, the Tourism Commission of Western Australia and the Department of Regional Development and the North West, Miscellaneous Publication No. 1/87, 1987, p. 5; Department of National Resources, *Ord Irrigation Project, Western Australia: An outline of its History, Resources and Progress*, p. 47.

⁹² D.R. Gallagher and W.F. Musgrave, *Location and the Australian Cotton Industry*, Armidale: Faculty of Agricultural Economics, University of New England, March 1966, p. 8.

⁹³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 5.

⁹⁴ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 5, 9 and 10.

Ord River, but in the Namoi Valley during the early 1960s that large-scale irrigated and highly-mechanised cotton production would be first achieved within Australia.

Cotton Growing in the Namoi Valley

It has been suggested that the establishment of an irrigated cotton industry in the Namoi Valley was ‘Cinderella-like’, and that it was essentially the result of the odyssey of two ‘pioneers’ from California’s San Joachin Valley who decided to grow cotton in the Namoi Valley.⁹⁵ Such a view is too simplistic. The founding of a cotton growing industry in the Namoi Valley was the culmination of a myriad of factors – political, geographic and economic. The forging by Californian migrants of an irrigated cotton growing industry within the Namoi Valley represented the convergence of New South Wales and Commonwealth government policies to foster cotton growing in Australia, as well as less favourable conditions in California that spurred a small number of farmers to migrate from that state.

The north-western region of New South Wales, within which lies the Namoi Valley, was considered during the 1920s to be advantageous for the production of cotton.⁹⁶ The Secretary to the 1922 British Cotton Delegation to Australia, Richard Harding argued that the crop’s growth could be sustained by the relatively high rainfall received by the region in the summer months.⁹⁷ Harding examined the district’s meteorological records and contrasted them favourably with that of Texas, where cotton growing had long been successful.⁹⁸ A small cotton crop had first been grown in the Namoi Valley during the 1920s. Mr J.J. Treloar grew cotton on ten hectares near Wee

⁹⁵ Ken Heydon, *The Cotton Story: A Pictorial History of Cotton in the Namoi Valley*, Narrabri: Courier Productions, 1980, p. 3.

⁹⁶ Richard Harding, *Cotton in Australia: the possibilities and the limitations of Australia as a cotton-growing country*, London: Longmans Green, 1924, pp. 79-84.

⁹⁷ Harding, *Cotton in Australia: the possibilities and the limitations*, pp. 82-84.

⁹⁸ Harding, *Cotton in Australia: the possibilities and the limitations*, pp. 79-84.

Waa in 1922, which produced nine bales of fibre.⁹⁹ The crop was produced without irrigation, and rainfall provided its only moisture. Cotton was again cultivated by Treloar in the following year, but the crop incurred damage from insect pests.¹⁰⁰

Although the growing of cotton had been relatively successful in the Namoi Valley during the 1920s, cotton production did not resume within the district until the late 1950s.¹⁰¹ Despite Harding's positive assessment of the north-western region's potential for cotton growing, almost four decades past before cotton production was established there on a substantial scale.

David L. Cohn argued in *The Life and Times of King Cotton* that:

Cotton is a frontier crop restlessly seeking new horizons, and new soil and climate that are favourable to it. It made the long march from Virginia to Texas before the Civil War. Recently it has moved on, ever westward, across the mountains to New Mexico, Arizona, and California where frontiers have been opened to it in semi-arid lands. There men cause the onetime desert to blow white with cotton as they sink deep wells and pump water through a dry land.¹⁰²

The development of cotton growing in Australia has not always conformed to Cohn's notion of cotton conquering new unsettled or marginal lands. Cotton may be interpreted as a frontier crop in colonial Queensland, where the growing of cotton was attempted in areas that could be inhospitable and had not previously been farmed. Cotton, however, cannot be seen as a frontier crop in the Namoi Valley. When a small number of farmers from California's San Joachin Valley migrated to the Namoi district, they purchased properties from local farmers that had predominantly been used for the grazing of sheep and cattle. The Namoi Valley in the 1960s was not a new frontier and the land it encompassed could not be considered marginal. The Namoi Valley was carefully selected as a location for cotton growing during the 1960s because of its potential for

⁹⁹ Heydon, *The Cotton Story*, p. 9.

¹⁰⁰ '25 acres at first', *The North Western Courier Special Edition: A Decade of Cotton*, June 1973, p. 23.

¹⁰¹ Heydon, *The Cotton Story*, p. 9. For details of other early cotton growing efforts in the Namoi district, see 'How cotton came to the North West', *The North Western Courier*, 29 April 1963, p. 6.

¹⁰² Cohn, *The Life and Times of King Cotton*, p. 171.

replicating the Californian mode of cotton production. Fundamental to the selection of the Namoi Valley as a cotton growing area was that which had transformed Californian agriculture: the availability of water for irrigation. Within the Namoi region, it was the Keepit Dam that provided this essential water supply.

The potential for irrigation in the Namoi Valley had first been noted during the nineteenth century.¹⁰³ Initial assessments of the prospects for irrigation in the region, however, were not entirely favourable. The occurrence of natural rainfall and the availability of an artesian water supply led an expert in irrigation from India to argue against the establishment of an irrigation system within the Namoi Valley in 1897.¹⁰⁴ The recurrence of drought in the early decades of the twentieth century revived interest in irrigation for the Namoi district. Investigative drilling was undertaken near Boggabri in 1911, but the site's foundations were found to be ill-suited to the construction of a dam.¹⁰⁵ Surveying was carried out at a location upstream of Manilla in 1916, but in 1923 a gauging station was built at the site that would subsequently be developed into the Keepit Dam.¹⁰⁶

Situated above the confluence of the Namoi and Peel Rivers, the dam was funded by the New South Wales state government and designed by the Water Conservation and Irrigation Commission.¹⁰⁷ Surveying began in 1936 and official

¹⁰³ John J. Pigram, *Australia's Water Resources: From Use to Management*, Collingwood: CSIRO Publishing, 2006, p. 134.

¹⁰⁴ C.H. Munro and D.T. Howell, 'History of the Dam and Irrigation in the Namoi Valley', in International Engineering Service Consortium, *An Economic Study of Keepit Dam, Northern New South Wales, Australia*, Sydney: Water Conservation and Irrigation Commission of New South Wales, December 1969, p. 53.

¹⁰⁵ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 53.

¹⁰⁶ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 53.

¹⁰⁷ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 55; John Eagles, 'Rockfill dams with earth cores', in Bruce Cole (ed) *Dam Technology in Australia, 1850-1999*, Penrith: Australian National Committee on Large Dams Inc., 2000, Table 8.2, p. 152.

approval for the construction of the storage was granted in 1937.¹⁰⁸ The building of the Keepit Dam was initiated from 1940.¹⁰⁹ The Keepit Dam project was halted soon after it had begun by the intervention of the Second World War.¹¹⁰ During the course of World War II, operations on the Keepit Dam site were suspended and the preparatory elements of the reservoir that had been erected apparently disintegrated.¹¹¹ While the Second World War continued, the abandonment of work on the Keepit Dam had been justified by the New South Wales government's 'win-the-war-first policy.'¹¹² The election of a new Labor government in New South Wales in 1941 had an important impact on the Keepit Dam project.

Led by Premier William McKell, the New South Wales government committed £30 million to an expansive post-war conservation plan which not only included the completion of the Keepit Dam, but also provided for the construction of the Glenbawn, Blowering and Burrendong dams, among other projects.¹¹³ Created under Roosevelt's New Deal, the Tennessee Valley Authority's programmes for dam construction, reforestation and soil conservation had provided inspiration for Premier McKell.¹¹⁴ He established a Ministry of Conservation that incorporated soil, water and forests, and the erection of the Keepit Dam was a component of McKell's efforts to conserve the state's water supplies.¹¹⁵ William McKell played a crucial personal role in the Keepit Dam's

¹⁰⁸ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 53; Kevin Jeffcoat, *Major Rural Dams in New South Wales*, Parramatta: Department of Land and Water Conservation, 1996, p. 40.

¹⁰⁹ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 53.

¹¹⁰ 'The Early Days: Keepit's History', Brochure produced by the Lake Keepit State Park, Oxley Highway, Tamworth, undated, no page numbers.

¹¹¹ 'The Early Days: Keepit's History'.

¹¹² Jack Hallam, *The Untold Story: Labor in Rural NSW*, Sydney: George Allen and Unwin, 1983, p. 46.

¹¹³ Hallam, *The Untold Story: Labor in Rural NSW*, p. 59.

¹¹⁴ Hallam, *The Untold Story: Labor in Rural NSW*, pp. 52-53.

¹¹⁵ Hallam, *The Untold Story: Labor in Rural NSW*, p. 47.

construction when he visited the site as Premier in 1945 and discerned a siltation problem. McKell recalled:

The hills were bare as a board. The rain ran off them, as from a galvanised iron roof. The rich, flat land was being cut into huge gullies. Enormous quantities of soil were being washed straight into Keepit Dam before it was even finished. I immediately gave the order to stop all work in the dam, to spend money to resume the catchment land and to restore it. If we hadn't done that in the 1940s the dam would have been silted up like so many US dams and there certainly wouldn't have been that cotton development in the north-west.¹¹⁶

Once the catchment land was rectified, the building of the storage dam had resumed by 1946, albeit 'at a relatively slow rate with day labour.'¹¹⁷ Work intensified at the site during the 1950s, particularly in the latter half of that decade, and the Keepit Dam was completed in 1960.¹¹⁸

The Keepit Dam would eventually become a reservoir for the provision of 'water for homes, for stock, and for extensive cotton crops grown by irrigation.'¹¹⁹ The 'highest earth core dam built with dumped rockfill' in Australia, the Keepit Dam had never been intended to foster an irrigated cotton growing industry in the Namoi Valley.¹²⁰ A Depression-era project designed to create employment, the construction of the Keepit Dam was more specifically impelled by the belief in the 1930s that artesian water reserves were dwindling.¹²¹ In the late 1920s, users of artesian water in the Namoi Valley had begun to report that their artesian supplies were in decline.¹²² The

¹¹⁶ William McKell, quoted in Hallam, *The Untold Story: Labor in Rural NSW*, p. 60.

¹¹⁷ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 53.

¹¹⁸ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 53; Jeffcoat, *Major Rural Dams in New South Wales*, p. 40.

¹¹⁹ Eve Pownall, *The Thirsty Land: Harnessing Australia's water resources*, London: Methuan & Co Ltd, 1967, p. 73.

¹²⁰ Eagles, 'Rockfill dams with earth cores', p. 151; Gallagher and Musgrave, *Location and the Australian Cotton Industry*, p. 13.

¹²¹ Pamela Joy Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', Ph.D. thesis, Geography, University of California, Berkeley, 1977, p. 112.

¹²² Jeffcoat, *Major Rural Dams in New South Wales*, p. 40.

development of the Keepit Dam was supposed to supplement these underground water sources in providing water for stock and domestic use, not irrigated cotton.¹²³ From 1945, however, the New South Wales Water Conservation and Irrigation Commission had introduced a strategy:

...for the extensive reconditioning of bores, including the construction of more bores using advanced techniques, improving methods of distribution, and control of wasteful flows from these bores.¹²⁴

By 1950, this strategy was so successful that the Keepit Dam appeared to be almost redundant before it had even been completed.¹²⁵ Despite the estimated \$53.8 million cost of construction and hydroelectric equipment, it seemed that the New South Wales government had funded the erection of a storage dam in the north-west of the state that may not be utilised.¹²⁶ At the beginning of the 1960s, the Keepit Dam stood completed but 'grossly underused', and the project was lampooned as a 'white elephant'.¹²⁷ As a source of increasing embarrassment for the New South Wales government in this period, the Keepit Dam urgently required a purpose.

With the Keepit Dam now completed, the New South Wales government began to appraise the prospects for the establishment in the Namoi Valley of a government-funded irrigation scheme similar to that of the Murrumbidgee Irrigation Area or the Ord River Irrigation Area. In May 1960, the Deputy Chairman of the New South Wales

¹²³ Siobhan McHugh, *Cottoning On: Stories of Australian cotton-growing*, Sydney: Hale and Iremonger, 1996, p. 2; Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 53.

¹²⁴ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 54.

¹²⁵ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 54.

¹²⁶ 'The total recorded capital cost of the dam including hydroelectric plant compounded over the 22 years construction period at 5% per annum amounted to \$53.8 millions. Because of the abnormally long construction period, a "rationalised cost" of Keepit Dam was calculated, assuming it was built in 3 years beginning in 1958-59. This cost, again compounded at 5% per annum, amounted to \$24.7 millions.' See International Engineering Service Consortium, *An Economic Study of Keepit Dam, Northern New South Wales, Australia*, Sydney: Water Conservation and Irrigation Commission of New South Wales, December 1969, p. x.

¹²⁷ McHugh, *Cottoning On*, p. 11; J.J.J. Pigram, *The Development and Potential of the Namoi Valley Cotton Industry*, Armidale: University of New England Research Series in Applied Geography, No. 17, 1968, p. 7.

Water Conservation and Irrigation Commission, R.A. Young, had announced that a government-sponsored irrigation scheme was indeed under consideration for the Namoi Valley. The New South Wales government was apparently contemplating the acquisition of 80,000 acres near Narrabri for the project.¹²⁸

While the state government ruminated on the benefits or otherwise of an official irrigation area in the Namoi district, measures were undertaken at the local level to ensure that the water supply from the Keepit Dam would be utilised. Myles MacRae, a Water Rights Officer working in the Namoi Valley for the New South Wales Water Conservation and Irrigation Commission, recalled:

So about 1962 we started doorknocking the people who lived along the river and said, 'Hey, why don't you take out a licence? . . . They're pretty cheap and renewable every five years, there's only one payment up-front and no more expenses for five years and you've got free and uninterrupted access to all that beaut water!'¹²⁹

Despite the efforts Myles MacRae and the Water Conservation and Irrigation Commission, it was not until later in that decade that the demand rose exponentially for water licences to access the Keepit Dam's supply.¹³⁰ As the state government continued to seek a purpose for the water from the Keepit Dam, the Water Conservation and Irrigation Commission announced as a contingency scheme in January 1963 a plan for an irrigation area funded by the New South Wales government.¹³¹ The proposed irrigation project was to have been located downstream of Narrabri, with the purchase of land and construction of irrigation works expected to cost an estimated \$4.5 million.¹³²

¹²⁸ 'Here's What Happened in '60', *The North Western Courier*, 5 January 1961, p. 2.

¹²⁹ Myles MacRae quoted in McHugh, *Cottoning On*, p. 14.

¹³⁰ Pigram, *Australia's Water Resources: From Use to Management*, p. 134.

¹³¹ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 55.

¹³² Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 55.

The state government plan for a community irrigation scheme near Narrabri was only officially abandoned after the dramatic increase in the usage of the Keepit Dam water supply in 1964 that followed the arrival of American cotton farmers in the Namoi Valley.¹³³ The principal purpose of the Keepit Dam ‘became the regulation of flow in the Namoi River for private diversion for irrigation downstream and the generation of a small amount of hydro-electric power.’¹³⁴ Within the Murray-Darling Basin, which encompasses the Namoi Valley, the funding, construction and operation of irrigation works, as well as the distribution of water from these storages, were usually undertaken by state governments.¹³⁵ In the Murrumbidgee Irrigation Area in New South Wales, for example, irrigation water was delivered through channels right up to the boundary of properties that lay within the government scheme.¹³⁶ Nevertheless, as Warren Musgrave explained:

There have been important exceptions to this pattern of development, however, particularly in a number of valleys in northern NSW and southern Queensland where the state, while constructing storages, has not established a distribution system. Instead it has relied on the river system to distribute water to irrigators, all of whom are river pumpers, though not necessarily riparian.¹³⁷

The Namoi Valley was one example of this atypical irrigation development within the Murray-Darling Basin. Although the New South Wales state government had funded the establishment of the Keepit Dam, the distribution of irrigation water from the storage was conducted by the release of water from the dam into the Namoi River, where it flowed downstream to be extracted by farmers’ pumps. While the Namoi

¹³³ Munro and Howell, ‘History of the Dam and Irrigation in the Namoi Valley’, p. 56.

¹³⁴ Pigram, *Australia’s Water Resources: From Use to Management*, p. 134.

¹³⁵ Warren Musgrave, ‘The Irrigation Industry in the Murray-Darling Basin and Aspects of its Reform’, in John J. Pigram (ed), *Security and Sustainability in a Mature Water Economy: A Global Perspective*, Armidale: Centre for Water Policy Research, University of New England, November 1996, p. 45.

¹³⁶ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, pp. 5-6.

¹³⁷ Musgrave, ‘The Irrigation Industry in the Murray-Darling Basin and Aspects of its Reform’, p. 45.

Valley and areas in southern Queensland were unusual in their establishment of irrigated agriculture despite the absence of a government-sponsored scheme, the Namoi Valley was unique in that irrigation, and eventually a substantial irrigated cotton growing industry, was developed ultimately by private American capital.

When the New South Wales Water Conservation and Irrigation Commission had recommended in 1963 the establishment of a government-sponsored irrigation scheme in the Namoi Valley, this recommendation was subject to the proviso that the Commonwealth cotton bounty was maintained without significant variation.¹³⁸ It seems that cotton may have been grown in the Namoi Valley regardless of whether the distribution of irrigation water from the Keepit Dam was funded by the state government or private sources.

The potential for the Namoi region to successfully produce cotton had been established by the beginning of the 1960s. Located at Myall Vale, between the towns of Wee Waa and Narrabri, the New South Wales Department of Agriculture had founded the Narrabri Agricultural Research Station in 1958.¹³⁹ Also known as the Myall Vale 'experiment farm', the Research Station had been assigned the task of assessing the suitability of crops that could be grown using irrigation water from the Keepit Dam.¹⁴⁰

Experiments at the Agricultural Research Station were intended to gauge 'the general agronomics, economics and water requirements of various crops' which may have been suitable for cultivation in the Namoi Valley.¹⁴¹ Grain crops, fodder

¹³⁸ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 55.

¹³⁹ J.F. McL. Dunnet, 'The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972: An Assessment of Economic, Social and Technological Change resulting from the Development of the Irrigation Industry in the Namoi Valley, Northwest N.S.W. between 1962 and 1972', B. Litt. thesis, Arts, University of New England, Armidale, October 1972, p. 12.

¹⁴⁰ Heydon, *The Cotton Story*, p. 9; 'History of Cotton Growing in Australia: Wee Waa and the Namoi Valley', *The Australian Cotton Grower*, Vol. 2, No. 4, October 1981, p. 4.

¹⁴¹ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 54.

sorghums, and pasture crops were trialled from 1958, as was cotton.¹⁴² In 1959, the Research Station trialled 136 different varieties of cotton alone.¹⁴³ While the results of the Research Station's experiments with irrigated sorghum were described as 'outstanding', irrigated cotton was found to have the greatest potential in terms of profitability.¹⁴⁴ Cotton was initially chosen as the major crop to undergo experimentation as it was considered to be 'a high value cash crop'.¹⁴⁵ The positive results of the trials of irrigated cotton saw the New South Wales Department of Agriculture invest more than £200,000 in the Research Station, with £60,000 of this amount being allocated for the purchase of machinery.¹⁴⁶ In spite of these government funds, the Narrabri Agricultural Research Station maintained only a small number of staff. Among the Research Station's employees was Nick Derera, appointed in 1959, who had been the Director of the Hungarian Cotton Research Institute for the three years from 1949.¹⁴⁷ Derera's determination to publish widely the favourable results of the Research Station's cotton growing experiments would prove significant in the eventual establishment of the cotton industry in the Namoi Valley.¹⁴⁸

At the same time as Narrabri's Agricultural Research Station was experimenting with cotton growing under irrigation in the Namoi Valley in 1958, the Australian federal government renewed the Commonwealth Cotton Bounty, guaranteeing that the

¹⁴² Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 54.

¹⁴³ McHugh, *Cottoning On*, p. 4.

¹⁴⁴ Munro and Howell, 'History of the Dam and Irrigation in the Namoi Valley', p. 54; Heydon, *The Cotton Story*, p. 9.

¹⁴⁵ F. Cutting, Farm Manager, and R. Schulze, Agronomist, Narrabri Experimental Farm, 'Departmental trials pointer to a New Industry', *The North Western Courier Special Feature: The Cotton Story*, 21 May 1964, p. 1.

¹⁴⁶ Mr A.G. Enticknap, Minister for Agriculture and Minister for Conservation, *New South Wales Parliamentary Debates*, Volume 51, 19 March 1964 to 3 June 1964, p. 8285.

¹⁴⁷ Correspondence, N.F. Derera to Paul D. Kahl, 30 November 1960, in Derera, Nicholas F. Papers, Mitchell Library, ML MSS 1495, 9-22B, 1v., p. 25; McHugh, *Cottoning On*, pp. 1-2.

¹⁴⁸ McHugh, *Cottoning On*, p. 5.

bounty would remain in place for an additional five years. As J.J. Basinski argued in 1965:

The history of cotton production in Australia is marked by several periods of upsurge promoted by economic factors and administrative measures, followed by periods of decline when the stimuli have disappeared or proved inadequate.¹⁴⁹

The American Civil War, for example, had, in its effect of increasing world cotton prices, provided a short-lived economic stimulus for Australian farmers to produce cotton during the 1860s and early 1870s.¹⁵⁰ At once both an administrative and economic measure, the Commonwealth Cotton Bounty endured far longer as an incentive to Australian cotton farmers.

When the outbreak of the Korean War had caused cotton prices to soar and reinvigorated cotton growing within Australia, a Commonwealth Cotton Bounty guaranteeing 9½ pence per pound of seed cotton was instituted in 1951.¹⁵¹ The decision by Australia's federal government to reintroduce a bounty for cotton was governed by the conviction that 'cotton growing on a large scale in Australia is desirable for the diversification of the economy and of Australia's full industrial development.'¹⁵² The re-establishment of the cotton bounty in 1951 was not only intended to foster a successful cotton growing industry, but also to bolster the domestic cotton spinning industry.¹⁵³ One of the major goals of the 1951 federal cotton bounty was for Australian-grown cotton to displace the imported cotton that was being used in

¹⁴⁹ Basinski, 'The Cotton Growing Industry in Australia', p. 206.

¹⁵⁰ Pigram, *Cotton*, p. 3.

¹⁵¹ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. ii; Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

¹⁵² Mr E.J. Harrison, Vice-President of the Executive Council and Minister for Defence Production, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 214, Session 1951, First Session of the Twentieth Parliament, 31 October 1951, p. 1359.

¹⁵³ See Mr E.J. Harrison, Vice-President of the Executive Council and Minister for Defence Production, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 214, Session 1951, First Session of the Twentieth Parliament, 31 October 1951, p. 1361.

Australia's spinning mills.¹⁵⁴ In 1950, for example, less than one per cent of the cotton used in spinning mills in Australia had been grown domestically, with the majority of the raw cotton being imported from the United States and Mexico.¹⁵⁵

Along with the prospects for import substitution and the advancement of another Australian agricultural industry, the context of the Korean War was crucial to the founding of the 1951 Commonwealth Cotton Bounty. In debating the re-introduction of the bounty in November 1951, the federal Minister for the Army, Mr J. Francis, argued that cotton was essential to the defence of Australia: 'It is required to clothe our troops, and it is a vital necessity in the manufacture of munitions.'¹⁵⁶ The federal Opposition concurred with the Minister for the Army, asserting that the act of growing cotton in northern Australia would further protect the nation by increasing the density of the population in that region.¹⁵⁷

Established at a rate of 9½ pence per pound of seed cotton in 1951, the Commonwealth Cotton Bounty increased substantially to 14 pence per pound in October 1952.¹⁵⁸ The Australian federal government maintained the cotton bounty at the latter rate from 1952 to 1958, when the bounty was instituted for a further five years at the same price.¹⁵⁹ While the 1958 revision of the bounty had provided an incentive

¹⁵⁴ Mr E.J. Harrison, Vice-President of the Executive Council and Minister for Defence Production, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 214, Session 1951, First Session of the Twentieth Parliament, 31 October 1951, p. 1361.

¹⁵⁵ Basinski, 'The Cotton Growing Industry in Australia', p. 219.

¹⁵⁶ Mr J. Francis, Minister for the Army, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 215, Session 1951, First Session of the Twentieth Parliament, 14 November 1951, p. 2024.

¹⁵⁷ See Mr W.J.F. Riordan, Member for Kennedy, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 215, Session 1951, First Session of the Twentieth Parliament, 14 November 1951, p. 2030.

¹⁵⁸ Bureau of Agricultural Economics, *Cotton Growing in Australia: An Economic Survey*, p. ii.

¹⁵⁹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1; Basinski, 'The Cotton Growing Industry in Australia', p. 209.

for Australian farmers to grow cotton, the changes to the bounty also attracted interest from some cotton farmers in the United States.

American Involvement in Cotton Production in the Namoi Valley

An estimated 140 Americans had become involved in cotton production in Australia by 1972, with 35 growing the crop and others engaged in cotton-related services.¹⁶⁰

During the 1963/1964 cotton season, a total of eight Americans were growing cotton in Australia. Of these eight, six were based in the Namoi Valley/Bourke district, one was at the Murrumbidgee Irrigation Area, and the remaining grower was located in southern Queensland. The Namoi Valley/Bourke area continued to be favoured by American migrants in 1967/1968, as 27 of the 40 Americans engaged in cotton growing in Australia were based in the region. A sole American produced cotton in the Murrumbidgee Irrigation Area in the same period, while two were situated in southern Queensland, and a further eight Americans had been attracted to the remote Ord River scheme. By 1971/1972, the Ord retained six American growers, while 19 American farmers were resident in the Namoi Valley/Bourke district, southern Queensland's population of American growers had increased to nine, and a single American grower was recorded in the Murrumbidgee Irrigation Area.¹⁶¹

A small number of the Americans who migrated to grow cotton in Australia had their origins in Texas, North Carolina and Oklahoma, but the majority of the migrants were drawn from 'the well-established cotton areas of California and Arizona.'¹⁶²

Moreover:

...all but a minority of the American interests entering cotton production in Australia were not only from cotton growing communities in California and

¹⁶⁰ Pamela J. Merrill and John J. Pigram, 'American Involvement in the Australian Cotton Growing Industry, 1962-72', *The Australian Geographer*, Vol. 16, 1984, p. 128 and Table 1, p. 129.

¹⁶¹ All of these figures are drawn from Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', Figure 4, p. 51.

¹⁶² Merrill and Pigram, 'American Involvement in the Australian Cotton Growing Industry, 1962-72', p. 128 and Table 1, p. 128.

Arizona, but had generally been directly involved as farm labourers or service personnel, if not actually growers in the activity.¹⁶³

Pamela J. Merrill and John J. Pigram have demonstrated that American involvement in the Australian cotton industry occurred through a series of chain migrations, which comprised friends and family members.¹⁶⁴ As Merrill argued in her doctoral thesis, this ‘friends and relatives effect’ was evident at the Ord River Irrigation Area. By 1966, nine of the Ord’s 33 pilot farms had been allotted to Americans, all of whom were from Arizona and had migrated to the Ord with family members, friends or associates.¹⁶⁵ This type of chain migration was also apparent in the relocation of Americans to the Namoi Valley.¹⁶⁶

The migration of Californian farmers to north-western New South Wales was led by Paul Kahl and Frank Hadley, farmers from Merced in the San Joachin Valley.

Frank Hadley described his farming activities in California:

We had grown a variety of crops in the States – peaches were the main crop my brother and I grew although we had bigger acreages of cotton and wheat. But we came to Australia specifically to grow cotton.¹⁶⁷

Frank Hadley had developed an interest in producing cotton in Australia in conjunction with his Merced neighbour, Paul Kahl. Like Frank Hadley, Paul Kahl’s Californian farming enterprise was quite diverse, with sugar beets and corn being produced along with cotton.¹⁶⁸ In California, Paul Kahl had been involved with the United States Farm

¹⁶³ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 68.

¹⁶⁴ Merrill and Pigram, ‘American Involvement in the Australian Cotton Growing Industry, 1962-72’, p. 128 and Table 1, p. 128.

¹⁶⁵ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 59.

¹⁶⁶ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 56.

¹⁶⁷ ‘The pioneering Hadleys’, in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992: Foundations for the Future*, Narrabri: North Western Courier Group, 1992, p. 32.

¹⁶⁸ Paul Kahl, ‘Reflections at Sea...’ in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992: Foundations for the Future*, Narrabri: North Western Courier Group, 1992, p. 25.

Bureau, was prominent among the members of Merced's Presbyterian Church, and had owned a failing Case tractor dealership in Merced from 1953 to 1955.¹⁶⁹ While farming at Merced on the eastern side of the San Joachin Valley, Paul Kahl had helped to establish a co-operative:

In 1950 I was active in the formation of a cotton cooperative and the building of a cotton gin at Minturn, a rail siding in our district. I was on the board of directors. My cousin Marvin was one of the key promoters of it. Most of the members sold their cotton through Cal-Cot, a cooperative marketing organization in Bakersfield. I became chairman of Minturn in 1955. At that time we joined Ranchers Cotton Oil based in Fresno, a cooperative oil crushing plant. I was on its Board for six years as Minturn's representative. The men at the head of Ranchers and Cal-Cot knew their business and knew how to operate cooperatives. I got a good schooling and learned a lot of lessons, all of which became very valuable in the 1960s and later.¹⁷⁰

At the same time as Paul Kahl was the chairman of this Californian co-operative, his neighbour, Frank Hadley, was also involved with the organisation. Hadley participated in the formation of the co-operative and for ten years he worked as its treasurer and secretary.¹⁷¹ Despite their prominent roles within the Californian co-operative, Frank Hadley and Paul Kahl decided to relocate their families to the Namoi Valley during the early 1960s. Once established as irrigated cotton producers in the Namoi Valley, the Merced pair would replicate their experience with Minturn, founding a cotton growers' co-operative that eventually constructed a number of cotton gins in the Namoi district and beyond.¹⁷²

¹⁶⁹ Kahl, *Cotton Pickin' Pioneer*, pp. 77-84.

¹⁷⁰ Kahl, *Cotton Pickin' Pioneer*, p. 82.

¹⁷¹ 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 33.

¹⁷² See 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992: Foundations for the Future*, Narrabri: North Western Courier Group, 1992, pp. 12-14.

The initial involvement of Paul Kahl and Frank Hadley in cotton growing within the Namoi Valley has been ascribed erroneously to ‘a series of coincidences’.¹⁷³ Helen Wheatley has suggested that Paul Kahl, after discussing with a ‘colleague’ during a ‘western cotton conference’ the cotton grown at the Narrabri Agricultural Research Station, as well as reading a report on the subject, decided to visit the Namoi region as he was seeking ‘adventure’.¹⁷⁴ Wheatley does not cite the name of the colleague or the conference, nor does she indicate from where this information was obtained. Wheatley’s emphasis on Paul Kahl’s adventurousness overlooks his careful evaluation, with Frank Hadley, of the potential for Australian cotton production prior to their journey to Australia in March 1961.¹⁷⁵ The decision by the two farmers to begin cotton production in the Namoi region was in fact calculated and thoroughly researched.

The interest of the Merced pair in growing cotton within Australia was first prompted by the accessibility of the Australian federal government’s cotton bounty. Paul Kahl had considered farming endeavours in the southern American state of Mississippi, and the prospects of migrating to Brazil or Mexico when he learned that Australia was attempting to strengthen and expand its cotton growing industry through the provision of this cotton subsidy.¹⁷⁶ Frank Hadley and Paul Kahl had been alerted to the 1958 amendment of the Australian cotton bounty through summary reviews in

¹⁷³ See ‘Think Kahl, think cotton: Kahl and Hadley cotton pioneers’, *The North Western Courier Special Edition: A Decade of Cotton*, June 1973, p. 14.

¹⁷⁴ Helen Wheatley, ‘Power farming: A comparative study of modern cotton production in the United States and Australia’, Ph.D. thesis, The Johns Hopkins University, Baltimore, Maryland, 1993, p. 75.

¹⁷⁵ In his autobiography, Paul Kahl states that he and Frank Hadley came to Australia in April 1961. Local newspaper articles indicate, however, that their journey occurred in mid-March 1961. See Paul Kahl, *Cotton Pickin’ Pioneer*, Taren Point: Cliff Lewis Printing, 2006, p. 87; ‘Arrived Today: U.S. Growers to Survey Cotton Potential in Narrabri District’, *The North Western Courier*, 16 March 1961, p. 1; ‘District Potential Impresses U.S. Cotton Growers’, *The North Western Courier*, 20 March 1961, p. 1.

¹⁷⁶ Kahl, *Cotton Pickin’ Pioneer*, p. 86.

Foreign Agriculture, a publication of the United States Department of Agriculture.¹⁷⁷

The decision by Australia's federal government to extend the cotton bounty at a fixed rate for five years was intended to serve as an inducement for the nation's farmers to undertake the growing of cotton. As cotton production expanded within Australia, the country's importation of the fibre would consequently be reduced.

At the end of the 1950s, however, many Australian farmers were entirely inexperienced in the cultivation of cotton. Those farmers who were growing cotton in that period, primarily in Queensland, produced small low-yielding crops which were regarded as poor in quality.¹⁷⁸ Payments under the 1958 cotton bounty did not reward farmers' efforts to grow cotton by paying them on the basis of the number of acres sown with cottonseed. The terms of the cotton bounty declared that growers' bounty payments would be determined by the weight of the harvested 'seed cotton', which is cotton that has not yet had the seeds extracted from the fibre through the ginning process. This stipulation meant that bounty payments were contingent upon the success, or yield, of the cotton crop. The yield of a cotton crop is indicated by how much fibre the crop delivers, and is often measured by the number of bales of cotton that are produced per hectare. For those Australian farmers whom had never before grown cotton, the yield and weight of their cotton crops and, therefore, their share of the cotton bounty payments could not be considered certain. For Californian farmers experienced in cotton growing, in contrast, the cotton bounty represented virtually a guaranteed subsidy.

Paul Kahl and Frank Hadley, recognising the Commonwealth cotton bounty as an important opportunity, began to investigate the possibility of growing cotton in

¹⁷⁷ Personal communication between Frank Hadley and Pamela Merrill, Wee Waa, New South Wales, 12 August 1972. See Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 58.

¹⁷⁸ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1; Basinski, 'The Cotton Growing Industry in Australia', p. 217.

Australia. In 1960, Kahl and Hadley travelled from Merced to the Australian Consulate in San Francisco.¹⁷⁹ The two farmers met with the Trade Commissioner, Ben Dawson, who encouraged them to grow cotton in Australia at the Murrumbidgee Irrigation Area, the Ord River Irrigation Area or Queensland's St George scheme.¹⁸⁰ Trade Commissioner Dawson gave Kahl and Hadley 'information, booklets and newspapers'.¹⁸¹ Although the men were impressed by the rate of payment received via the federal cotton bounty, they were not convinced that the prospects for cotton growing in Queensland or southern New South Wales were favourable:

We took all this stuff home and began studying. There had been some pilot plots in the southern part of New South Wales which were not very successful. [Australia's annual production of approximately] ten thousand bales were scattered across a good part of central to the eastern side of Queensland and the federal government was guaranteeing a good price for it. The Queensland government owned the ginning and marketing organizations and operated in a rigid and very archaic manner.¹⁸²

While Trade Commissioner Ben Dawson urged Paul Kahl and Frank Hadley at their San Francisco meeting to consider undertaking cotton growing at one of the government-sponsored irrigation projects established within Australia, Paul Kahl has asserted that it was Ben Dawson who first told them of the Namoi Valley.¹⁸³

In the days following the meeting, Paul Kahl's wife Jean noticed a brief article on agronomist Nick Derera's work and the success of cotton cultivation at Narrabri's Agricultural Research Station among those newspapers given to Kahl by the Trade

¹⁷⁹ Kahl, 'Reflections at Sea', p. 25.

¹⁸⁰ Personal communication between Frank Hadley and Pamela Merrill, Wee Waa, New South Wales, 12 August 1972. See Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 58.

¹⁸¹ Kahl, 'Reflections at Sea', p. 25.

¹⁸² Kahl, *Cotton Pickin' Pioneer*, p. 86.

¹⁸³ See 'Think Kahl, think cotton: Kahl and Hadley cotton pioneers', *The North Western Courier Special Edition: A Decade of Cotton*, June 1973, p. 14. This account obviously conflicts with Helen Wheatley's assertion that Kahl first heard of the possibilities of the Namoi Valley from a colleague at a cotton conference. However, there are a number of contradictory versions of events leading to Kahl and Hadley's arrival in the Namoi Valley.

Commissioner.¹⁸⁴ Early in November 1960, Jean Kahl composed a long and comprehensive letter to Nick Derera.¹⁸⁵ The letter enquired in detail about the prospects for cotton production in the Namoi Valley, as well as asking questions about ‘land availability, land cost, types of soil, school, hospitals, taxes, and bank practices.’¹⁸⁶ Jean Kahl’s letter was submitted by Nick Derera to a meeting of the Namoi Valley Agricultural Development Council, and a number of the Council’s members provided their own written responses to her enquiry.¹⁸⁷ Derera continued to compile information on ‘land management and farming practices’, along with details on ‘banking, taxation, farming and amenities in the region’.¹⁸⁸ His extensive reply to Jean Kahl’s letter weighed an estimated three and a half kilograms.¹⁸⁹ Jean Kahl’s correspondence with Nick Derera had revealed that the Kahl family was just one of ‘several families from the San Joaquin Valley of California’ interested in cotton production within Australia.¹⁹⁰

It was only after Nick Derera had responded positively regarding cotton’s potential in the Namoi Valley that Paul Kahl and Frank Hadley resolved to assess the district themselves.¹⁹¹ When Kahl and Hadley journeyed to Australia in March 1961, however, they did not confine their investigations solely to the Namoi Valley. Frank Hadley revealed that he and Paul Kahl did restrict their tour to regions which had

¹⁸⁴ Kahl, ‘Reflections at Sea’, p. 25. Different versions of these events have been recorded. For example, one local newspaper suggested that Jean Kahl discovered an article about cotton growing at the Experiment Farm by chance, and that this discovery prompted Paul Kahl to visit the Trade Commissioner. See ‘How cotton came to the North West’, *The North Western Courier*, 29 April 1963, p. 6.

¹⁸⁵ Paul Kahl has stated that it was his wife Jean who wrote the letter, but it bears the signature ‘Paul D. Kahl’. See Kahl, ‘Reflections at Sea’, p. 25; Correspondence, Paul D. Kahl to N.F. Derera, 7 November 1960, in Derera, Nicholas F. Papers, Mitchell Library, ML MSS 1495, 9-22B, 1v., pp. 1-3.

¹⁸⁶ Kahl, *Cotton Pickin’ Pioneer*, p. 87.

¹⁸⁷ Kahl, ‘Reflections at Sea’, p. 25. Paul Kahl refers to the organisation as the ‘Narrabri Development Council’ but its correct name was the Namoi Valley Agricultural Development Council.

¹⁸⁸ McHugh, *Cottoning On*, p. 6.

¹⁸⁹ Derera, ‘Enthusiasm for cotton led to a new industry’, p. 22.

¹⁹⁰ McHugh, *Cottoning On*, p. 6.

¹⁹¹ Kahl, ‘Reflections at Sea’, p. 25.

irrigation water available, but they had initially favoured an area on the Lachlan River near Condoblin in New South Wales.¹⁹² Before their visit to Australia the two Merced farmers had apparently given some consideration to Australia's agricultural marketing methods. Frank Hadley and Paul Kahl 'liked the marketing system for primary products' that existed in New South Wales during the early 1960s and, prior to their departure from California, the pair had decided that they would investigate cotton growing prospects within that state only.¹⁹³ Paul Kahl explained:

We were not interested in the government operation in Queensland which was more than thirty years behind the times. The worst part was they did not realize that their cotton quality was extremely poor. The Ord River in the northwestern part of Australia was too remote and, again, tied to a state government that knew it all and was very positive about it. We had decided to concentrate on NSW. Geoff Crawford, the local Member of Parliament, had already assured us by letter that the NSW government had no interest in getting involved in controlling the cotton industry in any way.¹⁹⁴

Having decided against Queensland and the Ord in Western Australia, Frank Hadley and Paul Kahl flew to Sydney in March 1961 to evaluate areas of New South Wales which may have been suitable for the growing of cotton under irrigation.

It has been asserted by Jack Hallam that Paul Kahl and Frank Hadley had a meeting in California with Jack Renshaw, who was then the Deputy Premier of New South Wales. A State Trade Delegation comprising representatives from New South Wales political parties and led by Jack Renshaw departed Australia in March 1961. Renshaw had apparently ensured that the delegation would visit California. Hallam contends that Renshaw had been informed of Kahl and Hadley's interest in producing cotton within Australia, and when Renshaw arrived in California with the delegation, he contacted the two Merced farmers. Renshaw's persuasiveness, Hallam argues, brought

¹⁹² McHugh, *Cottoning On*, p. 8.

¹⁹³ Paul Kahl quoted in 'Think Kahl, think cotton', *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 14.

¹⁹⁴ Kahl, *Cotton Pickin' Pioneer*, p. 87.

Hadley and Kahl to Australia.¹⁹⁵ Both Frank Hadley and Paul Kahl have acknowledged the assistance provided to them by Jack Renshaw after they had settled in the Namoi Valley.¹⁹⁶ However, Paul Kahl's autobiography and other sources written by or quoting Kahl and Frank Hadley regarding how they came to migrate to Australia contain no reference to a meeting with Jack Renshaw in California.¹⁹⁷

When Frank Hadley and Paul Kahl arrived in Sydney in March 1961, their visit drew attention from both a state parliamentarian and the New South Wales Department of Agriculture. On the day of Paul Kahl and Frank Hadley's arrival in Sydney, they were sought by the Country Party's Member for Barwon, Geoff Crawford, whose electorate included the Namoi Valley.¹⁹⁸ The two Americans joined Crawford for lunch.¹⁹⁹ Geoff Crawford made arrangements for Kahl and Hadley to travel to Narrabri the following day. When they arrived in the Namoi Valley, Geoff Crawford drove them personally on a two-day tour of the district.²⁰⁰

While the visit of the two Californians had come to the notice of the Namoi Valley's political representative, those with business interests in the district had already become involved in efforts to encourage the founding of a local cotton industry. Following the success of the cotton experiments at Narrabri's Agricultural Research Station, agronomist Nick Derera delivered a speech at the Narrabri Town Hall in March 1960 regarding the need for cotton production to be established commercially within the

¹⁹⁵ Hallam, *The Untold Story: Labor in Rural NSW*, p. 70.

¹⁹⁶ See 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 34; Kahl, 'Reflections at Sea', p. 27.

¹⁹⁷ See Kahl, *Cotton Pickin' Pioneer*; 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, pp. 32-34; Kahl, 'Reflections at Sea', pp. 24-31.

¹⁹⁸ Kahl, 'Reflections at Sea', p. 25.

¹⁹⁹ Kahl, *Cotton Pickin' Pioneer*, p. 88.

²⁰⁰ Kahl, 'Reflections at Sea', p. 25.

district.²⁰¹ Derera's Town Hall address, as well as his correspondence with Jean Kahl had created an enthusiasm for cotton growing among the members of the Narrabri Chamber of Commerce. As a result of this enthusiasm, the Namoi Valley Agricultural Development Council was formed by the Narrabri Chamber of Commerce 'to foster cotton's future.'²⁰² Nick Derera has stated that the idea for the forging of the Namoi Valley Agricultural Development Council was his, but as a government employee he was prohibited from becoming an official member of the organisation.²⁰³ Members of the Development Council greeted Paul Kahl and Frank Hadley at the Narrabri Airport when the two men first arrived to inspect the Namoi Valley.²⁰⁴ Paul Kahl recalled that, after their tour with Geoff Crawford, he and Frank Hadley were in general favourably inclined toward growing cotton in the Namoi Valley.²⁰⁵ The Namoi Valley, however, was not the only region of New South Wales competing for American investment in cotton production.

In addition to the encounter with Geoff Crawford during the first day of Paul Kahl and Frank Hadley's Australian tour, the two men visited the New South Wales Department of Agriculture's office in Sydney. There they were introduced to the Department of Agriculture's head of plant industry, Mr Poggendorf, and Mr M. Kitamura, who was responsible for overseeing cotton in New South Wales as part of his role as miscellaneous crops specialist.²⁰⁶ These Department of Agriculture officials advised the Californian farmers emphatically to consider growing cotton within

²⁰¹ Derera, 'Enthusiasm for cotton led to a new industry', p. 22.

²⁰² 'How cotton came to the North West', *The North Western Courier*, 29 April 1963, p. 6.

²⁰³ Derera, 'Enthusiasm for cotton led to a new industry', p. 22.

²⁰⁴ 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 32.

²⁰⁵ Kahl, 'Reflections at Sea', p. 26.

²⁰⁶ Kahl, *Cotton Pickin' Pioneer*, pp. 87-88.

southern New South Wales, specifically in the Murray-Murrumbidgee area.²⁰⁷ The officials attempted to dissuade Frank Hadley and Paul Kahl from even inspecting the Namoi Valley, insisting that cotton growing in the Namoi district was ‘fraught with all sorts of dangers and pitfalls.’²⁰⁸ The Department of Agriculture’s unequivocal promotion of the Murrumbidgee Irrigation Area as ‘the only place to grow cotton’ was perhaps due to the MIA’s status in 1961 as an important component of New South Wales Minister for Agriculture, A.G. Enticknap’s electorate.²⁰⁹ Paul Kahl and Frank Hadley did agree to investigate the Murrumbidgee Irrigation Area on a tour organised by the Department of Agriculture, and they travelled south following their expedition to the Namoi Valley.

The two Merced farmers found the climate of the Murrumbidgee Irrigation Area unsuitable for high-yielding, Californian-style cotton production. As well as touring the MIA, Hadley and Kahl obtained weather data on New South Wales from the state meteorological offices in Sydney.²¹⁰ Paul Kahl explained:

We came to the conclusion that the south was about 3 [degrees Fahrenheit] cooler than the temperature charts the NSW Department of Agriculture had given us. That would make the south too cool for the cotton varieties then available.²¹¹

Kahl alleged that the farmer responsible for recording the MIA’s temperatures for the New South Wales Department of Agriculture had deliberately increased the figures by a number of degrees, hoping to sell his property to cotton growers in the process.

Although they were offered land with an irrigation supply ‘virtually free’ in southern

²⁰⁷ Kahl, *Cotton Pickin’ Pioneer*, p. 88; McHugh, *Cottoning On*, p. 7.

²⁰⁸ Kahl, ‘Reflections at Sea’, p. 25.

²⁰⁹ Kahl, ‘Reflections at Sea’, p. 25; Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 116.

²¹⁰ Kahl, *Cotton Pickin’ Pioneer*, p. 88.

²¹¹ Kahl, ‘Reflections at Sea’, p. 26.

New South Wales, Frank Hadley and Paul Kahl decided instead to grow cotton in the Namoi Valley.²¹²

Paul Kahl returned alone to the Namoi Valley in June 1961 to survey properties in the district. Within weeks, Kahl had finalised the purchase of 'Glencoe', a property on the outskirts of Wee Waa, and he and Frank Hadley had resolved to produce cotton on Glencoe as a partnership.²¹³ The property had previously been used for wheat growing, the grazing of cattle and sheep, and the production of a small irrigated lucerne crop.²¹⁴ The 1958 revision of the cotton bounty had guaranteed the continuation of the subsidy for a period of five years, but the renewal of the Bounty after its expiration was not certain. With the cotton bounty's five-year limitation perhaps underpinning Paul Kahl and Frank Hadley's haste in establishing themselves in the Namoi Valley, the first cotton crop had been sown on the Glencoe property by November 1961.

The delayed delivery of cottonseed from Brisbane meant that the crop was planted late, but, although the cotton plants suffered from weed and insect problems, Glencoe's initial cotton crop proved successful.²¹⁵ The novelty of cotton growing in New South Wales in 1961 meant that the fibre harvested from Glencoe had to be transported to Queensland for processing as, at that time, there were no local ginning facilities available. Paul Kahl described how the cotton was transported north:

...we had to begin delivering the picked cotton to the ginnery at Whinstanes on the north side of Brisbane. For this project we bought a 1950 International truck and a single axle semi trailer on which we built a light steel frame 4.4 metres off the ground with wire mesh sides. We then dug trenches for the truck to drive into allowing the pickers to dump into the trailer. The cotton was packed down by leg power. The worst part was the twelve hundred km round trip to the gin over a road that was two thirds dirt. Half of that was in an atrocious state. We

²¹² Kahl, 'Reflections at Sea', p. 26.

²¹³ Kahl, 'Reflections at Sea', p. 26.

²¹⁴ 'Co-operative fostered the industry's growth', pp. 12-13; Kahl, *Cotton Pickin' Pioneer*, p. 89.

²¹⁵ 'U.S. Cotton Growers Plant Initial Acreage', *The North Western Courier*, 13 November 1961, p. 1; McHugh, *Cottoning On*, p. 8.

made ten trips. I drove two of them. ... It was a ten to eleven hour trip. That trip firmed my resolve to get a gin built close to home for the next crop.²¹⁶

Frank Hadley and Paul Kahl's first Australian cotton harvest was the only one of their Glencoe cotton crops to be ginned interstate. That initial crop produced ninety bales of cotton fibre from sixty acres and it soon generated enough interest in the Namoi Valley for the district's fledgling cotton industry to erect its first cotton gin.²¹⁷

The promising results of Kahl and Hadley's foundation crop attracted others to the growing of cotton in the Namoi Valley. From 1962, the migration of Americans to the Namoi Valley occurred steadily. Among those who relocated to the district from the United States was Ben Dawson, the former Australian Trade Commissioner, who had become convinced of the Namoi Valley's cotton producing potential.²¹⁸ Dawson and his Sydney-based American partner, Ward W. Beman, purchased the property 'Weetawaa' and, together, established the Australian and American Development Company Limited.²¹⁹ Some of the Namoi Valley's local farmers were also drawn to cotton growing in this early period. While Kahl and Hadley grew their first cotton on Glencoe, small cotton crops were also cultivated by local residents, Vic Melbourne and Frank Boyle, albeit to produce cottonseed for breeding experiments at Narrabri's Agricultural Research Station.²²⁰

As the production of cotton rapidly gained attention within the Namoi Valley, the North West Cotton Growers' Association was formed in September 1962. The Cotton Growers' Association was 'symptomatic of the growing importance and

²¹⁶ Kahl, *Cotton Pickin' Pioneer*, p. 104.

²¹⁷ Kahl, 'Reflections at Sea', p. 27.

²¹⁸ 'From Trade Commissioner to Cotton Farmer', *The Cotton Valley*, sponsored by the Namoi Cotton Co-operative and the Bradford Cotton Mills, printed by The North Western Courier, Narrabri, 1966, p. 15.

²¹⁹ Wallace Crouch, 'BOOM! Cotton hits placid town of Wee Waa', *The Daily Telegraph*, 25 May 1964, p. 16; 'Self Help: Best help', *The Namoi Valley Echo*, 31 May 1963. (Page numbers are irregular or absent in *The Namoi Valley Echo* but they have been cited where possible).

²²⁰ McHugh, *Cottoning On*, p. 8.

increasing interest in this field of primary industry.²²¹ The Association listed twenty-two founding members, however, the number of farmers actually growing cotton in the Namoi Valley at that time represented a mere fraction of that membership.²²² Former Trade Commissioner, Ben Dawson, was made president of the Growers' Association, while Paul Kahl became the organisation's vice-president. Frank Boyle, one of the local farmers growing cotton experimentally, was given the duties of treasurer and secretary.²²³ The North West Cotton Growers' Association was reportedly 'seeking ways and means of financing and erecting' a cotton gin at Wee Waa, at an estimated cost of £100,000.²²⁴ Two months after the North West Cotton Growers' Association was created, it was reconfigured into a new organisation, the Namoi Cotton Co-operative.

Some difficulty was initially experienced in finding the mandatory seven members required for the organisation to be officially registered as a co-operative in New South Wales. Although Paul Kahl's wife Jean 'became registered as a cotton grower and became the vital seventh member' of the Namoi Cotton Co-operative, she was not included on the Co-operative's board of directors.²²⁵ In November 1962, the board of directors comprised Ben Dawson, Frank Hadley, J.C. Holcombe, and G.T. Johnson, as well as Paul Kahl, who was the Co-operative's chairman, and Frank Boyle, who became the Co-operative's secretary.²²⁶ Paul Kahl would reign as the chairman of

²²¹ 'Cotton Growers: Association formed', *The Namoi Valley Echo*, 14 September 1962, p. 1.

²²² 'Cotton Growers' Association Formed at Wee Waa', *The North Western Courier*, 10 September 1962, p. 1.

²²³ 'Cotton Growers: Association formed', *The Namoi Valley Echo*, 14 September 1962, p. 1.

²²⁴ 'Cotton Growers' Association Formed at Wee Waa', *The North Western Courier*, 10 September 1962, p. 1.

²²⁵ See 'Co-operative fostered the industry's growth', p. 13.

²²⁶ 'New Body Formed: Initial cotton gin capacity 3½ million pounds', *The North Western Courier*, 6 November 1962, p. 9; 'Chairmen of the Board: 1962-1992', *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992: Foundations for the Future*, Narrabri: North Western Courier Group, 1992, p. 19.

the Co-operative's board of directors from 1962 until 1987, with the exception of 1966, when Ben Dawson briefly assumed the role.²²⁷

The Namoi Cotton Co-operative's official history states that it was formed 'to pursue the goal of a gin for the locally produced cotton.'²²⁸ Frank Hadley and Paul Kahl's plan to form a co-operative and 'finance erection of their own ginneries' had been made known during their first visit to the Namoi Valley.²²⁹ Having already produced their initial irrigated cotton crop in the Namoi Valley, Hadley and Kahl had sought to establish an organisation similar to the co-operative they had been involved with in Merced.²³⁰ The pair's alleged intention to create 'a private American-style co-operative that would not comply with the other, State-run bodies' had been a cause for concern among the Society of Co-operatives.²³¹ The Society of Co-operatives had opposed the approval of the Namoi Cotton Co-operative's by-laws, as they were based on California's cotton co-operative system.²³² The main point of contention was that, under the Namoi Cotton Co-operative's articles of incorporation, 'power was vested in current cotton growers', and those growers who ceased growing cotton 'were obliged to sell their shares to the Co-op.'²³³ The impasse between the Society of Co-operatives and the cotton growers' organisation was resolved by the Deputy Premier of New South Wales, Jack Renshaw, who exerted pressure upon the secretary of the Society of Co-

²²⁷ See 'Chairmen of the Board: 1962-1992', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 19.

²²⁸ See 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 13.

²²⁹ 'Arrived Today: U.S. Growers to Survey Cotton Potential in Narrabri District', *The North Western Courier*, 16 March 1961, p. 1.

²³⁰ See Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', pp. 54-55 and p. 134.

²³¹ McHugh, *Cottoning On*, p. 18.

²³² Kahl, 'Reflections at Sea', p. 28.

²³³ Kahl, *Cotton Pickin' Pioneer*, p. 215.

operatives. Renshaw indicated that, if the Society continued to refuse to recognise the cotton growers' by-laws, he would enact legislation and have the cotton organisation approved regardless.²³⁴ After a few minor changes, the Society of Co-operatives relented, and the Namoi Cotton Co-operative was officially incorporated on 1 November 1962.²³⁵

The Deputy Premier, Jack Renshaw again proved pivotal when the Namoi Cotton Co-operative tried to obtain finance for the purchase of its first cotton gin. The potential for the construction of a cotton gin had been a principal consideration when Paul Kahl and Frank Hadley had initially inspected the Namoi Valley. Paul Kahl has asserted that the availability of 'plenty of uncommitted land' for the building of a cotton gin was crucial in their decision to settle in the Namoi district.²³⁶ Indeed, Frank Hadley revealed that the reason he and Kahl rejected the idea of growing cotton near Condoblin was because they 'didn't think there was enough area there to have a cotton gin'.²³⁷ In their second year of growing cotton in the Namoi Valley, Kahl and Hadley attempted unsuccessfully to gain funding for a cotton gin from the Namoi Valley Agricultural Development Council and the United States' Export Development Bank, among others.²³⁸ Kahl and Hadley's 'friend and backer', Jack Renshaw ensured that the New South Wales government guaranteed 50 per cent of a £120,000 loan to the cotton growers from the ANZ Bank.²³⁹

²³⁴ Kahl, 'Reflections at Sea', p. 28.

²³⁵ Kahl, 'Reflections at Sea', p. 28; 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 13.

²³⁶ 'Think Kahl, think cotton: Kahl and Hadley cotton pioneers', *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 14.

²³⁷ Frank Hadley quoted in McHugh, *Cottoning On*, p. 8.

²³⁸ Kahl, 'Reflections at Sea', p. 27; Kahl, *Cotton Pickin' Pioneer*, p. 215.

²³⁹ Kahl, 'Reflections at Sea', p. 27; Kahl, *Cotton Pickin' Pioneer*, p. 215.

Only hours after confirmation was received from Renshaw, Frank Hadley, who was then in the United States, had finalised the purchase of a cotton gin from a company in Alabama.²⁴⁰ One-hundred tonnes of equipment were transhipped in 100 crates to the Namoi Valley, with six rail trucks required to transport the load to its intended site at Wee Waa.²⁴¹ Despite the strain placed upon the small town's electricity supply, the establishment of the Namoi Cotton Co-operative's first gin was praised by the New South Wales Premier, R.J. Heffron, as 'an example of the finest form of decentralisation'.²⁴² However, it was Jack Renshaw, as the acting Premier of New South Wales, who presided over the official opening of the Namoi Cotton Co-operative's Wee Waa gin in 1963.²⁴³

The need for a cotton gin had been highlighted by the increasing number of Americans, along with some local farmers, who were joining Frank Hadley and Paul Kahl in growing cotton in the Namoi Valley. Although local farmers were paying greater attention to Kahl and Hadley's farming enterprise, the Namoi Valley's favourable prospects for cotton growing were 'still more apparent to other Californian growers.'²⁴⁴ In the years after Paul Kahl and Frank Hadley commenced irrigated cotton production, the Namoi Valley experienced an influx of visitors, many of whom were simply curious about the Americans' venture. Before Kahl and Hadley had even

²⁴⁰ Kahl, 'Reflections at Sea', p. 28; 'ISAS Gain: Gin representatives', *The Namoi Valley Echo*, 2 July 1965.

²⁴¹ 'Scattered', *The Namoi Valley Echo*, 22 February 1963, 'Cotton Gin Plant at Wee Waa', *The North Western Courier*, 18 February 1963, p. 1, 'Heavy Hardware' *The Namoi Valley Echo*, 15 February 1963; 'Cotton Gin Plant Arrives', *The North Western Courier*, 21 February 1963, p. 3.

²⁴² 'Cotton Gin of National Importance', *The North Western Courier*, 26 November 1962, p. 3; 'Cotton Gin – A Major Power Consumer', *The North Western Courier*, 24 December 1962, p. 1; 'Lacking Oomph', *The Namoi Valley Echo*, 11 April 1963.

²⁴³ 'Red Letter Day for Wee Waa – and the State: Cotton ginning plant set in motion by Acting Premier Renshaw', *The Namoi Valley Echo*, 3 May 1963; 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 13.

²⁴⁴ 'History of Cotton Growing in Australia: Wee Waa and the Namoi Valley', *The Australian Cotton Grower*, Vol. 2, No. 4, October 1981, p. 5.

finished growing their first cotton crop, three other Californians had toured the Namoi Valley, one of whom hired a small aeroplane to survey possible cotton growing districts throughout New South Wales.²⁴⁵ In 1963, American farmers, predominantly, made 'persistent enquiries for land' in the Namoi Valley.²⁴⁶ During one fortnight in February 1963, 'no less than 15 visitors and tourists' inspected different properties in the district.²⁴⁷ Not all those who toured the Namoi Valley were from California. In February 1964, for example, the Namoi district was inspected by four cotton farmers from Phoenix and Buckeye in Arizona.²⁴⁸

While some of those who toured the Namoi Valley during the early 1960s were merely inquisitive, others purchased land and strove to emulate Paul Kahl and Frank Hadley's efforts. Many who went abroad to settle in the Namoi district did so with relatives or with other members of the same community. Although Pamela Merrill's research indicated that most of the Americans who migrated between 1962 and 1972 to grow cotton in Australia were from Arizona and California, it seems that those who chose to settle in the Namoi Valley were predominantly drawn from the latter American state. Where local Namoi Valley newspapers recorded the arrival of cotton growers from the United States and their purchase of properties in the district, the newcomers are described, almost without exception, as being from California.

Frank Hadley and Paul Kahl had led the migration from that state and, during 1962, 'several more families' from California had relocated to the Namoi Valley.²⁴⁹ Among the families who moved to grow cotton in the Namoi district in that year were

²⁴⁵ 'District Rates High with U.S. Land Men', *The North Western Courier*, 27 November 1961, p. 1; '14 Farmers Co-operate in Cotton Trials', *The North Western Courier*, 28 September 1961, p. 1.

²⁴⁶ 'Widespread interest in cotton crop', *The North Western Courier*, 5 March 1963, p. 7.

²⁴⁷ 'Widespread interest in cotton crop', *The North Western Courier*, 5 March 1963, p. 7.

²⁴⁸ 'Impressed by Cotton Possibilities', *The North Western Courier*, 10 February 1964, p. 1.

²⁴⁹ 'Think Kahl, think cotton: Kahl and Hadley cotton pioneers', *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 16.

Frank Hadley's cousin, Hadley Alf, and father, Ernest Hadley.²⁵⁰ Some of the American families that populated the Namoi Valley in the early 1960s had migrated together as a single group. In 1961, for example, T.A. Davis from California had inspected the Namoi Valley's cotton growing prospects on behalf of a number of families.²⁵¹ Davis returned to the Namoi Valley in 1963 to purchase a large property with relatives from the Californian community of McFarland.²⁵² Just months later, four families were settled on the property, and the arrival of more of their relatives was anticipated.²⁵³ Others emigrated from the United States to Australia to join business associates. Edward Griffith and his family, for example, moved to the Namoi Valley from Fresno in California to work for Ben Dawson's Australian and American Development Company Limited in 1962.²⁵⁴ At least one farmer migrated to the area after learning of the Namoi Valley's cotton growing success through Frank Hadley's mother in California.²⁵⁵ Some property sales to American buyers were arranged extremely quickly. One Californian, Mr Clark White, had concluded the purchase of a farm in the Namoi Valley only a day after arriving in Wee Waa.²⁵⁶ The changes in ownership and land use, impelled by the establishment of irrigated cotton production, were evident within the Namoi Valley by mid-1962.²⁵⁷ By April 1963, 31,500 acres in

²⁵⁰ Kahl, *Cotton Pickin' Pioneer*, p. 105; 'Cotton Gin of National Importance', *The North Western Courier*, 26 November 1962, p. 3.

²⁵¹ 'An Important Mission: Visitors Impressed', *The North Western Courier*, 4 May 1961, p. 1.

²⁵² 'Cotton Acreage Boost Seen in Property Deal', *The North Western Courier*, 29 January 1963, p. 1; 'Cotton Spreads', *The Namoi Valley Echo*, 1 February 1963, p. 1; 'Land at Wee Waa sells for £85 per acre', *The North Western Courier*, 14 March 1963, p. 10.

²⁵³ 'Family Enterprise at Gunedra', *The North Western Courier*, 29 April 1963, p. 7.

²⁵⁴ 'Californians to settle here', *The North Western Courier*, 13 August 1962, p. 1.

²⁵⁵ 'History of Cotton Growing in Australia: Wee Waa and the Namoi Valley', *The Australian Cotton Grower*, Vol. 2, No. 4, October 1981, p. 5.

²⁵⁶ 'Quick Work', *The Namoi Valley Echo*, 15 February 1963, p. 1; 'Property Sale', *The North Western Courier*, 18 February 1963, p. 1.

²⁵⁷ 'Land Moves', *The Namoi Valley Echo*, 8 June 1962, p. 1.

the Namoi district had been sold for a total of £620,000, with cotton production 'responsible for a 25 to 30 per cent increase in river frontage and adjacent land values'.²⁵⁸

The scientific analysis of cotton's physical requirements had gained such favour in the United States by the 1960s that the Namoi Valley was only selected for cotton growing after it had been deemed geographically and climatically suitable. This analysis had determined that the growing of cotton was most productive in the regions of the world located approximately 30 degrees north or south of the equator.²⁵⁹ As well as being located a specific distance from the equator, the cotton plant flourished in conditions free from frost. Cotton, it was discovered, grew best during a period of 200 consecutive frost-free days.²⁶⁰ Within the Namoi Valley, the towns of Wee Waa and Narrabri were appropriately located 30.3 degrees south of the equator.²⁶¹ Areas of the Namoi region, too, provided an interval of approximately 240 days without frost, which usually began in September.²⁶² When Paul Kahl had first visited the Namoi Valley, he was excited to discover Noogoora burrs growing in the district which resembled those which could be found in California's zones of successful cotton production:

The Noogoora burr plant is related to the cotton plant, and prefers similar country. ... As well, we were looking for reasonably good soil, the right climate, with plenty of water, and facilities for our families.²⁶³

Paul Kahl has asserted that similarities between the 'terrain and conditions' of California and the Namoi Valley explained the relocation of Californians to the latter

²⁵⁸ 'Sales Record: £620,000 land deals', *The Namoi Valley Echo*, 24 April 1963, p. 1.

²⁵⁹ 'Spectacular Growth of Namoi Cotton Industry', *The Cotton Valley*, sponsored by the Namoi Cotton Co-operative and the Bradford Cotton Mills, printed by the North Western Courier, Narrabri, 1966, p. 3.

²⁶⁰ Greenland, 'Cotton Farming under irrigation', p. 1.

²⁶¹ 'Spectacular Growth of Namoi Cotton Industry', *The Cotton Valley*, sponsored by the Namoi Cotton Co-operative and the Bradford Cotton Mills, printed by the North Western Courier, Narrabri, 1966, p. 3.

²⁶² Greenland, 'Cotton Farming under irrigation', p. 1.

²⁶³ 'Think Kahl, think cotton: Kahl and Hadley cotton pioneers', *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 14.

region.²⁶⁴ With an appropriate location equatorially, a frost-free growing period and other geophysical likenesses, the Namoi Valley seemed suitable for the replication of the intensive cotton growing techniques employed in California.

Some local accounts of cotton's arrival in the Namoi Valley prefer to emphasise the district's 'opportunities', 'untapped potential' and other aspects of the Namoi region that attracted American migrants.²⁶⁵ The issues that may have prompted this departure from the United States are rarely considered. Pamela Merrill's study provides the only in-depth examination of the various factors that motivated a small number of Americans to relocate to Australia to engage in cotton growing during the period from 1962 to 1972.²⁶⁶ Merrill interviewed many of the American cotton migrants regarding their decision to move to Australia. Australia was described as a 'politically stable, English-speaking' nation where the American migrants could satisfy their 'pioneering urges'.²⁶⁷ As the majority of the Americans who migrated to Australia to grow cotton were from the cotton-producing areas of Arizona and California, Merrill sought to examine the conditions which prevailed in these two American states at the time of their emigration. Within the United States generally, the cotton price was declining quite dramatically during the late 1950s, as the costs of farming simultaneously increased. Compared to these difficulties, the five-year guarantee and favourable terms of Australia's federal cotton bounty presented an attractive alternative.²⁶⁸

²⁶⁴ Paul Kahl suggested further that those Arizona farmers who opted for the Ord River region did so because of the likeness between the Ord and Arizona. See 'Think Kahl, think cotton: Kahl and Hadley cotton pioneers', *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 17.

²⁶⁵ Heydon, *The Cotton Story*, p. 5; Kerrie Cruickshank, 'Wee Waa Cotton Capital of Australia', in Ian Thompson, (ed.) *Stories of Wee Waa*, Wee Waa: Wee Waa Historical Society, 2000, p. 217.

²⁶⁶ See Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972'.

²⁶⁷ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', pp. 64-66.

²⁶⁸ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 91 and p. 124.

The government-imposed restrictions on cotton acreages in the United States in the 1950s are discussed by Pamela Merrill in terms of their contribution to the relocation of a small number of farmers to Australia at the beginning of the subsequent decade. The introduction of acreage restrictions was an attempt to combat the overproduction of agricultural products. Under these restrictions, ‘prior acreage history’ determined how much cotton was permitted to be planted in particular regions. The long tradition of producing cotton in the South meant that acreage restrictions in the southern states were not as severe as those imposed in the relatively new western cotton growing states of California and Arizona.²⁶⁹ Paul Kahl has indicated that the acreage restrictions instituted in California had influenced his decision to exit that state:

The main problem ... was the increasing awareness of the cost increases and the inefficiencies caused by subsidies to agriculture and the subsequent Government controls on crops. I was growing cotton, corn and sugar beets. Every Winter I had to go to the A.S.C. Office to find out how much of what I could plant the following year. That was not my idea of “free enterprise”. Profits were not high enough.²⁷⁰

Despite Paul Kahl’s declaration, the significance of acreage restrictions in the relocation of some Americans to Australia is somewhat dubious as, from 1959 to 1962, which denotes the period in which this migration began, no acreage restrictions were imposed.²⁷¹ Although Paul Kahl has linked his low profit levels in 1950s California to acreage restrictions, without government intervention overproduction would likely have worsened, decreasing prices for agricultural commodities and, ultimately, reducing profits further.

With regard to Arizona and California specifically, Pamela Merrill identified a number of issues which may have contributed to the migration to Australia of some

²⁶⁹ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 74.

²⁷⁰ Kahl, ‘Reflections at Sea’, p. 25.

²⁷¹ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 73.

farmers from these two states. The increasing militancy of predominantly Mexican cotton workers during the 1960s was described as a concern by many of the Americans who had moved to Australia to grow cotton. These farmers, primarily from the cotton producing areas of California and Arizona, ‘found disquieting the labourers seeking equal community rights as well as higher wages.’²⁷² However, it was not until later in that decade, after the migration to Australia commenced, that Cesar Chavez helped to organise and lead farm workers on strikes in California. Urban encroachment upon the region of cotton production near Phoenix, as well as the increasing invasion of the state’s cotton crops by the pink bollworm were problems encountered by some of Arizona’s cotton farmers from the 1950s.²⁷³

Within California, Merrill suggests that the ‘One Variety Cotton Law’ may have influenced the departure of some farmers from particular areas of the state.²⁷⁴ The One Variety statute had, from 1925, permitted only a single strain of cotton to be grown within California’s San Joachin Valley, and that variety was Acala. The One Variety Law had for decades ensured the consistent quality of Californian cotton generally, however, the Acala strain did not produce the same results throughout the San Joachin Valley:

Six counties were affected by the law: three on the valley’s west side (Fresno, Kern, and Kings) and three on its east side (Madera, Merced, and Tulare). The San Joachin Valley currently accounts for about 95 percent of all California cotton production, of which about 80 percent is grown on the west side and 20 percent on the east side. Growing conditions differ substantially across the valley. Critics argued that the USDA Acala varieties performed well in the west-side counties (with long, hot, growing seasons) but did poorly in the

²⁷² Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 63.

²⁷³ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 89 and p. 92.

²⁷⁴ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, pp. 79-89.

northern east-side counties, Madera and Merced (with shorter, cooler, growing seasons), and on the wilt-infested soils of Tulare County.²⁷⁵

Cotton farmers in the eastern counties of Merced, Madera and Tulare experienced 'low and declining yields' from the mid-1950s, however, their requests for a new cotton variety that would adapt better to their climatic conditions were refused.²⁷⁶ Pamela Merrill asserts that the One Variety Cotton Law left farmers frustrated in relation to their 'inability to exercise individual judgement in striving for maximum cotton yields.'²⁷⁷ However, as Merrill attests, the overproduction of cotton in the wake of the Korean War had contributed to depressed cotton prices, and the achievement of maximum yields would only have eroded the value of cotton further.²⁷⁸

Pamela Merrill's study revealed that not all of the Americans who migrated to Australia to produce cotton were well-capitalized. While many of the Californian cotton migrants were able to fund the purchase of land in Australia through the sale of their properties in California, those who migrated from Arizona were not as fortunate. Indeed, 'all but one of those from Arizona either did not have the property to sell, or chose to hold it in the family while settling in Australia'.²⁷⁹ Merrill identified a broad correlation between the cotton migrants' levels of capital and the different locations within Australia where the Americans decided to take up residence. For those Arizonans who did not have substantial finance available, the Ord River Irrigation Area represented an economically viable option for their relocation to Australia. In contrast, the Namoi Valley was primarily chosen for settlement by highly-capitalized Californian

²⁷⁵ John H. Constantine, Julian M. Alston and Vincent H. Smith, 'Economic Impacts of the California One-Variety Cotton Law', *Journal of Political Economy*, Vol. 102, No. 51, 1994, p. 953.

²⁷⁶ Constantine, Alston and Smith, 'Economic Impacts of the California One-Variety Cotton Law', p. 954.

²⁷⁷ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 79.

²⁷⁸ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', pp. 79-82.

²⁷⁹ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 93.

farmers. In the absence of a government-sponsored irrigation scheme to make use of the water from the Keepit Dam, irrigation infrastructure costs were the responsibility of the individual water licence holder in the Namoi Valley. The higher costs involved in establishing irrigated cotton production in the Namoi region were prohibitive for those migrants from the United States who were under-capitalized.²⁸⁰

Although irrigated cotton production in the Namoi Valley initially entailed higher development costs than the Ord or the Murrumbidgee Irrigation Area, property prices in the Namoi Valley were relatively inexpensive compared to the cost of land in California during the early 1960s.²⁸¹ Competition for land and water was intensifying within California in that period. One Californian, Mr L. Frick, described the situation in his home state while visiting the Namoi Valley in November 1961:

Demand for water in California is increasing at such a rate as to present a serious problem in the future. In addition, parts of California attract about 3000 people each month, anxious to live in Western U.S.A. Where farms once helped to serve a nation's needs in food, settlements and new cities are mushrooming.²⁸²

Along with the pressures of a rapidly increasing population and the intrusion of urban sprawl into farming areas, there existed in California a significant disparity between large farms and small family farms. Some of these large farms were controlled by corporations 'such as the oil companies, Tenneco Inc. and Standard Oil of California or operators such as the Southern Pacific Railroad.'²⁸³ With much of California's irrigable land dominated by large landholdings, many smaller farmers found it difficult to compete and high land prices precluded expansion.

²⁸⁰ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 93.

²⁸¹ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 132.

²⁸² Mr L. Frick quoted in 'District Rates High with U.S. Land Men', *The North Western Courier*, 27 November 1961, p. 1.

²⁸³ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 142.

In the Namoi Valley during the early 1960s, land suited to cotton production could be purchased ‘for between \$100 and \$125 per hectare’, while similar land in California was priced at approximately \$600 a hectare.²⁸⁴ In contrast to California’s substantial corporate farms, Paul Kahl was a small Merced farmer with six children on a mere 160 acres.²⁸⁵ When the Kahl family made the decision to migrate to Australia, they were seeking a vastly increased acreage. Jean Kahl’s correspondence with agronomist Nick Derera had clearly stated that they and the other interested farmers from the United States required ‘500 to 1000 acres per farm unit’.²⁸⁶ The property of Glencoe satisfied many of the requirements Jean Kahl had outlined in her letter to Derera, particularly regarding the availability of irrigation water, and acreage size.²⁸⁷ The Glencoe property encompassed a substantial river frontage, with a water licence and small pump already in place.²⁸⁸ At 2,000 acres, Glencoe exceeded the Kahl family’s basic requirement of between 500 and 1,000 acres.²⁸⁹ Paul Kahl raised the capital for the purchase of Glencoe by selling half of his Californian land and borrowing against the value of the house and remaining land.²⁹⁰ Such was the difference between land prices in California and the Namoi Valley, Frank Hadley had been able to finance his portion of the Glencoe purchase through the sale of only part of his Merced farm.²⁹¹ Small farmers from the United States like Frank Hadley and Paul Kahl, however, were

²⁸⁴ Irwin, *Cotton Systems of the Namoi Valley*, p. 6.

²⁸⁵ McHugh, *Cottoning On*, p. 5.

²⁸⁶ McHugh, *Cottoning On*, p. 6.

²⁸⁷ McHugh, *Cottoning On*, p. 6.

²⁸⁸ Kahl, *Cotton Pickin’ Pioneer*, p. 96.

²⁸⁹ McHugh, *Cottoning On*, p. 8.

²⁹⁰ Kahl, *Cotton Pickin’ Pioneer*, p. 89.

²⁹¹ ‘The pioneering Hadleys’, in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 33.

not the only ones to have a financial stake in Australia's irrigated cotton growing industry.

Government Involvement in the Controversial Founding of Auscott Pty Ltd

As Acting Premier of New South Wales in May 1963, Jack Renshaw alluded to a forthcoming deal that would bring significant investment to the Namoi Valley.

Renshaw announced that the New South Wales government was 'considering offers of substantial overseas capital investment in the cotton industry', with the initial injection of funds expected to comprise between £1,000,000 and £2,000,000.²⁹² The deal, which was ultimately approved, involved the sale of three adjoining blocks of land totalling 7,534 acres near Wee Waa that, under a government scheme, had been designated for settlement only by Australian war veterans.²⁹³ The New South Wales government permitted three 'soldier-settlers' to sell their parcels of land to Americans, James Blasdell, Richard Rhodes and George Voll.²⁹⁴ The three Americans combined the former soldier-settler farms and founded the cotton growing enterprise known as 'Auscott Pty Ltd'.²⁹⁵ Although George Voll purchased one of the soldier-settler properties, it was James Blasdell and Richard Rhodes who moved to the Namoi Valley to manage Auscott. Soon after the sale of the adjoining properties, Blasdell and Rhodes had 'scandalised locals by tearing down fences and everything else to create 7500 acres of flat and featureless land'.²⁹⁶

²⁹² 'American cotton interests: Multi-Million Pound Investment in Wee Waa-Narrabri Area Expected', *The North Western Courier*, 6 May 1963, p. 2.

²⁹³ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4261.

²⁹⁴ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', pp. 153-154; 'Unobtrusive giant, Auscott', *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 4.

²⁹⁵ 'History of Cotton Growing in Australia: Wee Waa and the Namoi Valley', *The Australian Cotton Grower*, Volume 2, No. 4, October 1981, p. 5.

²⁹⁶ McHugh, *Cottoning On*, p. vii.

A number of aspects in the establishment of the Auscott venture were highly contentious. The fact that the American enterprise had usurped land assigned to Australian war veterans was controversial, in spite of the New South Wales government's approval and the agreement of the three soldier-settlers involved in the land sale. The New South Wales government's efforts in the Auscott case to attract 'large scale investment in an effort to aid decentralisation' contradicted the policy of closer settlement, which encouraged the establishment of relatively small farms.²⁹⁷ Nevertheless, access to water from the Keepit Dam was arguably the most vexed issue in the founding of the Auscott company. New South Wales laws permitted the holder of a water licence in that state to make use of water for the irrigation of no more than 400 acres. As the owners of the three former soldier-settler blocks, James Blasdell, Richard Rhodes and George Voll were entitled to apply for one water licence each. This would have enabled Blasdell, Rhodes and Voll to irrigate only 1,200 acres of their newly acquired 7,534 acres of land.

The Member for Barwon, Geoff Crawford, stated that when he learned of the American trio's intention to obtain such an expansive acreage, 'he had been adamant that the proposed area would have to be cut up into units of 400 acres to conform with the present policy of water rights per holding.'²⁹⁸ Rather than acquiescing to Crawford's demand for the subdivision of the adjoining properties, the three Americans devised their own plan to ensure the Namoi Valley cotton venture would be a success. Without substantial water, the American farmers could not establish irrigated cotton growing on the large scale they had intended and their foray into Australian agriculture may have been a failure before it had properly commenced. Instead of accepting that they would be able to irrigate less than sixteen per cent of the total land area they had

²⁹⁷ 'Member Replies to N.V.A.D.C. Statements', *The North Western Courier*, 27 May 1963, p. 1.

²⁹⁸ 'Member Replies to N.V.A.D.C. Statements', *The North Western Courier*, 27 May 1963, p. 1.

agreed to purchase, Richard Rhodes, James Blasdell and George Voll sought to evade the limitations placed upon the acquisition of water rights by New South Wales law. Blasdell, Rhodes and Voll organised for seventeen Australians to apply for water licences for the irrigation of 400 acres each on the 7,354 acres of land.

The public notice regarding these water licence applications appeared in *The Namoi Valley Echo* and listed the seventeen Australians assisting the Americans in commandeering additional irrigation water for the Auscott enterprise:

The Local Land Board for the Land District of Narrabri will ... publicly enquire as to the desirability of granting the application by James Arden Blasdell, Richard Samuel Rhodes, George Voll, John Barry Higgins, Cecil Martin, James Frederick John Auswild, Ronald William Auswild, Shaun Jerome Brady, John Thomas Broad, Leo Leahy, Robert Parsons, Mirco Rinaldo Plos, Francis Friend Crutchett, Thomas Herbert Preston, Ronal Macauley, Cyril Mears, John Macpherson, John Smith, Victor Bailey and John Thomas Logan, for an authority for a joint water supply scheme for seven pumps on the Namoi River, part portion 31, parish Galathera, county Jamison.²⁹⁹

The Narrabri Land Board quickly approved all twenty of the water licence applications pertaining to Auscott's land and also granted an authority to the project for the installation of seven pumps on the Namoi River, with each pump capable of extracting '12,000 gallons per minute'.³⁰⁰ Although each of the Auscott license applications apparently lacked essential information, and other applications lacking the same information had been delayed by ten months, the Auscott licenses were rapidly approved.³⁰¹ Only days after the notice of the application for the Auscott water licenses had been printed in a local newspaper, the construction of a channel on the Auscott land to access irrigation water from the Namoi River had already begun.³⁰² The American trio was so confident their Auscott venture would be granted the twenty joint water

²⁹⁹ 'Water Act, 1912-1955', *The Namoi Valley Echo*, 26 July 1963, p. 1.

³⁰⁰ 'Water Licence Approved for Large Cotton Project: Land Board hearing', *The North Western Courier*, 12 August 1963, p. 1.

³⁰¹ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4264.

³⁰² *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4264.

licences that they immediately invested in the excavation of a large channel, which was expected to be four miles in length, '25 feet wide and nine feet deep.'³⁰³ Geoff Crawford, the New South Wales Member for Barwon, argued that James Blasdell, Richard Rhodes and George Voll had 'received promises from higher up.'³⁰⁴

The most notable of the seventeen Australians who obtained water licenses for the Auscott enterprise was James Auswild. The principal of a Rose Bay firm of chartered accountants, Auswild was 'associated with General Motors-Holden' and the chairman of a number of private companies. James Auswild was the 'Governing Director Austwilde Corporation Pty Ltd and Auswild Group of Companies' as well as the director of Skandia Australia Insurance Ltd.³⁰⁵ From 1961, Auswild was a commissioner of the Rural Bank of New South Wales.³⁰⁶ Geoff Crawford described Auswild and the sixteen other Australians involved as 'dummies' who were assisting Americans Richard Rhodes, James Blasdell and George Voll in garnering more water licences that they were entitled to legally.³⁰⁷ The Australian seventeen were primarily accountants, none of whom even resided in the Namoi Valley or had any experience in the growing of cotton.³⁰⁸ While they did not share an involvement in cotton production or other agricultural pursuits, these Australians were all linked by a connection to one of their number: James Auswild. Each of the other sixteen dummy lessees was an

³⁰³ 'Ministerial Seal for 1½ million pound Cotton Project', *The North Western Courier*, 17 June 1963, p. 1.

³⁰⁴ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4264.

³⁰⁵ J.S. Legge, *Who's Who in Australia: An Australian Biographical Dictionary and Register of Titled Persons, with which is incorporated John's Notable Australians, XIXth Edition*, 1968, Melbourne: The Herald and Weekly Times Limited, 1968, p. 61.

³⁰⁶ Legge, *Who's Who in Australia*, p. 61.

³⁰⁷ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4253.

³⁰⁸ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4277.

employee or business associate of Auswild.³⁰⁹ New South Wales parliamentarian, Geoff Crawford deemed James Auswild the ‘dummy lessee-in-chief’.³¹⁰

As well as criticising the garnering of water licences by Auscott, Geoff Crawford claimed that George Voll, Richard Rhodes and James Blasdell were acting as representatives for the family-owned American company, J.G. Boswell Pty Ltd.³¹¹ Boswell was ‘the biggest farmer in America and the last land baron of California’, who had ‘built the most highly industrialized cotton operation in the world’.³¹² J.G. Boswell created an ‘empire that stretched over the years from the middle of California to Arizona to Oregon to Colorado’.³¹³ Pamela Merrill described the extent of the Boswell empire during the early 1970s:

Boswell’s holdings of approximately 130,000 acres place him sixth in a ranking of non-government holders of California’s seven million acres of arable land. In 1973 his holdings encompassed the California “home ranch”, El Rico, approximately 66,000 acres located near Corcoran on part of the reclaimed bed of Tulare Lake; the Boston Ranch, 36,000 acres located on the west side of the San Joachin Valley; the Buena Vista Ranch, 27,000 acres in one of the most southerly basins of the Valley; and a cattle ranch to the east in the Sierra foothills... The latter, while a minor operation compared to the two Boswell ranches in Oregon that encompass 400,000 acres, nevertheless plays an important part in the El Rico Ranch feedlot operation.³¹⁴

Geoff Crawford’s allegation about J.G. Boswell’s role in the Auscott enterprise was seemingly ignored in 1963, as the sale of the soldier-settler land to Voll, Rhodes and Blasdell was granted approval regardless.

Members of the New South Wales government sought to counter Geoff Crawford’s criticisms and defend the government’s involvement in the establishment of

³⁰⁹ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4258.

³¹⁰ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4254.

³¹¹ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4253.

³¹² Mark Arax and Rick Wartzman, *The King of California: J.G. Boswell and the Making of a Secret American Empire*, New York: PublicAffairs, 2003, p. 6.

³¹³ Arax and Wartzman, *The King of California*, p. 6.

³¹⁴ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 142.

Auscott Pty Ltd. The Minister for Lands, Mr K.C. Compton, attempted to downplay the Auscott deal, emphasising that there had been no transfer of land title and the three Americans were merely leaseholders.³¹⁵ The Deputy Premier, Jack Renshaw, tried to focus attention on the positive aspects of Auscott's creation, highlighting the economic benefits the American investment would bring to the region. Renshaw asserted that the water licences granted to Blasdell, Rhodes, Voll and the seventeen Australians would terminate 'in five years and then have to be renewed.'³¹⁶ However, this five-year 'limitation' to the twenty Auscott licences was not a special provision imposed on the project by the New South Wales government. Rather, all of the irrigation licenses issued to access Keepit Dam's storage were valid only for five years, and, following this period, the renewal of these licenses was a mere formality.³¹⁷

Within the Namoi Valley, significant debate was provoked regarding Blasdell, Voll and Rhodes' acquisition of the soldier-settlement land. In June 1963, Geoff Crawford, the Member for Barwon, organised a town meeting in Narrabri to discuss the involvement in the deal of 'overseas capital'.³¹⁸ However, not all Namoi Valley residents agreed with Crawford's opposition to the venture.³¹⁹ In particular, the members of the Namoi Valley Agricultural Development Council dissociated themselves from the opinions of the Member for Barwon.³²⁰ The NVADC members embraced the Auscott proposal, arguing that the injection of American capital may

³¹⁵ 'Ministerial Seal for 1½ million pound Cotton Project', *The North Western Courier*, 17 June 1963, p. 1.

³¹⁶ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4275.

³¹⁷ See Myles MacRae, former Water Rights Officer of the New South Wales Conservation and Irrigation Commission, cited in McHugh, *Cottoning On*, p. 14.

³¹⁸ 'Hip and Thigh', *The Namoi Valley Echo*, 14 June 1963.

³¹⁹ Crawford's opposition to the sale of soldier-settler lands to Americans may have been influenced by the fact that he had served in the Second World War. See Heather Radi, Peter Spearritt, and Elizabeth Hinton, *Biographical Register of the New South Wales Parliament, 1901-1970*, Canberra: Australian National University Press, 1979, p. 62.

³²⁰ 'Cotton controversy', *The North Western Courier*, 20 May 1963, p. 1.

curtail ‘the never-ending stream of youth migrating to capital cities.’³²¹ Similarly, the Auscott proposal was supported by the Narrabri Municipal Council, as well as the mayor of Narrabri, who argued that Australians, who had ‘neither the knowledge nor money to develop the cotton industry’, could learn from these experienced Americans.³²² The majority of the local opinions recorded in the Namoi district’s newspapers were supportive of the Auscott development,³²³ including one ex-serviceman who suggested that encouraging the project would express ‘our national appreciation for the American blood spilt in the protection of this country’.³²⁴ Another local conveyed a more measured perspective of the Auscott scheme, emphasising the importance of the Keepit Dam storage, and observing that ‘such a large volume of water was being allocated to the Auscott project before a town water supply for Wee Waa had even been established.’³²⁵

In the years that followed the sale of the soldier-settlement blocks to the three Americans who forged Auscott Pty Ltd, further details emerged about the deal and those it involved. Before entering Australian agriculture, James Blasdell and Richard Rhodes had jointly operated cotton growing enterprises in Mexico and Arizona. On the strength of their successes in Arizona and Mexico, Rhodes and Blasdell sought backing from a major American manufacturer of farm machinery for their new venture in Australia. Having decided to grow cotton in the Namoi Valley, the two men had ‘approached Allis-Chalmers International in Milwaukee, Wisconsin, to seek land-

³²¹ ‘Cotton controversy’, *The North Western Courier*, 20 May 1963, p. 1. See also: ‘Vital Issue in District Progress’, *The North Western Courier*, 16 May 1963, p. 1.

³²² ‘“Boom town” forecast if project succeeds’, *The North Western Courier*, 13 June 1963, p. 1.

³²³ See ‘Expressions of Local Opinion’, *The North Western Courier*, 6 June 1963, p. 16; ‘Disillusioned’, Letters to the Editor, *The North Western Courier*, 6 June 1963, p. 2.

³²⁴ See ‘Ex-Serviceman’s View’, Letters to the Editor, *The North Western Courier*, 6 June 1963, p. 2.

³²⁵ See ‘Cotton controversy’, Letters to the Editor, *The North Western Courier*, 20 June 1963, p. 2.

clearing and agricultural equipment.³²⁶ Allis-Chalmers International did agree to supply the equipment to Blasdell and Rhodes, but the exact nature of the company's involvement, and whether the company had a financial stake in the Auscott enterprise, is unknown.

In contrast, the role played in Auscott's establishment by another company, J.G. Boswell Pty Ltd, became irrefutable less than a year after the New South Wales government had approved the purchase of soldier-settler land by Rhodes, Blasdell and Voll. Although Geoff Crawford had attempted in 1963 to expose the involvement of J.G. Boswell Pty Ltd in Auscott, the particulars of this involvement only became clear subsequent to government approval for the land deal. It had not been disclosed in 1963 that James Blasdell and Richard Rhodes were J.G. Boswell's Arizona neighbours, nor was it revealed that George Voll was actually an employee of J.G. Boswell Pty Ltd in Los Angeles.³²⁷ James Auswild, who was central to Auscott's acquisition of seventeen additional water licences, was James Blasdell's Australian accountant. At James Blasdell's request, Auswild had organised what Blasdell described as 'straw men' to obtain as many water licences as possible on behalf of the Auscott venture.³²⁸

Richard Rhodes and James Blasdell had been 'farm-loan customers' of the Boswell company and they convinced J.G. Boswell to finance their operations in Australia.³²⁹ However, Rhodes and Blasdell's first crop was disastrous, with record rainfall and flooding ensuring that their land was dominated by weeds rather than

³²⁶ 'U.S. Backing For Cotton Farm Gamble: Machinery's Major Role', *The Australian Financial Review*, 14 July 1964, p. 21.

³²⁷ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 154.

³²⁸ Arax and Wartzman, *The King of California*, p. 306.

³²⁹ Arax and Wartzman, *The King of California*, p. 306.

thriving cotton plants.³³⁰ The role of J.G. Boswell Pty Ltd in the Namoi Valley enterprise could no longer be concealed once Boswell took control of Auscott toward the end of 1963.³³¹ Mark Arax and Rick Wartzman explained:

Blasdell knew that the partnership was kaput; under their arrangement, Boswell had the right to take over some farmland in Arizona that Blasdell had put up as collateral, or assume 100 percent control of the Australian venture. Though things were in disarray in Australia, the hard-to-get land and water licenses were now in place. Boswell chose to go it alone.³³²

Unlike Paul Kahl, Frank Hadley and the other Americans who had established themselves in the Namoi Valley to grow cotton, J.G. Boswell did not migrate to Australia once he had acquired Auscott Pty Ltd. Boswell instead installed Jim Fisher, an agronomist from the San Joachin Valley, to manage Auscott. At fewer than 8,000 acres, the land in the Namoi Valley represented a very small component of Boswell's empire.

By 1968, when the Auscott water licences were to be renewed, a change of government had occurred in New South Wales, and the ownership of Auscott had been transferred to J.G. Boswell. In 1968, the Liberal-Country Party state government permitted the Boswell corporation to take possession of the land and water titles for the Auscott property. Although Jack Renshaw had denied in 1963 that Rhodes, Blasdell and Voll were acting on behalf of J.G. Boswell, it was revealed in 1968 that Boswell had a 49 per cent share of Auscott's operations from the company's inception.³³³ After five years, Auscott was firmly established in the Namoi district as an employer and, it was claimed, the 'substantial investment of capital' for the region justified the transfer

³³⁰ 'Unobtrusive giant, Auscott', *The North Western Courier Special Edition: A Decade of Cotton*, June 1973, p. 7; Arax and Wartzman, *The King of California*, p. 306.

³³¹ 'U.S. Investment Taking Hold in Cotton Industry', *The Australian Financial Review*, 28 May 1964, p. 1.

³³² Arax and Wartzman, *The King of California*, p. 306.

³³³ *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, p. 393.

of titles to Boswell.³³⁴ The New South Wales coalition government that had, in its opposition to the deal in 1963, accused Rhodes, Blasdell and Voll of being dummies for J.G. Boswell, cited as the main justification for the transfer of titles to Boswell in 1968 their claim that the three Americans had only ever been ‘nominees’ of the Boswell corporation.³³⁵

Jack Renshaw, who had arranged the initial Auscott deal, was, in 1968, strongly opposed to the granting of titles to Boswell. Although Renshaw admitted in 1968 that he knew of George Voll’s association with J.G. Boswell when the soldier-settler blocks were purchased in 1963, he maintained that Voll had bought his land as an individual.³³⁶ Renshaw claimed that the seventeen Australian ‘dummy lessees’ had actually been installed as ‘trustees’ in 1963, ‘on behalf of the Crown to safeguard the State’s interest’ and that of ‘young Australians’.³³⁷ Although Jack Renshaw argued that an agreement had been entered into with the three Americans whereby, after five years, the Auscott land would be subdivided among Australians, it seems there is little evidence of such a deal.³³⁸ Jack Renshaw had supposedly told James Blasdell that the subdivision deal “will never be expected to be fulfilled while I am Premier.”³³⁹ Renshaw’s claims regarding his creation of a ‘trusteeship’ are undermined by the fact that each of the

³³⁴ *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, pp. 205-206.

³³⁵ Contrast Geoff Crawford’s 1963 statements (*New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4253) with those of Tom Lewis, Minister for Lands, in 1968 (*New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, pp. 205-206).

³³⁶ *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, p. 375.

³³⁷ *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, pp. 376-382.

³³⁸ Tom Lewis, the Minister for Lands, maintained in parliament that no such ‘trusteeship’ existed. See *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, pp. 375-380.

³³⁹ James Blasdell supposedly told this to J.G. Boswell, who repeated the story to Geoff Crawford. See *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, pp. 393-394.

Australian ‘trustees’ gave Auscott Pty Ltd a power of attorney to exercise complete control in relation to the water licenses.³⁴⁰

Like Renshaw, Geoff Crawford also reversed his stance regarding the issue of Auscott. When the deal was first brokered in 1963, Crawford had demanded that a Royal Commission or select committee be established to investigate the granting of concessions to Richard Rhodes, James Blasdell and George Voll.³⁴¹ In 1968, with millions of dollars invested by Auscott in the Namoi Valley, Crawford argued in favour of the transfer of titles to J.G. Boswell Pty Ltd, stating that the ‘day to appoint a select committee has passed.’³⁴² With the massive scale of investment in Auscott’s land, it was never realistic for a subdivision plan to be enforced in 1968 or at any other time.³⁴³

Although Geoff Crawford’s 1963 prediction that the approval of the Auscott project would ensure 90 per cent of the water from Keepit Dam was controlled by United States’ interests never eventuated, the appropriation of irrigation licenses by Blasdell, Rhodes and Voll on J.G. Boswell’s behalf was not insignificant.³⁴⁴ Auscott’s garnering of substantial irrigation rights was defended retrospectively by a local newspaper on the grounds that the use of dummy nominees in water licence applications ‘was a common enough practice at the time’.³⁴⁵

The Federal Cotton Bounty and the Namoi Valley’s American Cotton Growers

Before the Auscott enterprise had been relinquished to J.G. Boswell Pty Ltd, James Blasdell had ‘insinuated himself with local politicians and other power brokers’ in

³⁴⁰ *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, p. 393.

³⁴¹ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4253.

³⁴² *New South Wales Parliamentary Debates*, Volume 73, 26th March 1968 to 22nd May 1968, p. 391.

³⁴³ For details of this investment see Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 155.

³⁴⁴ *New South Wales Parliamentary Debates*, Volume 46, 2nd April 1963 to 29th August 1963, p. 4254.

³⁴⁵ See ‘Unobtrusive giant, Auscott’, *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 4.

Australia.³⁴⁶ Blasdell's skill in these pursuits was considerable; he had after all convinced California's agricultural magnate to finance his Australian gambit. James Blasdell was similarly influential in Australia, where he attempted to guide the federal government in making changes to the Commonwealth cotton bounty in 1963:

Blasdell knew that the Australian government, eager to improve its balance of trade, was hoping to turn cotton into an export crop. So he pushed for the Bounty Act, under which farmers would be paid a premium on top of the market price for every pound of fiber produced. He met with officials in Canberra, lobbying and shaping the legislation, which passed in November 1963.³⁴⁷

James Blasdell was not the only one to advise the federal government on how the cotton bounty laws could be improved. The revision of the Commonwealth cotton bounty in 1963 was apparently undertaken at the behest of the Australian cotton growing industry. Broad agreement to the 1963 amendments had reportedly been reached at a conference convened by the Department of Primary Industry in Canberra during October 1962 which had involved 'all cotton interests'.³⁴⁸ It seems, however, that some of the individuals growing cotton in Australia were more vocal than others regarding the need for changes to be made to the cotton bounty. The Americans who had migrated to engage in cotton production within Australia were described as instrumental in the modification of the terms of the federal bounty.³⁴⁹ Paul Kahl had been visited personally in September 1962 by two economists from the Commonwealth government who enquired about his opinion on the need for modifications to the cotton bounty. While James Blasdell had demanded a premium be paid to growers, Paul Kahl went further and insisted that bounty payments should be based on the quality of the cotton

³⁴⁶ Arax and Wartzman, *The King of California*, p. 306.

³⁴⁷ Arax and Wartzman, *The King of California*, p. 493.

³⁴⁸ Mr C.H. Adermann, Member for Fisher, Minister for Primary Industry, *Commonwealth of Australia Parliamentary Debates*, Session 1962-63, First Session of the Twenty-Fourth Parliament, Vol. H. of R. 40, 24 October 1963, pp. 2268-2269; Dawson, 'The Past, Present, and Future of Cotton Growing in Australia', p. 5.

³⁴⁹ Dawson, 'The Past, Present, and Future of Cotton Growing in Australia', p. 5.

produced.³⁵⁰ Following the formation of the Namoi Cotton Co-operative, Paul Kahl stated that, for the Co-operative's Board of Directors:

One of the first questions was the future of the bounty payments. We suggested to Canberra their new program should base the premium on the quality of the cotton, not just so much per pound of any cotton.³⁵¹

Paul Kahl, James Blasdell and the other American cotton migrants who had been so 'quick to recognise the advantage they would hold on the basis of their experience with cotton growing' assisted in the implementation of changes to Australia's cotton bounty from which they would directly benefit.³⁵²

The Commonwealth cotton bounty, which had first attracted American cotton growers to Australia, was fundamentally altered in 1963. Prior to that year, the bounty had paid the cost of freight for seed cotton to be delivered from the farm to the gin. It was this provision that had enabled Paul Kahl and Frank Hadley to transport their initial cotton crop to a gin in Queensland without the cost of the freight making their operations uneconomic. The 1963 bounty amendments abolished the freight provision to encourage 'the growing and processing industry to be located in more centralised areas'.³⁵³ Of greater consequence, however, was the reformulation of the method by which the federal cotton bounty was calculated.

The minimum price guarantee that had been in place since the reinstatement of the cotton bounty in 1951 was eliminated in 1963. Until 1963, the Commonwealth bounty had provided a fixed price for every pound of seed cotton produced in Australia. Essentially, the payments delivered under the cotton bounty scheme before 1963 were determined solely by weight. In calculating the bounty prior to 1963, cotton was

³⁵⁰ Kahl, *Cotton Pickin' Pioneer*, p. 106.

³⁵¹ Kahl, 'Reflections at Sea', p. 29.

³⁵² Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 125.

³⁵³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 2.

weighed before the seed had been extracted from the cotton fibre, which occurs during the ginning process. Cotton lint constitutes on average 'between 30% and 40% of the weight of the seed cotton'.³⁵⁴ Cotton lint was the desired product; the cottonseed was treated more as a secondary commodity that was crushed for use as a vegetable oil or was utilised as a fodder for livestock. While bounty payments were determined by weight, sixty to seventy per cent of those payments were being made for the weight of the embedded cottonseed, rather than the more valuable cotton lint. More importantly, before 1963, payments from the federal cotton bounty had been dictated by the weight of the seed cotton alone, without reference to the quality of the cotton fibre produced.³⁵⁵

Quality became paramount under the *Raw Cotton Bounty Act 1963*, with both the staple length and the grade of the cotton being assessed, and bounty payments were made in accordance with these two measures.³⁵⁶ The bounty rate was established in 1963 at '16.125d. per lb. for the grade middling one inch white raw cotton'. For those farmers whose cotton lint was ranked above or below that middling grade, bounty payments were increased or reduced commensurately.³⁵⁷

The purpose of the cotton bounty, as described by the federal Minister for Primary Industry, Mr C.H. Adermann, in 1963 was 'to promote a self-contained and economic industry.'³⁵⁸ While the ultimate aim was for an Australian cotton growing industry independent of government assistance schemes, the *Raw Cotton Bounty Act 1963* enshrined a curious change to the remuneration provided to cotton farmers. Under

³⁵⁴ Pigram, *The Development and Potential of the Namoi Valley Cotton Industry*, p. 7.

³⁵⁵ Pigram, *Cotton*, p. 3.

³⁵⁶ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 2.

³⁵⁷ Mr C.H. Adermann, Member for Fisher, Minister for Primary Industry, *Commonwealth of Australia Parliamentary Debates*, Session 1962-63, First Session of the Twenty-Fourth Parliament, Vol. H. of R. 40, 24 October 1963, p. 2269.

³⁵⁸ Mr C.H. Adermann, Member for Fisher, Minister for Primary Industry, *Commonwealth of Australia Parliamentary Debates*, Session 1962-63, First Session of the Twenty-Fourth Parliament, Vol. H. of R. 40, 24 October 1963, p. 2268.

previous bounty arrangements, the Australian federal government had guaranteed growers a minimum price per pound for the cotton they produced. However, this did not mean that the Commonwealth government bore the cost of the entirety of that fixed rate. The terms of the bounty had merely required the federal government to pay the difference between the market price received by the farmer and the guaranteed minimum price, when such a difference existed.³⁵⁹ With this system abandoned, a new arrangement was instituted that paralleled James Blasdel's recommendation. From 1963, the bounty rates set by the Commonwealth government were paid to farmers in addition to the market price received for their cotton.³⁶⁰ Although the changes to the bounty in 1963 incorporated a grading system, the new remuneration scheme broadly resembled that of the original 1907 cotton bounty, which had been paid as a bonus or premium.

Within Australia in 1963, it was the Namoi Valley which produced the highest proportion of lint that met the requirements of the newly-introduced grading system.³⁶¹ Although the federal bounty had been resurrected in 1951 to encourage Australians to grow cotton, the changes to the terms of the bounty in 1963 did little to assist those experimenting with cotton production in regions other than the Namoi Valley. Concern was raised in the New South Wales Parliament about the impact of reducing the cotton bounty on the Murrumbidgee Irrigation Area, where yields were considerably less than those achieved in the Namoi Valley.³⁶² Ironically, it was Queensland, the one

³⁵⁹ Mr E.J. Harrison, Vice-President of the Executive Council and Minister for Defence Production, *Commonwealth of Australia Parliamentary Debates*, House of Representatives, Vol. 214, Session 1951, First Session of the Twentieth Parliament, 31 October 1951, p. 1360.

³⁶⁰ Mr C.H. Adermann, Member for Fisher, Minister for Primary Industry, *Commonwealth of Australia Parliamentary Debates*, Session 1962-63, First Session of the Twenty-Fourth Parliament, Vol. H. of R. 40, 29 October 1963, p. 2390.

³⁶¹ Basinski, 'The Cotton Growing Industry in Australia', pp. 211-213.

³⁶² See Mr K.C. Compton, Minister for Lands, *New South Wales Parliamentary Debates*, Volume 48, 23 October 1963, p. 5847.

Australian state where cotton growing had experienced some longevity, which suffered the most from the transfer to a graded bounty system. More than 40 per cent of the cotton lint produced in Queensland during the 1963-64 season was classified as below the desired grade, and bounty payment rates were reduced accordingly.³⁶³

The cotton growing efforts of the American migrants in the Namoi Valley consistently surpassed that of Australian farmers.³⁶⁴ Consequently, the payments made to cotton producers under the Cotton Bounty scheme were to benefit the Americans more than Australian cotton growers.³⁶⁵ J.G. Boswell, who in 1969 alone received US\$4 million in United States' cotton subsidy payments, was also, through his ownership of Auscott Pty Ltd, a major beneficiary of the Australian Cotton Bounty scheme.³⁶⁶ In 1967, for example, Auscott received \$1 million from the federal government's Cotton Bounty. Auscott's 1967 payment represented 25 per cent of the total \$4 million Bounty pool.³⁶⁷ In 1971, Boswell's Auscott again received a 25 per cent portion of the Bounty fund, which had been reduced to a total sum of \$2 million.³⁶⁸

Cotton Production and Water Licences in the Namoi Valley

The period in which Americans such as J.G. Boswell could enter cotton growing in the Namoi Valley to take advantage of the irrigation water from Keepit Dam, as well as payments from the federal cotton bounty, was relatively short. The relocation of American cotton migrants to the Namoi Valley that had begun in the early 1960s was

³⁶³ Basinski, 'The Cotton Growing Industry in Australia', p. 211.

³⁶⁴ Wheatley, 'Power farming: A comparative study of modern cotton production in the United States and Australia', p. 80.

³⁶⁵ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 4.

³⁶⁶ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', pp. 143-144.

³⁶⁷ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 152.

³⁶⁸ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 181.

effectively brought to an end when the New South Wales Water Conservation and Irrigation Commission ceased issuing water licences for the irrigation of cotton from the Keepit Dam storage in October 1965.³⁶⁹ The Keepit Dam has a storage capacity of 420,000 megalitres, which is equivalent to an estimated 345,334 acre-feet.³⁷⁰ At the beginning of the 1960s, it had been anticipated that a maximum of 100,000 acre-feet of water would be ‘available to irrigators annually’ from the Keepit Dam.³⁷¹ With cotton requiring approximately two acre-feet of water for every acre of the crop, it was expected that the Keepit Dam would enable a large area in the Namoi Valley to be devoted to irrigated cotton production.³⁷²

By the end of June 1962, a total of 8,000 acres in the Namoi district had been granted approval from the Water Conservation and Irrigation Commission for licensed irrigation.³⁷³ The issuing of water licences spiralled from that time, however, as by November 1963, licenses for the irrigation of 50,000 acres in the Wee Waa-Narrabri district had already been issued.³⁷⁴ The Water Conservation and Irrigation Commission’s decision to halt the allocation of water licenses forced a handful of Americans to revise their plan to migrate to the Namoi Valley late in the 1960s:

With one well-capitalised exception (that is, the brother of one of the original American ‘pioneers’ at Wee Waa) insufficient financing had precluded their entry into the Australian industry until after 1968, when ... their choice of the

³⁶⁹ ‘Water Conservation and Irrigation Commission: Statement of Commission policy for the diversion of water from the Namoi River for irrigation purposes downstream of Keepit Dam’, *The Namoi Valley Echo*, 10 December 1965.

³⁷⁰ Jeffcoat, *Major Rural Dams in New South Wales*, p. 43; J.J.J. Pigram, ‘Policy Implications for Water Resource Management in Northwestern New South Wales’, *The Australian Geographer*, XII, 4, 1973, p. 299.

³⁷¹ Pigram, ‘Policy Implications for Water Resource Management in Northwestern New South Wales’, p. 299.

³⁷² F. Cutting, Farm Manager, and R. Schulze, Agronomist, Narrabri Experimental Farm, ‘Departmental trials pointer to a New Industry’, *The North Western Courier Special Feature: The Cotton Story*, 21 May 1964, p. 1.

³⁷³ Munro and Howell, ‘History of the Dam and Irrigation in the Namoi Valley’, p. 55.

³⁷⁴ ‘Cotton – Solution to Developing North West’, *The North Western Courier*, 7 November 1963, p. 6.

Namoi region was forestalled by water restrictions that ruled out expansion of cotton acreage there. Two brothers from Merced and a partnership from Tulare, further south in the San Joachin Valley are representative of this category.³⁷⁵

This small group of Americans who had delayed their migration to the Namoi Valley until the end of the 1960s were instead forced to choose from the other regions of Australia that still had irrigation water available. It seems that this particular grouping of farmers from the United States selected the St George Irrigation Area in Queensland to establish themselves as cotton growers.³⁷⁶

With respect to the fact that, after 1965, irrigation licences for the use of the Keepit Dam's water could no longer be obtained, the New South Wales government's transfer of water titles to J.G. Boswell's Auscott in 1968 is even more extraordinary. Ironically, when responding to criticism of Auscott's acquisition of substantial water licenses, Richard Rhodes had stated in 1963, "There is twenty times more water available than what is going to be used in the near future."³⁷⁷

Although licences to access the Keepit Dam's water supply were only available for a brief period before allocations were terminated in 1965, by that stage an irrigated cotton growing industry was already firmly established in the Namoi Valley. During this early period, cotton growing within the district was centred upon Wee Waa and its surrounds. The small township experienced a relative influx of American cotton farmers in the years that followed Frank Hadley and Paul Kahl's arrival in the Namoi Valley. In 1966, American cotton growers accounted for more than ten per cent of the population of Wee Waa, which at that time consisted of approximately 1,200 people.³⁷⁸

³⁷⁵ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', pp. 60-61.

³⁷⁶ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 62.

³⁷⁷ "Bigness' Underlined in Cotton Projects', *The North Western Courier: Cotton Feature Supplement*, 18 November 1963, p. 6.

³⁷⁸ McHugh, *Cottoning On*, p. 21.

Within the Namoi Valley in 1967, a total of 65 farmers were growing cotton. This figure comprised 38 Australian growers and 27 American farmers.³⁷⁹ Although those Australians producing cotton in the Namoi Valley during 1967 surpassed in number the migrants from the United States, it was their respective levels of production that were most important. Despite being among the minority of cotton growers in the Namoi Valley in 1967, the American farmers' combined cotton acreage was more than double that sown by the district's 38 Australian growers.³⁸⁰ 1967 was a critical period for the Namoi Valley's emergent irrigated cotton growing industry. It marked the first year the members of the Namoi Cotton Co-operative produced enough cotton lint to exceed the requirements of Australia's spinning mills. Once the needs of the domestic manufacturers were met, the Co-operative's 8,000 remaining cotton bales were sold to China through a Hong Kong-based broker.³⁸¹

After producing cotton intermittently from the arrival of the First Fleet in 1788,³⁸² Australia again became a cotton exporter in 1967. In that year, the Namoi Valley alone accounted for sixty per cent of Australia's total cotton production.³⁸³ While 1967 was not the first year in which Australia had exported cotton fibre, this overseas sale was important for a number of reasons. With experienced cotton growers from California and Arizona cultivating the majority of the Namoi Valley's cotton in the 1960s, the exported commodity little resembled the low-yielding, poor quality cotton that had characterised Queensland's production of the crop until that decade.³⁸⁴

³⁷⁹ Pigram, *The Development and Potential of the Namoi Valley Cotton Industry*, p. 23.

³⁸⁰ Pigram, *The Development and Potential of the Namoi Valley Cotton Industry*, Table IV, p. 23.

³⁸¹ Kahl, *Cotton Pickin' Pioneer*, p. 218.

³⁸² Rebeka Freckleton, 'Whether to Measure? Assessing the social implications of the cotton industry in Emerald', B. Sc. (Hons) thesis, Geosciences, University of Sydney, 2004, p. 22.

³⁸³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 6.

³⁸⁴ Basinski, 'The Cotton Growing Industry in Australia', p. 213; Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

Where in the past the growing of cotton in Australia had been sporadically impelled by inflated prices, events such as the American Civil War and the Great Depression, and even a desire to materially assist the British Empire, the 1960s represented a departure from this pattern.³⁸⁵ As the Namoi Cotton Co-operative exported its 8,000 bales in 1967 – sixty years after Australia’s first federal cotton bounty had been instituted – it seemed that Australia may finally have established a cotton industry that was permanent and capable of producing high-quality lint.

The revival of cotton growing in Australia during the 1960s, which was led by those Americans who migrated to the Namoi Valley, would never have occurred had the Commonwealth cotton bounty not been resurrected. The fixed rate of payment that was enshrined in the 1958 version of the cotton bounty legislation was guaranteed for an additional five years and provided growers protection from the declining world price of cotton.³⁸⁶ Within the Namoi Valley specifically, the availability of irrigation water from the Keepit Dam, the relatively low price of land, and the geographical and climatic suitability of the region for the production of cotton, which had been proven in experiments at Narrabri’s Agricultural Research Station, all served to attract a number of American migrants to the district. The permanency afforded the Australian cotton growing industry from the 1960s can be attributed in part to the ‘long-term nature’ of the involvement of the cotton migrants from the United States.³⁸⁷ As Pamela Merrill asserted:

Despite unusually high returns on investment in the earlier years of the 1963 Bounty Scheme, the American interests who may have preferred to return to

³⁸⁵ Basinski, ‘The Cotton Growing Industry in Australia’, pp. 206-209.

³⁸⁶ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 91 and 124.

³⁸⁷ Merrill, ‘American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972’, p. 67.

California or Arizona with their profits were largely forestalled by Australia's capital gains tax system.³⁸⁸

In a small number of cases where American cotton migrants returned to the United States, Australia's capital gains tax laws were circumvented by the transfer to other Australian-based Americans of 'assets in Australia in exchange for some in California.'³⁸⁹ Nevertheless, it seems that the majority of Americans remained resident in Australia once they had moved there for the purpose of growing cotton.

For some farmers from California and Arizona, Australia offered opportunities that the United States could no longer provide. Administrative measures such as acreage restrictions on cotton and other commodities, as well as the San Joachin Valley's One Variety Cotton Law had made aspects of cotton production in Arizona and California somewhat inflexible by the end of the 1950s. While some of the American cotton migrants had cited the increasing unrest of the primarily Mexican cotton workforce, the most important factors in their relocation to Australia were economic. Australia's Commonwealth cotton bounty was a substantial inducement when the rising cost of farming, the plummeting price of cotton and the high cost of land saw some farmers in the United States confronting a 'cost-price squeeze' in the late 1950s.³⁹⁰ Within California in particular, an enlarging urban population was placing greater pressure upon the state's land and water resources during the 1960s. The dominance of extensive tracts of California's agricultural land by corporate interests and the prodigious family-owned company, J.G. Boswell Pty Ltd, deprived many small farmers of the possibility of expanding their holdings. Indeed, those Americans who had

³⁸⁸ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 68.

³⁸⁹ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 68.

³⁹⁰ Wheatley, 'Power farming: A comparative study of modern cotton production in the United States and Australia', p. 81; Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 124; Merrill and Pigram, 'American Involvement in the Australian Cotton Growing Industry, 1962-72', p. 131.

migrated to the Namoi Valley to produce cotton early in the 1960s did not welcome J.G.

Boswell's acquisition of Auscott:

...it is known that the private U.S. farmers, who settled down around Wee Waa, are perturbed about the arrival of one of the largest U.S. cotton-gin operators, J.G. Boswell, on the local scene.³⁹¹

With the availability of water licenses and irrigable land in the early 1960s, perhaps the smaller American farmers such as Paul Kahl and Frank Hadley had seen in the Namoi Valley the opportunity to establish their own Boswell-like fiefdom.

Paul Kahl and Boswell's 'representative', James Blasdell, did, however, share a common perspective on the need for the Commonwealth cotton bounty to be revised. Both men assisted in the transformation of the bounty in 1963, which saw the bounty paid as a premium that was calculated in terms of the cotton lint quality, rather than the weight of the lint and cottonseed combined. The new quality provision of the bounty legislation meant that both the staple length and grade of the cotton lint were scrutinised in determining growers' bounty payments. It was the cotton producers of the Namoi Valley who fared best under the 1963 revision of the federal bounty.³⁹²

While the Namoi Valley demonstrated the greatest propensity for the production of the high-grade cotton that was favoured under the 1963 bounty revision, some in the Namoi district were already insisting that the Commonwealth cotton bounty should be eliminated, albeit gradually. The Namoi Cotton Co-operative's Board of Directors had recommended to Australia's federal government that, in addition to the 1963 bounty adopting a quality-based grading system, there should be a termination of all bounty payments within ten years.³⁹³ The Namoi Cotton Co-operative's chairman, Paul Kahl argued that there was:

³⁹¹ 'U.S. Investment Taking Hold in Cotton Industry', *The Australian Financial Review*, 28 May 1964, p. 1.

³⁹² Basinski, 'The Cotton Growing Industry in Australia', pp. 211-213.

³⁹³ Kahl, 'Reflections at sea', p. 29.

...the need to put a sunset clause into the legislation... I suggested a scale declining to zero over ten years. This would stop growers from getting themselves attuned to a life style that the government could not afford in the long haul. Also, the financial institutions would base their decisions on the world market price and not an artificial one developed in Australia, the ramifications of which had caused me to leave America.³⁹⁴

Paul Kahl and the Namoi Cotton Co-operative's demand for the phasing out of the Commonwealth cotton bounty – the subsidy that had originally prompted some American farmers to migrate to Australia – appears paradoxical. It seems contradictory that the region which was producing the largest proportion of high-quality cotton in Australia, and was thereby dominating the receipt of bounty payments, would want this subsidy disbanded.

This apparent paradox is explained by the predominance of experienced American cotton growers in the Namoi Valley and among the Namoi Cotton Co-operative's membership during the early years of the 1960s. The Americans who had migrated to the Namoi Valley were primarily drawn from the cotton growing areas of California and Arizona. They were familiar with cotton growing and knew that they were capable of producing high-value, high-quality cotton lint whether or not there was a bounty in place. The quality-based grading system that was introduced to Australia by the 1963 cotton bounty, too, was already standard in the United States. Helen Wheatley has suggested, moreover, that some of the American cotton migrants may have been disingenuous in the opinions they expressed about the Commonwealth cotton bounty:

Following American tradition, growers fully exploited Australian subsidies (some of the family cotton farmers became multi-millionaires, a rare species in Australian farming) while denouncing them as anti-competitive.³⁹⁵

The fact that an 'anti-competitive' subsidy such as Australia's Commonwealth cotton bounty had compelled some Americans to relocate to the southern hemisphere was

³⁹⁴ Kahl, *Cotton Pickin' Pioneer*, p. 106.

³⁹⁵ Wheatley, 'Power farming: A comparative study of modern cotton production in the United States and Australia', p. 87.

somewhat ironic. The American cotton migrants continued to profit from the Australian cotton bounty until it was finally eliminated in 1973.

Regardless of whether some of these Americans were sincere in their criticisms of the cotton bounty, the Namoi Cotton Co-operative's demand in the early 1960s for the bounty to be progressively phased out may be viewed as a challenge to farmers in Australia's other cotton growing regions. In the 1963-1964 cotton season, cotton growers in the Murrumbidgee-Murray area, the Ord district, and in Queensland had struggled to meet the high quality standard that had been installed in the new federal bounty.³⁹⁶ Paul Kahl, for one, had condemned the United States government's post-World War II subsidies and price guarantees that 'kept marginal, poverty status farms barely in business when the owner should be doing something else.'³⁹⁷ Kahl brought to Australia his opinion that farms must be competitive without relying on government financial support. With regard to his advocacy for the bounty's termination, Paul Kahl stated that this had incensed Queensland growers in particular.³⁹⁸

In allowing American farmers to migrate to Australia and dominate the receipt of cotton bounty payments, influence the terms of bounty legislation and ultimately persuade the Australian federal government to eliminate the bounty altogether, the cotton bounty's original purpose, which was to encourage Australian farmers to grow cotton, had been somewhat distorted. While the termination of the cotton bounty in 1973 had little effect in the Namoi Valley, it exacerbated problems in some of Australia's other cotton producing regions. Until the 1960s, cotton in Queensland had been characterised by small-scale production and was often sown merely as a secondary

³⁹⁶ Basinski, 'The Cotton Growing Industry in Australia', Table 2, p. 211.

³⁹⁷ Kahl, *Cotton Pickin' Pioneer*, p. 75.

³⁹⁸ Kahl, *Cotton Pickin' Pioneer*, p. 106.

crop.³⁹⁹ With the bounty's emphasis on quality from 1963, and its cessation ten years later, Queensland's small cotton growers may not have been well-capitalised enough to compete. The bounty's elimination created similar economic difficulties for those growing cotton in the Murrumbidgee Irrigation Area in southern New South Wales. Cotton production in the Murrumbidgee Irrigation Area was already complicated by the region's 'marginal temperature regime', which was often unfavourable to cotton plants.⁴⁰⁰ The success and profitability of the rice cultivation that dominated the Murrumbidgee Irrigation Area had prevented cotton growing from becoming widespread in the district even when the cotton bounty had been in existence.⁴⁰¹

The problems that stemmed from the termination of Australia's federal cotton bounty were, however, most acute in the Ord River Irrigation Area. Cotton growing at the Ord was never going to be profitable without the subsidisation provided by the Commonwealth cotton bounty.⁴⁰² Along with its remoteness, the Ord's long harvesting period decreased the quality of the cotton lint through excessive sun exposure.⁴⁰³ The tropical climate in the Ord region saw insect pests flourish amidst the cotton, and these pests became increasingly resistant to insecticides toward the end of the 1960s.⁴⁰⁴ At the same time as their pest control measures were becoming ineffectual, the Ord's cotton growers were confronting the 'rising costs of insect control, fertilisers, fuel and freight'.⁴⁰⁵ So dependent was the Ord on the federal government's financial assistance

³⁹⁹ Basinski, 'The Cotton Growing Industry in Australia', Table 2, pp. 216-217.

⁴⁰⁰ Gallagher and Musgrave, *Location and the Australian Cotton Industry*, p. 8.

⁴⁰¹ Pigram, *Cotton*, pp. 23-24.

⁴⁰² Davidson, 'Economic Aspects of the Ord River Project', p. 7.

⁴⁰³ Davidson, 'Economic Aspects of the Ord River Project', p. 12.

⁴⁰⁴ Information Branch, Western Australian Department of Agriculture, *Ord River Irrigation Area, Kununurra, Western Australia*, p. 5.

⁴⁰⁵ Department of National Resources, *Ord Irrigation Project, Western Australia: An outline of its History, Resources and Progress*, p. 49.

that cotton growing there lasted just one more season after the cotton bounty was eliminated.⁴⁰⁶

With cotton production abandoned on the Ord project in 1974, and the production of the crop encountering some difficulties in the Murrumbidgee Irrigation Area and in Queensland, the Namoi Valley was established as Australia's premier cotton growing region. Compared to the Ord and the Murrumbidgee Irrigation Area, the Namoi Valley had a distinct geographic and climatic advantage with regard to the cultivation of cotton. The experience the Namoi Valley's American migrants had gained in the cotton growing areas of California and Arizona certainly ensured the success of their large cotton acreages in north-western New South Wales.⁴⁰⁷ However, it was not merely the prior experience of these American cotton migrants that made them highly successful in the Namoi Valley. Had those who relocated to the Namoi Valley been from America's southern states, for example, the style of cotton production developed in the Namoi region would likely have been very different to that which did occur. The method of cotton production that was introduced to the Namoi Valley by its newly-arrived American residents was distinguished by its resemblance to cotton production in California. This method was characterised by large-scale, irrigated, and capital-intensive cotton production. Within Australia, these traits of industrialised cotton production were unique to the Namoi Valley during the 1960s.

This chapter has examined cotton growing in Australia from white settlement to the 1960s. It has demonstrated that the growing of cotton had remained a marginal agricultural activity within Australia until the 1960s. This chapter has provided an exploration of the pivotal role of government in fostering cotton growing historically in

⁴⁰⁶ Information Branch, Western Australian Department of Agriculture, *Ord River Irrigation Area, Kununurra, Western Australia*, p. 5.

⁴⁰⁷ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 68.

Australia, and how government involvement was again central to the establishment of a cotton growing industry in the Namoi Valley. This chapter has offered a detailed analysis of the factors involved in the introduction of industrialised cotton production to the Namoi Valley. The analysis in this chapter of cotton in the Namoi Valley has presented an important case with regard to the internationalisation of industrialised agriculture, as it has demonstrated the significance of local factors in the establishment of industrialised cotton production within the Namoi Valley. The following chapter offers an investigation of the system of industrialised cotton production that was introduced by the Namoi Valley's Californian migrants.

CHAPTER FOUR: THE NAMOI VALLEY'S COTTON MODE OF PRODUCTION

This chapter analyses the industrialised cotton production system introduced to the Namoi Valley during the 1960s. Specifically, this chapter examines the growing, harvesting and processing dimensions of the industrialised cotton production system established in the Namoi district in the 1960s. This chapter also explores how the Namoi Valley's industrialised cotton growing system has been modified in the decades since its introduction. This chapter offers an analysis, too, of the role of labour in Namoi region's industrialised cotton growing system. The commodity systems analysis perspective developed by William H. Friedland, Amy E. Barton and Robert J. Thomas in *Manufacturing Green Gold* has guided this chapter in terms of both its design and parameters. This chapter employs an historical analysis to explore the development of an agricultural commodity system in historical context.

The analysis of a specific rural industry within a particular region requires a close examination of the circumstances of that form of agricultural production. As William H. Friedland, Amy E. Barton and Robert J. Thomas argued in their study of the lettuce industry in the United States:

Agriculture is composed of a complex of specialized production systems. The peculiarities of weather and soil in the making of food and fiber crops should not, however, obscure the universal character of commodity production in capitalist agriculture.¹

Friedland, Barton and Thomas saw agricultural production 'as simply one distinct segment of the *capitalist mode of production*.'² As with lettuce in the United States, cotton production in the Namoi Valley cannot be understood without an examination of

¹ William H. Friedland, Amy E. Barton and Robert J. Thomas, *Manufacturing Green Gold: Capital, Labor, and Technology in the Lettuce Industry*, Cambridge: Cambridge University Press, 1981, p. 6.

² Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. 6, emphasis in original.

the method by which cotton is grown, harvested and processed within the region. The growing, harvesting and processing of the cotton and the labour and capital equipment required for each of these procedures gave rise to a mode so distinctive in the Namoi Valley that it may be conceived of as a ‘cotton mode of production’.³ While this chapter asserts that a distinctive ‘cotton mode of production’ emerged in the Namoi Valley, it does not contend that such modes of production are absent from other agricultural commodity systems. The ‘cotton mode of production’ described in this chapter is a component of the wider capitalist mode of production.

Cotton in the Namoi Valley has been the subject of an invaluable analysis published by P.G. Irwin in 1972. Irwin asserted that within the Namoi Valley, in spite of ‘the difference in the scale of operations, each cotton grower followed a similar system.’⁴ While this is accurate, Irwin nonetheless selected a sole cotton farm as the model for the chapter describing ‘The Cotton Farming System’.⁵ The chosen farm was Auscott Pty Ltd, the district’s largest cotton growing enterprise which, compared to other Namoi Valley cotton farms in that era, was notably atypical.⁶ Unlike Irwin’s method of emphasising the cotton growing practices on one particular property, this study attempts to provide a broader investigation of the region’s cotton industry in the 1960s and beyond. This chapter examines the nature of the cotton industry in the district through an analysis of the origins, establishment, adaptation and expansion of the Namoi Valley’s cotton mode of production.

³ The ‘mode of production’ has been defined as ‘how the economy is organised for the purpose of producing goods and services. It involves the use of tangible *forces of production*, comprising the raw materials, capital goods, labour power, and technology. It also involves particular *relations of production*, concerned with how people are organised (e.g. whether by authoritarian/hierarchical means or in democratic/participatory ways).’ See Frank Stilwell, *Political Economy: The Contest of Economic Ideas*, South Melbourne: Oxford University Press, 2002, p. 390, emphasis in original.

⁴ Irwin, *Cotton Systems of the Namoi Valley*, p. 8.

⁵ Irwin, *Cotton Systems of the Namoi Valley*, pp. 8-18.

⁶ Irwin, *Cotton Systems of the Namoi Valley*, pp. 8-9.

The cotton mode of production that began to emerge in the Namoi Valley from the early 1960s was modelled on Californian methods of cotton growing and processing. The establishment of this mode of production was a result of the determination of the Namoi Valley's American cotton migrants to recreate the institutions, growing techniques and processing methods with which they were familiar. Within Australia during the 1960s, this type of industrialised cotton production was peculiar to the Namoi Valley. In its origins and style, however, the Namoi Valley's cotton mode of production was manifestly Californian.

The differences between the cotton production method used in the Namoi Valley and the techniques employed in Australia's other cotton growing regions were marked during the 1960s. In the United States in the 1920s, cotton growing in California had been similarly conspicuous. During that period, Californian agriculture at large was unusual in its rapid mechanisation of agrarian production. Californian farmers had, for example, exceeded farmers in America's other states in the purchase of tractors by 1920.⁷ Although California's cotton boom only began in the 1920s, by the end of that decade cotton in California was exceptionally industrialised:

By the early twentieth century, California agriculture and particularly cotton represented one of the most developed forms of capitalist agriculture in the world. In part this was a matter of sheer size. By 1929, California cotton ranches were the largest in the nation, whether measured by acreage, production, or number of workers employed.⁸

The vast scale of cotton operations in California, as well as the volume of employees required to pick the cotton by hand, ensured that the adoption of labour-saving technological innovations was favoured by farmers in that state from the 1920s. Farmers in California had led the nation in what has been described as the 'tractORIZATION' of agriculture in the United States from that decade. Where California's

⁷ Weber, *Dark Sweat, White Gold*, p. 24.

⁸ Weber, *Dark Sweat, White Gold*, pp. 6-7.

farmers had been in the vanguard of the rapid adoption of the tractor, the state's cotton growers were also quick to acquire the cotton harvesting machines that became more widely available after the end of the Second World War.⁹

In the United States by 1961, California was the state that had the greatest proportion of its cotton harvested by machine. With 88 per cent of its 1961 cotton crop being mechanically harvested, California was closely followed by neighbouring Arizona, which used mechanical cotton pickers on 82 per cent of its total cotton acreage. New Mexico had the third highest proportion of machine-picked cotton with 73 per cent, while the Delta states of Arkansas, Louisiana, Mississippi, Missouri and Tennessee together had an average of 57 per cent of their cotton crops harvested by machine in 1961. In that year, the south-eastern states of Alabama, Georgia, North Carolina and South Carolina had the smallest proportion of machine harvested cotton, with a combined average of only 24 per cent.¹⁰

The level of mechanisation in California's production of cotton was most pronounced when contrasted with that in the traditional cotton growing areas of America's South. Unlike the state of California, the adoption of the tractor and the acquisition of equipment capable of harvesting the cotton mechanically both occurred relatively slowly in the southern Cotton Belt. The mechanisation of cotton in the South was impeded by the fact that many southern farmers were lacking the funds that would make such a transition affordable.¹¹ The legacy of plantation slavery in the southern American states inhibited the purchase and use of labour-saving farm machinery in the twentieth century. Following the end of the American Civil War, the structure of plantation slavery was effectively reconfigured into a system of tenancy based upon

⁹ Fite, *Cotton Fields No More*, pp. 185-186.

¹⁰ U.S. Department of Labor, *Cotton Harvest Mechanization*, Table 4, p. 14.

¹¹ Fite, *Cotton Fields No More*, p. 181.

sharecropping. Share-tenants cultivated cotton crops on small parcels of land using the labour of the family unit. The small-scale of the cotton crops grown by the southern sharecroppers made mechanisation uneconomic and unnecessary.¹² Moreover, the incentive for landowners to reduce the cost of labourers' wages by substituting capital machinery for labour was largely immaterial to share-tenancy arrangements:

Cheap labor came in the form of a cheap *laborer* for the year. The cost of cheap tenant labor was a share of the crop value, and the landlord saved no labor cost when only preharvest labor inputs were saved. To translate these input savings into costs savings, the landowner had to displace, one might say, a unit of a tenant from the labor force for the entire year with all of the cost repercussions that had for the harvest. Not only cheap labor, but also the form of that cheap labor, reduced the profitability of mechanization.¹³

While the pattern of tenancy and small-scale cropping stalled the mechanisation of cotton growing in the southern Cotton Belt, there were no such obstacles in America's south-western states.

Within California and Arizona, the terrain and weather conditions of the cotton growing areas favoured the use of tractors and mechanical cotton harvesters. The flatness of the land in the cotton growing zones of these states was suited to the operation of tractors, while the rainless harvesting period ensured that cotton picking machines could function without the hindrance of boggy ground. Along with these climatic and topographic factors, the economic circumstances of cotton farmers in California and Arizona were influential in the adoption of labour-saving machinery in those states. The wage rates received by agricultural labourers in California and Arizona were relatively high compared to those earned by farm workers in America's other states during the 1960s. This factor, as well as the large dimensions of many of

¹² Warren C. Whatley, 'A History of Mechanization in the Cotton South: The Institutional Hypothesis', *The Quarterly Journal of Economics*, Vol. 100, Issue 4, November 1985 p. 1208, <http://econpapers.repec.org/article/tprqjecon/v_3A100_3Ay_3A1985_3Ai_3A4_3Ap_3A1191-1215.htm>

¹³ Whatley, 'A History of Mechanization in the Cotton South', p. 1208.

California and Arizona's cotton farms determined that, by reducing labour costs, the purchase of cotton machinery was advantageous in terms of economies of scale.¹⁴

Particularly after World War II, the long-established cotton growing areas in the southern United States struggled to compete with the 'irrigated and highly mechanized farms of western Texas, Arizona and California.'¹⁵ Cotton's expansion and industrial transformation in these three states caused a substantial increase in the United States' overall production of the crop. Already a major producer of cotton, the United States had an additional 10.3 million acres sown to cotton during the decade 1919 to 1929.¹⁶ Texas alone accounted for an estimated 5.4 million acres of the extra cotton plantings that occurred in that period.¹⁷ The entry of farmers in Texas, California and Arizona into cotton production only exacerbated the crisis of cotton overproduction within the United States in the late 1930s. While domestic demand for cotton fibre during the Second World War alleviated this crisis temporarily, measures were required to eliminate America's chronic cotton surplus.¹⁸

President Franklin D. Roosevelt's New Deal policies were crucial in determining where and how cotton would be grown in the United States. In order to combat the persistent surplus of cotton fibre during the Great Depression, the Agricultural Adjustment Act, instituted in 1933, provided payments to those American farmers who reduced their production of the crop. Ironically, agricultural restructuring under the New Deal had a greater impact on the states that had historically comprised the southern Cotton Belt than it did in the newer western cotton growing areas. Within America's southern states, many landowners accepted Roosevelt's financial

¹⁴ US Department of Labor, *Cotton Harvest Mechanization*, p. 6.

¹⁵ Fite, *Cotton Fields No More*, p. 164.

¹⁶ Whatley, 'A History of Mechanization in the Cotton South', p. 1209.

¹⁷ Whatley, 'A History of Mechanization in the Cotton South', p. 1209.

¹⁸ Fite, *Cotton Fields No More*, p. 164.

compensation, decreasing their cotton acreages and severing their ties with the sharecroppers who had farmed their land.¹⁹

The 1933 Agricultural Adjustment Act had set in motion a social upheaval in the South that was further compounded by shortages of agricultural labour during the Second World War and the gradual shift to mechanised cotton production:

The need for hand labor that had motivated antebellum trading in slaves and postwar sharecropping had ended. After World War II millions of rural folk who had served in the military or labored in defense industries abandoned, either from choice or from necessity, the farming life. A work culture that utilized hoes, mule-drawn implements, and family-operated farms yielded to machines, chemicals, and large units of production.²⁰

While some in the southern states of America turned to a mechanised form of cotton growing, others began from the mid-twentieth century to abandon the cultivation of the South's iconic crop. Industrialised cotton production in the western states of America had triumphed, as cotton farmers in the South 'tired of competing with large-scale growers in California, Arizona, and west Texas put in soybeans or alfalfa and ran cattle on their lands.'²¹

Although the establishment of cotton production in America's south-western states was 'swift and on a huge scale', the relocation of acreages westward did little to alleviate cotton production's attendant social inequalities.²² In California, the disparity between large landowners and the wages and working conditions of their seasonal cotton-picking labourers had been highlighted by the 1933 Cotton Strike. As well as the disparity between cotton farmers and workers, a gulf was evident between California's large and small landowners. One of the ways that J.G. Boswell had been able to

¹⁹ Arax and Wartzman, *The King of California*, pp. 135-136.

²⁰ Daniel, *Breaking the Land*, p. 239.

²¹ Danbom, *Born in the Country*, p. 238.

²² Cohn, *The Life and Times of King Cotton*, p. 171.

develop his Californian cotton empire was to capitalise upon the immiseration and bankruptcy of smaller farmers during the Great Depression:

As the 1930s dragged on, many smaller farmers and ginners in California went out of business, and Boswell grabbed up their assets at bargain prices. Over a five-year stretch, starting in 1933, Boswell bought thousands of acres around the [Tulare] lake bottom; by 1938, it operated thirteen different ranches. And just four companies, including Boswell, now ginned two-thirds of the cotton in California. Boswell executives also acquired key water rights at this time, in part by wheedling Portuguese farmers along the Kings [River] who were starved for cash.²³

The opportunistic acquisitions by J.G. Boswell in the Depression era demonstrated the disproportionate economic power held by California's largest landowners. Even at the end of the 1920s, the high cost of agricultural land had ensured that farming in California could only be entered by those with significant capital reserves.²⁴ By the mid-twentieth century, the pattern of large-scale farming remained entrenched. With competition for land and water intensifying through urban sprawl and population growth, California's smaller farmers were increasingly marginalised. Toward the end of the 1950s, the costs of farming were rising in the United States at the same time as the price received for cotton was declining.²⁵ The mechanisation of cotton production in California had not merely entailed the purchase of a tractor and a mechanical cotton harvester; it changed almost every aspect of the way in which cotton was produced. The incorporation of chemicals and machinery was crucial to the success of industrialised cotton farming in California and it was just as fundamental to the method transposed from that state to the growing of cotton in the Namoi Valley.

When at the beginning of the 1960s a small number of farmers from the United States migrated to the Namoi Valley, they sought to take advantage of the Australian

²³ Arax and Wartzman, *King of California*, p. 136.

²⁴ Weber, *Dark Sweat, White Gold*, p. 25.

²⁵ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 91 and p. 124.

government's cotton bounty. The financing of the Auscott enterprise by J.G. Boswell Pty Ltd early in that decade represented a minor overseas expansion of Boswell's vast holdings.²⁶ After floods had decimated the first Auscott cotton crop, ownership of the venture had been transferred outright to the Boswell company.²⁷ Boswell's involvement in the growing of cotton in the Namoi Valley epitomised that of an absentee landlord. Once he had assumed control of Auscott Pty Ltd, Boswell immediately installed a Californian agronomist to manage his Australian investment.²⁸ At more than 7,000 acres, the size of the Auscott property was anomalous amidst the Namoi Valley's newly-established cotton industry. Even when compared to the holdings of the Namoi Valley's other American cotton interests, the scale of Auscott's tract of land appeared aberrant. Apart from its extensive acreage, J.G. Boswell's Auscott was differentiated from the Namoi Valley's American cotton migrants by Boswell's absence from the region. With the exception of both Ben Dawson's financier, Ward W. Beman, who was an American based in Sydney, and J.G. Boswell, it seems that those from the United States who involved themselves in establishing a cotton industry in the Namoi Valley typically became residents of that New South Wales region.

Aside from the more prominent of the Americans who were connected to cotton in the Namoi Valley, such as J.G. Boswell, Paul Kahl and Frank Hadley, details are scant regarding the farmers who moved to the Namoi district from the United States. While it is known that the majority of Americans who relocated to Australia between 1962 and 1972 to grow cotton were drawn from the cotton-producing districts of California and Arizona and had experience either servicing the cotton industry or as

²⁶ Arax and Wartzman, *King of California*, p. 6.

²⁷ 'Unobtrusive giant, Auscott', *The North Western Courier Special Feature: A Decade of Cotton*, June 1973, p. 4 and 7.

²⁸ Arax and Wartzman, *King of California*, pp. 306-307.

farm workers or cotton growers, specific figures on the migrants' involvement in these activities are unavailable.²⁹ Just as information on the background of the Americans who were producing cotton in Australia from the 1960s is limited to generalities, the particulars of the prior cotton experience of the Namoi Valley's American migrants have not been recorded. The proportion of the American émigrés in the Namoi district who had previously owned or worked on cotton farms or in the cotton service industry has not been ascertained. Similarly, the size of the cotton farms in the United States that had employed or been owned by these migrants is undocumented.

Of those among the Namoi Valley's American population who had been the proprietors of cotton farms in the United States, it is probable that they were smallholders. Jean Kahl's correspondence with agronomist Nick Derera had specified that farms of between 500 and 1,000 acres in the Namoi Valley were desired by 'several families' from California's San Joachin Valley.³⁰ Compared with the acreage that was subsequently purchased by Auscott Pty Ltd, farms of 500 to 1,000 acres were relatively modest in size. The proportions of the farms requested by the interested San Joachin Valley families appear particularly conservative given that land in the Namoi Valley in the early 1960s was selling at approximately one-sixth of the price of equivalent land in California.³¹

In part, the demand for farm units that were no bigger than 1,000 acres may have been determined by the cautiousness of some of the Californian migrants. Merced farmers, Paul Kahl and Frank Hadley were certainly circumspect in their 'pioneering' of cotton in the Namoi Valley. While purchasing property and establishing themselves in the Namoi district, both Frank Hadley and Paul Kahl retained ownership of their

²⁹ Merrill, 'American Involvement and the Resurgence in the Australian Cotton Growing Industry, 1962-1972', p. 68.

³⁰ McHugh, *Cottoning On*, p. 6.

³¹ Irwin, *Cotton Systems of the Namoi Valley*, p. 6.

Californian homes and a portion of the surrounding land.³² Perhaps the requirement of 500 to 1,000 acre farm units outlined by Jean Kahl simply reflected the pragmatism of the interested San Joachin Valley families in limiting their investment in the Namoi Valley before cotton growing within that region had proven a commercial success. The capital-intensive nature of irrigated cotton production, too, undoubtedly restricted the initial expenditure that could be made on land alone.

There are indications, however, that some of the Americans who migrated to grow cotton in the Namoi Valley were not well-capitalised, and this may at first have constrained their purchase of land in the Namoi district. In Merced, California, Paul Kahl had farmed only 160 acres, but in the Namoi Valley he became the joint owner of a 2,000 acre property.³³ Kahl sold half of his Merced farm to invest in the Namoi Valley, but the extraordinary differences between land values in the two regions were not enough to fund the entirety of Kahl's share of the Australian property. The Kahl family's Merced home was used as collateral for a loan to finance the procurement of the Namoi Valley farm known as 'Glencoe'.³⁴ In spite of the sale and mortgaging of his Californian assets, Paul Kahl's ownership and operation of a Namoi Valley farm that was more than twelve times the size of his Merced smallholding was only made possible through his partnership with Frank Hadley. Paul Kahl and Frank Hadley were not the only Americans who were able to buy farming land in the Namoi district through the pooling of their resources. In 1963, a large Namoi Valley property was purchased collectively by T.A. Davis and his relatives from McFarland, California, and the land quickly became home to four families.³⁵ Had they been the possessors of

³² 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 33; Kahl, *Cotton Pickin' Pioneer*, p. 89.

³³ McHugh, *Cottoning On*, pp. 5-8.

³⁴ Kahl, *Cotton Pickin' Pioneer*, p. 89.

³⁵ 'Cotton Acreage Boost Seen in Property Deal', *The North Western Courier*, 29 January 1963, p. 1; 'Cotton Spreads', *The Namoi Valley Echo*, 1 February 1963, p. 1; 'Land at Wee Waa sells for £85 per

significant individual wealth in the early 1960s, it is doubtful that T.A. Davis, Frank Hadley and Paul Kahl would have entered into their respective arrangements for joint property ownership in the Namoi Valley.

Although few details are known about the background of the Namoi Valley's American cotton migrants or the level of capital at their disposal upon arriving in Australia, it seems that those Americans who relocated to the Namoi region during the 1960s were not farmers of J.G. Boswell's stature. The expressions of interest in farms comprising only 500 to 1,000 acres, as well as the joint purchase of properties by a number of the American migrants, signalled that at least some of these newcomers did not have unlimited means. The nature of much of the American involvement in the Namoi Valley during the 1960s implied that J.G. Boswell was the sole magnate connected to cotton in that area of New South Wales. While Boswell was prepared to invest in the Namoi Valley, his appointment of a manager for Auscott confirmed that he was never going to abandon his Californian empire to personally oversee the running of the comparatively limited enterprise in Australia. In presiding over Auscott from his ranch on another continent, Boswell was atypical when compared to the other Americans engaged in cotton growing in the Namoi district. In contrast to Boswell's proprietorship from afar, two-thirds of the 27 Americans growing cotton in the Namoi Valley in 1967 were doing so as owner-operators.³⁶ Of the remaining one-third, five Americans were share farming and four were producing cotton on land they had leased within the Namoi district.³⁷ Apart from J.G. Boswell, whose role in the Namoi Valley's cotton industry exemplified foreign investment, the American stakeholders in that industry were overwhelmingly resident in the Namoi Valley, and were primarily

acre', *The North Western Courier*, 14 March 1963, p. 10; 'Family Enterprise at Gunedra', *The North Western Courier*, 29 April 1963, p. 7.

³⁶ Pigram, *The Development and Potential of the Namoi Valley Cotton Industry*, Table IV, p. 23.

³⁷ Pigram, *The Development and Potential of the Namoi Valley Cotton Industry*, Table IV, p. 23.

growing cotton on properties they had purchased. Nevertheless, what Boswell did have in common with the other Americans growing cotton in the Namoi Valley was that, in their involvement with the crop in Australia, all were guided by their experience of cotton production in the United States.

Within a decade of the arrival of the first two American migrants, Paul Kahl and Frank Hadley, a specific cotton mode of production had become entrenched in the Namoi Valley. Modelled on Californian methods, the Namoi Valley's cotton mode of production incorporated a range of chemicals and machinery into an intensive farming regime. This style of industrialised agricultural production, described as 'scientific, mechanised power farming', was unseen in the Namoi Valley prior to the American migration of the 1960s.³⁸ The rudiments of the emerging industrialised mode of cotton production were discernible in the growing of the Namoi Valley's first irrigated cotton crops on the 'Glencoe' property from 1961.

On their property on the outskirts of Wee Waa, Frank Hadley and Paul Kahl sought to replicate the cotton growing methods that were common in their home state of California. Many of the techniques deployed in growing cotton on 'Glencoe' in the early 1960s became characteristic of the cotton mode of production within the Namoi Valley. At the time they were introduced, however, these industrialised farming strategies were alien to Australia, which was only just beginning to experience the effects of agribusiness penetration of agriculture. Within the Namoi Valley, the intensive irrigation method deployed on the 'Glencoe' property was virtually unknown to a district that continued to be dominated by the grazing of sheep and cattle and the growing of wheat. Before the arrival of cotton, irrigation in the Namoi Valley had primarily been used in periods of drought by graziers to water fodder crops and pastures. In contrast, cotton's need for water was immense.

³⁸ Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', p. viii.

The growing of cotton under irrigation necessitated the adoption of a different form of land use to that which had prevailed in the grazier-dominated Namoi Valley. Irrigated cotton production entailed significant earthworks, with heavy machinery being used to clear vegetation and level the land. Channels were carved out of the soil to provide a passage for the transfer of irrigation water from the Namoi River to the paddocks where cotton was to be grown. The fundamental importance of water to the cultivation of cotton plants in a semi-arid climate such as that of the Namoi district made it a precious commodity. The raising of cotton crops in the Namoi Valley during the 1960s primarily occurred between the months of September and May. The growing period of the cotton plants encompassed the Namoi region's summer months, which were characterised by hot temperatures. Water was arguably the most critical element in the survival and flourishing of the region's cotton, but a single watering was not enough to sustain the crops through to maturity.

Cotton's need for moisture during the Namoi Valley's hottest season meant that the forging of channels was just one aspect of the construction of irrigation infrastructure on individual farms. Swathes of earth were excavated to create storage dams that would both capture rainfall and hold water drawn from the Keepit Dam and distributed via the Namoi River. By the late 1960s, some farms in the district had expanded their irrigation works with the addition of tailings dams. Designed to catch the run-off after a field had been irrigated, tailings dams enabled that water to be used again to bring moisture to the cotton plants. Although the establishment of storage and tailings dams demonstrated that water was vital to the region's newly-established cotton farms, the type of irrigation used in the Namoi Valley was not drip irrigation but flood irrigation. The latter method required copious amounts of water for the inundation of cotton fields. As well as vast volumes of water, the employment of flood irrigation meant that the land had to be re-shaped. The paddocks in which cotton would be

planted had to be moulded to a precise and consistent gradient. This would ensure the even flow of irrigation water to all of the cotton plants within a field, while avoiding the problems associated with poor drainage. In a process known as ‘hilling up’, a tractor-drawn plough was used to sculpt the earth into long parallel raised beds that were formed at uniform intervals. The cottonseed was sown into the raised beds, while irrigation water was delivered from channels into the furrows between these beds.

Although land clearing and the establishment of irrigation infrastructure became common on cotton farms in the Namoi Valley as the 1960s progressed, the district’s initial American cotton migrants, Paul Kahl and Frank Hadley, were the first to undertake these operations on a significant scale during the early part of that decade. After part of their Glencoe property was cleared, the land was levelled in preparation for the planting of cotton. The furrows for irrigation on the farm were spaced forty inches apart and stretched 2,000 yards in length.³⁹ Aside from the trial plots at the Narrabri Agricultural Research Station, Paul Kahl and Frank Hadley were the earliest practitioners of irrigated cotton production in the Namoi Valley. As irrigation was not often engaged in by the region’s farmers at the beginning of the 1960s, the Merced pair experienced some difficulties in obtaining the required equipment from local Namoi Valley suppliers. As Frank Hadley recalled, “You could buy anything for sheep. You could get wheat equipment, but anything to do with irrigation or row crop farming was just totally foreign.”⁴⁰ Aluminium siphons, which were used to transfer irrigation water from channels into the furrows between the cotton rows, could not be purchased within Australia. Paul Kahl and Frank Hadley had to resort to importing these siphons from California.⁴¹

³⁹ ‘Pre-Planting Preparation’, *The North Western Courier Cotton Feature Supplement*, 18 November 1963, p. 1.

⁴⁰ ‘The pioneering Hadleys’, in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 33.

⁴¹ ‘U.S. Cotton Growers Plant Initial Acreage’, *The North Western Courier*, 13 November 1961, p. 1.

Along with the foreignness of flood irrigation techniques, it was the scale of its irrigation works that made the Glencoe property unique in the Namoi Valley in the early 1960s. While only a small number of local farmers were using the water from the Namoi River, Paul Kahl and Frank Hadley installed a pump capable of extracting water from the river at a rate of 4,000 gallons per minute.⁴² In what was described as a ‘miniature river’, irrigation water pumped from the Namoi River by Kahl and Hadley into the channel on Glencoe flowed through the channel at a rate of 240,000 gallons per hour.⁴³

Irrigation was not the only aspect of cotton farming that made Frank Hadley and Paul Kahl’s endeavours at Glencoe conspicuous. The volume of diesel fuel required for their intensive cotton production confounded local fuel suppliers. Farming in the Namoi Valley had not previously been so dependent on the use of machinery and the supply of fuel to power it. It was unprecedented for farmers to order particularly large quantities of fuel. As Frank Hadley explained, “We wanted bulk fuel instead of 44 gallon drums and the reps came out and laughed – you can’t use that much diesel.”⁴⁴ All but one fuel supplier refused to meet the demand of the two Americans for bulk fuel. An agent for Neptune fuel delivered to the Glencoe property “a 500 gallon tank and a truck load of 44 gallon drums and pumped them all into the bulk tank.”⁴⁵

In forging the Namoi Valley’s irrigated cotton industry in the style of Californian production, Paul Kahl and Frank Hadley attempted to secure a supply of the products and equipment that were used by Californian cotton growers. Mirroring

⁴² ‘U.S. Cotton Growers Plant Initial Acreage’, *The North Western Courier*, 13 November 1961, p. 1.

⁴³ ‘Powerful pumps create miniature river at Glencoe’, *The North Western Courier Cotton Feature Supplement*, 18 November 1963, p. 6; ‘U.S. Cotton Growers Plant Initial Acreage’, *The North Western Courier*, 13 November 1961, p. 1.

⁴⁴ ‘The pioneering Hadleys’, in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 33.

⁴⁵ Frank Hadley quoted in ‘The pioneering Hadleys’, in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 33.

California's cotton farmers, Kahl and Hadley purchased a high-powered pump and aluminium siphons to irrigate their cotton. While securing a bulk fuel supply was important, the most essential piece of equipment for Frank Hadley and Paul Kahl to grow cotton profitably on 'Glencoe' was a mechanical cotton harvester.

In California, it was the invention of the mechanical cotton picker that had enabled large-scale production of the crop to succeed. The planting of substantial cotton acreages in California had been constrained somewhat by the need for the crop to be hand-picked by labourers. While the introduction of the tractor had made the planting of large cotton acreages possible, the cost and time involved in the hand-picking of the crop had remained until the mechanical cotton harvester became available commercially.⁴⁶ The mechanical cotton picker was just as important to the establishment of a cotton growing industry in the Namoi Valley as it had been in California.

With only a small, largely un-mechanised cotton industry in existence in Queensland at the beginning of the 1960s, mechanical cotton harvesters were not readily available within Australia. Following their move to the Namoi Valley, Paul Kahl and Frank Hadley had initially been unsuccessful in their attempt to lease a single-row mechanical cotton harvester from manufacturer John Deere.⁴⁷ However, when the John Deere Company discovered that Kahl and Hadley's cotton crop was to be the central feature of the Namoi district's 1962 Cotton Field Day, the company seized the opportunity to market their mechanical cotton harvesters. Paul Kahl recalled that the John Deere Company relented when they heard of the planned Field Day: 'Then they insisted on giving me the picker for a week if I would just pick with it during the

⁴⁶ Hurt, *American Agriculture*, p. 310.

⁴⁷ Kahl, 'Reflections at Sea', p. 27.

show.⁴⁸ In accordance with Californian methods, the cotton grown on the 'Glencoe' property was chemically defoliated before the harvesting demonstration using the John Deere machine commenced.⁴⁹

While Frank Hadley and Paul Kahl did not establish the Namoi Valley's cotton mode of production single-handedly, it is from their initial efforts that the cotton mode of production can be delineated. The growing of cotton under irrigation, the chemical defoliation and mechanical harvesting of the ripened cotton were each first practised in the Namoi Valley by Paul Kahl and Frank Hadley. It was not until a number of other migrants, primarily from California, joined Kahl and Hadley in growing cotton in the Namoi Valley that the cotton mode of production became apparent.

The success of the American cotton growers who settled in the Namoi Valley encouraged some local farmers to embark upon cotton production. Just six years after the region's first commercial cotton crop had been produced under irrigation, those Australians who had begun to cultivate cotton in the Namoi Valley had surpassed in number the district's coterie of American cotton farmers. A total of 38 Australians grew cotton in the Namoi Valley during 1967, while the American growers numbered only 27.⁵⁰ Despite the numerical dominance of local farmers in cotton growing toward the end of the 1960s, the Namoi Valley's cotton mode of production reflected plainly its American roots. This anomaly is explained by the Namoi Valley farmers' comparative inexperience in irrigated cotton growing, which led many during that era to rely on and defer to the knowledge of the district's American growers.

At the same time as the favourable results of the Narrabri Agricultural Research Station's cotton trials and the activities of the Namoi Valley Agricultural Development

⁴⁸ Kahl, 'Reflections at Sea', p. 27.

⁴⁹ 'Cotton Interest: Field day boom', *The Namoi Valley Echo*, 27 April 1962, p. 1.

⁵⁰ Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', Table IV, p. 24.

Council were attracting the attention of cotton growers from the United States, interest in cotton was also generated amongst some local farmers. Nevertheless, it was only after the American migrants' initial crops had flourished that Namoi Valley locals joined the newcomers in planting cotton on a commercial basis. In 1964, however, as irrigated cotton production was becoming more extensive in the Namoi Valley, the New South Wales Minister for Agriculture warned novice cotton growers of the crop's particular problems and urged them to seek guidance regarding its cultivation. The Minister, A.G. Enticknap, emphasised the nature of cotton as 'a highly specialised plant, demanding close and detailed attention'.⁵¹ Enticknap implored new growers of cotton to obtain advice from the state's Department of Agriculture officers prior to commencing cotton production on a substantial scale.⁵² Three months after the New South Wales Minister for Agriculture had delivered his warning to fledgling cotton growers, a Namoi Valley newspaper cautioned, too, that 'successful cotton growing depended on close adherence to established techniques and the use of specialised equipment.'⁵³ It seems that the unfamiliar status of irrigated cotton production in the district at the beginning of the 1960s, as well as the cautions issued about the peculiarities of cotton growing, did result in Namoi Valley farmers seeking counsel before attempting to grow the crop. During the 1960s, however, there existed in the Namoi district only two sources of advice on cotton production: the American cotton growers and the Narrabri Agricultural Research Station.

Amongst the region's American migrants, Paul Kahl and Frank Hadley's position as the founders of irrigated cotton growing within the Namoi Valley accorded

⁵¹ 'Research in Cotton Fibres: New Laboratory authorised', *The Namoi Valley Echo*, 21 February 1964, p. 1.

⁵² 'Research in Cotton Fibres: New Laboratory authorised', *The Namoi Valley Echo*, 21 February 1964, p. 1.

⁵³ 'Cotton growing aids Australian National economy', *The North Western Courier Cotton Feature*, 21 May 1964, p. 11.

the pair an especial prominence. Hadley and Kahl did not merely cultivate the crop themselves; they acted as proponents for the establishment of a cotton growing industry within the Namoi district. The prominent yet informal role of Kahl and Hadley as advisers on cotton was one they actively sought from their first visit to the Namoi Valley in 1961, when they addressed a Narrabri crowd on the prospects of fostering a local cotton industry.⁵⁴ This public-spiritedness also served a more tangible purpose. In choosing to settle in the Namoi Valley, Hadley and Kahl had planned to erect a cotton gin but the construction and operation of the gin would not have been cost-effective if it was used to process their crop alone. Paul Kahl stated:

We wanted plenty of uncommitted land around us, too, because if the crop took off as we hoped, we would need a gin, which meant more people would have to follow us in growing cotton.⁵⁵

In order to promote cotton production and interest others in the growing of the crop, Kahl and Hadley hosted the 1962 Cotton Field Day and involved themselves in the Cotton Festival, held in the Namoi Valley for the first time in 1964. Frank Hadley and Paul Kahl's participation in these events further cemented their reputation within the district as expert cotton growers. From their arrival and establishment in the region, Kahl and Hadley's methods of producing cotton on their Glencoe property were used as a model by many Namoi Valley farmers who ventured into the cultivation of the fibre crop. Paul Kahl explained the unusual situation he and Frank Hadley shared once they had migrated to north-western New South Wales early in the 1960s:

We were able to provide the knowledge, and I think we were visited by every cotton-farmer in Australia during those first years.⁵⁶

⁵⁴ See 'U.S. Farmers discuss cotton as future N.S.W. crop', *The North Western Courier*, 23 March 1961, p. 1.

⁵⁵ 'Think Kahl, think cotton', *The North Western Courier Special Edition: A Decade of Cotton*, June 1973, p. 14.

⁵⁶ 'Think Kahl, think cotton', *The North Western Courier Special Edition: A Decade of Cotton*, June 1973, p. 16.

It was not only the producers of cotton, novice or otherwise, who sought the expertise of Kahl and Hadley; the Agricultural Research Station near Narrabri apparently benefited from ‘close co-operation’ with Paul Kahl in particular.⁵⁷

When Paul Kahl and Frank Hadley began to produce cotton commercially in the Namoi Valley, the techniques they had learnt in California were not dissimilar to the practices which were then being recommended to potential growers by the Agricultural Research Station. The success of industrialised cotton production in California had not gone unnoticed and, even without the migration of farmers from the United States, employees of Narrabri’s Agricultural Research Station were already favourably disposed to Californian-style cotton growing methods. The United States had long been one of the world’s leading cotton growing countries, but in the aftermath of the Second World War, America was unrivalled in the application of scientific and technological innovations to the growing of cotton. To some, the adoption of these innovations represented the modernisation of cotton growing, an archaic agricultural industry that in the United States had been built on the toil of slaves and sharecroppers. The elimination of cotton’s long-established dependence on a large pool of labour was viewed as a breakthrough:

The American cotton growing industry has tackled these [labour] problems by mechanisation – reducing labour requirements to a minimum; movement of the crop into the irrigation and delta areas where larger farms and larger yields are obtainable; extensive research on breeding, fertiliser requirements, weed and pest control and cultural practices.⁵⁸

These aspects of cotton’s industrialisation were, by the 1960s, most evident in California. The pinnacle of America’s cotton industry in that period, California’s irrigated, capital-intensive and heavily mechanised form of cotton production rapidly

⁵⁷ ‘Intensified farming needed to produce best results with cotton’, *The North Western Courier*, 2 April 1962, p. 3.

⁵⁸ ‘Minister speaks on cotton: Queensland £80,000 cotton ginnery opened’, *The North Western Courier*, 8 June 1961, p. 3.

gained a popularity that extended beyond that state. The Namoi Valley was one region which came to emulate California's cotton growing practices.

By 1959, two years prior to Frank Hadley and Paul Kahl's inspection of the Namoi Valley, the Narrabri Agricultural Research Station agronomist, Nick Derera, was convinced of the potential for the district 'to produce cotton under an intensive irrigated cropping system'.⁵⁹ During 1960, Nick Derera and Tom Lawler, the manager of the Research Station, wrote a series of newspaper articles which outlined how cotton may be grown in this manner.⁶⁰ Derera and Lawler's articles emphasised the need for the production of cotton to incorporate the use of fertiliser, irrigation water, insecticides and weed control, as well as contrasting the harvesting of cotton by machine with that of hand-picking.⁶¹ Of Paul Kahl and Frank Hadley's entrance into cotton farming in the Namoi Valley, Nick Derera stated:

I assisted them to grow their first crop. As a matter of fact I released my farm foreman to be employed by them to help to grow their first very successful crop.⁶²

This collaboration between the Narrabri Agricultural Research Station and the two American cotton growers illustrated the convergence of cotton growing techniques that occurred in the Namoi Valley early in the 1960s. The inclination of the Research Station's employees toward the cotton growing techniques favoured in the United States, as well as their close association with the district's American cotton migrants contributed to an intensive, industrialised method of cotton production becoming dominant within the Namoi Valley. The participation of the Research Station, too,

⁵⁹ Derera, 'Enthusiasm for cotton led to a new industry', p. 21.

⁶⁰ T. Lawler and N. Derera, 'Cultivation During Growing Period', *The North Western Courier*, 1 December 1960, p. 10; T. Lawler and N. Derera, 'Advice to Cotton Growers', *The North Western Courier*, 19 December 1960, p. 11.

⁶¹ T. Lawler and N. Derera, 'Cultivation During Growing Period', *The North Western Courier*, 1 December 1960, p. 10; T. Lawler and N. Derera, 'Advice to Cotton Growers', *The North Western Courier*, 19 December 1960, p. 11.

⁶² Derera, 'Enthusiasm for cotton led to a new industry', p. 23.

indicated the significance of state involvement in the establishment of industrialised cotton growing in the Namoi Valley.

In providing advice to novice cotton growers, the Agricultural Research Station effectively disseminated intensive, Californian-style cotton growing techniques. Indicative of the Research Station's emphasis on this new farming regime was the statement by its agronomist, Ralph Schulze, that cotton growing had not been a significant industry in the Namoi Valley before the 1960s because of 'farmers' indifferent approach to intensified farming which was required for growing the crop under irrigation'.⁶³ The Research Station's alliance with intensified farming was apparently further reinforced after Ralph Schulze was sent by the Station to the United States in 1962, where he studied American methods of cotton growing for a year.⁶⁴ Schulze, based in Bakersfield, California during that period, was reportedly heavily influenced by his tour of cotton growing regions of the United States.⁶⁵ The virtual lack of variance in the advice proffered to novice cotton growers by the Narrabri Agricultural Research Station and the American cotton farmers meant that the cotton growing method adopted in the Namoi Valley was almost formulaic, and was distinctly influenced by techniques developed in the United States.

By 1966, more than 120 Americans had migrated to the Namoi Valley.⁶⁶ This influx occurred only after Paul Kahl and Frank Hadley's first cotton growing efforts had proven successful. For those Americans who migrated subsequent to Hadley and Kahl,

⁶³ 'Intensified farming needed to produce best results with cotton', *The North Western Courier*, 2 April 1962, p. 3.

⁶⁴ F. Cutting, Farm Manager, and R. Schulze, Agronomist, Narrabri Experimental Farm, 'Departmental trials pointer to a New Industry', *The North Western Courier Special Feature: The Cotton Story*, 21 May 1964, p. 1.

⁶⁵ 'Bright Future Forecast for Cotton Industry', *The North Western Courier*, 17 October 1963, p. 1; 'An Australian's impression of the U.S. cotton industry', *The North Western Courier Cotton Feature Supplement*, 18 November 1963, p. 2.

⁶⁶ McHugh, *Cottoning On*, p. 21.

the two crucial factors of cotton production in the Namoi Valley – irrigation water and irrigable land – remained available to them until the final years of the 1960s. As that decade came to an end, no further licences were being issued for the Keepit Dam as it was recognised that the dam’s water supply had been over-allocated. The migration of farmers from the United States to the Namoi region had peaked during the same decade in which it had begun. Although this migration occurred within a brief period, the arrival of these American migrants and the establishment of their industrialised methods of cotton production saw the rapid transformation of pockets of the Namoi Valley’s landscape.

As the conduit of essential irrigation water, the Namoi River and the creeks that adjoined it were the focus of development by American farmers. A pattern of development emerged with the purchase by U.S. interests of properties with river frontage, and cotton was soon produced on clusters of farms along the Namoi River and its tributaries. The sale of these properties to American cotton growers heralded significant land clearing in the vicinity of Wee Waa, where irrigated cotton production became concentrated. River gums were razed and burnt, as grazing lands were adapted for cotton production.⁶⁷ The majority of those trees felled were Coolibah.⁶⁸ The clearing of land for cotton production was likened to a military operation, as the American farmers’ ‘armed forces’ commenced ‘fighting the earth with bulldozers, tractors, ploughs, insecticides and theodolites.’⁶⁹ The clearing of land was commonly undertaken by two crawler tractors with a heavy chain connected between the two machines. The tractors would drag the chain between them simultaneously,

⁶⁷ ‘Agricultural revolution is evident in the North West: Improved Methods’, *The North Western Courier*, 29 April 1963, p. 9.

⁶⁸ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 6.

⁶⁹ Don Campbell, ‘Twin Regions Break Farm Records: Namoi and New England Story’, *Australian Country Magazine*, March 1964, p. 81.

demolishing everything in their path in what was known as ‘chain-clearing’.⁷⁰ Only two years after the migration of American cotton growers had begun, the solitude of stretches of the Namoi River was broken by the echo of irrigation pumps.⁷¹

As most of the American farmers producing cotton in the Namoi district during 1967 were owner-operators, it seems improbable that they would have relocated to the southern hemisphere, incurring all of the expense involved, without seeking to acquire a substantial acreage in an area where land was relatively cheap. Along with its inexpensive land and the availability of irrigation water, the Namoi Valley at the beginning of the 1960s had presented another important inducement to cotton growers from the United States: the potential for expansion. Agriculture in the Namoi district in that period was not complicated by the competition for land and population pressures that confronted Californian farmers and made it difficult for smallholders to afford to increase the size of their properties. When J.G. Boswell II toured the Auscott enterprise during the 1960s, he made plain his determination to expand the venture. Auscott’s manager at the time, James (Jim) Fisher, recalled Boswell inspecting the 7,354 acre property and asking, “How much bigger can you make this? Two, three, five times bigger?”⁷²

Like Boswell, Paul Kahl and Frank Hadley were not content with making a small investment in the production of cotton in the Namoi region. When interviewed by a local newspaper in 2005, Paul Kahl was candid about the objective he had settled upon when he and his Merced neighbour had resolved to leave Californian farming:

What Frank [Hadley] and I set out to achieve together was a cotton farm on a grand-scale in a water abundant area, which is how we ended up in Australia.⁷³

⁷⁰ Former employee of the Namoi Valley’s cotton growing industry, personal correspondence with the author, March and April 2005.

⁷¹ ‘Agricultural revolution is evident in the North West: Improved Methods’, *The North Western Courier*, 29 April 1963, p. 9.

⁷² Jim Fisher cited in Arax and Wartzmann, *The King of California*, p. 307.

⁷³ Paul Kahl quoted in Matt Deans, ‘Farming foresight’, *The Northern Daily Leader*, 4 June 2005, p. 22.

After jointly purchasing the 'Glencoe' property east of Wee Waa in July 1961, Frank Hadley and Paul Kahl began to increase their holdings in the following year.⁷⁴ The pair bought a share of a farm that was located to the south-west of the town in September 1962.⁷⁵ Together, Kahl and Hadley acquired half of this 2,000 hectare property, which was known as 'The Gardens'. The remainder of the farm was split between two other American buyers: Frank Hadley's cousin, Hadley Alf, and Frank Hadley's father, Ernest Hadley.⁷⁶

During 1963, Paul Kahl and Frank Hadley bought more land which adjoined their original property. The neighbouring farm, 'Brae', comprising 1,150 hectares, was divided between Hadley, Kahl and Bob Hoss, who had been a resident of Denver in the United States.⁷⁷ Despite these acquisitions, Frank Hadley and Paul Kahl's joint holdings appeared to be minor when compared to the expanse of Namoi Valley land controlled by J.G. Boswell's Auscott. In 1965, Auscott planted 80 per cent of the total 28,500 acres that were sown to cotton within the Namoi Valley.⁷⁸

From a mere sixty acres in 1961, the progression of the district's cotton production to almost 30,000 acres less than five years later was remarkable. Although occasionally overshadowed by the dominance of Auscott Pty Ltd, a complex system which encompassed the production and ginning of the region's cotton rapidly emerged in the Namoi Valley.

⁷⁴ 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 32.

⁷⁵ Kahl, *Cotton Pickin' Pioneer*, p. 105.

⁷⁶ Kahl, *Cotton Pickin' Pioneer*, p. 105.

⁷⁷ Kahl, *Cotton Pickin' Pioneer*, p. 113.

⁷⁸ McHugh, *Cottoning On*, p. 25.

The Growing, Harvesting and Processing of Cotton in the Namoi Valley during the 1960s

Beginning in the early 1960s, a cotton mode of production had been established in the Namoi Valley before the end of that decade. From the 1960s, the district's cotton mode of production was demarcated by three distinct phases: the growing, harvesting and processing of the cotton crop. Each of these phases of the cotton mode of production took place within the Namoi region.

Although irrigated cotton growing was forged in an industrialised form in the Namoi Valley, the production of the crop was nevertheless governed by the biological requirements of the cotton plant. Not all climates and terrains are suited to the production of cotton crops that generate a significant portion of fibre and are profitable. For this reason, cotton growing had historically been restricted to the tropical and sub-tropical regions of the globe, until it was discovered that the crop could be successfully produced under irrigation in semi-arid areas like California. Within Australia, the Namoi Valley was situated at what was believed to be an optimum latitude for cotton production, and much of the district delivered the frost-free period that was needed for the crop to grow without impairment.⁷⁹

Along with these broad attributes, the Namoi Valley was proven favourable to the growing of cotton under irrigation by the positive results obtained from the experimental cotton plots sown by the Narrabri Agricultural Research Station in the late 1950s and early 1960s. The results of these trials alone did not make the Namoi Valley unique, but its irrigation supply and inexpensive land saw the Namoi district chosen by American migrants as the site for an irrigated cotton growing industry. While the intensive Californian-style of irrigated cotton growing introduced to the Namoi Valley

⁷⁹ 'Spectacular Growth of Namoi Cotton Industry', *The Cotton Valley*, sponsored by the Namoi Cotton Co-operative and the Bradford Cotton Mills, printed by the North Western Courier, Narrabri, 1966, p. 3; Greenland, 'Cotton Farming under irrigation', p. 1.

in the 1960s bore little resemblance to the small-scale method of cotton production that had prevailed in Australia prior to that decade, there were fundamental aspects of cotton growing that remained unaltered by adherence to these industrialised techniques.

The parameters of the Namoi Valley's cotton mode of production were determined foremost by the growing cycle of the cotton plant. Cotton's susceptibility to frosts and its requirements of both high temperatures and soil moisture levels dictated that the crop would be grown under irrigation in the Namoi Valley between the months of September and May. For cottonseed to germinate successfully, a moderate soil temperature had to be evident before the sowing of the cottonseed could commence. As a result, cotton in the Namoi district was usually planted in September or October.⁸⁰ In the areas of the Namoi Valley where irrigated cotton was produced, the predominant soil types were grey and grey-brown self-mulching clays.⁸¹ The features of these varieties of earth were amenable to row cropping under irrigation:

Apart from the suitable physical characteristics of these soils for surface irrigation, the landscape in which they occur is generally of very even surface topography, which allows for very long runs for furrow irrigated crops with relatively little land preparation.⁸²

The parts of the Namoi Valley which were selected for the production of irrigated cotton crops were distinguished by a relative uniformity in the flatness of the land. While the rows of cotton produced in an industrialised manner in the Namoi Valley resembled 'factories in the field' during the 1960s, there were commonalities between the intensive method used within the Namoi district and the way in which cotton had been grown for centuries in different parts of the world.

Despite the breeding of improved varieties of cottonseed by the late 1960s and the reliance of the district's cotton growing industry on an array of chemicals and heavy

⁸⁰ Greenland, 'Cotton Farming under irrigation', p. 2.

⁸¹ Stannard and Kelly, *The Irrigation Potential of the Lower Namoi Valley*, p. 29.

⁸² Stannard and Kelly, *The Irrigation Potential of the Lower Namoi Valley*, p. 29.

machinery, in the Namoi Valley the cotton plant nonetheless remained a living organism that was vulnerable to fluctuations in the weather and other environmental hazards. None of the accoutrements of the Namoi district's industrialised production method could, for example, prevent the destruction of much of the region's cotton crops when they were inundated by flood water in 1971.⁸³ By the 1960s, the majority of the cotton-related innovations that had been achieved were focused on improving the yield of the cotton fibre and reducing the need for labour in the harvesting of the crop. These objectives had driven the creation of different types of mechanical cotton harvesters, for instance, as well as the creation of high-yielding varieties of cotton that were conducive to successful harvesting by machine. However, no invention or innovation had been developed to either dramatically hasten or prolong the growing period of cotton. Although aided in the era of the 1960s by the application of fertilisers, irrigation water and insecticides, the cotton plant itself had not yet undergone dramatic genetic modifications.

The Namoi Valley's cotton mode of production, while exhibiting marked differences from pre-twentieth century cotton growing techniques, nevertheless retained a feature common throughout the historical continuum of cotton production: the growing cycle of the cotton plant was the determining factor in shaping the mode of production. The desired product from the growing of cotton was the crop's white fibre, but this could not be extracted until the plant had reached maturity and its bolls, like the bud of a flower, had burst open to display the lint. Not all of the bolls opened simultaneously, however, and the initial harvesting of the cotton by machine was often followed by a second and even a third picking, where the mechanical harvesters would

⁸³ John Andrews, 'Progress and expansion... despite the floods', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992: Foundations for the Future*, Narrabri: North Western Courier Group, 1992, pp. 36-37.

re-enter the cotton paddocks to collect the fibre from late opening bolls.⁸⁴ The growing period of the cotton was not always predictable, nor could it be calculated precisely. The survival and growth rate of each cotton crop was subject to a variety of factors, including temperature, exposure to sunlight, soil nutrient content and moisture levels. The timing of the latter phases of the Namoi Valley's cotton mode of production, the harvesting and processing of the fibre, was entirely reliant on the duration of the crop's growing season. In the 1960s, cotton in the Namoi Valley was generally harvested and processed between the months of March and June.⁸⁵

The growing of cotton in the Namoi Valley during the 1960s was not without its complexities. Clearing the land of trees, ploughing the soil and planting only cottonseed did not ensure that it would grow unchallenged. Cotton in the Namoi Valley was not grown within a vacuum; the American farmers who grew the fibre crop in the region in the early 1960s had to contend with vigorous weed growth between the rows of cotton and amongst the cotton plants. Following flooding in the first weeks of 1964, for example, the growth of weeds amidst some of the district's cotton crops was described as 'so dense that cultivators [drawn by tractors] have difficulty in moving through the drying ground.'⁸⁶ Insect infestations of the Namoi Valley's cotton crops were equally problematic for the initial American migrants, who encountered at least one cotton-attacking insect that they 'weren't at all familiar with.'⁸⁷ Within the Namoi Valley from the early years of the 1960s, the production of cotton as a monoculture entailed something of a battle against nature. The suppression of natural processes, such as the proliferation of weeds and insects amidst the cotton, became integral to the

⁸⁴ Greenland, 'Cotton Farming under irrigation', p. 3.

⁸⁵ Greenland, 'Cotton Farming under irrigation', p. 3.

⁸⁶ 'Prolific weed growth adversely affects some cotton crops', *The North Western Courier*, 28 January 1964, p. 1.

⁸⁷ 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 33.

success of irrigated cotton in the Namoi Valley. To achieve their success, Namoi Valley cotton growers turned to chemicals.

The arrival of American farmers and the introduction of irrigated cotton production did not transform the Namoi Valley in its entirety. The reliance upon irrigation water had dictated that cotton farming would take place close to the Namoi River, however, the need for water was not the sole issue that determined the location and extent of cotton growing within the Namoi Valley. The Namoi Valley's boundaries encompassed a variety of soil types, not all of which were as suited to irrigated cotton production as the grey and grey-brown self-mulching clays. Cotton sown in the region's red-brown soils, for example, resulted in 'patchy germination and growth in some locations.'⁸⁸ By its nature, intensive cotton production did not need to occupy all of the farming land in the Namoi district to succeed. It is the yield of the cotton fibre that is crucial in the production of cotton, not the acreage that is sown. With intensive farming techniques, the acreage planted to cotton did not need to be vast to produce significant quantities of cotton lint. In the Namoi Valley, irrigated cotton production was, from its inception, directed toward the achievement of maximum yields of high-grade cotton fibre. This objective underpinned every feature of the cotton growing method established in the Namoi region by the American émigrés. Chemicals were embraced by those growing cotton within the Namoi Valley in their quest to produce high-yielding crops.

While farmers engaged in industrialised agriculture have been described as being on a 'pesticide treadmill', even from the 1960s, pesticides represented merely one element of the chemical regimen adopted by the Namoi Valley's cotton industry. The use of herbicides, pesticides, fertilisers and defoliant in the Namoi district became endemic in the drive toward substantial yields of the fibre. The achievement of high

⁸⁸ Stannard and Kelly, *The Irrigation Potential of the Lower Namoi Valley*, p. 29.

cotton yields in the Namoi Valley was essentially the product of chemicalised agriculture. Although the Namoi district is climatically favourable to the production of cotton, the yields produced would not have been as substantial without the aid of chemicals. Moreover, the maintenance of high cotton yields was a relatively fragile exercise: the absence of any of these chemical aids, or an inadequate supply of irrigation water, could affect the yield of the cotton fibre detrimentally. The perpetuation of these artificially high yields and, consequently, the economic viability of the Namoi Valley's cotton growing industry, was contingent from the early 1960s on adherence to the industrialised and chemicalised cotton growing method introduced by the American migrants.

Replicating Californian cotton growing, heavy machinery and chemicals were paramount in the cotton mode of production that developed in the Namoi Valley during the 1960s, while labour was used sparingly for the tasks that could not be undertaken by machines. The use of various chemicals and heavy machinery was integral to every phase of the cotton growing method established in the region in that decade. Their use was intended to enhance the growth of the cotton plants and the yield of the cotton fibre or, alternately, to defend it.

The importance of machinery and chemical aids to irrigated cotton growing within the Namoi Valley in the 1960s was evident before the cottonseed had even been sown. The preparation of paddocks for the planting of cotton was entirely dependent on the use of heavy machinery. When Namoi Valley farms were being converted for cotton production for the first time in the 1960s, the uprooting of trees was a priority, particularly when those trees were large. The task of felling trees was often carried out by bulldozers, and 'then the whole area [was] deep ripped to remove stumps and roots'.⁸⁹ Although in that decade the clearing of land was conducted on a scale never

⁸⁹ Australia and New Zealand Bank Limited, *Survey of the Cotton Growing Industry in the Wee Waa/Narrabri Area*, p. 7.

before seen in the Namoi Valley, the removal of trees and tree-stumps was only the beginning of the preparatory work for the growing of the crop. Once the paddocks had been stripped of vegetation and irrigation channels had been constructed, the soil was ploughed by crawler tractors towing scarifiers, deep rippers, land planes, discs or other heavy implements.⁹⁰ In the 1960s, prior to the sowing of the crop it was common for Namoi Valley cotton fields to be ‘first ripped to a depth of over two feet then cultivated to about one foot’, before being levelled with a land plane until the correct gradient for the flow of irrigation water was achieved.⁹¹ Demonstrating the sizeable dimensions of some of this machinery, a Namoi Valley newspaper article entitled, ‘Not a Bridge – a Land Plane’, described a land plane used in the preparation of cotton lands as weighing eleven tons and spanning eighty feet in length.⁹²

The most comprehensive study to date of how cotton was grown in the Namoi Valley during the 1960s was published by Australia’s Bureau of Agricultural Economics in 1970. The study, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, was based on surveys conducted with Australian cotton growers, including those in the Namoi district. The surveys examined cotton growing practices and the economics of cotton production during the study’s designated period.⁹³ The results of the Bureau of Agricultural Economics’ surveys highlighted the uniformity of aspects of the cotton growing method employed in the Namoi Valley. For example, the dominance of a single cotton variety was made plain, with 89.6 per cent of

⁹⁰ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 22; Australia and New Zealand Bank Limited, *Survey of the Cotton Growing Industry in the Wee Waa/Narrabri Area*, p. 7.

⁹¹ Greenland, ‘Cotton Farming under irrigation’, p. 2.

⁹² ‘Not a Bridge – a Land Plane’, *The North Western Courier Cotton Feature Supplement*, 18 November 1963, p. 2.

⁹³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*.

Namoi Valley growers planting Deltapine cotton in the 1964-65 season, rising to 99.4 per cent in 1965-66, and 98.3 per cent in 1966-67.⁹⁴ The report provides details that are essential to an in-depth understanding of the cotton mode of production that emerged in the Namoi Valley during the 1960s.

Intended to permit the cottonseed to take root unhindered, the ripping and ploughing of the soil was done on an average of four occasions before sowing on Namoi district cotton properties in the 1966-67 season.⁹⁵ The application of herbicides and fertiliser in this initial phase of the cotton mode of production was also motivated by the determination to augment the growing conditions of the crop. Many growers in the Namoi region in the 1960s applied 'pre-emergent' herbicides prior to the sowing of the cottonseed.⁹⁶ The early application of herbicides was designed to eliminate weeds, which rival the cotton plants for access to water, sunlight, and nutrients from the soil.⁹⁷ With high-yielding cotton plants the ultimate aim, Namoi Valley cotton growers incorporated fertiliser into the soil close to the time of planting.⁹⁸ More than three-quarters of the Namoi region's cotton growers fertilised using anhydrous ammonia in 1966-67, which was injected directly into the ground beneath the cotton rows.⁹⁹ Cotton

⁹⁴ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, Table No. 16, p. 24.

⁹⁵ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 22.

⁹⁶ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 22 and 32.

⁹⁷ Greenland, 'Cotton Farming under irrigation', p. 2.

⁹⁸ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 26.

⁹⁹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 26.

was usually sown in the 1960s with a row crop planter mounted at the rear of a tractor, and was followed soon after by irrigation of the planted area.¹⁰⁰

Once the cotton seedlings were visible, the monitoring of weed growth, insect infestations, and the soil's moisture and nutrient levels took precedence. Herbicides, pesticides, irrigation water and fertiliser were applied as necessary, until the cotton reached maturity and was ready for harvesting. In the 1966-67 growing period, for example, Namoi Valley cotton farmers irrigated their cotton on an average of 5.9 occasions, with 97 per cent of the district's growers using siphons to deliver irrigation water to their cotton crops.¹⁰¹ The farm average for the application of anhydrous ammonia to cotton in the Namoi Valley during the same period was 19.6 tons.¹⁰² The growth of weeds amongst the cotton crop was dealt with by the spraying of chemicals, 'mechanical inter-row cultivation', where a tractor-drawn implement uprooted weeds growing between the rows of cotton, or by labourers hoeing the weeds out manually.¹⁰³ Ninety-one per cent of Namoi Valley cotton growers used herbicides on their crops in the 1966-67 season, while weeds were removed mechanically by 'cultivating' or ploughing on an average of five occasions subsequent to the planting of the cotton.¹⁰⁴

In combating insect pests amidst the district's cotton in the early 1960s, Frank Hadley described DDT as 'the universal pesticide'.¹⁰⁵ However, DDT was not the

¹⁰⁰ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 23 and 30.

¹⁰¹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 29.

¹⁰² Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, Table No. 18, p. 26.

¹⁰³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 31.

¹⁰⁴ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 31.

¹⁰⁵ Frank Hadley quoted in 'The pioneering Hadleys', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, pp. 33-34.

chemical panacea for insect infestations of agricultural crops that it had seemed. The rough bollworm, common bollworm, pink bollworm, tip borer, loopers and red spider mite were the insects that were identified as being hazardous to the cotton plant in Australia in the mid-1960s.¹⁰⁶ DDT alone could not combat all of these insects and prevent cotton crops from incurring damage. Narrabri Agricultural Research Station employees, Tom Lawler and Nick Derera had, by December 1960, devised a 'cocktail' combining the chemicals DDT, Roger 40 and Endrin that would kill 'not only the rough boll worm but nearly any other possible insects.'¹⁰⁷

Nevertheless, it seems that DDT and Endrin became the principal means of insect control for the Namoi district's cotton growers in the 1960s. In 1964, for example, J.G. Boswell's Auscott venture used between one and one-and-a-half pounds of DDT per acre to eliminate the *Heliothis* bollworm and the tip borer, while the rough bollworm was controlled through the application of between one-quarter and one-half a pound of Endrin for every acre.¹⁰⁸ In the latter half of the 1960s, DDT and Endrin remained the chief insecticides used on cotton in the Namoi Valley and other cotton growing regions of Australia.¹⁰⁹ Within the Namoi district, pesticides were applied by farmers to their cotton crops on an average of 11.5 occasions during the 1966-67 growing season.¹¹⁰ A 1966 study of the Namoi region's cotton industry observed that these insecticides were applied to the district's large cotton crops by light crop-dusting aircraft, while tractors with boom sprays attached were used on the smaller cotton

¹⁰⁶ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹⁰⁷ T. Lawler and N. Derera, 'Cultivation During Growing Period', *The North Western Courier*, 1 December 1960, p. 10.

¹⁰⁸ James Fisher, 'New Truths on Cotton Growing', *Australian Country Magazine*, November 1965, p. 33.

¹⁰⁹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹¹⁰ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 32.

farms.¹¹¹ However, a survey by the Bureau of Agricultural Economics indicated that the use of aerial spraying was far more prevalent in the Namoi Valley than the latter method. In the 1966-67 cotton season, the proportion of insecticide applications conducted in the Namoi Valley by boom spray was a mere four per cent.¹¹²

The application of insecticides to the region's cotton crops was quite frequent in the mid-1960s, with one study advising that 'continual spraying is necessary at all stages' of the crop's growth.¹¹³ The spraying of pesticides was not intended to be undertaken indiscriminately, but was to occur only once insect infestations of the cotton were apparent.¹¹⁴ Many growers in the Namoi Valley, however, undertook 'preventative' insect control measures, blanketing their cotton crops with pesticides 'on a programme of 7 to 10 days for most of the growing season'.¹¹⁵ The Bureau of Agricultural Economics estimated, too, that growers in Australia's cotton growing areas, including the Namoi Valley, were applying insecticides in the mid-1960s on an average of every 10 days during a number of months of the cotton growing period.¹¹⁶ On the Auscott property in 1964, insecticide applications followed the monitoring of insect numbers amongst the cotton plants. Nevertheless, Auscott's farm manager, James Fisher, explained that this insecticide spraying 'system could be plotted into practically a scheduled treatment during the months of December to January when *Heliothis* attacks were practically continuous.'¹¹⁷

¹¹¹ Greenland, 'Cotton Farming under irrigation', p. 2.

¹¹² Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 32.

¹¹³ Greenland, 'Cotton Farming under irrigation', p. 2.

¹¹⁴ T. Lawler and N. Derera, 'Cultivation During Growing Period', *The North Western Courier*, 1 December 1960, p. 10.

¹¹⁵ Greenland, 'Cotton Farming under irrigation', p. 2.

¹¹⁶ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹¹⁷ Fisher, 'New Truths on Cotton Growing', p. 89.

After surviving insect pests and weed growth, cotton's growing period came to an end with the ripening and opening of its bolls. Within Australia during the 1960s:

Most growers defoliate the crop prior to picking by aerial spraying with either a sodium chlorate compound or a phosphate defoliant. It is normally undertaken about two weeks before the commencement of picking when about 80% of the mature bolls are open. Removing the leaves from the bush lets in more sunlight and air which prevents boll rot and speeds up opening; more importantly it facilitates efficient mechanical picking by eliminating potential trash and preventing lint stain from green leaves.¹¹⁸

In the Namoi Valley in the 1960s, defoliants were used on cotton by all of the region's cotton farmers. When harvesting commenced in the district after the cotton had been defoliated, most of the mechanical pickers used in that period were two-row harvesters.¹¹⁹ In the 1960s the ginning of the cotton was not delayed until after the harvest had been completed; rather, the harvesting and processing of the crop occurred concurrently. As P.G. Irwin explained:

Each two-row picker harvests the equivalent of about two bales per hour; that is, about twenty-four bales in a twelve-hour picking day... A gin has a capacity of about twenty-four bales per hour but, because the pickers only work for twelve hours each day, one gin is able to handle the seed cotton from twenty pickers.¹²⁰

The harvested cotton fibre was gathered in the basket of a mechanical cotton picker and once the basket was full, the fibre was emptied into large cotton trailers. The trailers, which resembled open-topped rectangular cages mounted on wheels and had a capacity of six tonnes, were towed to a gin behind a tractor.¹²¹ When they reached the gin, the cotton-filled trailers were 'weighed, the cotton sucked into machines which dry and

¹¹⁸ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹¹⁹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹²⁰ Irwin, *Cotton Systems of the Namoi Valley*, p. 20.

¹²¹ Pigram, *Cotton*, pp. 16-17.

clean it, then ginned'. The lint was formed into bales that weighed 500 pounds each and was ready for sale or export.¹²²

While cotton was grown, picked and baled in the Namoi Valley during the 1960s, these activities were not accompanied by the emergence of a cotton manufacturing industry within the district. The Namoi Valley's cotton production was never intended for the region's own consumption. As the 1958 revival of the Commonwealth Cotton Bounty had intended, the cotton grown in the Namoi Valley delivered to Australian spinning mills outside the district a supply of high quality cotton that brought to an end the mills' reliance upon cotton imports. Indeed, the expansion of cotton production within the Namoi district was so rapid that within a decade of the industry's inception, Namoi Valley cotton growers had satisfied the needs of Australian spinners and were beginning to export their cotton fibre.

When irrigated cotton production was introduced to the Namoi Valley at the beginning of the 1960s, it was an intensive style of production that was unmistakably different from the region's other agricultural industries. Through its dependence on the use of insecticides, herbicides, fertilisers, defoliant and machinery, as well as the need for the crop to be harvested and processed, the Namoi Valley's cotton industry incorporated all of these elements into a system that can be understood as a cotton mode of production. As Namoi Valley cotton producers became exporters of the fibre from 1967, cotton growing was already firmly entrenched in the region and a specific cotton mode of production was apparent.¹²³ In the decades following cotton's establishment in the Namoi Valley, however, the region's cotton mode of production has been the subject of significant change.

¹²² Greenland, 'Cotton Farming under irrigation', p. 3.

¹²³ 'Early industry days were exciting times', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992: Foundations for the Future*, Narrabri: North Western Courier Group, 1992, p. 40.s

The Evolution and Modification of the Namoi Valley's Cotton Mode of Production

Although in the twenty-first century the Namoi Valley's cotton mode of production remains very similar in most respects to that which had developed in the region during the 1960s, the mode has undergone various modifications since its inception. When irrigated cotton production was established in its highly industrialised form by American migrants in the Namoi Valley, it was viewed as an example of an agricultural industry where 'scientific, mechanised power-farming is virtually complete.'¹²⁴ With its use of chemicals and a range of implements and machinery, Namoi Valley cotton growing in the 1960s already epitomised a style of farming that was far more industrialised than that observed by Carey McWilliams in 1930s California.

The Namoi district's cotton growing industry was founded upon a dependence on machinery and chemicals. In relocating to Australia, Paul Kahl and Frank Hadley did not consider growing cotton on a small scale or having their crop harvested by hand-picking; the pair arrived with a clear vision of the way their cotton would be grown and they imported many of the requirements needed to reproduce that method in the Namoi Valley.¹²⁵ Kahl and Hadley and the Australians and fellow Americans who followed them in growing cotton in the Namoi region established a mode of cotton production that even in the 1960s was highly mechanised and capital-intensive. In the early years of that decade, the Namoi Valley's cotton industry was using techniques and equipment that had rarely been seen in Australian agriculture. That many of the aspects of the district's cotton mode of production have experienced only minor modification since the 1960s demonstrates just how advanced the industry was from its founding in the Namoi Valley. Indeed, the changes that have had the greatest impact on the region's cotton

¹²⁴ Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', p. viii.

¹²⁵ Kahl, *Cotton Pickin' Pioneer*, p. 142.

mode have involved the adoption of new technologies and innovations that were yet to be conceived of in the 1960s. These changes have resulted in the intensification of a cotton mode of production that was industrialised from the outset.

This intensification of the Namoi Valley's cotton mode is discernible in the relatively minor modifications that have occurred to the way land is prepared for the planting of cotton. The preparation of paddocks for the sowing of the crop is still carried out in the Namoi district with the aid of heavy machinery. Almost half a century after irrigated cotton production was introduced to the area, discs, deep rippers, scarifiers, cultivators and ploughs continue to be used to till the soil to varying depths. Nevertheless, between the 1960s and the early years of the twenty-first century, many of these tractor-drawn implements have been re-designed and updated. The refinement of these tools has, to a certain degree, contributed to an improvement in the efficiency of the tasks for which they are used.¹²⁶

Of far greater significance to the intensification of this early stage of the Namoi Valley's cotton mode of production was the change in the capacity of the machine that was fundamental to so many aspects of industrialised cotton growing: the tractor. During the initial years of the district's irrigated cotton growing industry, the types of wheel tractors that were commonly used by Namoi Valley cotton farmers were incapable of pulling some of the implements used to re-shape the land for cotton. The greater power of crawler tractors compared to other models in the 1960s had seen them used for the clearing of land. It was usually only the heavier crawler tractors, too, that could manage in that era to haul large land planes across paddocks in order to level the soil. From the 1960s to the present, however, the capability of the average tractor has been altered dramatically. In that intervening period, the horsepower of most tractors multiplied. Tractors with an approximate horsepower of fifty that were used by farmers

¹²⁶ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

in the 1960s have largely been replaced by more contemporary models with a capacity of around 220 horsepower or more. This rise in power both increased the speed at which tractors could travel and decreased the time involved in the completion of preparations for the planting of cotton.¹²⁷

As well as tractors with greater power and speed, an important development in cotton production in the Namoi Valley has been the incorporation into regular farm operations of the navigation system that uses satellite technology, known as the Global Positioning System (GPS). Many of the modern tractors used by the district's cotton growers have both GPS navigation and automatic steering as standard features.¹²⁸ GPS technology has greatly improved the accuracy of some tasks, such as the planting of cottonseed and the application of fertiliser. With regard to the levelling of fields for the even flow of irrigation water, for example, many farmers have adopted the 'laser bucket' to measure and achieve the precise gradient that is required. The cumbersome land planes that were popular in the 1960s for levelling paddocks for cotton are no longer used by Namoi Valley farmers.¹²⁹

Almost half a century after irrigated cotton production commenced in the region, the spacing of the rows of cotton on most Namoi Valley properties has been altered. The cotton rows had formerly been set out at a distance of forty inches apart, but most Namoi Valley growers now allow one metre between each raised bed of cotton plants.¹³⁰ When commercial cotton production began under irrigation in the Namoi district, the imperial system of measurement was still being used in Australia. The

¹²⁷ Former employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹²⁸ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹²⁹ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹³⁰ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

amendment to the spacing of cotton rows over time can be broadly attributed to the rising dominance of the metric system and the consequent decline in the usage of imperial calculations such as inches. More specifically, however, the adjustment to the positioning of cotton rows is explained in the Namoi Valley by farmers' adoption of newer multi-row equipment. In the farming of cotton with multi-row implements, the number of rows planted is usually determined in accordance with the capacity of that equipment. For instance, if cotton was to be sown with a two-row tractor-drawn planter, the rows of cotton would be created in multiples of two. When cotton in the Namoi district had been sown at intervals of forty inches, rows were often formed in multiples of four, as four-row planters were the most common type of sowing implement used in the production of cotton in that era.¹³¹ Reflecting the re-design and expansion of the capacity of multi-row implements and machines since the 1960s, that row configuration has been abandoned by all but the smallest cotton farmers in the region. The format now adhered to by most Namoi Valley growers is to create rows in multiples of eight, with each one spaced a metre apart. This is achieved by using planters capable of sowing eight rows of cotton at once, while some larger farms use twelve-row planters and equipment.¹³²

In addition to the increase in the number of rows that can be sown simultaneously, the method by which cotton is planted in the Namoi Valley has become more exact since the 1960s. Before the emergence of industrialised cotton production, it was not uncommon for a cotton crop to require thinning during the growing season. Where cotton plants were growing too close together, the plants would compete for sunlight and moisture, with neither plant reaching their full potential. For this reason,

¹³¹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 23.

¹³² Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

some plants would be removed to allow the stronger ones to flourish. Within Australia during the 1960s, a portion of growers already ‘used precision planters which drop the seeds at regular intervals and this reduces the need to thin the stand at the seedling stage.’¹³³ In the Namoi region today, this rigorousness has been further enhanced: the rate that the cottonseed is sown with modern planting equipment is monitored by an electronic laser that ensures the accuracy of the even spacing of the seed.¹³⁴ The speed of planting operations has also increased, both as a result of faster tractors and implements that encompass a larger number of rows. During the 1960s, between three and six acres of cotton could be sown in an hour with a four-row planter.¹³⁵ With contemporary tractor models and eight-row implements, cotton is planted in the Namoi Valley at more than twice that acreage per hour.¹³⁶

Within the first decade of irrigated cotton production in the Namoi Valley, some of the farmers growing the crop had built their own tail-water drainage systems, which capture and recycle the water that runs off a paddock after it is irrigated.¹³⁷ In the more than forty years that have elapsed since that period, tailings drainage systems and water storage dams have become standard on the farms in the district that produce cotton under irrigation.¹³⁸ Although drip irrigation ‘ensures maximum efficiency of water allocation’, its higher cost has meant that growers in the Namoi Valley continue to use

¹³³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 23.

¹³⁴ Current employee of the Namoi Valley’s cotton growing industry, personal correspondence with the author, March and April 2005.

¹³⁵ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 23.

¹³⁶ Current employee of the Namoi Valley’s cotton growing industry, personal correspondence with the author, March and April 2005.

¹³⁷ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 29.

¹³⁸ Current employee of the Namoi Valley’s cotton growing industry, personal correspondence with the author, March and April 2005.

the method of flood irrigation, which is also known as furrow irrigation because the water is delivered into the furrows between the rows of cotton.¹³⁹ The distribution of water from the Keepit Dam for use by cotton irrigators along the Namoi River was virtually unregulated for much of the 1960s. A roster system introduced in the latter half of that decade improved the situation only slightly by restricting farmers' extraction of irrigation water to particular days in a schedule designed to avoid mass pumping at any one time. This was replaced from 1967 with an allocation system based on the volume of water which assigned to irrigators 'three acre feet per licensed acre of land: thus a four hundred acre holding would be supplied with twelve hundred acre feet of water per year.'¹⁴⁰ Allocating water in this manner had important consequences for the infrastructure on individual farms, as well as determining the extent of the cotton acreages sown annually:

The new system brought changes to farming practices. Once they were given the projected allocation for the year, the growers had to decide whether to plant a reduced amount in keeping with a lower allocation, or take a punt on getting rainfall through the season to keep a larger crop alive. Conservation of water also assumed a new importance. It wasn't long before virtually every farm on the river had its own private off-river storage, ranging from a modest hole in the ground to a sophisticated large capacity reservoir, according to the farmer's needs, or more often, his means. Some large farms were able to store water up to three times their basic allocation, enabling them to plant crops up to seventy per cent of their basic areas in years when the official allocation from Keepit Dam was down to ten or fifteen per cent.¹⁴¹

In more recent years, a severe drought has seen the amount of water allotted to the irrigation of cotton in the Namoi Valley reduced.¹⁴²

¹³⁹ 'Drip Irrigation', *Cotton Discovery Centre Education Kit*, Cotton Australia, p. 14, <<http://www.cottonaustralia.com.au/factSheets/resources/Cotton%20Education%20Kit%20-%20Secondary.pdf>>; Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹⁴⁰ McHugh, *Cottoning On*, p. 33.

¹⁴¹ McHugh, *Cottoning On*, p. 35.

¹⁴² Agronomist employed by the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

As in the 1960s, the application of fertilisers and nutrients to cotton fields in the district remains contingent upon the type and condition of the soil on individual farms. The use of nitrogen, potassium, phosphorus, zinc and, to a lesser extent, boron, is relatively common on the Namoi Valley's cotton properties. It differs from farm to farm as to whether these fertilisers and nutrients are added before the cottonseed has been sown or at different stages during the crop's growing period, or both. The rate of application also varies depending on the results of the analysis of the soil.¹⁴³ Injecting anhydrous ammonia into the ground, the method of fertilising that was often used in the 1960s, remains popular with many of the Namoi Valley's cotton growers. Granulated urea is another type of fertiliser commonly used on cotton properties within the region and the changing method of its application is an example of the increased efficiency evident in the contemporary cotton mode of production. On some farms in the Namoi Valley, the granulated urea is dispersed across the cotton paddocks and is later incorporated into the soil by a tractor-drawn plough. Other farmers have adopted an implement that reduces the time involved in such a two-stage operation. The implement, a specially designed 'air seeder rig', distributes and ploughs the urea into the soil concurrently during a single manoeuvre.¹⁴⁴ Like the adoption of air seeder rigs, small moves toward greater efficiency have also occurred in the way in which insecticides are applied to cotton.

As the 1960s progressed, there was greater attention paid to minimising the drift of insecticide sprays from crop-dusting aircraft. Before that decade had ended, a correlation had been recognised between the hotter temperatures in the middle of the day and the windier periods that caused this spray drift to occur. By the latter half of

¹⁴³ Agronomist employed by the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹⁴⁴ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

the 1960s, many of the pilots of the light aircraft that administered chemicals to Australian cotton crops were limiting their operations to evenings or early mornings when conditions are generally calmer and more conducive to the effective distribution of the chosen chemicals. Compared to the other cotton growing regions of Australia in that era, the Namoi Valley was unusual as many of its growers were electing to have their cotton sprayed with chemicals at night.¹⁴⁵ The attractions of night spraying included the calmness of conditions and the avoidance of interruptions to the performance of other tasks on cotton farms during daylight hours. The application of insecticides from crop-dusters continues to be undertaken at night, in the evening or during early mornings in the Namoi Valley.¹⁴⁶ Nonetheless, aerial spraying is not required for every application of pesticide. Most farmers in the Namoi Valley also use tractor-drawn spray booms to distribute chemicals. These spray booms commonly span 16 metres in width, while others are 28-30 metres wide, and are capable of spraying numerous rows of the crop at the same time.¹⁴⁷ It is the size of the cotton plants that determines whether spray booms or crop-dusting aircraft are used to distribute insecticides and control infestations. As they mature, the plants become too large to permit tractors with spray booms to enter the rows of cotton without causing damage to the crop. Consequently, aerial spraying has been favoured later in the growing season.¹⁴⁸

Unlike 1960s methods, Namoi Valley cotton crops in the later stages of growth are no longer blanketed with insecticides on a weekly basis. There is an increased

¹⁴⁵ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹⁴⁶ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹⁴⁷ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹⁴⁸ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 32.

understanding of the ecosystem created amidst cotton crops and the fact that not all of the insects that inhabit cotton fields are detrimental pests. This has led to the formulation of a strategy known as ‘Integrated Pest Management’:

A major goal for the cotton industry is to reduce dependence on insecticides while remaining sustainable. This can be achieved by developing an IPM program that minimises insecticide use through integration of a range of proactive management tactics, especially the conservation and use of natural enemies (predators and parasites) to control pests.¹⁴⁹

Integrated Pest Management strategies have been adopted by many cotton farmers in the Namoi Valley and throughout Australia. The development of this programme was motivated by a desire to curb the incidence of insects becoming resistant to the chemicals that were intended to kill them. The insects that demonstrate immunity to a particular pesticide may become more numerous than others of the same species as the immune insects ‘are more likely to survive and produce offspring.’¹⁵⁰ The problem of insect resistance had caused cotton growers to abandon the Ord River Irrigation Area in Western Australia during the 1970s, but farmers in the Namoi Valley have adapted their chemical usage to avoid a similar fate.

Growers in the Namoi district have dispensed with their dependence on DDT and Endrin, the two main insecticides used on the region’s cotton crops in the 1960s. This represented an important change for cotton producers as the application of insecticides evolved into an extremely complex system under the guidelines of Integrated Pest Management. In place of DDT and Endrin, a regime of different types and groupings of chemicals has been implemented to control damaging pests amongst the cotton. To ensure that insects do not become resistant to the chemicals that are a part of this new regime, the insecticides used on cotton are frequently rotated. In the

¹⁴⁹ ‘What is Integrated Pest Management?’, *Cotton Catchment Communities CRC*, Accessed: 5 March 2008, <<http://www.cotton.crc.org.au/content/Industry/Publications/PestsandBeneficials/IntegratedPestManagementGuidelines.aspx>>

¹⁵⁰ Tracey Farrell, *Cotton Pest Management Guide 2007-08*, NSW Department of Primary Industries, Orange, November 2007, p. 38.

Namoi Valley in 2007 and 2008, for instance, it was recommended that the same insecticide was not to be used for more than two consecutive applications, nor was it acceptable to carry out successive sprayings of insecticides drawn from the one chemical grouping.¹⁵¹ While the adoption of this more complicated pattern of pesticide usage was a significant change from earlier practices, the most crucial modification of the Namoi Valley's cotton mode of production was the development of genetically modified cotton varieties.

The creation of genetically modified cotton has been led by the multinational biotechnology corporation, Monsanto. The features of Monsanto's cotton varieties were entirely dissimilar from anything achieved through the cotton breeding programmes of the past. During the twentieth century, the United States Department of Agriculture had been able to produce cotton crops with a greater proportion of bolls that opened simultaneously at a relatively uniform height and facilitated harvesting by machine. In the Namoi Valley, too, the Narrabri Agricultural Research Station experimented in the 1960s with different cotton breeds to determine which were the most productive under local conditions. These are both examples of orthodox cotton breeding activities where the intention was to modify the properties of the cotton plant and enhance the yield of the crop. Monsanto's genetically modified cotton varieties represented a radical departure from these more traditional forms of plant breeding. Monsanto undertook the extraordinary measure of genetically altering cotton plants in order to exert control over two factors that were external to and independent of the plant itself: insects and weeds. The corporation's genetically modified cotton breeds are divided into two categories, distinguished by whether the breed was manufactured to aid the suppression of the insects that attack cotton, or to control the weeds that inhibit the growth of the crop.

¹⁵¹ Farrell, *Cotton Pest Management Guide 2007-08*, pp. 45-46.

Monsanto's initial genetically modified cottonseed varieties were concerned solely with curbing insect damage to cotton crops. The Monsanto cotton breeds designed to control insects are categorised as 'Bt' cotton varieties because they have been genetically engineered to incorporate genetic material from the soil bacterium 'Bacillus thuringiensis'. When cotton's primary insect pest, the *Heliothis* caterpillar (also known as the bollworm or *Helicoverpa*) feeds on these types of cotton, 'the Bt protein fatally disrupts the caterpillar's digestive system'.¹⁵² Monsanto had succeeded in creating cotton plants which, from the seedling stage to maturity, secreted an inborn insecticide that was lethal to the crop's main predator.

The novelty of Bt cotton's internal insecticide did not mean, however, that it was protected from the prospect of insects becoming resistant to it. Regardless of whether an insecticide is used as a conventional spray or incorporated into a plant through genetic modification, over time the insecticide will be less effective as, after repeated exposure to that chemical, some of the targeted pests will be immune. This issue has obviously been a critical one for Monsanto as, less than a decade after its commercial release in Australia, the corporation's initial Bt cotton variety was withdrawn from sale to ensure the bollworm did not develop a resistance to the effects of the Bt gene. In the United States, Monsanto's Bt cotton had been retailed under the brand name, 'Bollgard', but this was superseded by a subsequent Bt cotton variant called 'Bollgard II'.¹⁵³ In contrast, the first transgenic cotton breed sold by Monsanto in Australia from 1996 was given the name 'Ingard'.¹⁵⁴ Nevertheless, Ingard was also replaced in

¹⁵² 'Biotechnology', *Cotton Australia*, Accessed: 5 March 2008, <<http://www.cottonaustralia.com.au/factSheets/resources/biotechnology2.pdf>>

¹⁵³ 'Bollgard II', *Monsanto*, Accessed: 5 March 2008, <http://www.monsanto.com/monsanto/ag_products/input_traits/products/bollgard.asp>

¹⁵⁴ 'Cotton: Overview', *Monsanto Australia*, Accessed: 5 March 2008, <<http://www.monsanto.com.au/layout/cotton/default.asp>>

Australia by Bollgard II, which began to be introduced from the 2002-2003 season.¹⁵⁵

The difference between the two cotton breeds is that, unlike the earlier Ingard variety, Bollgard II incorporated a second Bt gene to provide greater protection from the bollworm.¹⁵⁶ It has been claimed that Bollgard II crops ‘require up to 85 per cent less insecticide than conventional cotton’.¹⁵⁷

During the 2002-2003 season in the lower portion of the Namoi Valley that encompasses the towns of Wee Waa and Narrabri, 34 per cent of the cotton acreage sown was of the Ingard or Bollgard II variety. A further 44 per cent was planted with Monsanto’s other type of transgenic seed: ‘Roundup Ready cotton’.¹⁵⁸ This breed of cotton is quite distinct from the corporation’s Bt varieties, not least because it was conceived to aid the suppression of weeds rather than insects. In creating Roundup Ready cotton, Monsanto did not duplicate its Bt cotton and substitute a herbicide for the Bt insecticide. The development of Roundup Ready cotton actually represented the inversion of the idea that had underpinned the making of Bt cotton. Bt cotton incorporated a naturally occurring bacterium as part of the composition of the plant which aimed to reduce the need for the crop to be sprayed with insecticides.¹⁵⁹ In contrast, Roundup Ready cotton was genetically modified so that the crop would not be killed or suffer adverse reactions when exposed to the herbicide Roundup, which was also owned and manufactured by Monsanto.¹⁶⁰ With other cotton varieties, farmers had

¹⁵⁵ See *The Australian Cottongrower Cotton Yearbook 2003*, Toowoomba: The Australian Cottongrower, 2003, p. 58 and p. 63.

¹⁵⁶ ‘Cotton: Overview’, *Monsanto Australia*, Accessed: 5 March 2008, <<http://www.monsanto.com.au/layout/cotton/default.asp>>

¹⁵⁷ ‘Biotechnology’, *Cotton Australia*, Accessed: 5 March 2008, <<http://www.cottonaustralia.com.au/factSheets/resources/biotechnology2.pdf>>

¹⁵⁸ *The Australian Cottongrower Cotton Yearbook 2003*, p. 63.

¹⁵⁹ ‘Biotechnology’, *Cotton Australia*, Accessed: 5 March 2008, <<http://www.cottonaustralia.com.au/factSheets/resources/biotechnology2.pdf>>

¹⁶⁰ ‘Cotton: Overview’, *Monsanto Australia*, Accessed: 5 March 2008, <<http://www.monsanto.com.au/layout/cotton/default.asp>>

to be precise in their application of herbicides and spray booms with shields had even been produced to prevent the chemicals from drifting onto the cotton plants. Roundup Ready cotton eliminated that constraint as it enabled farmers to kill the weeds amongst the cotton by dousing the entire crop with Roundup herbicide. That herbicide, also known as glyphosate, 'is highly effective against the majority of annual and perennial grasses as well as broad-leafed weeds'.¹⁶¹

However, as Monsanto's initial type of herbicide-tolerant cotton matured, the applications of Roundup had to cease, allowing weeds to proliferate late in the cotton growing season. This problem was eradicated with the formulation of a new transgenic, 'Roundup Ready Flex Cotton', which was released in Australia and the United States during 2006.¹⁶² Unlike the first version of cotton immune to glyphosate, Roundup Ready Flex permitted growers to apply the chemical 'over the top from cotton emergence up to one week prior to harvest'.¹⁶³ Monsanto has taken its genetic engineering further by combining in a single breed of cottonseed the properties of its glyphosate-tolerant and Bt cotton varieties. That breed, 'Bollgard II with Roundup Ready Flex' is both immune to glyphosate applications, and protected from the bollworm by its inborn insecticide.¹⁶⁴

¹⁶¹ 'Cotton: Roundup Ready cotton', *Monsanto Australia*, Accessed: 5 March 2008, <http://www.monsanto.com.au/layout/cotton/rr_cotton/default.asp>

¹⁶² 'Cotton: Roundup Ready Flex', *Monsanto Australia*, Accessed: 5 March 2008, <http://www.monsanto.com.au/layout/cotton/rr_flex/default.asp>; 'Roundup Ready Flex Cotton', *Monsanto*, Accessed: 5 March 2008, <http://www.monsanto.com/monsanto/ag_products/input_traits/products/roundup_ready_flex_cotton.asp>

¹⁶³ 'Roundup Ready Flex Cotton', *Monsanto*, Accessed: 5 March 2008, <http://www.monsanto.com/monsanto/ag_products/input_traits/products/roundup_ready_flex_cotton.asp>

¹⁶⁴ 'Bollgard II with Roundup Ready Flex', *Monsanto*, Accessed: 5 March 2008, <http://www.monsanto.com/monsanto/ag_products/input_traits/products/bollgard_roundup_ready_flex.asp>

Far less sensational than Monsanto's gene technology, but important nonetheless, was the modification of the cotton harvest in the Namoi Valley. As in the 1960s, the district's cotton crops continue to be defoliated before picking commences.¹⁶⁵ Other aspects of the harvest have, however, been altered significantly. The single row self-propelled mechanical cotton picker used by Paul Kahl and Frank Hadley to harvest their first Namoi Valley crop, for example, has long been obsolete.¹⁶⁶ At the time, the single-row harvester was quite advanced in comparison with the other machinery that was then being used to pick the crop. Some farmers in the Namoi Valley during the early 1960s were able to harvest their cotton with converted tractors. The addition of a basket and 'picking head' made it possible for a tractor to serve as a cotton harvester and this conversion was easily reversed, allowing the machine to return to its usual function outside of the cotton harvesting period.¹⁶⁷

The use of this makeshift form of cotton picking machinery, like that of the single-row harvester, has ceased in the Namoi district. Before the end of the 1960s, two-row self-propelled spindle harvesters were already more common on the region's cotton farms.¹⁶⁸ In the Namoi Valley in the twenty-first century, harvesting is carried out with two-row, four-row or six-row cotton pickers. In general, the size of the cotton acreage on an individual farm corresponds to the capacity of that farm's harvesting equipment. Consequently, the district's smaller farms tend to use two-row harvesters, while only the largest growers have their cotton picked with six-row machines.¹⁶⁹ The

¹⁶⁵ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹⁶⁶ Kahl, *Cotton Pickin' Pioneer*, p. 101.

¹⁶⁷ Former employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

¹⁶⁸ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹⁶⁹ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

cumulative increase in the capacity of multi-row cotton picking machines ensured that the duration of the harvest was significantly reduced. During the 1960s, two-row harvesters travelled through Australian cotton crops picking the fibre at an average rate of ‘only one acre an hour or less.’¹⁷⁰ By the beginning of the 1980s, the hourly harvesting rate had risen to approximately half a hectare of cotton.¹⁷¹ With a four-row harvester, cotton in the Namoi Valley today is picked at almost four times the rate it was in the 1980s.¹⁷²

Decreasing the time taken to harvest the cotton was important for a number of reasons. The use of heavy machinery to pick the crop meant that, if it rained, the harvesters may become bogged and be immobilised in the field until the soil dried out. By picking multiple rows of cotton at once and shortening the harvest, the potential for rainfall to delay operations was reduced. Just as important, however, was the prospect of decreasing operating costs by harvesting the cotton more quickly. When harvesting cotton mechanically, the associated costs include not only the purchase of the machine itself, but diesel fuel and the labour costs of employing a number of workers as a cotton picking crew. With the crop being harvested in a shorter period with multi-row machines this reduced the amount and, consequently, the cost of the labour and fuel involved in the cotton harvest.¹⁷³

The method of harvesting and transporting the seed cotton to a gin for processing has been substantially altered since the late 1970s, and not just through the use of multi-row mechanical cotton pickers. During the 1960s and 1970s in the Namoi

¹⁷⁰ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹⁷¹ Heydon, *The Cotton Story*, p. 33.

¹⁷² Current employee of the Namoi Valley’s cotton growing industry, personal correspondence with the author, March and April 2005.

¹⁷³ Current employee of the Namoi Valley’s cotton growing industry, personal correspondence with the author, March and April 2005.

Valley, cotton harvesting machines moved along the rows of cotton collecting the fibre from the open bolls. The fibre was captured in the basket of the harvester and, once full, the harvester would exit the cotton rows to empty its load of lint into nearby cotton trailers before returning to continue picking. Once the cotton trailers were filled to capacity they were hauled to the gin by tractors. This system of harvesting and transportation, used in the first two decades of irrigated cotton growing in the Namoi Valley, encountered some difficulties.

At a maximum of only 25 kilometres an hour, the speed at which tractors could tow cotton trailers to a gin was not great.¹⁷⁴ Once at a gin, each trailer had to be weighed before it could be emptied and towed slowly back to be filled with cotton again. The delivery of the cotton trailers to a gin had the potential to temporarily disrupt the harvesting of the crop. Mechanical cotton harvesters could not continue picking the seed cotton while their baskets were full. If all of the cotton trailers were at the gin, the pickers could not be emptied and the harvesting of the crop was effectively suspended. Although more than one trailer could be towed at a time, provided the tractor was not driven on a public road, the saving on transport costs by towing trailers in tandem was eroded by the time lost in harvesting the cotton.¹⁷⁵

The invention of the module builder during the 1970s brought to an end the inefficiency of towing cotton trailers to gins by tractor. An American innovation, the module builder eliminated the need for the harvested cotton to be immediately transported to a gin for processing.¹⁷⁶ As with cotton trailers, module builders were large and rectangular and the cotton was emptied directly into them from the basket of a mechanical picker. Unlike cotton trailers, however, module builders did not merely

¹⁷⁴ Irwin, *Cotton Systems of the Namoi Valley*, p. 19.

¹⁷⁵ Irwin, *Cotton Systems of the Namoi Valley*, p. 19.

¹⁷⁶ Victoria G. Myers, 'The module man', in *The Australian Cottongrower Cotton Yearbook 2003*, p. 14.

serve as receptacles for transportation. When filled with the harvested cotton, the module builders compressed the fibre into free-standing rectangular blocks known as modules.¹⁷⁷ The cotton modules could be created quickly in the same paddock as the cotton was being harvested. More importantly, after the upper section of a module was covered with a tarpaulin to prevent rain damage, the module could remain in the field until it was convenient to deliver it to the gin.¹⁷⁸ By using a module builder rather than cotton trailers, the harvesting of the cotton could take place faster and with fewer disruptions. The creation of modules also enabled a speed-up in the transportation of cotton fibre from the farm to the gin. Instead of slow-moving tractors towing cotton trailers, modules were delivered by flat-bed or chain-bed trucks that did not confront the same speed constraints as tractors.¹⁷⁹

Module builders were first used by the Namoi Cotton Co-operative in 1976, but the size and weight of the modules produced have been altered substantially since that period. Initially, the modules had a weight of eight tonnes, but modules in the early 1990s comprised approximately 13 tonnes of seed cotton.¹⁸⁰ By that time, the dimensions of modules had also increased, with the compressed cotton blocks measuring 2.5 metres tall, 2.5 metres in width, and between 11 and 12 metres in length.¹⁸¹ In designing the module builder, the intention had been to devise a method

¹⁷⁷ 'From 'boll buggy' to 'module builder', *Cotton Discovery Centre Education Kit*, Cotton Australia, p. 20, <<http://www.cottonaustralia.com.au/factSheets/resources/Cotton%20Education%20Kit%20-%20Secondary.pdf>>

¹⁷⁸ Heydon, *The Cotton Story: A Pictorial History of Cotton in the Namoi Valley*, p. 44.

¹⁷⁹ 'From 'boll buggy' to 'module builder', *Cotton Discovery Centre Education Kit*, Cotton Australia, p. 20, <<http://www.cottonaustralia.com.au/factSheets/resources/Cotton%20Education%20Kit%20-%20Secondary.pdf>>

¹⁸⁰ 'Namoi's workshop innovations', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 96; 'From 'boll buggy' to 'module builder', *Cotton Discovery Centre Education Kit*, Cotton Australia, p. 20, <<http://www.cottonaustralia.com.au/factSheets/resources/Cotton%20Education%20Kit%20-%20Secondary.pdf>>

¹⁸¹ 'From 'boll buggy' to 'module builder', *Cotton Discovery Centre Education Kit*, Cotton Australia, p. 20, <<http://www.cottonaustralia.com.au/factSheets/resources/Cotton%20Education%20Kit%20-%20Secondary.pdf>>

‘to keep harvesters running in the field and give gins a way to process cotton without holding up an operation’s cotton trailers.’¹⁸² The impulse to ensure harvesting was not interrupted also underpinned another cotton invention, that of the boll buggy.

In the 1960s and 1970s, the smaller mechanical cotton pickers would be forced to cease harvesting and leave the rows of cotton in order to empty the picker’s basket into cotton trailers once the basket was full. The capacity of the baskets on these early pickers was quite limited, and the procedure of frequently emptying the basket slowed the harvesting process. In later decades, mechanical cotton harvesters, despite their increased capacities, would nevertheless emerge from the cotton rows at regular intervals to empty the cotton into module builders. The boll buggy, essentially a bin towed behind a tractor, was created to enter the rows of cotton along with the picker.¹⁸³ The mechanical cotton pickers were able to empty the harvested cotton into the boll buggy without having to lose time by leaving and then re-entering the field. The boll buggy, rather than the harvester, would transport and empty the seed cotton into the module builder.

The desire to speed-up the harvesting process had led to the creation of the boll buggy and the module builder, but the latter invention necessitated the involvement of yet more machinery in the transportation and ginning of the harvested cotton. While the use of module builders allowed the harvest to be completed more rapidly, the size and weight of the modules produced meant that they were not easily moved. The creation of cotton modules made essential the use on cotton farms of in-field loaders, which could lift the heavy modules onto the trucks that would transport them to a gin. At the Namoi Valley’s gins, too, equipment was required to bring the modules from the yard to be

¹⁸² Myers, ‘The module man’, p. 14.

¹⁸³ ‘From ‘boll buggy’ to ‘module builder’’, *Cotton Discovery Centre Education Kit*, Cotton Australia, p. 20, <<http://www.cottonaustralia.com.au/factSheets/resources/Cotton%20Education%20Kit%20-%20Secondary.pdf>>

processed as required. For this purpose, machines known as moon buggies were specially-built to carry cotton modules. As modules have increased in size, moon buggies have been adapted to bear these heavier and longer loads.¹⁸⁴

Irrigated cotton production has been occurring in the Namoi Valley for almost half a century. Within that period, the expansion of the region's cotton growing industry took place at a phenomenal rate. In the decades that followed the establishment of cotton in the Namoi district, significant changes were made in the growing, harvesting and processing of the crop. Although irrigated cotton growing in the region was predominantly capital-intensive, an analysis of the Namoi Valley's cotton mode of production would be incomplete without an examination of the role of labour.

Labour and the Namoi Valley's Cotton Mode of Production

As the mode of cotton production introduced to the Namoi Valley was modelled on Californian methods rather than those that had prevailed in America's Deep South, labour was not the most crucial factor of production in the district's cotton growing industry. The arrival of American migrants in the 1960s did not generate an overwhelming demand for labourers to work on the Namoi Valley's newly-founded cotton farms throughout the year, or even for the duration of the cotton season.

Although the establishment of an intensive, irrigated cotton growing industry created employment within the Namoi Valley, cotton was a seasonal crop that did not entail year-round employment in most cases. With significant investment costs in land and irrigation infrastructure, as well as the machinery and chemicals which characterised cotton production in the Namoi Valley from the 1960s, labour was one expense that the district's American migrants sought to minimise from the beginning. Following the Californian model, the American cotton farmers in the Namoi Valley

¹⁸⁴ 'Namoi's workshop innovations', in *Namoi Cotton Co-operative Ltd 30th Anniversary, 1962-1992*, p. 96.

endeavoured to substitute machinery and chemicals for labour where possible, and reduce the need for a significant quantity of labour to specific tasks and discrete periods. Since its inception in the Namoi Valley from the early 1960s, cotton production has been distinguished by periods of peak employment, notably prior to the harvest, during the harvest, and in the ginning of the harvested fibre. As in California, the use of contract labour became a key feature of cotton production in the Namoi region. The nature of cotton production in the Namoi Valley meant, too, that much of the employment created by the cotton industry did not involve on-farm work but was instead concentrated within cotton's various ancillary businesses.

It has been suggested on the issue of the use of labour in agriculture that:

Specifically, the disjunction between labor time (planting and harvesting) and "production time" (the naturally determined growing season) creates a system where "labor is forced to be idle during the excess of production time over labor time" which "gives rise to serious labor supply and recruitment problems"... The longer the "slack season" and the shorter the planting and harvest seasons, the greater the problems in securing adequate labor at the necessary times, as potential wage workers migrate to areas where employment is more steady (urban-industrial centers, transportation, construction, etc) and farmers compete fiercely for a finite pool of labor during the relatively brief planting and harvest seasons.¹⁸⁵

It may be argued, conversely, that rather than creating competition for labour amongst farmers, agriculture's intervals of relative idleness and inactivity have led farmers, at least from the mid-twentieth century, to embrace chemicals and mechanisation and turn away from a reliance on labour. Perhaps more so than other farmers, cotton growers were able to dramatically decrease their need for labour during the harvest period once an efficient spindle cotton harvester had been developed. Where the demand for labour in the Californian cotton harvest had been so great that a 'Bracero' program was created to bring Mexican workers into the United States to pick cotton, the mechanisation of the

¹⁸⁵ Susan Mann, *Agrarian Capitalism in Theory and Practice*, University of North Carolina Press, Chapel Hill, p. 39 cited in Charles Post, 'An "agricultural revolution" in the United States: The development of capitalism and the adoption of the reaper in the antebellum U.S. north', *Science and Society*, Vol. 61, Issue 2, Summer 1997, pp. 216-228.

harvest brought significant change to the growing of the crop in that state. This shift was exemplified by California's Central Valley in the late 1950s, where contract labour supplemented 'a small labor aristocracy of permanent employees – irrigators, tractor drivers, and mechanics who had permanent positions and lived in rented accommodations on the ranch.'¹⁸⁶ To a certain degree, cotton farming operations in the Namoi Valley during the 1960s resembled this stratified Central Valley labour structure, but it would be erroneous to class Namoi Valley farm workers as members of an aristocracy.

Although the Australian state of Queensland had been the site of a labour-intensive cotton growing industry, the Namoi Valley had no such history. When a cotton growing industry was forged in the Namoi region in the early 1960s, it mirrored Californian methods of cotton production in the same era. Nevertheless, the development of cotton growing in California was substantially different to the way in which it occurred in the Namoi Valley. From the emergence of cotton as a dominant crop within California in the 1920s, a reliance on labour during the harvest was a key feature of that state's production of the fibre. While the labour shortages associated with the escalation of the Second World War drove Californian cotton producers toward mechanisation, that conversion was not completed immediately. By the early 1960s, though a high percentage of the Californian cotton harvest was undertaken by machine, the mechanisation of the harvest had not been achieved in its entirety.¹⁸⁷ Nonetheless, Californian cotton production had largely undergone a transformation, evolving within decades from a dependence on hundreds of thousands of immigrant labourers to a reliance upon cotton harvesting machines.

¹⁸⁶ Friedberger, *Farm Families and Change*, p. 40.

¹⁸⁷ U.S. Department of Labor, *Cotton Harvest Mechanization*, Table 4, p. 14.

In contrast to the evolution of cotton growing in California, the picking of the cotton fibre by hand was never a feature of the cotton mode of production that was established in the Namoi Valley in the 1960s. Even the district's first commercial cotton crop to be grown under irrigation during that decade was harvested by machine, despite it comprising a mere sixty acres.¹⁸⁸ From the early 1960s, a key aspect of the Namoi Valley's cotton mode was the American migrants' reluctance to recruit a substantial on-farm workforce that was retained on a full-time basis. However, even that agricultural industry, predicated on the use of machinery and chemicals, could not supplant labour entirely. Tractors and mechanical cotton harvesters had, for example, eliminated the need for much manual labour in the growing of cotton but workers were still required to operate these machines.

Ken Heydon has presented a portrait of the archetypal Namoi Valley cotton grower:

The successful cotton farmer must first of all be sure that his geographic location and his property are suitable. He must be a man familiar with irrigation techniques; he must have some knowledge of surveying, mechanics, hydraulic engineering and welding. He should also be an accountant, a plant operator, an agronomist – and he must be prepared to be a risk taker.¹⁸⁹

Heydon's depiction is somewhat misleading with regard to the role of the cotton grower and the way in which cotton farms in the Namoi Valley functioned. A number of the abilities and activities Heydon attributes to his exemplary cotton farmer were in fact most commonly performed by contractors with the requisite specialist skills. Labour was rationalised on irrigated cotton properties in the Namoi Valley from the outset, and this was reflected in the use of contractors for short periods of time. Many of the district's cotton farmers employed only a small number of permanent workers. These full-time workers were usually augmented by contract and casual workers who were

¹⁸⁸ Kahl, *Cotton Pickin' Pioneer*, p. 96.

¹⁸⁹ Heydon, *The Cotton Story*, p. 5.

hired for the completion of particular tasks during specific phases of the cotton season. This type of labour structure was evident on the Namoi Valley's biggest cotton farm in 1972, although the size of Auscott's workforce was exceptionally large:

At Auscott the permanent labour force is about seventy employees including administrative and technical staff, mechanics and tractor drivers. At picking time an additional twenty men are employed and from mid-November to mid-March about forty men are employed on a casual basis to chip the weeds...¹⁹⁰

Unlike other cotton properties in the region, Auscott was a fully-integrated enterprise with its own ginning and processing facilities, which explained the extent of the labour force it employed during the 1970s. Auscott's considerable capital and large-scale operations meant that sections of its permanent labour force were clearly demarcated. In contrast to Auscott, it seems that the permanent workforce on most Namoi Valley cotton farms was typically much smaller and performed a range of duties, rather than being limited to strictly-defined roles, such as that of tractor driver or mechanic.

Permanent employees were usually responsible for the operation and maintenance of tractors, cotton pickers and other machinery, the planting of the cottonseed, the distribution of fertiliser, the removal of weeds with tractor-drawn implements (cultivators), the application of insecticides using spray rigs that were towed behind tractors, and the placement, manipulation and re-positioning of siphons during irrigation periods. As intensive, irrigated cotton production was new to the Namoi Valley in the 1960s, farm workers were largely unfamiliar with these kinds of agricultural practices. Many who were permanently employed on cotton farms during the initial years of that decade had to undergo training in order to become accustomed to the elements of their work that required significant technical knowledge and skill.¹⁹¹ Agronomists and their assistants, known as 'bug checkers', also required training and

¹⁹⁰ Irwin, *Cotton Systems of the Namoi Valley*, p. 14.

¹⁹¹ Australia and New Zealand Bank Limited, *Survey of the Cotton Growing Industry in the Wee Waa/Narrabri Area*, p. 10.

expertise, but it varied as to whether they were employed full-time or on a contract or seasonal basis. An array of other tasks were undertaken on Namoi Valley cotton farms by contract and casual labour, but financial considerations were foremost in determining when these additional workers would be employed. Instead of purchasing the heavy machinery needed to clear land, for instance, it was more economical for many Namoi district cotton farmers to hire contractors with specialised equipment to conduct clearing work in the 1960s.¹⁹² Contractors, too, were commonly employed by growers to construct on-farm irrigation infrastructure, and to prepare paddocks for cotton through ‘burning, ripping, stickpicking, levelling and excavation of ditches’.¹⁹³ Similarly, those who applied chemicals to cotton from crop-dusting aircraft were chiefly contractors:

Normally aerial spraying did not involve the farm labour force at all, although occasionally operators had to provide ‘markers’ to guide the pilot.¹⁹⁴

Markers were often casual workers whose job it was to stand in a cotton field and indicate to the low-flying pilot where the release of the pesticide should be aimed.¹⁹⁵ However, it was not marking but the task of cotton ‘chipping’ for which numerous casual labourers were required.

Cotton ‘chippers’, known in the United States as ‘choppers’, were hired in the period just prior to the harvest to remove the weeds growing amidst the cotton crop.

¹⁹² Australia and New Zealand Bank Limited, *Survey of the Cotton Growing Industry in the Wee Waa/Narrabri Area*, p. 7.

¹⁹³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 47.

¹⁹⁴ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 33.

¹⁹⁵ The dangers of this task were highlighted by the death in 1993 of a woman who was struck by a crop-dusting plane while working as a marker on a cotton farm near Wee Waa. See: ‘Plane kills woman’, *The Sydney Morning Herald*, 19 March 1993, p. 5. Some studies have been conducted on the health and safety implications of cotton growing: National Aboriginal and Islander Health Organisation, *Health Problems of Aboriginal Cotton Workers in North-West New South Wales: Report of NAIHO Team Visiting the New South Wales Cotton Belt*, Fitzroy: National Aboriginal and Islander Health Organisation, 19 May 1984; Lyn Clarke and Tim Churches, *Pesticide Exposure in Cotton Chippers in the Gwydir Valley, 1991-92*, Moree: Australian Agricultural Health Unit, December 1992; Richard Franklin, Lyn Fragar, James Houlahan, Phil Brown and Jacqui Burcham, *Health and Safety Risks Associated with Cotton Production On-Farm*, Barton: Rural Industries Research and Development Corporation, 2001.

Late in the season when the plants were nearing maturity, the ‘cultivation’ of weeds using a large tractor-drawn plough risked damaging the cotton. Moreover, while this mechanised method extracted the weeds growing in the furrows between the cotton rows, it left undisturbed the weeds that had taken root in the raised beds where the cotton plants had been sown. This was one area of the cotton mode of production where machinery could not be substituted for labour. Workers were needed to distinguish between cotton plants and weeds and uproot the latter. Armed with hoes, chippers would traipse the length of each row of cotton, removing the weeds manually.

During the 1960s, this type of work was merely transient and usually only lasted from November until February.¹⁹⁶ Within the Namoi region, the need for cotton chippers instigated ‘a large influx of itinerant labour each year during the summer months.’¹⁹⁷ Cotton chippers were employed casually and paid by the hour, but they were rarely recruited directly by farmers. Chipping contractors organised the supply of teams of labourers for the Namoi Valley’s cotton properties, and these contractors would often also oversee the work of the chippers.¹⁹⁸ While those employed permanently on the region’s cotton farms were exclusively adult males, for the task of chipping weeds growers were not averse to the hiring of female and child labour.¹⁹⁹ Demographically, the district’s 1960s chipping labour force was estimated to have been “90 per cent Aboriginal”.²⁰⁰ Even in the early 1980s it was not uncommon for Aboriginal children as young as twelve to be employed to remove weeds on Namoi

¹⁹⁶ Greenland, ‘Cotton Farming under irrigation’, p. 2.

¹⁹⁷ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 31.

¹⁹⁸ Christine Clare McIlvanie, ‘The Responsibility of People: A Study in Race and Racism, Wee Waa, NSW’, B.A. (Hons) thesis, Politics, University of New England, Armidale, 1982, p. 30.

¹⁹⁹ Australia and New Zealand Bank Limited, *Survey of the Cotton Growing Industry in the Wee Waa/Narrabri Area*, p. 9; McHugh, *Cottoning On*, p. 62.

²⁰⁰ Yvonne Kelly quoted in McHugh, *Cottoning On*, p. 61.

Valley cotton farms.²⁰¹ Itinerant Aboriginal labourers were easily exploited during the first decade of irrigated cotton growing within the Namoi Valley. It was not until 1967 that Indigenous Australians were included in the census and granted citizenship following a national referendum, which did little to alter their material circumstances. As Siobhan McHugh asserted, ‘Aboriginal workers were an underclass outside the world of organised labour.’²⁰²

It was not coincidental that the Namoi Valley’s American cotton growers employed Aborigines to do the most arduous, poorly-paid work on their farms. The exploitation of non-white labour in the United States’ production of cotton had endured from slavery and sharecropping in the South to California’s growing of the crop under irrigation. Within California’s San Joachin Valley:

The stratified hierarchy on the labor ranches of the 1920s reemphasized the crucial role played by race in enforcing class divisions. The owners and top managers were white: foremen, contractors, and workers were Mexican... Growers and managers used racism to justify treating Mexicans as inferior, paying them low wages, and offering only barely tolerable working and living conditions.²⁰³

This wage differential made Mexican labour critical to the profitability and success of cotton growing in California. When a number of American cotton growers migrated to the Namoi Valley in the 1960s, they sought to replicate these unequal labour relations, with Aborigines taking the place of Mexicans in the lower echelons of the transposed labour structure. Where Californian farmers had ensured that state laws were enacted to permit the importation of Mexican workers through the Bracero program, American growers in the Namoi Valley were able to capitalise on pre-existing racism in Australia and exploit for profit a maligned and marginalised sector of the population. As in

²⁰¹ McHugh, *Cottoning On*, p. 62.

²⁰² McHugh, *Cottoning On*, p. 64.

²⁰³ Weber, *Dark Sweat, White Gold*, p. 45.

California, the composition of labour within the Namoi district's cotton growing industry reflected the racial divide:

A hierarchy of employment opportunity emerged. Administrative and clerical staff were, without exception, white. Those men trained in the skills required to operate the field and ginning machinery were also white. The contractors for the chipping gangs were white. The 'chippers' themselves were, for the most part, Aboriginal men, women and children drawn from a large area of the Gamilaraay territory of north-west New South Wales and southern Queensland.²⁰⁴

The use of Aboriginal labour was confined almost exclusively to the menial work of chipping weeds, which occurred in the pre-harvest phase of the Namoi Valley's cotton mode of production. During that period, too, it was essential that the crop was defoliated before the picking of the fibre commenced. In the 1960s, defoliation was usually carried out under contract by the pilots of crop-dusting aircraft.

With the weeds removed, the cotton plants defoliated, and the majority of the bolls opened, harvesting could begin. Additional workers were often required in the 1960s to assist with the essential aspects of the Namoi Valley's cotton harvest, such as the operation of cotton picking machines and the driving of the tractors that towed trailers filled with cotton fibre to the gin. Although mechanical pickers would commonly return on a second and even a third occasion to collect the fibre from late opening bolls, the initial harvest usually captured between 75 and 80 per cent of the total fibre produced by an average 1960s Namoi Valley cotton crop.²⁰⁵ As this first pick gathered the greatest proportion of the cotton fibre it was arguably the most crucial period of the Namoi Valley's cotton mode of production. The quality of the cotton lint was critical as, from 1963, it was the measure that determined the price growers received for their crop. The fibre had to be delivered to the gin in the best possible condition but rain, in particular, was a hazard during the harvest as it could discolour and downgrade the white fibre. Wet weather also had the potential to halt picking by

²⁰⁴ McIlvanie, 'The Responsibility of People: A Study in Race and Racism, Wee Waa, NSW', p. 30.

²⁰⁵ Greenland, 'Cotton Farming under irrigation', p. 3.

making the ground too saturated for harvesting machines to operate. These considerations ensured that there was a need to harvest the cotton in haste, which underpinned the heightened demand for labour in that phase of the cotton mode. The importance of hastening the cotton harvest was demonstrated in the most exaggerated manner by the Auscott enterprise in 1965 when it purchased a total of 28 self-propelled cotton picking machines.²⁰⁶

Like harvesting, the ginning of the cotton was one of the aspects of the Namoi Valley's cotton mode of production where a greater proportion of labour was required, albeit for a relatively brief period. The ginning of the cotton locally created a seasonal demand for workers to perform the duties associated with this phase of the cotton mode. As the Namoi Cotton Co-operative's gins functioned twenty-four hours a day once the harvest commenced, the ginning workforce was separated in two, with 'each group working a twelve-hour shift for seven days per week.'²⁰⁷ When trailers of harvested cotton were delivered to the Co-operative's gins in the 1960s and 1970s, they were first taken to a weigh bridge to have the weight of the trailer's contents recorded. This task alone had required a number of workers to be stationed at the weigh bridge during the ginning season. Once a cotton trailer had been weighed, it was taken to the gin's suction bay where workers used a large pipe to suck the cotton out of the trailer and into the gin.²⁰⁸ As machine-harvested cotton was not as free from impurities as that which was picked by hand, the ginning of machine-picked did not simply involve the extraction of the cottonseed:

The ginning process consists of moisture reduction, leaf and trash removal, the separation of lint from seed and finally, the compaction of lint into bales.²⁰⁹

²⁰⁶ Greenland, 'Cotton Farming under irrigation', p. 3.

²⁰⁷ Irwin, *Cotton Systems of the Namoi Valley*, p. 20.

²⁰⁸ Former employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

²⁰⁹ Heydon, *The Cotton Story*, p. 44.

These procedures were completed by a variety of machines manned by workers who were often employed casually. As well as the cleansing and baling of the cotton lint, however, another crucial function was also performed at the gin: the grading of the cotton fibre. This occurred after the lint had been baled, with an employee cutting a sample from each bale for use in the grading process. Still more workers had to be trained as ‘cotton classers’, whose responsibility it was to assess the quality of each farmer’s cotton.²¹⁰ Although the majority of ginning-associated jobs were merely seasonal, the Namoi Cotton Co-operative did employ a small gin maintenance crew year-round to ensure the machines and equipment remained in working condition.²¹¹

Some facets of the role of labour have undergone change in the decades since irrigated cotton production began in the Namoi Valley. The most significant change to cotton labour in recent years has been the result not of mechanisation or technological innovation, but the severe long-running drought that has adversely affected much of rural Australia. The drought has led to a downturn in employment within the Namoi Valley from which the district’s cotton growing industry has not been exempt. Nevertheless, a small permanent farm workforce remains essential to the Namoi Valley’s production of cotton. The farm labour situation on Namoi Valley cotton properties was explained by one employee in 2005:

On each farm there is an owner or manager and depending on farm size, two or three permanent workers (obviously this goes up with larger farms). The key issue is whether employees are paid for a guaranteed 40 hours a week plus overtime, or just a standard hourly rate. As it is impossible to work on a farm when it rains, if it rains for 2 weeks the worker won’t get paid if they are just on an hourly rate. Paying an hourly rate also benefits employers because the amount of work that needs doing fluctuates during different times of the year. For example, at the start of the season there are many jobs that require long

²¹⁰ Former employee of the Namoi Valley’s cotton growing industry, personal correspondence with the author, March and April 2005.

²¹¹ Irwin, *Cotton Systems of the Namoi Valley*, p. 20.

hours and must be done on schedule: fertilising, cultivating, irrigating... but at other times there is nearly nothing to do but wait.²¹²

This worker's account illuminates the precarious economic position of those wage labourers who have ongoing 'permanent' employment on cotton-producing farms in the Namoi Valley. More broadly, it illustrates labour's predicament within an agricultural industry that is both subject to disruptive weather fluctuations and characterised by periods of idleness. Whether cotton was grown for its fibre on a small or industrial scale, intervals of virtual inactivity have been common during the raising of the crop. Even when cotton production was labour-intensive, there were stages in the growing season where little was to be done. In the United States, these periods of flux in the need for labour had been of little concern for farmers and plantation owners while slavery and, later, sharecropping had prevailed, as neither slaves nor sharecroppers were paid for their labour. It was only with increased levels of mechanisation and the shift to capital-intensive production in the United States that the employment of wage labour became significant in the growing of cotton. That farm workers in the Namoi Valley in the twenty-first century would accept an hourly rate with no overtime, sick pay or other basic conditions is perhaps symptomatic of the lack of alternative employment within the district, as well as the Namoi region's geographic isolation from larger centres where other forms of work may be found, and the absence of a union presence amongst farm labourers within Australia. Nevertheless, the demand for farm workers has at least remained relatively steady since irrigated cotton production began in the Namoi district in the 1960s. The number of labourers required for cotton chipping has, in contrast, been somewhat diminished.

In the 1960s, itinerant Aboriginal labourers drawn to the Namoi Valley town of Wee Waa by the availability of cotton chipping work had numbered in the thousands.²¹³

²¹² Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

In subsequent decades, a change occurred in the composition of the chipping workforce. From the situation in the 1960s where an estimated 90 per cent of Wee Waa's cotton chippers were Aboriginal, by the mid-1990s it was suggested that this proportion had been reduced to between 30 and 40 per cent.²¹⁴ Along with itinerant labour, the chipping work force was increasingly made up of local townspeople, with a significant number of white women involved in the hoeing of the weeds amongst the cotton.²¹⁵ By the 1990s, some cotton chippers in the Wee Waa district were coming 'from as far away as New Zealand, Tasmania and Western Australia, to work alongside students, nurses, backpackers and housewives.'²¹⁶ The future of cotton chipping in the Namoi Valley is, however, uncertain. The development of Monsanto's Roundup Ready cotton has had important implications for cotton chipping labourers. By creating cotton plants that can withstand applications of the weed-killer, Roundup, the need for workers to manually remove the weeds may consequently be reduced.²¹⁷ However, it is Monsanto's Roundup Ready Flex cotton variety, introduced to Australia in 2006, that has the greatest potential to impact upon the seasonal need for cotton chippers.²¹⁸ Unlike the initial Roundup Ready breed, the Flex variety permits growers to use Roundup to kill weeds much later in the growing season, encroaching on the period when cotton

²¹³ Simon Luckhurst, *Eddie's country: Why did Eddie Murray die?* Broome: Magabala Books, 2006, p. 38.

²¹⁴ McHugh, *Cottoning On*, p. 61 and 68.

²¹⁵ Kahl, *Cotton Pickin' Pioneer*, p. 112.

²¹⁶ McHugh, *Cottoning On*, p. 67.

²¹⁷ Wendy Russell, 'Use of the Triple Bottom Line Framework in Evaluating Social Changes Associated with the Adoption of Genetically Modified Crops in Australia', in Bill Pritchard, Allan Curtis, John Spriggs and Richard Le Heron (eds) *Social dimensions of the triple bottom line in rural Australia*, Canberra: Australian Government Bureau of Rural Sciences, 2003, p. 201.

²¹⁸ 'Roundup Ready Flex Cotton', *Monsanto*, Accessed: 5 March 2008, <http://www.monsanto.com/monsanto/ag_products/input_traits/products/roundup_ready_flex_cotton.asp>

chippers are normally hired. It remains to be seen whether the development of the Flex cotton breed will diminish the demand for cotton chipping labour in the Namoi Valley.

In contrast to the district's chipping workforce, the role of labour in the cotton harvest has undergone only minor modification since cotton growing under irrigation first began in the Namoi Valley in the 1960s. One shift has been the establishment of harvesting contractors within the district. As mechanical cotton harvesters expanded from single-row or two-row capabilities during the 1960s to four-row and six-row capacity by the beginning of the twenty-first century, the price of these machines increased exponentially. For some Namoi Valley cotton farmers, the hiring of picking contractors was more economical than investing in an expensive harvesting machine that would be needed for just a brief period each year. Harvesting contractors had their own equipment which they used to pick the cotton on a number of farms in the Namoi district. It was often contractors who used boll buggies as part of their picking operations, as the buggies helped to decrease the time involved in gathering the ripe cotton.²¹⁹ The founding of contract picking services was a result of the expansion of the Namoi Valley's cotton growing industry and a growing demand from the region's cotton farmers. The adoption of module-compactors, too, created a shift in the demand for workers with specific skills. While cotton was delivered to the gin in trailers, there had been a need for qualified tractor drivers to tow the trailers to the gin. With the move to module-builders, however, the cotton began to be transported to the gin by chain-bed and flat-bed trucks. This instigated a demand for these types of vehicles and for workers who were qualified to drive them, creating an opportunity for trucking contractors to establish themselves in the Namoi Valley.

Just as the configuration of harvested cotton fibre into modules had required new transportation methods, modules also caused a revision of some aspects of the

²¹⁹ Current employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

ginning process. Once cotton began to be delivered in module form, the Namoi Cotton Co-operative had to modify the suction bay area of its gins. When cotton had been transported in trailers, suction bay workers would climb into a cotton-filled trailer and manoeuvre a large suction pipe until all of the fibre had been drawn into the gin for processing. The size and weight of each module, as well as the level of fibre compaction, meant that modules were ill-suited to gin suction bays that had been designed for cotton trailers. Rather than workers using suction pipes, the Co-operative's gins adopted a more mechanised procedure for conveying the cotton fibre from a module into the ginning machines. Under the new method, moon buggies were used to collect modules and dispatch them into a module feeder, where the fibre was separated and siphoned to the gin stands.²²⁰ Like the transition from suction bay workers to an automated module feeder, a number of tasks that were performed by gin workers in the 1960s have since been mechanised. The manual sampling procedure, for example, in which a worker would cut a sample from every bale by hand, has been eliminated.²²¹ Sampling for the purpose of grading the cotton is now carried out by machine.²²² The strapping which secured a bale has also undergone a number of alterations. Initially, a flat steel band was fitted to a bale by hand. In the 1970s, this was replaced by wire band ties, which still required labourers to manually couple the ties. The workers responsible for this task during the 1970s were known as 'press men'. By the 1990s, the need for press men to secure strapping to bales was eliminated by the adoption of plastic straps, which were fitted in a mechanised process.²²³

²²⁰ Former employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

²²¹ Irwin, *Cotton Systems of the Namoi Valley*, p. 22.

²²² Former employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

²²³ Former employee of the Namoi Valley's cotton growing industry, personal correspondence with the author, March and April 2005.

The establishment of irrigated cotton production by Californian migrants created in the Namoi Valley the fundamental structure of the district's cotton mode of production. This capital-intensive cotton mode was founded upon the use of machinery and chemicals, with a small permanent labour force and an emphasis on supplementary casual, seasonal and contract labour. In existence for almost half a century, the growing, harvesting and ginning phases of the Namoi Valley's cotton mode of production have each undergone modification and refinement during that period. Through an analysis of the Namoi Valley's cotton mode of production the method by which cotton is grown, harvested and processed has been delineated. The cotton mode encompassed every stage from the planting of the cottonseed to the baling of the lint. Nevertheless, examining the cotton mode of production alone does not provide a comprehensive account of cotton in the Namoi Valley. What of the supply of the chemicals and machinery that is so crucial to irrigated cotton production in the region? How has the Namoi Valley changed to accommodate an agricultural industry that only five decades ago was so foreign to the region and its farming practices? These issues are considered in the following chapter through an examination of the political economy of cotton in the Namoi Valley.

CHAPTER FIVE: A POLITICAL ECONOMY OF COTTON IN THE NAMOI VALLEY

In the decades that followed the migration of American farmers and the establishment of irrigated cotton growing, cotton became entrenched as the Namoi Valley's economically ascendant crop. The ramifications of the development of cotton production in the Namoi district were not, however, purely economic. The changes caused by the emergence of an industrialised cotton mode of production in the Namoi Valley were not just evident on those farms that began to grow the crop. Irrigated cotton production in the Namoi Valley is notable for the impact that the introduction of the crop has had upon the region.

From the early 1960s, cotton growing under irrigation in the Namoi Valley signalled the beginning of a transition in Australia's production of the crop. That transition would result in major changes to the volume of cotton grown in Australia, the quality of the nation's cotton, and the method by which cotton would be produced within Australia. Apart from upsurges during the period of the American Civil War and the Great Depression, Australia's production of cotton had been minuscule until the 1960s. Prior to that decade, the raising of cotton had occurred almost exclusively within the north-eastern state of Queensland.¹ Although various Australian federal governments had attempted to foster a domestic cotton growing industry by making a cotton bounty available for much of the first half of the twentieth century, it was not until the late 1950s that the cotton bounty began to attract substantial interest from farmers. Before the latter period, the Commonwealth cotton bounty had been subject to renewal each year, which provided farmers with little security or incentive to grow cotton on a permanent basis. In 1958, however, the federal government instituted the

¹ Basinski, 'The Cotton Growing Industry in Australia', p. 209.

cotton bounty for a guaranteed five years. Rather than being reappraised annually like the previous measures, the bounty installed in 1958 remained in place until it was revised in 1963 and approved for a further five years.

From 1958, the Commonwealth cotton bounty stimulated greater interest in cotton growing within Queensland and led to the establishment of cotton production in other parts of Australia, including the Murrumbidgee Irrigation Area and the Namoi Valley within the state of New South Wales, and the Ord River region of Western Australia. The favourable terms of the federal cotton bounty inspired a small number of Americans to migrate and grow cotton in these areas of Australia. The suitability of the Namoi Valley for cotton production and the expertise of those Americans who settled there to grow the crop ensured that cotton was highly successful in the Namoi district. Cotton did not fare as well in the Murrumbidgee Irrigation Area, where the temperatures were found to be inadequate for the production of premium cotton crops, and at the Ord insect pests developed a chronic resistance to cotton farmers' insecticides. At both the Ord and the Murrumbidgee Irrigation Area, cotton growers would struggle to remain profitable once the Commonwealth cotton bounty was eliminated in the early 1970s. Although the existence of the bounty had fostered cotton production in areas of Australia that were not ultimately suited to the growing of the plant, the subsidy nonetheless succeeded in forging an Australian cotton growing industry.

The Namoi Valley would prove crucial in the progression of cotton in Australia from a minor agricultural endeavour to a major export commodity. While the production of cotton was expanding in the Namoi district early in the 1960s, cotton was of negligible economic significance to Australia at that time:

In comparison with other rural industries, cotton growing has been, and [in 1965] still remains, of little importance to the national economy as a whole. The value of cotton grown in 1962-3 (£938,000) contributed only 0.17 per cent to the

total value of agricultural (crop) production and less than 0.07 per cent to the total value of rural (agricultural and pastoral) production.²

Despite cotton's marginal financial position within Australia's agricultural sector early in the 1960s, the growing of the crop proliferated as the decade proceeded. In the 1963-64 cotton season, the total production of cotton in Australia had amounted to 5.7 million pounds of raw cotton. Less than five years later, the nation's output of cotton had multiplied. The 1967-68 season in Australia yielded 72 million pounds of raw cotton.³ This dramatic rise in Australian cotton production stemmed primarily from the development and expansion of cotton growing within the Namoi Valley.

Demonstrating the region's central role in advancing Australia's output of cotton, the Namoi Valley had become the source of the greater portion of the cotton produced in Australia by the mid-1960s. In the 1964-65 season, the Namoi Valley accounted for 64.4 per cent of Australia's total cotton production. The proportion of the nation's cotton that was grown in the Namoi district increased to 75.5 per cent during the 1965-66 season, and remained high in the 1966-67 season at 60.4 per cent.⁴

The upsurge in the production of the crop in Australia during the decade of the 1960s reflected a changing outlook toward cotton as a farming pursuit. When confined to the state of Queensland, cotton growing had typically been a secondary activity for Queensland dairy farmers, many of whom treated cotton 'simply as a chance crop.'⁵ Similarly, some who were engaged in cotton growing in the Namoi Valley in 1967 indicated that they perceived the raising of cotton as a minor, impermanent undertaking:

...for most share farmers, (except those seeking experience and capital, to apply in later seasons to their own land), cotton growing is a transient, even part-time

² Basinski, 'The Cotton Growing Industry in Australia', p. 209.

³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 74.

⁴ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 21.

⁵ Basinski, 'The Cotton Growing Industry in Australia', p. 217.

occupation, in which to earn additional income to supplement returns from other sources, e.g. clearing, fencing, carrying, shearing...⁶

It is not known how many share farmers viewed cotton in this manner, but as a group, share farmers comprised less than one-third of Namoi Valley cotton growers in 1967.⁷ In that period, the production of the crop in the Namoi district was dominated by those who were farming cotton on their own land as owner-operators. The average cotton acreage planted by owner-operators was more than double that of share farmers in 1967, suggesting that the majority of the Namoi Valley's cotton producers saw their involvement in cotton growing as more than merely transitory.⁸ It could be argued that the 1960s marked the first attempt to establish in earnest a substantial Australian cotton growing industry which could eventually be sustained without the aid of government bounties or subsidies. However, the key to the creation of a viable and significant cotton growing industry in Australia lay not in the adjustment of attitudes to the crop, but in the development of irrigation. From the 1920s, California had provided a revolutionary example of how areas of virtual desert could be transformed into productive cotton farming land by the means of irrigation. Particularly in the aftermath of the Second World War, the Californian model had popularized irrigated agriculture. Without such a precedent, it is unlikely that Australian cotton production would have undergone its 1960s transformation. The inception of successful irrigated cotton production in California led, decades later, to the establishment of cotton growing in Australia's Namoi Valley, Ord River region and Murrumbidgee Irrigation Area.

The largest cotton acreages in Australia during the 1960s were those sown within the Namoi Valley. In the 1964-65 season, for example, the average cotton area was 528 acres in the Namoi Valley, compared to an average of 290 acres in the Ord

⁶ Pigram, *The Development and Potential of Cotton in the Namoi Valley*, p. 24.

⁷ Pigram, *The Development and Potential of Cotton in the Namoi Valley*, Table IV, p. 23.

⁸ Pigram, *The Development and Potential of Cotton in the Namoi Valley*, Table IV, p. 23.

River region, 154 acres in the Murrumbidgee Irrigation Area, 138 acres in southern Queensland, 113 acres in central Queensland, and an average of 104 acres planted by Queensland farmers whose cotton was grown without the aid of irrigation.⁹ While the relative size of these acreages was important, such figures revealed nothing of the amount or quality of the fibre produced by cotton crops in disparate parts of Australia. The crucial measure of success in cotton growing is the amount, or yield, of the fibre borne by the bolls of the cotton plant. During the 1960s, the criterion of yield distinguished the Namoi Valley as Australia's premier cotton growing region. Especially in the latter half of that decade, cotton yields in the Namoi Valley were 'considerably higher than those achieved elsewhere in Australia.'¹⁰

Exceeding the nation's other cotton growing areas in terms of acreage and yield by the mid-1960s, the Namoi Valley's cotton was, moreover, considered to be of comparatively high quality. During the 1963-1964 cotton season, growers from the Namoi district produced the greatest proportion of cotton fibre that was classed as having the staple length and grade most preferred by Australian spinning mills.¹¹ In that season, 57.6 per cent of the Namoi Valley's cotton lint was rated as being in this desired range, followed by the Murrumbidgee-Murray region with 35.1 per cent, and the Ord at 34 per cent. At only 30.8 per cent, cotton growers in Queensland harvested the smallest proportion of cotton fibre that was classified as being in the range required by cotton spinners in Australia.¹² With more than half of its lint meeting spinners' standards just a few years after cotton growing commenced in the region, the Namoi Valley had swiftly become Australia's pre-eminent cotton producing district. The migration of

⁹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, Table No. 5, p. 12.

¹⁰ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 74.

¹¹ Basinski, 'The Cotton Growing Industry in Australia', pp. 211-213.

¹² Basinski, 'The Cotton Growing Industry in Australia', Table 2, p. 211.

experienced American cotton farmers and the development of a distinctive cotton mode of production ensured that, by the mid-1960s, the Namoi Valley would be at the forefront of Australian cotton production, not only in terms of volume and yield, but also with regard to the quality of its cotton lint.

The rapid introduction and expansion of commercial cotton production in the Namoi Valley had significant consequences for that region from the early 1960s. The Namoi district's cotton growing industry had its beginnings in the previous decade, however, with the Narrabri Agricultural Research Station conducting cotton-rearing trials from 1958. The trials were designed to find an agricultural application for the water from the Keepit Dam, the construction of which was completed by 1960. The success of the cotton trials, coupled with the availability of irrigation water from the Keepit reservoir and the federal government's provision of a cotton bounty, inspired a small number of Americans to migrate to the Namoi Valley to grow cotton. The cotton growing method introduced by the American migrants would have a considerable impact upon the Namoi region.

Where the growing of the crop in Queensland had been 'geographically scattered', cotton in the Namoi Valley had a specific spatial configuration.¹³ Queensland's production of cotton had historically been limited to 'low yielding crops of a quality that was often criticised by spinners.'¹⁴ As Queensland's cotton crops prior to the 1960s were usually small-scale, sideline enterprises that were reliant on rainfall and sunlight alone, the state's cotton acreages tended to be dispersed in a haphazard style.¹⁵ In contrast, irrigation was the pivotal factor in determining the geography of cotton production within the Namoi Valley. Once licensed farmers were allocated

¹³ Basinski, 'The Cotton Growing Industry in Australia', p. 209.

¹⁴ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 1.

¹⁵ Basinski, 'The Cotton Growing Industry in Australia', pp. 209-217.

water from the Keepit Dam, the Namoi River and a number of the creeks that flowed from it were used as conveyance channels for delivering the water from the storage dam to the cotton producing areas downstream. The delivery of irrigation water in this way governed where those cotton growing areas would be located within the boundaries of the Namoi Valley.

Cotton growing in the Namoi district was not strictly limited to the properties that bordered the Namoi River and the creeks that stemmed from the river, although that is where most cotton production occurred. Some groups of Namoi Valley cotton producers pumped their allocated water ‘into a flood outlet water course.’¹⁶ One Namoi Valley farmer who converted to cotton growing during the 1960s has suggested that the region’s American migrants were instrumental in altering perceptions of what constituted irrigable land:

They taught us to go and find large acres well away from the river and take the water to it... it wouldn’t matter if it was ten miles away, find suitable land and take the water to it...¹⁷

A prominent example of such an approach was provided by the farming operations of Auscott Pty Ltd. The Auscott enterprise created a channel to deliver water pumped from the Namoi River to its cotton paddocks, which were located a distance of four miles from the river. While irrigation was not restricted to those farms that directly adjoined creeks or the river, by the mid-1960s, the Namoi Valley’s irrigated cotton was nevertheless concentrated on areas of flat land in close proximity to the Namoi River and the towns of Wee Waa and Narrabri.¹⁸

The development of irrigated cotton growing in small clusters within the Namoi Valley determined the selection of the sites on which gins would be built for the

¹⁶ Australia and New Zealand Bank Limited, *Survey of the Cotton Growing Industry in the Wee Waa/Narrabri Area*, p. 2.

¹⁷ Pat Carberry quoted in McHugh, *Cottoning On*, p. 24.

¹⁸ Greenland, ‘Cotton Farming under irrigation’, p. 1.

processing of the region's cotton. Although the manufacturing of the cotton fibre into fabric took place outside of the region, the ginning of the cotton occurred in the Namoi Valley. The decision to locate ginning facilities in the region where cotton was produced was most likely influenced by the composition of unprocessed 'raw' cotton. Whether it is harvested by the spindles of a mechanical picker or by hand, raw cotton is an amalgam of seeds and fibre. The seeds are usually considered a by-product and attract a much lower price than the white lint for which the cotton plant is predominantly grown. Cotton in the Namoi Valley was certainly propagated for its fibre, not its seeds. The inefficiency of moving raw cotton out of the district for ginning was demonstrated in 1962 by Paul Kahl and Frank Hadley when their first Namoi Valley cotton crop had to be trucked to a Queensland gin in ten separate 1,200 kilometre round trips.¹⁹ Ginning the cotton locally was preferable because, as well as removing the seeds, this process involved the compression of the lint into bales. Rather than transferring the bulky raw cotton elsewhere for ginning, it was far more practical to move the lint out of the Namoi Valley once it was processed, compacted into dense bales and ready to be sent to Australia's spinning mills. When cotton from the Namoi Valley began to be exported overseas late in the 1960s, the lint had to be delivered from the inland region to an Australian port, making the saving on transport costs by ginning the cotton locally all the more important.

The first cotton gin in the Namoi Valley was erected at Wee Waa in 1963 by the Namoi Cotton Co-operative.²⁰ With the establishment in that same year of Auscott Pty Ltd, the American-owned enterprise soon built two gins in the Namoi Valley. As well as processing and baling its own harvested cotton crop, Auscott's gins also handled the

¹⁹ Kahl, *Cotton Pickin' Pioneer*, p. 104.

²⁰ 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary: 1962-1992*, p. 13.

cotton produced by a number of other farmers in the district.²¹ It seems, however, that most Namoi Valley growers in the 1960s had their cotton ginned and marketed by the Namoi Cotton Co-operative.²² This was evidenced by the rapid increase in the number of gins owned and erected by the Co-operative during that decade.²³ The dramatic expansion in the cotton acreages sown within the Namoi district meant that, by the mid-1960s, two gins were inadequate for the processing of the region's total cotton production. In 1965, the Namoi Cotton Co-operative's Wee Waa gin was expanded to four stands, increasing its capacity, and, together with Auscott's four-stand plant, these two gins were capable of a combined output of approximately 500 cotton bales a day.²⁴ As the 1960s progressed, more gins were established in the vicinity of Wee Waa and Narrabri within the Namoi Valley. The Namoi Cotton Co-operative built another two gins, situated at Myall Vale and Merah North, during 1966.²⁵ This expansion by the Co-operative continued later in the decade:

In 1968, the then Premier, Sir Robert Askin, officially opened new gins costing more than \$1,00,000 at Tulladunna and Yarraman. In 1969 Yarraman No. 2 came on line and Myall Vale expanded to four stands.²⁶

With cotton growing properties concentrated in pockets of the Namoi Valley close to the river and adjoining creeks, the gins established to process the region's cotton were positioned close to the farms where the fibre was grown. Having the gins nearby the

²¹ 'History of Cotton Growing in Australia: Wee Waa and the Namoi Valley', *The Australian Cotton Grower*, October 1981, p. 5.

²² See Irwin, *Cotton Systems of the Namoi Valley*, Figure 11, p. 20.

²³ 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary: 1962-1992*, p. 13.

²⁴ James B. Fisher, 'Cotton Growing in North-West New South Wales', Paper presented at the Australian Institute of Agricultural Science Symposium, 24 June 1965, p. 5; 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary: 1962-1992*, p. 13.

²⁵ 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary: 1962-1992*, p. 13.

²⁶ 'Co-operative fostered the industry's growth', in *Namoi Cotton Co-operative Ltd 30th Anniversary: 1962-1992*, p. 13.

Namoi Valley's cotton properties kept the cost of transport low for growers. As cotton in the 1960s was delivered to the gin in trailers towed by tractors, the gins could not be located too distantly from the areas where cotton was grown.

The construction of gins was one of the earliest indicators of cotton's increasing influence in the Namoi Valley during the 1960s. Dominated at the beginning of that decade by the grazing of sheep and cattle and the growing of wheat, the Namoi district remained characterised by mixed farming even after the arrival of cotton:

Of the total area used for agricultural and pastoral purposes within the [Namoi] shire in 1964-65 almost 20% was under crop and of this area 63% was devoted to wheat which yielded an average of 29 bushels per acre. Other cash crops commonly grown in this region include sorghum, maize and safflower. Sheep grazing for wool production is also an important activity within the region generally.²⁷

Indeed, in the mid-1960s, it was not cotton but 'dryland grazing for wool production' that constituted the main activity on the Namoi Valley's farming lands.²⁸ Cotton did not replace the other agricultural industries in the Namoi Valley; rather, cotton became 'an additional commercial crop in the area'.²⁹

Although irrigated cotton growing was confined to specific areas of the Namoi Valley, cotton did alter the district and the town of Wee Waa in particular, in a number of significant ways. Paul Kahl and Frank Hadley's selection of the property, 'Glencoe', on the outskirts of Wee Waa would have tremendous consequences for that town over time. One local described the town prior to the acceleration of cotton growing under irrigation:

Newcomers to Wee Waa in the early sixties found a town of windmills and trees, two butcher shops, several general stores, a number of stock and station agents, a daily train service, two schools, a dairy supplying fresh milk daily...

²⁷ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 6.

²⁸ Stannard and Kelly, *The Irrigation Potential of the Lower Namoi Valley*, p. 28.

²⁹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 2.

There was a baker, a timber mill... they also found that everything stopped for lunch between 1 and 2 pm.³⁰

Less than five decades later, the small town of Wee Waa has metamorphosed into a service centre for the district's cotton growing industry. Gone are the butcheries, the dairy, the timber mill, and all passenger train services to and from the town. While the disappearance of industries and services from rural Australian towns has not been uncommon since the late twentieth century, Wee Waa was unusual in that this decline occurred once its rebirth as a burgeoning cotton town had begun.

Cotton transformed Wee Waa in a number of respects because of the method by which the fibre crop was produced in the district. That method was notably different from previous approaches to cotton growing in Australia. Farmers of cotton in Queensland before the 1960s had used virtually no fertilisers or pesticides on their small, rain-grown crops.³¹ The changes to pesticide usage in Australian cotton production by the mid-1960s were outlined by J.J. Basinski:

Until recent years, owing to doubts about the economics of spraying rainfed cotton, only a few growers took any steps to control insect pests. Currently, the application of insecticides is universal on irrigated cotton and is becoming more frequent on rainfed crops.³²

The Namoi Valley was one region where the use of insecticides and fertilisers was an integral component of the system of cotton growing that prevailed. The cotton mode of production that emerged in the Namoi Valley was characterised as both intensive and industrialised. From the early 1960s, the region's cotton mode involved the deployment of crop-raising techniques that required a range of inputs. In addition to insecticides, fertilisers and irrigation water, the predominant cotton growing method in the Namoi district demanded seed, chemical defoliant and an array of heavy machinery.

³⁰ Ros Hudson, 'Change: A cotton culture shock arrived in the 1960's' in Ian Thompson, (ed.) *Stories of Wee Waa*, Wee Waa: Wee Waa Historical Society, 2000, p. 153.

³¹ Basinski, 'The Cotton Growing Industry in Australia', p. 216.

³² Basinski, 'The Cotton Growing Industry in Australia', p. 216.

The Namoi Valley's American cotton migrants, seeking the materials to which they were accustomed, tended initially to import some of these items from the United States. This was particularly common in regard to machinery. The importation of machinery for cotton growing was sanctioned in the early 1960s by the Commonwealth cotton bounty which, as well as providing payments to farmers for producing the fibre, also waived import duties on equipment for the raising of the crop. Paul Kahl recalled that he and Frank Hadley used this provision to full advantage:

When we arrived in Australia in 1961 we were given a three year duty moratorium on machinery and parts, new or used, declared by us as for use in cotton growing. This, in fact, prevailed on some items for five years. Frank and I shipped over a couple of bulldozers, a scoop, land plane, several wheel tractors, cultivators to mount on same and a number of single row cotton pickers. Discs, planters and parts as needed. Australian prices on the latter were normally over twice the US prices.³³

While Kahl and Hadley looked to the United States for a supply of cotton farming machinery in the early 1960s, the two men had quite a different solution to the problem of securing a steady stock of insecticides for their cotton crops. Finding that Shell Chemicals was the maker of many of these insecticides, Paul Kahl contacted the company directly to attempt to address the supply problem in Wee Waa. Kahl and Hadley were persuaded to become Shell Chemicals' agents in the district and the pair founded a business, 'Glencoe Distributors', which supplied Shell's agricultural chemicals to other farmers whilst ensuring that their own supply of insecticides was constant.³⁴

The involvement of Shell Chemicals in the Namoi Valley's cotton growing industry foreshadowed the entrance of other multinational corporations in the decades that followed. Reflecting the degree to which cotton growing in the Namoi Valley is industrialised, in the twenty-first century many of the world's pre-eminent multinational

³³ Kahl, *Cotton Pickin' Pioneer*, p. 141.

³⁴ Kahl, *Cotton Pickin' Pioneer*, p. 99.

biotechnology, machinery, seed and agrochemical companies have agents and dealerships operating within the Namoi district. The farm machinery firm, Case IH, for instance, has 4,900 dealerships worldwide, one of which is located in the town of Wee Waa.³⁵ In 2006, Wee Waa had a population of just 2,608 people, yet the town has two machinery dealerships.³⁶ The second machinery business in Wee Waa sells the products of John Deere, ‘the world’s leading manufacturer of farm equipment.’³⁷

Along with these leading farm machinery companies, a number of the most prominent multinational corporations which specialise in the development of chemicals, seed and biotechnology have established a presence in the Namoi Valley. With insecticides and herbicides designed for use in cotton growing, Dow AgroSciences, a subsidiary of the Dow Chemical Company, has a ‘cotton sales team’ operating in the region.³⁸ DuPont, which manufactures cotton insecticides and herbicides, has a ‘team’ of representatives working in the Namoi Valley and other cotton growing regions of Australia.³⁹ Bayer CropScience has area managers in the Upper and Lower Namoi Valley to market its ‘range of seed and soil insecticides, seed treatments, foliar

³⁵ ‘About Us’, *Case IH North America*, Date accessed: 28 June 2008, <<http://www.caseih.com/about/about.aspx?navid=103&RL=ENNA>>; ‘Case IH Dealer List’, *Case IH Australia*, Date accessed: 28 June 2008, <<http://123.243.43.12/anzcomms/CaseIHWeb/Case%20IH%20Dealer%20List.pdf>>

³⁶ Australian Bureau of Statistics, ‘Basic Community Profile – 2388: Selected Person Characteristics by Sex’, *2006 Census Community Profile Series: 2388 (Postal Area)*, Cat. No. 2001.0, Date accessed: 6 July 2008, <<http://www.censusdata.abs.gov.au>>

³⁷ ‘General Information Deere and Company: About Us’, *John Deere USA/Canada*, Date accessed: 28 June 2008, <http://www.deere.com/en_US/compinfo/index.html?location=ourcompany&link=aboutus>; ‘International Dealer Locator: Dealer List: Australia’, *John Deere Australia/New Zealand*, Date accessed: 28 June 2008, <http://www.deere.com/en_AU/homepage/default.html>

³⁸ ‘About Us’, *Dow AgroSciences*, Date accessed: 28 June 2008, <<http://www.dowagro.com/about/who/>>; Dow AgroSciences (Advertisement), ‘Trade Directory: Chemical Companies’, in *The Australian Cottongrower Cotton Yearbook 2003*, p. 186; ‘Contact Us’, *Dow AgroSciences Australia*, Date accessed: 28 June 2008, <<http://www.dowagro.com/au/contact/index.htm?category=2>>

³⁹ ‘Crop Protection: Cotton’, *DuPont*, Date accessed: 28 June 2008, <http://www2.dupont.com/Production_Agriculture/en_US/crops/cotton/index.html>; DuPont (Advertisement), ‘Trade Directory: Chemical Companies’, in *The Australian Cottongrower Cotton Yearbook 2003*, p. 187.

insecticides, plant growth regulators, harvest aids' and other products designed specifically for cotton.⁴⁰ The seed, biotechnology and chemical firm, Monsanto, has a business manager based in the Namoi Valley.⁴¹ Syngenta, too, has sales managers in the Upper and Lower Namoi Valley to promote the company's fungicide seed treatments, herbicides, insecticides, and insecticide seed treatments for cotton.⁴² Incitec Pivot, a 'leading global chemicals company with nitrogen-based manufacturing at its core', has its fertiliser products sold through four different suppliers in Wee Waa alone.⁴³ Deltapine, the Monsanto-owned breeder of genetically modified and 'conventional' cotton seed, has a research centre and its head office in Australia located near the Namoi Valley town of Narrabri.⁴⁴ Narrabri is also the site of an oilseeds processing plant which handles much of the district's cotton seed and is owned by the international food and grain company, Cargill.⁴⁵ Bayer CropScience and Syngenta

⁴⁰ Bayer CropScience (Advertisement), 'Trade Directory: Agricultural Chemicals and Fertilisers', in *The Australian Cottongrower Cotton Yearbook 2003*, p. 183; 'Business Groups: Cotton', *Bayer CropScience Australia*, Date accessed: 28 June 2008, <<http://www.bayercropscience.com.au/cs/businessgroups/cotton.asp>>

⁴¹ Monsanto (Advertisement), 'Trade Directory: Biotechnology', in *The Australian Cottongrower Cotton Yearbook 2003*, p. 186.

⁴² 'Cotton: Rainfast periods', *Syngenta Australia*, Date accessed: 28 June 2008, <http://www.syngenta.com.au/start.aspx?UCCurrent=/CropPortal/RainfastSearchResultUC.ascx&pageId=20001&menuId=2212&MM=cc_2>; Syngenta (Advertisement), 'Trade Directory: Chemical Companies', in *The Australian Cottongrower Cotton Yearbook 2003*, p. 187; 'Contact Us: Find Local Contact', *Syngenta Australia*, Date accessed: 28 June 2008, <<http://www.syngenta.com.au/Start.aspx?PageID=1111&menuId=0&sti=1>>

⁴³ 'Company Profile', *Incitec Pivot*, Date accessed: 28 June 2008, <http://www.incitecpivot.com.au/company_profile.cfm?CFID=10481444&CFTOKEN=48251594>; 'Locate A Supplier', *Incitec Pivot*, Date accessed: 28 June 2008, <http://www.incitecpivot.com.au/locate_supplier.cfm>

⁴⁴ 'Contact Us', *Deltapine Australia*, Date accessed: 22 July 2008, <<http://www.deltapine.com.au/ho.htm>>; 'Deltapine Pty Ltd', *Life Science Directory: Industry Overview: NSW Department of State and Regional Development*, Date accessed: 22 July 2008, <<http://www.biotechnology.nsw.gov.au/Alphabetical.aspx?letter=d&companyid=1417>>

⁴⁵ 'Locations', *Cargill Australia*, Date accessed: 29 June 2008, <<http://www.cargill.com.au/Locations.htm>>; 'About Us: How We Are Organized: Our Businesses', *Cargill*, Date accessed: 29 June 2008, <<http://www.cargill.com/about/organization/organized.htm>>

jointly own Cotton Growers Services, a business which provides seed, equipment and agronomic consultancy to cotton farmers and has its head office located in Wee Waa.⁴⁶

As well as the entry of multinational agribusiness corporations, the success of irrigated cotton production in the Namoi Valley has seen the expansion of some of the cotton firms that were established in the region during the 1960s. The Namoi Cotton Co-operative, for example, has grown from having a single gin at Wee Waa in 1963 to 'a fully integrated ginning, marketing, warehousing and shipping organisation' which has fourteen gins within New South Wales and Queensland, and has been listed on the Australian Stock Exchange since 1998.⁴⁷ Similarly, the expansion of the J.G. Boswell-owned Auscott Limited has involved considerable vertical integration. As well as extending its farming operations within and beyond the Namoi Valley, Auscott provides ginning, warehousing, classing, shipping and marketing services to other cotton producers in Australia.⁴⁸ The prevalence of irrigated cotton production in the Namoi Valley prompted another enterprise, Queensland Cotton, to become established in the region as a competitor with Auscott and the Namoi Cotton Co-operative. Queensland Cotton, too, gins, markets and ships the cotton of Namoi district farmers.⁴⁹ Cotton Seed Distributors Ltd, which evolved from the Namoi Cotton Seed Association established in 1964, continues to breed cotton seed varieties for farmers in the Namoi Valley.⁵⁰

⁴⁶ 'About Us', *Cotton Growers Services*, Date accessed: 28 June 2008, <<http://www.cgs.com.au/index1.htm>>; 'Services', *Cotton Growers Services*, Date accessed: 28 June 2008, <<http://www.cgs.com.au/index1.htm>>

⁴⁷ 'About Namoi: Corporate Profile', *Namoi Cotton Co-operative Ltd*, Date accessed: 29 June 2008, <<http://www.namoicotton.com.au/01a.htm>>; 'About Namoi: Locations', *Namoi Cotton Co-operative Ltd*, Date accessed: 29 June 2008, <<http://www.namoicotton.com.au/01e.htm>>; 'History of Namoi Cotton: About Us', *Cotton Co-operative Ltd*, Date accessed: 12 May 2004, <<http://www.namoicotton.com.au/templates/aboutus/aboutushistory.htm>>

⁴⁸ 'About Us', *Auscott Limited*, Date accessed: 29 June 2008, <<http://www.auscott.com.au/AboutUs/default.aspx>>

⁴⁹ 'Our Business', *Queensland Cotton*, Date accessed: 28 June 2008, <<http://www.qcotton.com.au>>

⁵⁰ Irwin, *Cotton Systems of the Namoi Valley*, p. 29; 'Corporate Profile: Company Structure', *Cotton Seed Distributors Ltd*, Date accessed: 30 June 2008, <<http://www.csd.net.au/page/show/21084>>

Today, however, Cotton Seed Distributors' operations are highly specialised and involve Monsanto, Syngenta, Bayer, E-Chem and BASF as 'commercial partners'.⁵¹

Along with the establishment of both Australian and multinational commercial interests, the growing of cotton in the Namoi Valley has spurred other developments in the region. For instance, the Cotton Research and Development Corporation, a joint venture between the Australian federal government and the cotton industry, has its headquarters in Narrabri.⁵² Near that town, too, the Narrabri Agricultural Research Station of the 1960s has evolved into the Australian Cotton Research Institute. ACRI incorporates more than seventy CSIRO staff, as well as workers from the New South Wales Department of Primary Industries, and the Cotton Catchment Communities Co-operative Research Centre.⁵³

In relation to the industrialisation of agriculture in Australia it has been observed that:

Industrial capital selects particular aspects of agricultural production and converts these into industrially-produced inputs prior to their re-incorporation into farming. The examples here are the various manufactured products used by most commercial farmers – fertilisers, insecticides, farm machinery ... The appropriation of such inputs has enabled significant increases in output, but the legacy has been to place farmers in a position of dependency.⁵⁴

In the case of the Namoi Valley's cotton growing industry, however, it is not only farmers who have been made dependent on the manufactured products of industrial capital. The sale of such goods is integral to many businesses in the towns of Wee Waa

⁵¹ 'Corporate Profile: Company Structure', *Cotton Seed Distributors Ltd*, Date accessed: 30 June 2008, <<http://www.csd.net.au/page/show/21084>>

⁵² 'About CRDC', *Cotton Research and Development Corporation*, Date accessed: 22 July 2008, <<http://www.crdc.com.au/index.cfm?pageID=1>>

⁵³ 'Narrabri: Australian Cotton Research Institute (NSW)', *CSIRO*, Date accessed: 22 July 2008, <<http://www.csiro.au/places/ps8a.html>>

⁵⁴ Geoffrey Lawrence, 'Genetic Engineering and Australian Agriculture: Agenda for Corporate Control', *Journal of Australian Political Economy*, No. 25, October 1989, p. 4.

and Narrabri and the Namoi Valley's economy has become intertwined with irrigated cotton production.

Contradicting the tendency nationally, the importance of the agricultural sector to Wee Waa rose between 1991 and 1996, and the town was described as being 'quite dependent' on that sector for employment.⁵⁵ The absence of employment and educational opportunities, and a lack of medical services, commercial and financial facilities have been recognised as characteristics of rural disadvantage, but those characteristics are not necessarily evident in Wee Waa.⁵⁶ Despite having a small population, Wee Waa has a branch of the National Australia Bank as well as the ANZ Bank, signifying 'the wealth that is present in the region, if not the town.'⁵⁷ It has been argued that Wee Waa has been relatively 'successful in retaining the presence of firms that supply and service capital items for the cotton industry' at the same time as there has been a decline or demise of some 'firms that supply household goods and services'.⁵⁸

At a public workshop in Narrabri in 2001, local participants identified as a potential threat the district's reliance on the cotton growing industry.⁵⁹ The Namoi Valley's reliance on the cotton industry, and consequent vulnerability to the industry's fluctuations, has been evident with regard to the adoption of genetically modified Bt

⁵⁵ Lisa Chapman and Jared Greenville, 'Profiling rural Australia: Impact of change in the agriculture sector of rural towns', *Australian Commodities*, Vol. 9, No. 1, March 2002, p. 237 and 247, Date accessed: 6 July 2008, <<http://www.assa.edu.au/Workshop/Papers/chapman.PDF>>

⁵⁶ These are considered characteristics of rural disadvantage as compared with Australian capital cities. See: Bill Pritchard and Phil McManus (eds) *Land of Discontent: The Dynamics of Change in Rural and Regional Australia*, Sydney: UNSW Press, 2001, p. 2.

⁵⁷ Margaret Southwell, 'A Test of Class: An Analysis of Class and Community in Wee Waa', B.A. (Hons) thesis, Politics, University of Western Sydney, 2002, p. 64.

⁵⁸ Reeve, et al. *A Scoping Study on Socio-Economic Indicators for the Cotton Industry*, p. 38.

⁵⁹ 'Outcomes of Workshop 4, Narrabri Shire Council Local Environmental Study, held at Narrabri Council Chambers, 4 August 2001', *Local Environmental Study Covering the Whole of Narrabri Shire Council Area: Volume 2 – Appendices*, Narrabri: Report prepared for Narrabri Shire Council by Hunter Development Brokerage Pty Ltd, March 2002, p. 36.

cotton varieties. The sowing of Bt cotton crops has seen reductions in chemical use, and a decline in trade for some Namoi Valley businesses that supply agricultural chemicals.⁶⁰ The levels of staff at chemical supply and spraying companies have also decreased in the Namoi Valley and other cotton growing regions of Australia.⁶¹

It had been suggested that the Namoi Cotton Co-operative's employment of an estimated 100 full-time workers in the Wee Waa office provided 'a sense of permanence with its investment in the future of the district'.⁶² However, the Namoi Cotton Co-operative closed its head office in Wee Waa, and relocated it not within the Namoi Valley, but interstate to Toowoomba in Queensland in 2003.⁶³ The Co-operative maintains an office at Wee Waa and its ginning facilities in the district. While exact figures are not available on the number of Wee Waa jobs lost in the relocation of the Co-operative's head office, there has been a subsequent reduction in the Co-operative's total workforce. In 2004, the Namoi Cotton Co-operative employed in total 'approximately 170 full time staff and over 300 seasonal and casual employees.'⁶⁴ The Co-operative continues to employ the same number of seasonal and casual workers, but its full time employees have been reduced to 120.⁶⁵

The migration of a small number of American farmers led to the Namoi Valley becoming one of Australia's leading cotton growing areas. The role of the state was

⁶⁰ Reeve, et al. *A Scoping Study on Socio-Economic Indicators for the Cotton Industry*, p. 37.

⁶¹ Reeve, et al. *A Scoping Study on Socio-Economic Indicators for the Cotton Industry*, p. 37; Russell, 'Use of the Triple Bottom Line Framework in Evaluating Social Changes Associated with the Adoption of Genetically Modified Crops in Australia', p. 200.

⁶² Southwell, 'A Test of Class: An Analysis of Class and Community in Wee Waa', p. 61; Hudson, 'Change: A cotton culture shock arrived in the 1960's', p. 153.

⁶³ 'Corporate Profile: About Us', *Namoi Cotton Co-operative Ltd*, Date accessed: 12 May 2004, <<http://www.namoicotton.com.au/templates/aboutus/aboutuscorporateprofile.htm>>; Alice Plate, 'Cotton company fears for employees', *ABC Rural Radio, Queensland Country Hour*, 26 July 2005, Date accessed: 15 September 2010, <<http://www.abc.net.au/rural/qld/stories/s1422704.htm>>

⁶⁴ 'Corporate Profile: About Us', *Namoi Cotton Co-operative Ltd*, Date accessed: 12 May 2004, <<http://www.namoicotton.com.au/templates/aboutus/aboutuscorporateprofile.htm>>.

⁶⁵ 'Corporate Profile', *Namoi Cotton Co-operative Ltd*, Date accessed: 15 September 2010, <<http://www.namoicotton.com.au/01a.htm>>

instrumental in spurring that migration through the provision of cotton bounty payments, and facilitating the development of industrialised cotton production in the Namoi Valley. From the waiving of import duties on cotton growing machinery in the 1960s to the funding of cotton research facilities from the 1960s to the present, crucial facets of cotton growing in the Namoi Valley have been supported and sustained by the state. This chapter has attempted to highlight the changes industrialised cotton production represented in terms of the involvement of corporate capital in the Namoi Valley. Much of the Namoi district's economic development since the 1960s has been shaped by the fact that the American migrants introduced a form of cotton growing that was industrialised and irrigated. Within the Namoi Valley, the establishment of cotton processing and marketing firms and other businesses supplying fertiliser, cottonseed, pesticides, machinery and herbicides would have been unlikely if cotton production in the district was small-scale or labour-intensive. The industrialised nature of the Namoi Valley's cotton mode of production ensured that a range of inputs were required to grow the crop and provided opportunities for corporate capital in relation to servicing and supplying the cotton growing industry. The founding of this industrialised form of cotton production, too, established the cotton farmers as a new and powerful segment of the Namoi Valley's petit bourgeoisie. While industrialised cotton production has contributed to the Namoi Valley's economic development, it has altered parts of the district's physical terrain and had environmental consequences for the region.

CHAPTER SIX: THE ENVIRONMENTAL CONSEQUENCES OF THE NAMOI VALLEY'S COTTON MODE OF PRODUCTION

The environmental consequences of irrigated cotton growing in the Namoi Valley have not been comprehensively investigated. Various aspects of the environmental impact of cotton production in the region have been studied, but a broad examination of cotton's environmental consequences over the decades of the industry's existence in the district has not been conducted to date. Studies of cotton's environmental impact in the region have largely been limited to specific periods or the consideration of key issues, such as pesticide residues. This chapter attempts to analyse what is known about the environmental impact of cotton in the Namoi district. Through an examination of articles from local newspapers, it seeks to chart when and why environmental concerns arose in relation to cotton production within the Namoi Valley. This chapter draws upon a range of published studies in an effort to provide a longitudinal and broadly chronological exploration of the consequences of cotton production for the Namoi Valley's environment.

In the first years of the 1960s, the impact of the nascent cotton growing industry upon the Namoi Valley's environment could be observed in the adaptation of farms for cotton production. The environmental consequences of the establishment of cotton production were at first evident in the alteration of the immediate surrounds in which the fibre crop would be grown. On those properties where cotton was to be sown for the first time in the 1960s, the preparations for irrigated cotton production typically involved the transformation of the farming landscape. Replicating the Californian model of cotton farming, the Namoi Valley's cotton mode of production was centred upon the growing of cotton as a monoculture. The production of cotton as a

monoculture involved an industrial configuration, with entire fields taken up with the planting of cotton alone.

Constructing a Cotton Landscape

The forging of a cotton monoculture necessitated significant land clearing on farms in the Namoi district. The clearing of land was not simply required to enable the establishment of long, uniform rows of cotton; space was needed to permit the manoeuvring of the mechanical cotton harvesters, tractors and other heavy machinery that were integral to the production of cotton in an industrial fashion. Bulldozers, chainsaws and crawler tractors were used to fell trees, uproot tree stumps and clear other forms of vegetation from paddocks. The denuding of the landscape through these actions in the preparatory phase of the founding of the Namoi Valley's cotton growing industry had ramifications for the flora and fauna on the farms that were converted for cotton production. These ramifications were explained by R.J. Whyte and M.L. Conlon in their study of the environment and the cotton industry within New South Wales:

The establishment of cottonfields requires the destruction of the native vegetation and habitat available for wildlife, although it is true that most cotton farms occupy land already cleared for wheat farming or grazing. Nonetheless, converting land to cotton growing represents the final destruction of a modified habitat. This environmental damage happens once at the beginning, is long-term and in terms of communities and succession is irreparable.¹

In the case of the Namoi Valley, it would seem that conditions in the district corresponded to those described by Whyte and Conlon in their state-wide study, as much of the land occupied by irrigated cotton production in the Namoi district had been used previously for grazing or other farming activities. The elimination of vegetation and the destruction of wildlife habitat that occurred through land clearing on these farms were significant during the earliest stages of the development of a cotton growing industry in the Namoi Valley. While the consequences of this initial land clearing are important, the nature of the agricultural production that emerged on Namoi Valley

¹ Whyte and Conlon, *The New South Wales cotton industry and the environment*, p. 1.

cotton farms is arguably more crucial in terms of understanding the impact of cotton on the valley's environment in the long term. The cotton mode of production established in the Namoi district, and the industrialised attributes of that mode, are fundamental to an understanding of cotton's environmental impact within the region. Although cotton growing was a relatively unfamiliar form of agricultural land use in the Namoi Valley prior to the 1960s, it was the 'high-input, high-output' method of producing the fibre crop that was so alien to the region.² The same features that made the Namoi Valley's cotton mode of production remarkable in that decade also ensured that the environmental consequences of the district's cotton growing industry would be more readily discernible.

In the early years of the 1960s, the establishment within the Namoi Valley of a cotton growing industry had required the modification of farms to enable the crop to be grown. A crucial aspect of this modification involved the use of irrigation water. In the Namoi Valley, as in California, the capture and control of water for irrigation made it possible for farmers to defy the natural environment. Climatic constraints on production, such as minimal or unreliable rainfall, could be transcended through the availability of irrigation water. In the Namoi district, a supply of irrigation water from the Keepit Dam created the artificial conditions under which cotton was able to be successfully produced in the region:

From a strictly physical point of view, periodic drought brought about by irregularity or seasonality in the rainfall regime is a primary factor in limiting agricultural production. The principal purpose of irrigation is to offset this limitation by altering the length and characteristics of the crop-growing period. In northwestern New South Wales, for example, the aim is to counteract drought during the summer months when prospects otherwise are most favourable for sustaining optimum plant growth.³

² N.J. Thomson, 'Cotton', in J.V. Lovett and Alec Lazenby (eds.) *Australian Field Crops, Volume 2: Tropical Cereals, Oilseeds, Grain Legumes and Other Crops*, Sydney: Angus and Robertson, 1979, p. 125.

³ Pigram, 'Policy Implications for Water Resource Management in Northwestern New South Wales', p. 299.

For cotton growers in the Namoi Valley to be able to harness the irrigation water needed for their crops during summer, it was not simply a case of waiting for the water released from the Keepit Dam to flow into the Namoi River. Irrigation pumps and pipes had to be installed along the banks of the river, but the most significant tasks with respect to irrigation were undertaken in the vicinity of the paddocks where cotton was to be grown. On individual farms, major earthworks were initiated to carve irrigation channels and large water storage dams out of the earth. Levees were erected around cotton paddocks on many farms to ensure that the irrigation water did not escape. Although the terrain of most Namoi Valley cotton farms was characterised by being relatively flat, the natural undulations of the land were eradicated and the soil was moulded to a precise gradient in order for the irrigation water to be distributed evenly across paddocks.

From the outset, the production of cotton in the Namoi Valley represented the intensive use and treatment of the soil on those properties where the crop was grown. In the conversion of farms for irrigated cotton production, trees and other vegetation were cleared by bulldozers and tractors. After the land was cleared, the soil was ‘deep ripped’ repeatedly with discs and ploughs towed behind tractors. Paddocks were levelled and reshaped to achieve the gradient desired for irrigation by a large implement known as a land plane that was usually pulled by a crawler tractor. Tractors and ploughs were used to create furrows and raised seed beds from the soil. Heavy machinery was essential to the modification of farms for irrigated cotton growing, but it was crucial to almost every aspect of the cotton production process. Tractors towed equipment through the fields where the crop would be sown in order to spray the soil with a ‘pre-emergent’ herbicide. Seed planting implements were pulled by tractors through the fields. Fertiliser was distributed by tractors pulling equipment known as ‘spreaders’. As the cotton grew, tractors were used to perform inter-row cultivations to

up-root the weeds growing between the rows of cotton. The soil was subjected to repeated, intensive operations conducted by tractors and other heavy machinery.

Irrigated cotton growing represented a crucial component in a more general transition in the way agricultural land was used in the Namoi Valley from the 1960s. The grazing of sheep and cattle and the growing of wheat had dominated farming in the district. During the 1960s, however, there was a shift away from grazing to the growing of both summer and winter crops.⁴ The expansion of irrigated cotton production, and the generalised trend toward the growing of crops, coincided with a dramatic increase in soil erosion within the lower Namoi Valley from the latter half of the 1960s:

The area affected by erosion increased by 8% during the 22 year period from 1945 to 1967. However, in the eight years 1967-1975, the area of land not eroded fell by 22%. Put another way, each year 2.75% of the once stable lands became affected by soil erosion for the first time.⁵

The rise in soil erosion was attributed in part to the move to the production of crops. Compared with grazing, the growing of crops exacerbated the prospect of soil erosion because cropping usually entailed the tilling of the earth and the removal of the grasses and other vegetation that had bound together the soil.⁶ In addition to the trend toward cropping, 'an intensification of land use' was identified as contributing to the rising rate of soil erosion as well as a 'breakdown in the soil structure and gradual lowering of fertility.'⁷

The intensification of land use was epitomised by the Namoi Valley's cotton mode of production. In relation to the intensity of land use, nevertheless, the significance of cotton extended beyond its industrial-style growing techniques. The profitability of cotton growing under irrigation caused many Namoi Valley farmers to

⁴ R.S. Junor and D. Marston, *A Situation Statement of Soil Erosion in the Lower Namoi Area*, Sydney: Soil Conservation Service of New South Wales, October 1979, p. 1.

⁵ Junor and Marston, *A Situation Statement of Soil Erosion in the Lower Namoi Area*, p. 4.

⁶ Junor and Marston, *A Situation Statement of Soil Erosion in the Lower Namoi Area*, p. 1.

⁷ Junor and Marston, *A Situation Statement of Soil Erosion in the Lower Namoi Area*, p. 1.

modify their properties in order to produce the white fibre. The conversion of a property from the grazing of livestock to the growing of cotton required a substantial capital investment and numerous costly inputs, such as fertiliser, insecticides and machinery. Yet, the production of cotton was not a year-round occupation; cotton was grown in the Namoi Valley as a summer crop. The relatively short duration of the cotton growing season provided farmers with the option to both precede and follow the production of cotton in summer with the sowing of other crops in winter. In this way, the establishment of irrigated cotton production could be viewed as having had a pivotal role in the intensification of land use within the Namoi Valley.

Water Control for Industrialised Cotton

As well as potentially exacerbating the problem of soil erosion in the district, the founding and subsequent expansion of the irrigated cotton growing industry within the Namoi Valley had crucial implications for both the Keepit Dam and the region's artesian water supply. It was the availability of irrigation water from the Keepit Dam that had first stimulated the migration of American cotton growers to the Namoi district. The rising popularity of irrigated cotton growing within the Namoi Valley during the 1960s saw a rapid increase in applications for licenses to access the irrigation water held by the Keepit reservoir. Water licenses authorising the use of the Keepit Dam's supply for irrigation farming were quickly allocated and, before the 1960s had ended, there was a halt to the issuing of any further licences. Nonetheless, it was soon apparent that the Keepit Dam's water supply had been over-allocated during the period when licenses were still being granted in the 1960s.⁸ The establishment and expansion of irrigated cotton production signalled a period of change for the Namoi River:

Three weirs have also been built in areas of the river where water use is greatest. These are Mollee Weir designed to improve the control of water deliveries, Gunidgera Weir, with the main function of raising the water level for diversion

⁸ Pigram, 'Policy Implications for Water Resource Management in Northwestern New South Wales', p. 302.

by gravity into Gunidgera Creek and thence Pian Creek, and Weeta Weir, constructed primarily to create a pumping pool to serve a concentrated irrigation development.⁹

Although the three weirs regulated the flow of the Namoi River and facilitated the extraction of water for irrigation, the construction of weirs could not alter the fact that licenses had been issued in excess of the Keepit Dam's capacity. Compounding the problem of the over-committal of the Keepit reservoir was the cotton crop's thirst for water. The production of cotton demanded a considerable supply of water, but it seems that water from the Keepit Dam was not being utilised efficiently in the Namoi Valley:

In the season ending 30 June 1967, for example, a total of 92,210 acre feet was diverted from the Namoi River specifically for the irrigation of cotton. Even at an excessive use of three acre feet per acre this amount should have been sufficient for more than 30,000 acres of cotton. Yet, in that same season, only approximately 25,000 acres of cotton were irrigated using river water.¹⁰

Cotton's demand for water was not the only problem; the reliance of Namoi Valley cotton growers on the Keepit Dam for their irrigation supply presented some difficulties. The storage of water in the Keepit reservoir was not guaranteed, as the dam was, like its surrounds, subject to the prevailing climatic and environmental conditions. In July 1966, for instance, little rainfall meant that the Keepit Dam held only five per cent of its storage capacity, potentially jeopardising Namoi Valley cotton farmers' ability to irrigate their crops.¹¹ Between 1964 and early 1971, the Keepit Dam was filled to its capacity on only one occasion.¹² In order to be assured of a constant water supply, a number of Namoi Valley cotton producers began to sink bores to access water

⁹ Angela H. Arthington, *State of the Rivers in Cotton Growing Areas: Northern NSW and border rivers with Queensland*, Canberra: Land and Water Resources Research and Development Corporation, Occasional Paper No. 02/95, 1995, p. 50.

¹⁰ Pigram, 'Policy Implications for Water Resource Management in Northwestern New South Wales', p. 308, fn. 7.

¹¹ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-1965 to 1966-67*, p. 6.

¹² Pigram, 'Policy Implications for Water Resource Management in Northwestern New South Wales', pp. 299-300.

from the Great Artesian Basin. Some of these bores had the potential to draw 2,000 gallons of water per minute from the artesian basin.¹³ The cotton growing industry's water requirements had begun to exceed that available from the Keepit reservoir and impinge upon the underground water supply, though the Keepit Dam had originally been devised with the intention of supplementing dwindling artesian water supplies.

Insecticides and Cotton Production

While the 1960s saw the Keepit Dam's water supply largely consumed by the production of irrigated cotton crops, the impact of cotton upon the Namoi Valley's environment was also evident in relation to insecticide use. The establishment of industrialised cotton production in that decade signalled a major departure from the traditional patterns of agricultural chemical usage within the Namoi Valley:

Sheep and beef cattle grazing, dryland crops (primarily cereals) and small irrigated lucerne fields were the principal agricultural activities in the Lower Namoi Valley before cotton production became a major industry in the early 1960s. Pesticides were primarily limited to fungicidal seed dusts, herbicides and insecticides for the control of ectoparasites on sheep and cattle. Insecticides such as DDT were infrequently used for the control of native budworm and other pests in pasture and crops.¹⁴

Where the use of agricultural chemicals had been a relatively minor aspect of crop growing and livestock raising in the district historically, chemicals were an integral part of the cotton mode of production that was introduced to the Namoi Valley at the beginning of the 1960s. Insecticides were a fundamental requirement for cotton growers in the Namoi district from the outset as the cotton plant can suffer considerable damage from a number of different types of insects. While the cotton crop itself may survive insect damage, the commercial component of the cotton plant – the boll – may sustain irreversible damage. Enclosed within the boll is the cotton plant's valuable and marketable product: the fibre. The varieties of insects known as bollworms or boll

¹³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-1965 to 1966-67*, p. 6.

¹⁴ State Pollution Control Commission, *Namoi Environmental Study*, p. 41.

weevils have derived their names from the fact that they feed on the cotton boll. The main pest for Australian cotton crops is the *Helicoverpa* species of bollworm, particularly the *Helicoverpa armigera*.¹⁵ In earlier literature on the Australian cotton industry, the *Helicoverpa* is also referred to as the 'Heliiothis'. The potential for these insects to substantially damage or destroy the most crucial part of the cotton plant ensured that Namoi Valley cotton growers would, from the very beginning, view insecticides as being essential to their production of the fibre crop.

Insecticides were used in large quantities and were applied frequently to the Namoi Valley's cotton crops from the early 1960s. Approximately 700 tonnes of DDT were believed to have been applied to cotton crops within the Namoi Valley by the 1969-70 cotton growing season.¹⁶ The prevalence of DDT usage in the Namoi district may be explained in part by the question of cost. The production of cotton in an intensive, industrialised fashion meant that insecticides were a major expense for Namoi Valley cotton farmers. DDT was identified as the least expensive insecticide used to control the primary cotton pest, the *Helicoverpa* or *Heliiothis*, during the 1970s, while organophosphate insecticides were described as being the most costly in comparison.¹⁷

The environmental impact of the insecticides used on cotton crops in the Namoi Valley was registered not only in terms of the volume and frequency of chemical applications, but also in relation to the way in which these chemicals were applied. There were two methods used to apply insecticides to cotton in the Namoi district during the 1960s. One method was to use spraying equipment that was towed through

¹⁵ Louise C. Rossiter and Robin V. Gunning, *Insecticide Resistance in Helicoverpa spp. and the role of IPM/Area Wide Management in Resistance Management: Final Report*, Narrabri: Cotton Research and Development Corporation, NSW Department of Primary Industries, 2005, p. 5.

¹⁶ W.S. Gilbert and G. Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*, Rydalmere: NSW Agriculture and Fisheries, Biological and Chemical Research Institute, July 1990, p. 1.

¹⁷ John W. Longworth and Don Rudd, 'Plant Pesticide Economics with Special Reference to Cotton Insecticides', *Australian Journal of Agricultural Economics*, Vol. 19, Issue 03, December 1975, p. 212.

the rows of cotton plants by a tractor, while the other technique employed light aircraft that had been fitted with tanks to hold the pesticides. Figures from the 1966-67 cotton season, for example, indicated that the proportion of insecticide applications carried out in the Namoi Valley by light aircraft was 96 per cent.¹⁸ The prevalence of the aerial spraying of Namoi Valley cotton crops may perhaps be accounted for by the type of irrigation that was undertaken on the district's cotton farms. The use of 'flood' irrigation meant that the furrows between the cotton rows were inundated with irrigation water. If the fields were flooded or even just damp from the distribution of irrigation water, heavy machinery, such as tractors, would likely become bogged if driven along the damp soil. The application of insecticides from tractor-drawn spraying equipment would not have been possible at different times during the cotton season as irrigation would have precluded the operation of tractors in moist fields. The aerial spraying of chemicals was adopted by most of the district's cotton growers, and, from the first decade of irrigated cotton production within the Namoi Valley, the drift of chemicals as a result of aerial spraying emerged as a crucial issue for the new industry and its surrounds.

The Impact of Industrialised Cotton's Chemical Usage

In many cases, it appears that research into the environmental consequences of the cotton growing industry in the Namoi Valley has been undertaken in response to perceived problems associated with the industry. By the early 1970s, a decade after the initial establishment of irrigated cotton production in the Namoi Valley, concerns had arisen in relation to the cotton industry's usage of chemicals and the methods by which those chemicals were applied. During the 1960s and early years of the 1970s, the Namoi Valley's local newspapers indicated that questions were mounting about the implications of the use of chemicals in the production of cotton. Between 1961 and

¹⁸ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-1965 to 1966-67*, p. 32.

1963, articles in one of the district's newspapers had examined the issue of chemicals and cotton growing solely in terms of the threat posed to cotton crops by spray drift from the herbicides used in the control of noxious weeds within the region.¹⁹ In 1964, however, a number of cotton farm employees were hospitalised as a result of their exposure to an organophosphate spray, which had occurred while crop-dusting aircraft was applying the chemical to fields of cotton.²⁰ These hospitalisations prompted investigations by the New South Wales Department of Health and the New South Wales Department of Agriculture.²¹ The hazards of using organophosphates were emphasised, with the Director-General of Agriculture advising cotton growers to instead use a combination of DDT and Endrin to control insect infestations, while one newspaper report noted that organophosphates had been developed as a consequence of German research into the creation of nerve gas as a weapon of war.²² In addition to the hospitalisation of cotton workers in 1964, the 'close proximity of some cotton crops to Wee Waa township and the activity of aerial spray planes over portions of the town' had seen the Namoi Shire Chief Health Inspector receive 'various complaints from persons living or working in close proximity to the cotton fields.'²³ Although the aerial application of chemicals had been a feature of cotton growing since the production of the crop under irrigation had commenced from 1961 in the Namoi Valley, by April 1964 legislation was still being drafted that would demand of pilots the completion of

¹⁹ 'Danger of Weedkiller Drift', *The North Western Courier*, 13 November 1961, p. 7; 'Urgent Talks on Cotton and Weed Spray', *The North Western Courier*, 17 October 1963, p. 16; 'Weed Spraying Near Cotton', *The North Western Courier*, 19 December 1963, p. 17.

²⁰ 'Dangers in phosphorous spray', *The North Western Courier*, 6 February 1964, p. 10; 'Farmworkers Affected by Cotton Spray', *The North Western Courier*, 12 March 1964, p. 1 and 14; 'Urgent Steps Taken Over Cotton Spray Illnesses', *The North Western Courier*, 27 April 1964, p. 1.

²¹ 'Urgent Steps Taken Over Cotton Spray Illnesses', *The North Western Courier*, 27 April 1964, p. 1.

²² 'Urgent Steps Taken Over Cotton Spray Illnesses', *The North Western Courier*, 27 April 1964, p. 1; 'Farmworkers Affected by Cotton Spray', *The North Western Courier*, 12 March 1964, p. 1 and 14.

²³ 'Farmworkers Affected by Cotton Spray', *The North Western Courier*, 12 March 1964, p. 1 and 14.

formal training before they could be granted a chemical rating and authorised to perform crop dusting operations using hazardous chemicals.²⁴

While the hospitalisation of some Namoi district cotton workers in 1964 had focused attention upon the role of chemicals in the production of cotton, it seems that it was not until the early 1970s that concerns intensified with regard to the potential implications of the cotton industry's heavy chemical usage. By 1972, a code of practice had been developed for workers involved in the aerial spraying of cotton and their levels of chemical exposure were being examined through blood tests conducted by the Industrial Hygiene Branch of the New South Wales Health Department's Division of Occupational Health and Pollution Control.²⁵ A meeting of Australian and international entomologists within the Namoi Valley in September 1972 was reported to have discussed 'the case for and against the use of DDT and the overall threat from the use of chemical insecticides to the environment.'²⁶ In the same month, a local newspaper published an article that explored the problems of DDT usage.²⁷ During November and December 1972, Jack Wann, the Superintendent Inspector of the New South Wales Department of Labour and Industry, addressed Namoi Valley cotton growers on the issue of pesticides, aerial spraying and what he described as the 'glaring deficiencies in many areas of the Industry's operations.'²⁸

²⁴ 'Urgent Steps Taken Over Cotton Spray Illnesses', *The North Western Courier*, 27 April 1964, p. 1.

²⁵ 'Code of practice for pesticides', *The North Western Courier*, 12 October 1972, p. 5.

²⁶ 'Insecticides: Study of Use', *The North Western Courier*, 4 September 1972, p. 1.

²⁷ 'A miracle insecticide now seen as menace', *The North Western Courier*, 4 September 1972, p. 5.

²⁸ 'Cotton Growers Told Of Hazards Of Poisoning By Pesticides', *The Wee Waa Echo*, 16 November 1972, p.2; 'Further Talks On Protection Against Chemical Sprays', *The Wee Waa Echo*, 21 December 1972, p. 3.

In February 1973, a total of eighteen men in Wee Waa were hospitalised suffering poisoning from the chemicals used in the aerial spraying of cotton crops.²⁹ The Wee Waa airport, which was being used by crop-dusting operators, was temporarily closed in relation to these incidents.³⁰ Crop-dusting planes did not just use the airstrip to land or depart; the loading of spray planes with chemicals took place in the vicinity of the areas where passengers boarded flights. Drums of chemicals were found to have 'been left lying around at the airstrip', and 'gross spillage' of chemicals was evident in the area.³¹ These incidents resulted in a review of the handling of chemicals at the airport.³² The large number of poisonings prompted investigations by the New South Wales Health Department's Division of Occupational Health and Pollution Control.³³ Blood tests on sixty people involved in the chemical spraying of cotton were carried out in Wee Waa by G.R. Simpson, a Scientific Officer from the Department whose findings were subsequently published in *The Medical Journal of Australia*.³⁴ Tests were conducted, too, on aircraft maintenance employees in Tamworth who had potentially been exposed to chemicals after working on crop-dusting planes used to spray cotton in the Wee Waa area.³⁵ Dr A. Bell, also from the Division of Occupational Health and Pollution Control, had 'tested 90 people at Wee Waa Hospital for suspected chemical

²⁹ 'Airstrip Shut-Down: Wee Waa Pesticide Poisonings', *The North Western Courier*, 22 February 1973, pp. 1-2; 'Chemical poisoning: Another Two In Hospital', *The North Western Courier*, 26 February 1973, p. 1.

³⁰ 'Chemical Poisoning Inquiry: Airstrip Closed', *The Wee Waa Echo*, 22 February 1973, p. 1.

³¹ 'Airstrip Shut-Down: Wee Waa Pesticide Poisonings', *The North Western Courier*, 22 February 1973, pp. 1-2.

³² 'Sub-committee's watch on airfield', *The North Western Courier*, 26 March 1973, p. 3; 'Council Concerned At Airport Conditions', *The Wee Waa Echo*, 29 March 1973, p. 1.

³³ 'Blood samples taken from 70', *The North Western Courier*, 5 April 1973, p. 2.

³⁴ 'Chemical Poisoning Inquiry: Airstrip Closed', *The Wee Waa Echo*, 22 February 1973, p. 1; G.R. Simpson, 'Aerial Spraying of Organic Phosphate Pesticides: Lowered Blood Cholinesterase Levels of Aerial Spray Operators at Wee Waa', *The Medical Journal of Australia*, Vol. 1, April 1973, pp. 735-736; G.R. Simpson and D.J. Penney, 'Pesticide Poisonings in the Namoi and Macquarie Valleys, 1973', *The Medical Journal of Australia*, Vol. 1, 1974, pp. 258-260.

³⁵ 'Chemical poisoning: Another Two In Hospital', *The North Western Courier*, 26 February 1973, p. 1.

poisoning, 40 of whom were affected – 10 badly.³⁶ The announcement that two Department of Health doctors would conduct a day of chemical exposure testing at the Wee Waa Hospital in April 1973 saw over seventy people tested, but a further fifteen to twenty people ‘had to be turned away.’³⁷

While the New South Wales Department of Health was conducting what was described as ‘a full scale investigation’ of ‘the possible effects of chemical sprays on Wee Waa people’ during March 1973, the Department’s Division of Occupational Health and Pollution Control was asked to examine a major fish kill in the Wee Waa area in the same month.³⁸ In that incident, fish were found to be dying over the course of a week ‘in the Namoi River and in creeks and channels near Wee Waa’, and birds that fed on the dead fish also died.³⁹ Tests on the dead fish and samples of the water in which they were found indicated the presence of chemical insecticides but concluded that the fish kill was caused by ‘a deficiency of oxygen concentration’.⁴⁰ The response to these findings in letters to the editor of the *North Western Courier* indicated that some in the local community viewed the cotton growing industry with a degree of scepticism.⁴¹ One letter suggested that the article on the fish kill test results had a discernible ‘note of relief that those embarrassing pesticides can be forgotten for a while.’⁴² Another letter to the editor asserted that blame for the fish kill lay ‘not on the cotton industry’s pesticide pollution, but on its fertilizer pollution.’⁴³

³⁶ ‘Doctor calls for stringent measures’, *The Wee Waa Echo*, 8 March 1973, p. 1.

³⁷ ‘Spray Poisonings – Health Dept. Investigation’, *The Wee Waa Echo*, 29 March 1973, p. 1; ‘Blood samples taken from 70’, *The North Western Courier*, 5 April 1973, p. 2.

³⁸ ‘Spray Poisonings – Health Dept. Investigation’, *The Wee Waa Echo*, 29 March 1973, p. 1; ‘Death of fish mystery’, *The North Western Courier*, 22 March 1973, p. 1.

³⁹ ‘Death of fish mystery’, *The North Western Courier*, 22 March 1973, p. 1.

⁴⁰ ‘Tests Show Insecticide Traces’, *The Wee Waa Echo*, 19 April 1973, p. 1.

⁴¹ See L.P. Miller, ‘Letters to the Editor’, *The North Western Courier*, 30 April 1973, p. 3; Dr Graham J. Nelson, ‘Letters to the Editor’, *The North Western Courier*, 30 April 1973, p. 3.

⁴² L.P. Miller, Narrabri, ‘Letters to the Editor’, *The North Western Courier*, 30 April 1973, p. 3.

The author of that letter to the editor also criticised ‘the government’s deliberate policy of suppressing details of the environmental effects of the cotton industry’.⁴⁴ Similarly, David Mowbray, a Research Fellow at the University of Sydney’s School of Biology who was researching DDT residues in wildlife in the Namoi Valley in May 1973 ‘urged that the Department of Agriculture release data on insecticide residues in the Wee Waa area.’⁴⁵ Mowbray described the way chemicals were used in cotton growing as ‘utterly mad’, and ‘expressed his surprise that Narrabri was one of the few places in the world where “uncontrolled” use of aerial sprays against weeds and insects was allowed.’⁴⁶ The assertion that the New South Wales government was suppressing the results of chemical residue testing conducted in the Namoi district during the early 1970s was accurate. The New South Wales Department of Agriculture had begun to study pesticide residues in the Namoi Valley from 1969. However, the results from those studies were not published until the first years of the 1990s.⁴⁷ With incidents of cotton workers suffering chemical poisoning in the Namoi Valley, investigations by the New South Wales Health Department, and a growing concern about cotton production’s pesticide usage demonstrated in the district’s newspapers, the Namoi Valley’s cotton industry was subject to greater scrutiny. Yet, it appears that it was not until concerns

⁴³ Dr Graham J. Nelson, Narrabri West, ‘Letters to the Editor’, *The North Western Courier*, 30 April 1973, p. 3.

⁴⁴ Dr Graham J. Nelson, Narrabri West, ‘Letters to the Editor’, *The North Western Courier*, 30 April 1973, p. 3.

⁴⁵ ‘Pesticides Application: Call For Board of Inquiry’, *The North Western Courier*, 3 May 1973, p. 4.

⁴⁶ ‘Control Programme “Utterly Mad” - Ecologist’, *The Wee Waa Echo*, 3 May 1973, p. 1; ‘Research Workers’ Addresses’, *The North Western Courier*, 26 April 1973, p. 4.

⁴⁷ Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*; W.S. Gilbert, G. Singh, and N. Ahmad, *Technical Bulletin 39: Pesticide contamination of the agricultural environment in the Namoi Valley 1976-1977*, Rydalmere: NSW Agriculture and Fisheries, Biological and Chemical Research Institute, July 1990; W.S. Gilbert, G. Singh, and N. Ahmad, *Technical Bulletin 40: Pesticide contamination of birds and fish in the Namoi Valley 1977*, Rydalmere: NSW Agriculture and Fisheries, Biological and Chemical Research Institute, July 1990; W.S. Gilbert, G. Singh, and N. Ahmad, *Technical Bulletin 45: Pesticide residue studies in the Gwydir and Namoi cotton growing environments, 1981 and 1983*, Rydalmere: NSW Agriculture and Fisheries, Biological and Chemical Research Institute, January 1992.

about the impact of these chemicals on human health had arisen that the environmental consequences of cotton production in the Namoi district began to be investigated.

Pesticide Contamination

Although irrigated cotton production had only commenced in the Namoi Valley from 1961, within a decade the impact of the cotton growing industry upon the district's environment was already evident. The intensive use of insecticides to combat insect pests amongst the cotton meant that in excess of 10kg of DDT per hectare had been used during some cotton seasons in the Namoi district, a practice which distinguished the Namoi Valley as the region with the highest DDT usage rates in Australia in the early 1970s.⁴⁸ The heavy usage of DDT and the fact that it was often sprayed from crop-dusting aircraft ensured that there was widespread contamination of the region:

Results of studies conducted in the Namoi Valley from 1969 to 1975 indicated that all non-target aquatic environments, land surfaces, stock, fish and wildlife associated with the cotton area were contaminated with DDT, the major cotton insecticide. Perennial contamination of the Namoi River occurred from seasonal cotton activity, but despite major floods in 1971 and 1974, DDT contamination remained within the Namoi Valley where the highest concentration was around Wee Waa, the main cotton growing centre.⁴⁹

Given the prevalence of DDT usage in cotton growing in the Namoi Valley during that period, some contamination within the district would be anticipated, but DDT residue levels varied and were, in some cases, alarming. In tests undertaken between 1969 and 1970, approximately 80 per cent of edible ducks sampled within the Namoi cotton growing district exceeded the Australian National Health and Medical Research Council's maximum residue limit for DDT, while one-quarter of fish sampled indicated DDT levels above the maximum residue limit.⁵⁰ Sampling of fish and ducks from the

⁴⁸ 'The use of DDT in Australia', *Australian Academy of Science Report No. 14*, 1972, cited in Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*, p. 1.

⁴⁹ Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*, p. iii.

⁵⁰ Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*, p. 6.

Namoi Valley in 1971, 1972 and 1973 found that DDT residue levels had generally increased.⁵¹ With respect to the considerable DDT residues recorded by some of the district's birds, it was believed that 'the level of contamination found in the Namoi environment was being concentrated in these species through food chains.'⁵² The Department of Agriculture and Fisheries report, published almost two decades after the sampling was completed, noted that the DDT residue levels 'provided a hazard for people eating birds shot in the cotton area.'⁵³ With the delay in publishing the study, however, it appears that residents of the Namoi Valley may not have been alerted during the 1970s to the potential danger posed by the consumption of local birds, such as edible ducks, that were significantly contaminated with DDT. Between 1969 and 1975 when the sampling for that study was conducted, there were no warnings or reports about the issue published in the Namoi Valley's local newspapers.

Further studies examining the environmental impact of the cotton growing industry's chemical use were conducted in the Namoi Valley by the New South Wales Department of Agriculture and Fisheries. One of the Department's studies, undertaken in the Namoi Valley between 1976 and 1977, stated that, 'although DDT contamination was essentially confined to the cotton growing area, land surface contamination extended to at least 30km from the cotton perimeter.'⁵⁴ Cattle were also tested in that study, with 45 per cent of the sampled stock found to exceed the maximum residue limit for DDT.⁵⁵ Another study conducted by the Department of Agriculture and Fisheries

⁵¹ Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*, pp. 9-19.

⁵² Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*, p. 19.

⁵³ Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*, p. 19.

⁵⁴ Gilbert, Singh, and Ahmad, *Technical Bulletin 39: Pesticide contamination of the agricultural environment in the Namoi Valley 1976-1977*, p. iii.

⁵⁵ Gilbert, Singh, and Ahmad, *Technical Bulletin 39: Pesticide contamination of the agricultural environment in the Namoi Valley 1976-1977*, p. 3.

during 1977 concluded that edible waterfowl within the Namoi Valley ‘grossly’ exceeded the maximum DDT residue limit for human food established by the National Health and Medical Research Council, while fish within the cotton growing district ‘could be regarded as generally unfit for human consumption.’⁵⁶

By the early 1970s, the heavy use of DDT on cotton crops in the Namoi Valley had resulted in the widespread DDT contamination of the district which was documented in the studies carried out by the New South Wales Department of Agriculture and Fisheries. While the application of DDT to cotton plants in the Namoi district had prompted the Department to investigate DDT residue levels in that region, the cotton growing industry’s chemical use was attracting attention more broadly. A 1975 article in the *Australian Journal of Agricultural Economics* noted that:

In Australia the plant pesticide problem which has caused the greatest concern in recent years has been the use of insecticides on cotton particularly in the Ord and Namoi Valleys.⁵⁷

Nevertheless, the early years of the 1970s marked the beginning of a shift in the use of DDT in the production of irrigated cotton crops within the Namoi Valley. This change in DDT use did not occur as a consequence of the growing public concern about chemical usage in cotton growing, nor was it brought about in response to the testing conducted by the New South Wales Department of Agriculture and Fisheries. The incidents of chemical poisoning among cotton workers in the Namoi Valley and the subsequent investigations by the New South Wales Department of Health which occurred in that period were not the cause of the changes to DDT usage in the region’s production of the fibre crop. Rather, the method of blanketing Namoi Valley cotton crops with DDT from crop-dusting aircraft was only altered when it became apparent

⁵⁶ Gilbert, Singh, and Ahmad, *Technical Bulletin 40: Pesticide contamination of birds and fish in the Namoi Valley 1977*, p. iii and p. 3.

⁵⁷ Longworth and Rudd, ‘Plant Pesticide Economics with Special Reference to Cotton Insecticides’, pp. 210-211.

that DDT was not as effective as it had once been in killing the insect pests that infested the cotton.

Insect Resistance to DDT

In 1972 and 1973, a crisis emerged for cotton growers in the Namoi Valley. The insects that had previously been controlled with regular applications of DDT had developed a resistance to the chemical. The crisis was ‘a combination of resistance and exceptional abundance’ of the insect pests that attacked the cotton crop.⁵⁸ Paul Kahl described that time as follows:

1973 arrived and created a new dimension to our experience. A heliothis attack like nothing before! The insects hit many fields so fast and so hard that much of the cotton was seriously damaged before many of the farmers could catch up. The Namoi cotton area harvested about two thirds of its normal crop.⁵⁹

The problem regarding the method of insect control in the Namoi Valley materialised at the same time as the issue was becoming critical in another of Australia’s cotton growing regions. As in the Namoi Valley, cotton production had begun on the Ord River irrigation scheme in Western Australia during the early 1960s. However, the difficulties of controlling insects that were increasingly resistant to chemicals saw cotton growing on the Ord scheme abandoned by 1974.⁶⁰ Cotton growers on the Ord had attempted to cope with an upsurge in insect numbers by intensifying their application of insecticides, until they were ‘spraying cotton as much as 64 times a season; cotton production became completely uneconomical.’⁶¹

⁵⁸ Gary P. Fitt, ‘Cotton Pest Management: Part 3: An Australian Perspective’, *Annual Review of Entomology*, Vol. 39, 1994, p. 551.

⁵⁹ Kahl, *Cotton Pickin’ Pioneer*, p. 132.

⁶⁰ Anon, ‘Cotton Pests in Australia’, in David Wade Chambers (ed.) *Worm in the Bud: Case Study of the Pesticide Controversy*, Geelong: Deakin University Press, 1984, p. 196.

⁶¹ J.R. Burton, ‘Environmental Issues and Water Allocation’, in *Irrigation Water: policies for its allocation in Australia*, Armidale: Papers from a workshop of the Australian Rural Adjustment Unit, University of New England, May 1982, p. 87.

Like their counterparts on the Ord River irrigation scheme, cotton farmers in the Namoi Valley responded to the emergence of insect resistance to DDT by increasing their use of chemical insecticides. An environmental study of the Namoi Valley conducted by the State Pollution Control Commission found that:

Prior to the 1972-1973 season the annual total use of insecticide (active ingredient per hectare) ranged from 8 to 20 kg. DDT represented 50 to 90 per cent of the insecticide used in any one season.

The sudden development of DDT resistance in cotton bollworm resulted in DDT use increasing two- and three-fold in the 1972-1973 season relative to previous seasons. The application of other insecticides, often in combination with DDT, also increased, in some cases by as much as eight times.⁶²

As well as the increased usage of DDT and other insecticides, the urgency with which these chemicals were applied had significant implications. The 'wholesale and indiscriminate spraying' of cotton crops with insecticides that was observed in the Namoi Valley during January 1973 was believed to account for the spate of pesticide poisonings among cotton workers in that period.⁶³ The fact that the cotton was being sprayed with multiple chemicals in an effort to control the infestation of DDT-resistant insects meant that it was difficult in some cases to determine which particular chemical was responsible for the poisoning of individual cotton workers.⁶⁴

While the occurrence of insect resistance to DDT between 1972 and 1973 initially caused Namoi Valley cotton farmers to drastically increase their use of DDT and other insecticides, it did eventually lead to changes to the role of DDT within the Namoi Valley's cotton mode of production. It was inevitable that some of cotton's insect pests would develop a tolerance to DDT when that chemical was being applied so frequently to the district's cotton crops. The emergence of insect resistance prompted one author to suggest in the late 1970s that:

⁶² State Pollution Control Commission, *Namoi Environmental Study*, p. 44.

⁶³ Simpson and Penney, 'Pesticide Poisonings in the Namoi and Macquarie Valleys, 1973', p. 258.

⁶⁴ Simpson and Penney, 'Pesticide Poisonings in the Namoi and Macquarie Valleys, 1973', p. 259.

This happening raises the question of the stability of the current system of growing cotton. It appears that its reliance on insecticides as the sole controlling agent of pests is inherently unstable because of the counter-prevailing response it induces from the insects. Consequently it seems necessary that the system of growing be altered to one relying much less on insecticides for pest control.⁶⁵

From a reliance on regular heavy applications of DDT throughout the cotton growing season, farmers in the Namoi Valley gradually adopted a method known as integrated pest management. Rather than depending solely on chemical insecticides to eradicate the insects that attack cotton crops, integrated pest management (IPM) is an approach that uses a range of techniques to control 'pest populations at levels below those causing economic injury'.⁶⁶

In the years that followed the 1972-1973 outbreak of insect resistance to DDT, it seems that many Namoi Valley cotton growers simply substituted the chemicals Camphechlor or Endosulfan in place of DDT, or continued to apply DDT but did so in conjunction with Camphechlor.⁶⁷ Nevertheless, the declining effectiveness of DDT in controlling insects did propel research into methods of reducing insecticide use in the production of cotton in the late 1970s:

Plant breeding, agronomic and entomological avenues are being explored in an attempt to achieve this objective. New cultivars of cotton are being bred possessing a range of different genes which, directly or indirectly, confer a degree of tolerance or resistance to pests. Some of the genes alter morphological characters such as leaf and bract size and shape, so that the pest is more exposed on the plant and hence more vulnerable to controlling agents. Other genes alter the amount of particular chemical constituents present, e.g. gossypol, a chemical present in the oil glands of the plant. At high concentrations this chemical decreases the growth and fecundity of a number of insect pest species. Yet other genes, such as those for early maturity, help to evade insect damage by shortening the period of crop growth.⁶⁸

⁶⁵ Thomson, 'Cotton', p. 134.

⁶⁶ Longworth and Rudd, 'Plant Pesticide Economics with Special Reference to Cotton Insecticides', p. 218, fn 13.

⁶⁷ State Pollution Control Commission, *Namoi Environmental Study*, pp. 44-45.

⁶⁸ Thomson, 'Cotton', p. 134.

Additional means of insect control that were being investigated at that time included ‘insect-resistant host plants, selective insecticides, introduced and native parasites, predators and pathogens, cultural controls and crop and land-use management.’⁶⁹

It has been argued that the occurrence of insect resistance to DDT ‘in the early 1970s created an environment in which IPM practices could be more widely introduced and accepted.’⁷⁰ It should be noted, however, that an economic imperative underpinned the adoption of integrated pest management strategies. It was a financial necessity for cotton growers to control the insect pests that had the potential to decrease the value of their cotton crops. At the same time, it was vital that the costs of insect control did not become excessive, as had occurred on the Ord River irrigation scheme. The beginning of the adoption of integrated pest management practices occurred, too, in a period when Paul Kahl suggests the cotton growing industry in the Namoi Valley was ‘again collecting a new wave of anti-chemical criticism.’⁷¹ Kahl has stated that, from the mid-1960s, the Namoi Cotton Co-operative had employed a public relations firm to respond to criticism about chemical use and other issues.⁷² Following the intensified use of insecticides and the related chemical poisoning of cotton workers during 1972-1973, the cotton industry engaged a public relations consultant in 1974. According to Paul Kahl, ‘By 1975 our act was coming together and there was less criticism.’⁷³

The Diversification of Industrial Cotton’s Insecticides and Pesticides

While the Namoi Valley’s cotton growers were diversifying their insecticide use and moving away from a reliance on DDT in the mid-1970s, other changes were also evident in irrigated cotton production within the district. From the introduction of

⁶⁹ State Pollution Control Commission, *Namoi Environmental Study*, p. 45.

⁷⁰ Fitt, ‘Cotton Pest Management: Part 3: An Australian Perspective’, p. 550.

⁷¹ Kahl, *Cotton Pickin’ Pioneer*, p. 138.

⁷² Kahl, *Cotton Pickin’ Pioneer*, p. 116.

⁷³ Kahl, *Cotton Pickin’ Pioneer*, p. 138.

cotton growing to the Namoi Valley in the early 1960s, the crop had been grown as a 'near monoculture'.⁷⁴ This meant that cotton was often the only crop being produced in paddocks that had been converted for irrigated agriculture during that period. In the mid-1960s, it was anticipated that 'crop hygiene and soil structural factors' would force changes to the practice of producing cotton as a monoculture.⁷⁵ By the middle of the 1970s, the rising occurrence of the disease 'verticillium wilt resulted in the introduction of crop rotations, involving a fallow period or other crops such as wheat and, more recently, soybeans.'⁷⁶ The adoption of crop rotations was advantageous for farmers because growing wheat, for example, as well as cotton created an additional source of income and permitted farmers to 'develop maximum profit farming systems'.⁷⁷ As cotton was grown as a summer crop in the Namoi Valley, farmers were able to plant an additional crop, often wheat, during the winter season.

The intensification of chemical use and the poisoning of cotton workers during the early 1970s drew attention to the question of chemical use in the growing of cotton in the Namoi Valley. The issue of the cotton industry's chemical usage became the subject of research, particularly after the crisis in insect control that occurred during 1972 and 1973. One of the earliest analyses of that issue was presented in the State Pollution Control Commission's *Namoi Environmental Study*. Published in 1980, the study sought to examine the environmental consequences of the insecticides used in the growing of cotton within the Namoi Valley.⁷⁸ Although the scope of the study was

⁷⁴ Thomson, 'Cotton', p. 125.

⁷⁵ N.J. Dudley and D.J. McConnell, 'An Economic Evaluation of Cotton and Alternative Farm Enterprises under Irrigation in the Namoi Region', *Review of Marketing and Agricultural Economics*, Vol. 35, No. 02, June 1967, p. 69.

⁷⁶ State Pollution Control Commission, *Namoi Environmental Study*, p. 33.

⁷⁷ Dudley and McConnell, 'An Economic Evaluation of Cotton and Alternative Farm Enterprises under Irrigation in the Namoi Region', p. 69.

⁷⁸ State Pollution Control Commission, *Namoi Environmental Study*, p. 11.

limited to the 1976-1977 cotton season and it focused primarily on the use of DDT, the State Pollution Control Commission's report was crucial as it was one of the first to explore the implications of insecticide use in the growing of cotton within the Namoi district.⁷⁹ The *Namoi Environmental Study* was not narrowly concentrated upon the chemical contamination of the environment that can occur in the immediate act of applying pesticides to cotton crops. Instead, the study examined the ramifications of chemical use in cotton production more broadly, and indicated that:

Insecticides can be dispersed to the environment as drift from sprays, as vapour from sprayed surfaces, by leaching into subsoils and groundwater, in surface runoff and through uptake by and movement of animals and transportation of crops.⁸⁰

As well as considering the different ways in which contamination can occur, the report explored crucial questions related to insecticide use, including the handling of those chemicals and the storage and disposal of the containers that had held the pesticides that were applied to cotton crops.⁸¹ Although eighteen airstrips in the Namoi Valley had been used as sites for the mixing of chemicals, the loading of chemicals into the tanks of crop-dusting aircraft and were often used, too, for the storage of drums of the chemicals used in cotton growing, the *Namoi Environmental Study* noted that there was no provision at any of the airstrips for the containment or clean up of chemical spillage.⁸² The chemical mixing area at one of the airstrips was 'drained by a ditch leading directly to the Namoi River', and empty chemical containers had been discarded in the same

⁷⁹ State Pollution Control Commission, *Namoi Environmental Study*, p. 11.

⁸⁰ State Pollution Control Commission, *Namoi Environmental Study*, p. 11.

⁸¹ State Pollution Control Commission, *Namoi Environmental Study*, pp. 54-55.

⁸² State Pollution Control Commission, *Namoi Environmental Study*, pp. 53-56.

ditch.⁸³ Similarly, the Namoi River was observed to be receiving a flow of insecticide-contaminated ‘tailwater’ from some cotton properties in the district.⁸⁴

The focus on the chemical DDT in the *Namoi Environmental Study* can be attributed to the fact that it had been the primary insecticide used by Namoi Valley farmers on their cotton crops, and DDT had been applied in substantial quantities.⁸⁵ Nevertheless, the study’s concentration on DDT is perhaps partly explained by the context of the period in which the work was completed. In the wake of the publication of Rachel Carson’s *Silent Spring*, concerns about the potentially harmful effects of DDT on human health and the environment were growing. The State Pollution Control Commission’s report appears to have been influenced, too, by David Mowbray’s doctoral research on the ecological impact of pesticides in the Namoi Valley. The *Namoi Environmental Study* cited Mowbray’s findings that:

...the shell thickness of eggs of kookaburras from the cotton-growing area was 13 per cent lower than that of kookaburras from outside the cotton-growing area. Nankeen kestrels from the cotton-growing area were laying eggs with 11 per cent thinner shells than nankeen kestrels from outside the cotton-growing area. Eggs of kestrels from the Lower Namoi Valley – 1971 to 1975 – were 19.5 per cent thinner than eggs of those species collected prior to 1941.⁸⁶

From this and other evidence, the State Pollution Control Commission’s study recommended that ‘DDT should be restricted to uses where practicable alternatives are not available.’⁸⁷

The move to eliminate DDT use was motivated in part by DDT’s characteristic persistence in the environment in which it has been applied. As the *Namoi*

⁸³ State Pollution Control Commission, *Namoi Environmental Study*, p. 55.

⁸⁴ State Pollution Control Commission, *Namoi Environmental Study*, p. 39.

⁸⁵ State Pollution Control Commission, *Namoi Environmental Study*, p. 44.

⁸⁶ D.L. Mowbray, ‘The ecological effects of pesticides on non-target organisms: a study of the environmental impact of pesticides on wildlife in the Namoi River Valley cotton growing area, 1972-1976’, Ph.D. thesis, Biological Sciences, University of Sydney, 1978, cited in State Pollution Control Commission, *Namoi Environmental Study*, p. 89.

⁸⁷ State Pollution Control Commission, *Namoi Environmental Study*, p. 13.

Environmental Study explained, for a lengthy interval after the chemical was dispensed the ‘recycling of DDT and its metabolites from sediments may result in continual contamination of waterways and aquatic organisms’.⁸⁸ Within the state of New South Wales, the use of DDT in the growing of cotton and other agricultural crops was banned from July 1981.⁸⁹ Sampling conducted in the Namoi Valley during the 1981 and 1983 by the New South Wales Department of Agriculture and Fisheries reflected both the persistence of DDT and the intensive use of the chemical in the cotton growing areas of the district. The Department’s study contrasted pesticide contamination in the Namoi Valley’s cotton areas with other regions of New South Wales that had been producing cotton for a shorter period of time. The DDT residue levels detected in the Namoi Valley’s birds, fish and other wildlife were generally much higher than those registered in the other cotton growing districts.⁹⁰ While these DDT residue levels certainly highlighted the long term use of DDT in the Namoi Valley, they also indicated that DDT was being concentrated through wildlife food chains and that cumulative DDT contamination of the district had occurred.⁹¹ Although DDT contamination levels were found to have declined in the Namoi Valley between 1977 and 1983, some water sources near cotton farms were ‘still being affected by contaminated run-off’, and a number of grazing properties in the district ‘were still too contaminated for the safe grazing of stock in 1983’.⁹²

⁸⁸ State Pollution Control Commission, *Namoi Environmental Study*, p. 48.

⁸⁹ Gilbert, Singh, and Ahmad, *Technical Bulletin 45: Pesticide residue studies in the Gwydir and Namoi cotton growing environments, 1981 and 1983*, p. 1.

⁹⁰ Gilbert, Singh, and Ahmad, *Technical Bulletin 45: Pesticide residue studies in the Gwydir and Namoi cotton growing environments, 1981 and 1983*, pp. iv-7.

⁹¹ Gilbert, Singh, and Ahmad, *Technical Bulletin 45: Pesticide residue studies in the Gwydir and Namoi cotton growing environments, 1981 and 1983*, pp. 6-7.

⁹² Gilbert, Singh, and Ahmad, *Technical Bulletin 45: Pesticide residue studies in the Gwydir and Namoi cotton growing environments, 1981 and 1983*, pp. 5-7.

The Increase in Environmental Research on Cotton Growing

Where the environmental consequences of cotton production had been the subject of only a few studies prior to the 1990s, that decade saw an increase in research on the topic within Australia. The increase could be attributed to the general expansion in the field of environmental research that has taken place in recent decades, but the rise in the number of studies on cotton's environmental ramifications coincided with growing public concern about the cotton growing industry in Australia. Events in the cotton producing town of Emerald in the state of Queensland could be viewed as pivotal to the mounting disquiet about cotton growing practices and the subsequent rise in research on the industry. The deaths of seven children in Emerald from leukaemia between the years of 1980 and 1985 were believed to have been linked to the heavy use of pesticides in the production of cotton within the district, although a Queensland Health Department report claimed that the abnormally high number of leukaemia cases was a 'chance occurrence'.⁹³ The association of the cluster of leukaemia deaths in Emerald with the production of cotton appears to have propelled a greater scrutiny of the cotton growing industry throughout Australia in the years since those deaths were recorded. Whether the attention paid to the Emerald cases led the New South Wales Department of Agriculture and Fisheries in the early 1990s to publish the results of the pesticide residue studies it had conducted in the Namoi Valley years earlier is unknown.⁹⁴ Nonetheless, concerns about the effects on human health of the chemicals used in cotton growing, particularly following the incidence of leukaemia in Emerald, may have

⁹³ Report to the Minister for Health and Environment, *Report of the enquiry into childhood leukaemia in Emerald*, Brisbane, October 1987, cited in Kate Short, *Quick Poison Slow Poison: Pesticide Risk in the Lucky Country*, Sydney: Envirobook/Southwood Press, 1994, pp. 28-29.

⁹⁴ The studies referred to are: Gilbert and Singh, *Technical Bulletin 38: Pesticide residue studies in the Namoi Valley 1969-1975*; Gilbert, Singh, and Ahmad, *Technical Bulletin 39: Pesticide contamination of the agricultural environment in the Namoi Valley 1976-1977*; Gilbert, Singh, and Ahmad, *Technical Bulletin 40: Pesticide contamination of birds and fish in the Namoi Valley 1977*; Gilbert, Singh, and Ahmad, *Technical Bulletin 45: Pesticide residue studies in the Gwydir and Namoi cotton growing environments, 1981 and 1983*.

propelled the subsequent increase in the field of environmental research on cotton within Australia.

One such study was that published in 1990 by R.J. Whyte and M.L. Conlon, which examined the cotton growing industry and the environment within New South Wales.⁹⁵ Whyte and Conlon's work encompassed the Namoi Valley, but their analysis of cotton production was conducted at the broader state level and did not compare, contrast or distinguish between the different cotton growing regions of New South Wales. As a result, their study offered few details on the Namoi Valley specifically, nor did it provide the degree of empirical depth found in other reports, such as the pesticide residue studies carried out by the Department of Agriculture and Fisheries. Nevertheless, Whyte and Conlon presented a useful examination of the ecological implications of cotton production, albeit a somewhat generalised state-wide examination. In terms of the cotton growing industry's environmental impact, Whyte and Conlon's study emphasised that it was the insecticides used in the production of the fibre crop that posed the most significant threat to the environment.⁹⁶ In the wake of the phasing out of DDT in New South Wales from 1981, Whyte and Conlon observed that:

Endosulfan, which has been associated with several fish kills in cotton growing areas, is the insecticide of most concern because it is the most widely used, is applied at heavy rates and is extremely toxic to fish.⁹⁷

As well as exploring the problem of insecticide use, the study examined the consequences of the land clearing associated with the establishment of cotton growing, the potential for soil degradation and soil compaction, and the impact of water extraction for irrigation on river flow.⁹⁸ Whyte and Conlon noted that 'tailwater', the water that runs off a field after irrigation, may not only be contaminated by insecticides,

⁹⁵ Whyte and Conlon, *The New South Wales cotton industry and the environment*.

⁹⁶ Whyte and Conlon, *The New South Wales cotton industry and the environment*, p. 60.

⁹⁷ Whyte and Conlon, *The New South Wales cotton industry and the environment*, p. 60.

⁹⁸ Whyte and Conlon, *The New South Wales cotton industry and the environment*, pp. 41-62.

but ‘can contain at different times varying levels of silt, insecticides, fertilisers and herbicides that have been applied to the crop.’⁹⁹ Their study also detailed a sample of public complaints received by the New South Wales Department of Agriculture and Fisheries during the 1987 cotton growing season. A number of the complaints listed related to episodes of chemical spray drift in the Namoi Valley, including one incident where a chemical odour had drifted into the town of Wee Waa and entered the air conditioning system at the local hospital.¹⁰⁰

The Australian Cotton Growing Industry’s Environmental ‘Audits’

In 1991, Gibb Environmental Sciences and Arbour International published *An Environmental Audit of the Australian cotton industry*, a report that was commissioned by the cotton industry.¹⁰¹ It is a misnomer to describe the report as an ‘audit’; it is essentially a limited survey of the environmental issues related to the production of cotton within Australia. The first stage of the ‘audit’ involved the distribution of forty environmental questionnaires to:

...a variety of cotton industry and government bodies, environmental groups, other agricultural land users, chemical industry bodies, aerial operators, individual growers, concerned citizen groups, medical and university researchers and crop consultants.¹⁰²

Of the forty questionnaires distributed, only eighteen were returned.¹⁰³ The second phase saw the auditors conduct 71 interviews, and undertake ‘site visits’ within

⁹⁹ Whyte and Conlon, *The New South Wales cotton industry and the environment*, p. 1.

¹⁰⁰ Whyte and Conlon, *The New South Wales cotton industry and the environment*, Table 5, p. 35.

¹⁰¹ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, Report prepared for the Australian Cotton Foundation by Gibb Environmental Sciences and Arbour International, 1991.

¹⁰² Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 4.

¹⁰³ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 4.

Australia to a seed processing plant, six cotton gins and a mere thirteen farms.¹⁰⁴ The purpose of the site visits was ‘to allow a first hand inspection of facilities and normal practices and procedures but did not involve any physical monitoring or measurements.’¹⁰⁵ In spite of the methodological limitations of the purported ‘audit’, the study contains some important findings about the cotton growing industry’s environmental implications within Australia. In relation to the storage of pesticides in compounds on farms, the report highlighted concerns about the security of some of the on-farm facilities.¹⁰⁶ Evidence of chemical spillage in these pesticide storage compounds was also observed during a number of the site visits to farms, which the report suggested ‘could give rise to occupational health hazards and pollution.’¹⁰⁷ Arguably one of the most crucial aspects of the 1991 environmental audit was what it revealed about pesticide application practices:

Interviews with aerial operators revealed that the mixing of different chemicals for application during the same flight is common practice. Many of these mixtures are not explicitly listed on compatibility data on product labels but the view offered was that operators know by experience what works. When mixtures that have not been tried before are used a ‘jug’ test is used to verify their compatibility. This consists of mixing small quantities of the two chemicals in a flask, agitating and waiting to see if any obvious problems such as precipitation occur.¹⁰⁸

The authors of the audit explained that this jug test ‘cannot guarantee that chemical reactions which might affect the safety of the product have not occurred.’¹⁰⁹ While

¹⁰⁴ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, pp. 4-5.

¹⁰⁵ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 5.

¹⁰⁶ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 55.

¹⁰⁷ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 56.

¹⁰⁸ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 48.

¹⁰⁹ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 48.

earlier studies of cotton growing had noted the practice of using more than one chemical, the 1991 environmental audit highlighted the fact that, rather than receiving separate applications of different chemicals, many cotton crops were being sprayed with mixtures of chemicals. Applications of amalgams of different chemicals that have not been thoroughly tested in combination could potentially have significant implications for the environment in which they are used, and for the health of the workers who may come into contact with the chemicals while applying them.

The Australian cotton industry's decision to commission the 1991 audit may have been influenced by the criticism the industry received during the 1980s in relation to the incidence of leukaemia in Emerald. The report briefly examines the Emerald leukaemia cluster, and notes in relation to community health more broadly that 'the limited available evidence' does not indicate a link between chemical spray drift from cotton production and serious illnesses such as cancer.¹¹⁰ The environmental audit suggested:

In addition to any adverse effects, it is probable that cotton growing has had some positive effects on community health through the increased affluence it has brought to these areas. This should also be taken into consideration when assessing the impact of the industry on community health.¹¹¹

The 1991 environmental audit examined only briefly the question of water use, but stated that 'the cotton industry is regarded by some as a particularly heavy water consumer at the expense of other water users.'¹¹² Similarly, the potential for the

¹¹⁰ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, pp. 35-36, and p. 49.

¹¹¹ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 49.

¹¹² Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 89.

eutrophication of rivers and other water resources as a result of the substantial use of fertilisers in the production of cotton was noted but not explored.¹¹³

While the audit provided a general examination of cotton's environmental issues and impact at the national level, one aspect of the audit in particular may have significance in relation to the Namoi Valley. The audit revealed that empty pesticide containers were commonly being buried in pits or rubbish tips on cotton farms in Australia:

New waste pits are dug as old ones are filled and covered over. Most interviewees claimed that they knew where they had buried wastes in the past but there was no indication of formal records being maintained of tip locations and contents or the locations of covered burial sites marked on the surface.¹¹⁴

The audit found, too, that a number of cotton growers were getting rid of their empty pesticide containers by burning the 'combustible containers in an oil-drum burner' on their farms.¹¹⁵ In recent decades, cotton producers have been encouraged to dispose of their pesticide containers with greater care, but as the 1991 audit indicated, that was not necessarily the case. As cotton growing has occurred in the Namoi Valley since the early 1960s, it is probable that substantial quantities of empty pesticide containers have been buried on farms over the decades of the cotton growing industry's existence within the region. It is unlikely that records of the exact location of the on-farm chemical rubbish tips have been maintained. Perhaps the greatest concern in relation to this issue is the potential for the seepage of pesticides from these farm tips.

¹¹³ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 85.

¹¹⁴ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 59.

¹¹⁵ Gibb Environmental Sciences and Arbour International, *An Environmental Audit of the Australian cotton industry*, p. 59.

The *Second Australian Cotton Industry Environmental Audit*, commissioned by the Cotton Research and Development Corporation, was published in 2003.¹¹⁶ The Audit concluded that the Australian cotton industry had complied with each of the recommendations from the original 1991 audit.¹¹⁷ As part of the 2003 Audit, visits were conducted to twelve Queensland cotton farms and twenty cotton properties in New South Wales.¹¹⁸ The authors of the Audit acknowledge an overrepresentation in their study of farms that were adhering to Best Management Practices, with 22 of the 32 farms visited being operated in accordance with the cotton industry's Best Management Practices program.¹¹⁹ That program is designed to assess the environmental performance of cotton farms, and the Audit noted that farms which followed the guidelines of the Best Management Practices program 'generally had better environmental management practices, as well as superior documentation and records management.'¹²⁰ With the auditors predominantly inspecting farms adhering to the Best Management Practices program, it is perhaps unsurprising that the 2003 Audit was largely positive about the environmental impact of the Australian cotton industry. Other studies conducted on the environmental impact of the cotton industry in the Namoi Valley have not produced such favourable results.

Industrialised Cotton Production and the Riverine Environment

A study published in 1991 by J.W.H. Barrett, S.M. Peterson and G.E. Batley was commissioned by the Land and Water Resources Research and Development Corporation and the Cotton Research and Development Corporation to examine the

¹¹⁶ GHD Pty Ltd, *Second Australian Cotton Industry Environmental Audit*, Report prepared for the Cotton Research and Development Corporation, August 2003, Accessed online: 26 February 2010, <http://www.crdc.com.au/uploaded/File/E-Library/E-ENVIRO/2nd_Ind_Environ_Audit.pdf>

¹¹⁷ GHD Pty Ltd, *Second Australian Cotton Industry Environmental Audit*, pp. 2-3.

¹¹⁸ GHD Pty Ltd, *Second Australian Cotton Industry Environmental Audit*, p. 13.

¹¹⁹ GHD Pty Ltd, *Second Australian Cotton Industry Environmental Audit*, p. 15.

¹²⁰ GHD Pty Ltd, *Second Australian Cotton Industry Environmental Audit*, p. 3.

impact on the riverine environment of the pesticides used in the production of cotton.¹²¹ Including insecticides, conditioners, defoliants and herbicides, the study found that a total of forty different chemicals were being used on cotton farms in Australia.¹²² The report identified the organochlorine insecticide Endosulfan as that which was being used in the greatest quantities on Australian cotton crops in 1991, while Profenofos was the most regularly used organophosphate insecticide.¹²³

Sampling conducted by Barbara Nowak and Moreno Julli between 1987 and 1989 revealed that residues of Endosulfan were being detected in wild fish collected from the Namoi River, as well as fish from other cotton growing areas of New South Wales.¹²⁴ Similarly, A. Kumar and John C. Chapman conducted sampling of wild fish near Wee Waa during 1993 and 1994 to examine residues of Profenofos.¹²⁵ Kumar and Chapman concluded that 'Profenofos concentrations in water, sediment, and fish tissue reflected its general level of use'.¹²⁶ They found that the levels of Profenofos residues in 1994 had declined six weeks after the spraying of the chemical of cotton crops had ended.¹²⁷ Kumar and Chapman noted that fish were generally exposed to Profenofos

¹²¹ J.W.H. Barrett, S.M. Peterson and G.E. Batley, *The Impact of Pesticides on the Riverine Environment with Specific Reference to Cotton Growing*, Narrabri: Report prepared for the Cotton Research and Development Corporation and the Land and Water Resources Research and Development Corporation, by Barrett Purcell and Associates and CSIRO Centre for Advanced Analytical Chemistry, December 1991.

¹²² Barrett, Peterson and Batley, *The Impact of Pesticides on the Riverine Environment with Specific Reference to Cotton Growing*, Executive Summary (no page numbers).

¹²³ Barrett, Peterson and Batley, *The Impact of Pesticides on the Riverine Environment with Specific Reference to Cotton Growing*, pp. 38-44.

¹²⁴ Barbara Nowak and Moreno Julli, 'Residues of Endosulfan in Wild Fish from Cotton Growing Areas in New South Wales, Australia', *Toxicological and Environmental Chemistry*, Vol. 33, 1991, pp. 151-153.

¹²⁵ A. Kumar and John C. Chapman, 'Profenofos Residues in Wild Fish from Cotton-Growing Areas of New South Wales, Australia', *Journal of Environmental Quality*, Vol. 30, May-June 2001, p. 740.

¹²⁶ Kumar and Chapman, 'Profenofos Residues in Wild Fish from Cotton-Growing Areas of New South Wales, Australia', p. 740.

¹²⁷ Kumar and Chapman, 'Profenofos Residues in Wild Fish from Cotton-Growing Areas of New South Wales, Australia', p. 740.

via 'direct uptake of insecticide from water'.¹²⁸ In contrast, Nowak and Julli found that Endosulfan tended to endure in soils rather than water and 'leaching from soil caused by rains and floods' could result in the contamination of wild fish in rivers beyond the period in which cotton crops were sprayed.¹²⁹ Both 'runoff water and runoff soil' has been found to be the route by which Endosulfan may contaminate rivers during periods of rain or flood.¹³⁰ Nowak and Julli emphasised that, when their study was conducted in 1991: 'No data for endosulfan residues in soil or sediment have been published for any of the Australian cotton growing areas.'¹³¹

Although Endosulfan was recognised as being 'extremely toxic' to fish, little was known about Profenofos, which had 'not been the subject of any in-depth research either locally or overseas.'¹³² Barrett, Peterson and Batley emphasised that there was a lack of detailed information available about many of the chemicals that were being used in the production of cotton:

With the continuing introduction of new pesticides, data is urgently required on their toxicity, fate and transport. Based on current usage, there is insufficient information on profenofos, parathion, monocrotophos, lambdacyhalothrin, esfenvalerate, alphacypermethrin and cyfluthrin to satisfactorily manage their use. Of the less toxic herbicides, fluometuron, prometryn, pendimethalin and metolachlor should be investigated. The additivity of toxicity in mixtures of these pesticides should also be assessed.¹³³

¹²⁸ Kumar and Chapman, 'Profenofos Residues in Wild Fish from Cotton-Growing Areas of New South Wales, Australia', p. 740.

¹²⁹ Nowak and Julli, 'Residues of Endosulfan in Wild Fish from Cotton Growing Areas in New South Wales, Australia', p. 151.

¹³⁰ Alex W. Leonard, Ross V. Hyne, Richard P. Lim, Kellie A. Leigh, Jiawei Le, and Ronald Beckett, 'Fate and Toxicity of Endosulfan in Namoi River Water and Bottom Sediment', *Journal of Environmental Quality*, Vol. 30, May-June 2001, p. 750.

¹³¹ Nowak and Julli, 'Residues of Endosulfan in Wild Fish from Cotton Growing Areas in New South Wales, Australia', p. 164.

¹³² Barrett, Peterson and Batley, *The Impact of Pesticides on the Riverine Environment with Specific Reference to Cotton Growing*, pp. 38-44.

¹³³ Barrett, Peterson and Batley, *The Impact of Pesticides on the Riverine Environment with Specific Reference to Cotton Growing*, Executive Summary (no page numbers).

Barrett, Peterson and Batley noted that a number of environmental studies from the 1980s had been conducted in response to the occurrence of fish kills.¹³⁴

Where Barrett, Peterson and Batley had emphasised the lack of data about the toxicity of the chemicals used in cotton growing, Kate Short's 1994 study, *Quick Poison, Slow Poison*, highlighted the problems of testing for the presence of those chemicals in the environment. A dearth of information about the characteristics of the chemicals applied to cotton crops meant that it was not possible to test for those chemicals in samples of soil or river water, for example. Kate Short stated:

Of the 27 herbicides registered for use on cotton only seven or so are part of routine government testing. Of 14 herbicides used, only five are tested for, and these are mainly chemicals no longer used for the cotton spray program.¹³⁵

The problems of testing for herbicides paralleled the difficulties in relation to the pesticides used in cotton growing, with testing being conducted for only a limited proportion of the pesticides used. As Kate Short explained:

Regulators have yet to address the fact that many rivers, streams and dams contain a cocktail of pollutants which cannot be readily analysed. According to CSIRO scientist Kathleen Bowmer, not only do governments not test for many commonly used herbicides, but their untested breakdown products could be more of a pollution problem than the parent compound. CSIRO research on cotton chemicals confirmed her concerns: only a small percentage of the pesticides used were the subject of detailed, routine monitoring.¹³⁶

Similarly, a 1996 study of the *Biological Impact of Cotton Pesticides* examined the difficulties in determining whether pesticides have been the cause of fish kills that have occurred in rivers and other water sources within Australia's cotton growing regions.¹³⁷

¹³⁴ Barrett, Peterson and Batley, *The Impact of Pesticides on the Riverine Environment with Specific Reference to Cotton Growing*, p. 54.

¹³⁵ Short, *Quick Poison Slow Poison*, p. 91.

¹³⁶ Short, *Quick Poison Slow Poison*, p. 204.

¹³⁷ Kathleen H. Bowmer, Peter G. Fairweather, Gillian M. Napier and Anthony C. Scott, (1996) *Biological Impact of Cotton Pesticides*, Canberra: Land and Water Resources Research and Development Corporation, Occasional Paper No. 03/96, 1996.

The authors suggest that many fish kills are neither reported nor recorded.¹³⁸ A delay in the discovery of a fish kill can mean that decomposition renders it impossible to ascertain what caused the event.¹³⁹ Further complicating matters is the fact that fish may not necessarily be killed by their exposure to pesticides, depending on the degree of exposure and other factors, and some chemicals are only detectable in water samples for a short period of time.¹⁴⁰ Nevertheless, the authors of the study concluded:

Despite all the difficulties in assessing the evidence, it is still clear that cotton pesticides are causing the majority of those fish kills that have been reported, and that endosulfan is the pesticide most often implicated...¹⁴¹

The study highlighted a Namoi River fish kill that occurred in April 1995 and went unreported for almost a week.¹⁴² The incident saw approximately 40,000 fish and over 100 ducks killed.¹⁴³ Ailing ducks found at the same location were ‘heavily contaminated with DDE’, although no DDE or DDT was registered in tests of water from that area of the river.¹⁴⁴ The Namoi River incident from 1995 illustrates the difficulties of determining the cause of such incidents where pesticides are believed to be responsible. Fish kills are not the only evidence of the ecological consequences of the use of insecticides and other chemicals in the production of cotton within the Namoi Valley. The use of Endosulfan has been linked with ‘decreases in population densities

¹³⁸ Bowmer, et al. *Biological Impact of Cotton Pesticides*, p. 27.

¹³⁹ Bowmer, et al. *Biological Impact of Cotton Pesticides*, p. 27.

¹⁴⁰ Bowmer, et al. *Biological Impact of Cotton Pesticides*, pp. 7-27.

¹⁴¹ Bowmer, et al. *Biological Impact of Cotton Pesticides*, p. 27.

¹⁴² Bowmer, et al. *Biological Impact of Cotton Pesticides*, p. 27.

¹⁴³ Bob Beale, ‘Water users alerted after huge river kill’, *The Sydney Morning Herald*, 13 April 1995, reproduced in Bowmer, et al, *Biological Impact of Cotton Pesticides*, p. 10.

¹⁴⁴ Bob Beale, ‘Water users alerted after huge river kill’, *The Sydney Morning Herald*, 13 April 1995, reproduced in Bowmer, et al, *Biological Impact of Cotton Pesticides*, p. 10.

of mayfly nymphs and caddisfly larvae' observed at the section of the Namoi River associated with cotton growing.¹⁴⁵

The production of cotton under irrigation is believed to have had some impact upon the health of the Namoi River. Water quality surveys conducted by the EPA in the Namoi River Valley during December 1987 and February and June of 1988 revealed turbidity, salinity and nutrient loading of the Namoi River to be the key issues of concern in relation to that catchment.¹⁴⁶ The EPA study noted that the cotton industry was not the source of the phosphorus that had caused blue-green algal outbreaks in the Namoi River, as the fertilisers used in the growing of cotton were predominantly nitrogen-based.¹⁴⁷ Some of the soils within parts of the Namoi Valley were found to have levels of phosphorus that were naturally high, and the EPA suggested that the 'physical disturbance of the soil' could be responsible for the levels of phosphorus detected in water samples from the Namoi River.¹⁴⁸ The tilling of the land for the growing of crops such as cotton may partly account for the Namoi River's phosphorus load.

The extraction of water from the river for use in the irrigation of cotton, too, may have had a detrimental impact on the health of the Namoi River. As Angela H. Arthington explained in her 1995 study of the state of the rivers in the cotton growing regions of Queensland and northern New South Wales:

Blue-green algal blooms are symptomatic of nutrient enrichment, but many other features of aquatic systems influence the incidence and extent of blooms (low river flows and lack of turbulence, stratification, the light environment, the

¹⁴⁵ Leonard, et al. 'Fate and Toxicity of Endosulfan in Namoi River Water and Bottom Sediment', p. 750.

¹⁴⁶ New South Wales Environment Protection Authority, *Water Quality Surveys, Namoi River Valley: December 1987, and February and June 1988*, Chatswood: New South Wales Environment Protection Authority, 1997, p. 46.

¹⁴⁷ New South Wales Environment Protection Authority, *Water Quality Surveys, Namoi River Valley: December 1987, and February and June 1988*, p. 44.

¹⁴⁸ New South Wales Environment Protection Authority, *Water Quality Surveys, Namoi River Valley: December 1987, and February and June 1988*, p. 3 and 44.

chemical milieu and concentration of minor elements, and patterns of invertebrate (and fish) grazing).¹⁴⁹

Water temperature may also be a factor in blue-green algal blooms.¹⁵⁰ Arthington's study offered a broad examination of the issues affecting the quality of the water in the Namoi River and the rivers of the other cotton producing regions in New South Wales and Queensland. For the Namoi River, Arthington identified the main problems as rising 'nutrient levels, blue-green algae blooms, moderate salinity problems for irrigation use of water and pesticide contamination of water and aquatic biota.'¹⁵¹ In a 1996 article, Arthington used the Namoi Valley as a case study to analyse the consequences of cotton production on the tributaries of the Darling River.¹⁵² Increasing turbidity, river saltation and soil erosion were highlighted in the article as the primary issues affecting water quality in the Namoi River system.¹⁵³ For the Namoi River and other tributaries of the Darling River, the release of water from storage dams had 'scoured and eroded river channels' and led to a rise in the level of turbidity.¹⁵⁴

The Namoi River was the subject of a *Stressed Rivers Assessment Report* conducted by the New South Wales Department of Land and Water Conservation in 1999.¹⁵⁵ The report concluded that:

¹⁴⁹ Arthington, *State of the Rivers in Cotton Growing Areas: Northern NSW and border rivers with Queensland*, p. 81.

¹⁵⁰ New South Wales Department of Land and Water Conservation, *Water Quality in the Namoi Catchment, 2000-2001*, Sydney: NSW Department of Land and Water Conservation, June 2002, p. 7.

¹⁵¹ Arthington, *State of the Rivers in Cotton Growing Areas: Northern NSW and border rivers with Queensland*, p. 82.

¹⁵² Angela H. Arthington, 'The effects of agricultural land use and cotton production on tributaries of the Darling River, Australia', *GeoJournal*, Vol. 40, No. 1-2, October 1996, pp. 115-125.

¹⁵³ Arthington, 'The effects of agricultural land use and cotton production on tributaries of the Darling River, Australia', p. 118.

¹⁵⁴ Arthington, 'The effects of agricultural land use and cotton production on tributaries of the Darling River, Australia', p. 118.

¹⁵⁵ New South Wales Department of Land and Water Conservation, *Stressed Rivers Assessment Report: Namoi Catchment*, Sydney: NSW Department of Land and Water Conservation, 1999.

Water management issues facing the Namoi catchment include the salinisation of rivers and creeks in the catchment; excessive groundwater usage – particularly in the drier months – the clearing of riparian vegetation; diffuse run off of agricultural products and chemicals; turbidity of streams due to an increased level of suspended solids; the threat of algal blooms; and soil erosion.¹⁵⁶

It is difficult to determine unequivocally the impact that irrigated cotton production has had on the state of the Namoi River. Cotton growing is one factor among many that is believed to have an influence upon the health of the Namoi district's water resources. The 1999 study, *Environmental Scan of the Namoi River Valley*, stated in relation to fish migration that the 'six dams and seven major weirs in the Namoi catchment have undoubtedly contributed significantly to the decline of native fish.'¹⁵⁷ As the establishment of irrigated cotton production near Wee Waa led to the creation of three weirs along the Namoi River, the Namoi Valley's cotton growing industry can be seen as partly responsible for this decrease in native fish numbers.

A New South Wales Department of Land and Water Conservation study of water quality in the Namoi catchment in 2000-2001 stated that herbicides were the chemicals detected most often during testing in that period.¹⁵⁸ The study contained some important findings in relation to Endosulfan, the main chemical used in the production of cotton in recent decades:

The insecticide endosulfan was detected at four sites in the lower Namoi valley. Endosulfan was composed of the breakdown product endosulfan sulfate, which suggests that this chemical is entering the surface water system in runoff rather than spray drift. Concentrations of endosulfan detected in the lower Namoi valley have dropped significantly since monitoring commenced in 1991.¹⁵⁹

¹⁵⁶ New South Wales Department of Land and Water Conservation, *Stressed Rivers Assessment Report: Namoi Catchment*, p. 11.

¹⁵⁷ Martin Thoms, Richard Norris, John Harris, David Williams and Peter Cottingham, *Environmental Scan of the Namoi River Valley*, Report prepared for the Department of Land and Water Conservation and the Namoi River Management Committee, December 1999, p. 39, <[http://freshwater.canberra.edu.au/Publications.nsf/0/bcd649e990f8974dca256f0f00401f7f/\\$FILE/Namoi%20Environmental%20Scan%20FINAL.doc](http://freshwater.canberra.edu.au/Publications.nsf/0/bcd649e990f8974dca256f0f00401f7f/$FILE/Namoi%20Environmental%20Scan%20FINAL.doc)>

¹⁵⁸ New South Wales Department of Land and Water Conservation, *Water Quality in the Namoi Catchment, 2000-2001*, p. 7.

¹⁵⁹ New South Wales Department of Land and Water Conservation, *Water Quality in the Namoi Catchment, 2000-2001*, p. 7.

Water quality and residues of agricultural chemicals are not the only environmental issues that have been investigated in research on the Namoi Valley.

Land Degradation and Tree Decline

The question of land degradation within the Namoi River catchment was examined in a 1997 report. The study suggested that the land degradation issues of greatest concern in the catchment included soil erosion, streambank erosion, sedimentation and declining water quality, soil structure decline, tree decline, dryland salinity and pasture degradation.¹⁶⁰ Of these issues, the establishment of the irrigated cotton industry in the Namoi Valley has arguably had the most significant impact in relation to tree decline.

The cotton growing district near Wee Waa lies in what the report classifies as the Western division of the Namoi River Catchment:

The Western section of the catchment has an average tree cover of 9%. Much of this area was originally sparse to open woodland with coolibah (*Eucalyptus microtheca*) as the dominant tree species, or grassland dominated by mitchell grass (*Astrebla lappacea*) or plains grass (*Stipa aristiglumis*) with River red gum (*Eucalyptus camaldulensis*) communities along the rivers. Much of this tree cover has been thinned to increase the grass cover and allow flood irrigation.¹⁶¹

The practice of flood irrigation only became a feature of agriculture in the Namoi Valley following the introduction of intensive cotton production under irrigation in the early 1960s. Land clearing represented the first phase in the establishment of irrigated cotton production within the Namoi district. According to Bruce Loder, who became the manager of the cotton growing enterprise, Auscott:

Cotton-growing, or any row crop, is a very precise form of farming and you just can't put up with things like trees ... Because there are no stock, you don't need shade and trees would be a real hazard as far as equipment goes... they're just something that's in the way.¹⁶²

¹⁶⁰ New South Wales Department of Land and Water Conservation, *Namoi River Catchment: Report on Land Degradation and Proposals for Integrated Management for its Treatment and Prevention*, Sydney: NSW Department of Land and Water Conservation, 1997, p. xi.

¹⁶¹ New South Wales Department of Land and Water Conservation, *Namoi River Catchment: Report on Land Degradation and Proposals for Integrated Management for its Treatment and Prevention*, p. 91.

¹⁶² Bruce Loder, cited in McHugh, *Cottoning On*, p. 15.

The absence of trees on many cotton farms has been emphasised by the publication of *Growing trees on cotton farms: A guide to assist cotton farmers to decide how, when, where and why to plant trees*.¹⁶³ Why would such a guide have been published if there was not an association between cotton production and tree decline in some areas?

Irrigation and Salinization

The practice of irrigation, too, may have significant environmental ramifications. Salinization has been described as ‘an inevitable consequence of intensive irrigation in arid regions.’¹⁶⁴ William J. Lines has argued that irrigation has been used to overcome Australia’s problem of limited arable land that is of a comparatively lower quality than that of other nations.¹⁶⁵ Lines asserted, however, that irrigated agriculture in eastern Australia has created a legacy of salinization that has been detrimental for the Murray Darling River Basin:

Ameliorating salinity requires lowering watertables and reducing the amount of water flowing through the soil. Not surprisingly, the majority of salinity mitigation measures proffered by hydraulic engineers involve engineering – plumbing the landscape. Sub-surface drains, designed to reduce watertables, only create problems of disposal. This arrangement, the most common solution in the Murray River basin, daily pours highly saline water into streams and rivers, all of which flow back into the Murray. Engineering has turned the Murray into an irrigation channel and drainage conduit for the increasingly salt-laden discharge from irrigated areas, and has destroyed Australia’s major river.¹⁶⁶

In addition to the problem of salinization, the extraction of water for the purpose of irrigation can decrease river flow, the consequences of which may be more damaging

¹⁶³ *Growing trees on cotton farms: A guide to assist cotton farmers to decide how, when, where and why to plant trees*, Barton: Rural Industries Research and Development Corporation, 1999.

¹⁶⁴ Vandana Shiva, *Water Wars: Privatization, Pollution and Profit*, Cambridge: South End Press, 2002, p. 110.

¹⁶⁵ William J. Lines, *Taming the Great South Land: A History of the Conquest of Nature in Australia*, North Sydney: Allen and Unwin, 1991, p. 262.

¹⁶⁶ Lines, *Taming the Great South Land: A History of the Conquest of Nature in Australia*, p. 263.

downstream of the irrigation area.¹⁶⁷ While cotton production has contributed to the problem of salinization, it has been suggested that the salinization of the irrigation water used on cotton crops poses a threat to ‘the sustainability of cotton production systems in eastern Australia.’¹⁶⁸

Industrialised Cotton Production and Ecological Sustainability

In *Collapse*, Jared Diamond argued that flood irrigation has created the problem of increased salinization of soil, groundwater and rivers.¹⁶⁹ The ecological fragility of the Australian continent and the low fertility and productivity of Australia’s aged soils have been emphasised by Diamond. He suggests that the contribution to the Australian economy from the industrialised cotton production that occurs in New South Wales and Queensland must be evaluated in terms of cotton’s environmental consequences:

In a narrow sense, cotton is Australia’s second most profitable agricultural export, after wheat. But cotton-growing depends on irrigation water provided at low cost or no cost by the government. In addition, all major cotton-growing areas pollute the water with their heavy applications of pesticides, herbicides, defoliants, and high-phosphorous and high-nitrogen fertilizers (causing algal blooms). Those pollutants even include DDT and its metabolites, last used about 25 years ago but still persisting in the environment because they resist breakdown.¹⁷⁰

Diamond argues that the indirect costs of cotton production cannot be ignored, particularly in relation to the environmental health of the Murray-Darling Basin.¹⁷¹

In 2002, an environmental study was published that examined the Narrabri Shire, which encompasses the towns of Narrabri and Wee Waa and much of the surrounding agricultural area. The study of the shire noted the high rate of turbidity affecting the

¹⁶⁷ P.F. Crapper, S.G. Beavis and Li Zhang, ‘The Relationship between Climate and Streamflow in the Namoi Basin’, *Environment International*, Vol. 25, No. 6/7, 1999, pp. 836-837.

¹⁶⁸ N.R. Hulugalle, T.B. Weaver and F. Scott, *Long-Term Effects of Cotton Rotations on the Sustainability of Cotton Soils II*, Narrabri: Report to Cotton Research and Development Corporation, NSW Agriculture, 2002, p. 3.

¹⁶⁹ Jared Diamond, *Collapse: How Societies Choose to Fail or Survive*, Camberwell: Allen Lane, 2005, pp. 401-402.

¹⁷⁰ Diamond, *Collapse*, p. 415.

¹⁷¹ Diamond, *Collapse*, pp. 403-415.

quality of the water in the Namoi River, as well as algal blooms resulting from the river's high phosphorus levels.¹⁷² Water use in the Narrabri Shire was dominated by irrigation for agricultural purposes, with groundwater bores augmenting the supply available from the Namoi River and its adjuncts.¹⁷³ The report noted that the shift over time from grazing to the growing of crops in the district had exacerbated problems when localised flooding occurs.¹⁷⁴

Integrated Pest Management

The strategy of Integrated Pest Management (IPM) adopted generally by the Australian cotton growing industry is supposed to take a broader approach to the control of insect pests. Rather than spraying chemicals constantly, IPM is intended to maintain pest populations below a level causing economic injury to the farmer's crop. Nevertheless, there are some problems with this idea, as one author has suggested:

...we are not willing to revert to the production levels and standards that existed before the advent of chemical fertilizers and pesticides, in part because of our acquired expectations of 'acceptable' yield and quality based on that attained with chemicals, and in part because of continually growing consumer demands.¹⁷⁵

It has been suggested that pesticide use on cotton crops could be decreased by encouraging and conserving types of insects that are the 'natural enemies' of the particular insect species that infest and cause damage to cotton crops. When cotton is grown as a monoculture, Robert Kofi Mensah has explained:

The lack of ecological diversity could be the major cause of pest problems because the food, hosts, prey and hibernating or overwintering sites of most of the natural enemies of the pests are reduced thereby limiting natural biological control. This can result in pest outbreaks because abundant food is available to

¹⁷² *Local Environmental Study Covering the Whole of Narrabri Shire Council Area*, Narrabri: Report prepared for Narrabri Shire Council by Hunter Development Brokerage Pty Ltd, March 2002, p. 20.

¹⁷³ *Local Environmental Study Covering the Whole of Narrabri Shire Council Area*, p. 22.

¹⁷⁴ *Local Environmental Study Covering the Whole of Narrabri Shire Council Area*, p. 37.

¹⁷⁵ J. McD. Stewart, *Biotechnology of Cotton*, ICAC Review Articles on Cotton Production Research No. 3, International Cotton Advisory Committee, 1991, p. 1.

the pest and they need not waste time searching for food or a mate or unduly expose themselves to their natural enemies.¹⁷⁶

In contrast, Gary Fitt has argued that such a view is a simplistic rendering of the ecology of cotton monocultures.¹⁷⁷ In relation to the sowing of other crops in addition to cotton to increase diversity, Fitt contends that ‘the impact of this on pest abundance will not necessarily be beneficial, particularly for polyphagous and mobile pests’.¹⁷⁸ As the effectiveness of retaining ‘beneficial insects’ to control cotton’s insect pests is doubtful, what does this mean for the strategy of Integrated Pest Management? Kate Short has argued that Integrated Pest Management is designed ‘to ensure that pesticides remain the focus of modern pest control’, and to perpetuate the notion that pesticides are essential to agriculture.¹⁷⁹ Is the cotton industry’s much lauded IPM strategy essentially little more than a chemical rotation plan? How effective is the Integrated Pest Management strategy in ensuring that chemicals are rotated? The Australian cotton industry’s second environmental audit, published in 2003, indicated that not all farmers were adhering to the dates specified for the rotation of insecticides. The 2003 audit noted, too, that genetically modified cotton is an integral part of the Integrated Pest Management strategy. Does IPM mean not only that chemical use is central to the strategy, but that GM cotton is now being marketed as essential? Who does this benefit?

A Genetically Modified Solution for Industrial Cotton?

It has been argued that the growing of genetically modified crops has decreased the usage of fuel by farm machinery as a result of ‘less frequent herbicide or insecticide

¹⁷⁶ Robert Kofi Mensah, *Conservation and Utilisation of Beneficial Insects in the cotton Agroecosystem for Integrated Pest Management in Conventional and Transgenic Cotton, July 1995 to June 1998*, Narrabri: Report to the Cotton Research and Development Corporation, NSW Agriculture, Australian Cotton Research Institute, 1998, p. 4.

¹⁷⁷ Fitt, ‘Cotton Pest Management: Part 3: An Australian Perspective’, p. 559.

¹⁷⁸ Fitt, ‘Cotton Pest Management: Part 3: An Australian Perspective’, p. 559.

¹⁷⁹ Short, *Quick Poison Slow Poison*, p. 244.

applications', which may decrease the greenhouse gas emissions from agriculture.¹⁸⁰

While that may prove to be the case, the introduction of genetically modified cotton to Australia – in the form of Monsanto's 'Ingard' variety of Bt cotton in 1996 – produced uneven results at first. Farmers who grew Ingard cotton within Australia during 1997-98 received yields of cotton fibre that were described as 'variable, with approximately half of the growers receiving less than those with conventional cotton, and the rest more.'¹⁸¹ Initially, some Australian cotton growers failed to produce a profit from their genetically modified cotton crops:

In the first two years of adoption of the technology (Ingard, single gene Bt cotton), small net income losses were derived, mainly because of the relatively high price charged for the seed. Since this price was lowered in 1998, the net income impact has been positive, with cost saving of between \$70/ha and \$90/ha, mostly derived from lower insecticide costs (including application) more than offsetting the cost of the technology.¹⁸²

The principal benefit in environmental terms of the introduction of genetically modified cotton has been the apparent reduction in the application of pesticides.¹⁸³ There are, however, differing views on the degree to which pesticide use has decreased since genetically modified cotton became available commercially in Australia. It has been claimed that, since 1996, a 50 per cent reduction in insecticide use has been achieved in the production of cotton in Australia.¹⁸⁴ Others contend that the reductions in

¹⁸⁰ Graham Brookes and Peter Barfoot, 'GM Crops: The First Ten Years – Global Socio-Economic and Environmental Impacts', *ISAAA Brief No. 36*, The International Service for the Acquisition of Agri-biotech Applications, Ithaca, NY, 2006, (Date accessed: 26 September 2008), <<http://www.isaaa.org/Resources/Publications/briefs/36/download/isaaa-brief-36-2006.pdf>>, p. xiv.

¹⁸¹ Els Wynen, 'Genetic engineering and agriculture: Australian farming at the crossroads', Information and Research Services, Department of the Parliamentary Library, Canberra, Research Paper No. 8, 1999-2000, p. 6.

¹⁸² Brookes and Barfoot, 'GM Crops: The First Ten Years – Global Socio-Economic and Environmental Impacts', p. 28.

¹⁸³ Wynen, 'Genetic engineering and agriculture: Australian farming at the crossroads', p. 14.

¹⁸⁴ Greg Constable, 'Research's contribution to the evolution of the Australian cotton industry', *New directions for a diverse planet: Proceedings of the 4th International Crop Science Congress*, 26 September-1 October 2004, Brisbane, (Date accessed: 21 January 2009), <http://cropscience.org.au/icsc2004/pdf/1136_constable.pdf>, p. 3.

insecticide use that were initially achieved by the Australian cotton growing industry have been eroded over time, declining from a 52 per cent reduction in 1997 to a 28 per cent reduction in insecticide use in 2000.¹⁸⁵

While decreases in chemical use have been attained by the sowing of genetically modified cotton varieties, pesticide applications continue to be a feature of industrialised cotton production in the Namoi Valley. The ‘DrumMUSTER’ program has operated in Australia’s cotton producing regions since 2003 to ensure that empty chemical drums and containers are collected and disposed of safely, rather than being buried on farms or dumped at local garbage tips as had occurred in the past.¹⁸⁶

Although drought had seen a decrease in cotton acreages planted and Bt cotton varieties had reduced insecticide usage, by 2008 the DrumMUSTER service had collected vast quantities of chemical containers:

Lower return rates notwithstanding, cotton growing regions such as Moree and Narrabri have still seen drumMUSTER numbers collected of 265,500 and 80,500 respectively over the last four years. ... This represents about 490 tonne of material which has been diverted from landfill to recycling.¹⁸⁷

With such substantial quantities of pesticide drums and containers still being amassed in cotton producing regions, it is clear that, in spite of the adoption of genetically modified cotton varieties, the cotton growing industry is not on the verge of eradicating the need for insecticides and other chemicals in the production of the fibre.

Some authors have expressed reservations about genetically modified cotton.

Sue Mayer has suggested:

¹⁸⁵ Sue Mayer, ‘Genetic modification – making cotton more sustainable? A review of GM cotton development’, Draft Briefing Paper, *The Soil Association*, (Date accessed: 26 September 2008), <[http://www.soilassociation.org/web/sa/saweb.nsf/librarytitles/gmcottonreport.html/\\$file/GDraft%20Briefing%20Paper%20%20GM%20cotton.pdf](http://www.soilassociation.org/web/sa/saweb.nsf/librarytitles/gmcottonreport.html/$file/GDraft%20Briefing%20Paper%20%20GM%20cotton.pdf)>

¹⁸⁶ ‘Cotton, containers and the environment’, in *Community and Co-operation: 50 Years of the ACRI: 1958-2008*, Narrabri: Australian Cotton Research Institute, 2008, p. 29.

¹⁸⁷ ‘Cotton, containers and the environment’, in *Community and Co-operation: 50 Years of the ACRI: 1958-2008*, p. 29.

The selling of GM cotton as a cure for the ills of pesticide use is eerily familiar to the way in which the pesticides themselves have been sold. Short-term benefits and high cost inputs are being promoted by industry salesmen.¹⁸⁸

Genetically modified cotton varieties, such as Ingard, Bollgard and Bollgard II, have been bred to include the bacillus thuringiensis or 'Bt' insecticide that is toxic to the main cotton insect pest, the Helicoverpa or Heliothis bollworm. The development of these genetically modified cotton varieties has not eliminated the need for cotton crops to be sprayed with insecticides. It appears that the number of chemical applications required has substantially decreased through the sowing of cotton strains that incorporate the Bt insecticide. However, Bt cotton crops have been designed with the aim of controlling cotton's primary insect pest. With the production of Bollgard cotton crops in the United States, for example, other insects such as mirids that had previously been considered secondary cotton pests 'moved to the forefront.'¹⁸⁹ An increase in the abundance of secondary insect pests has also been observed in genetically modified cotton crops within the Namoi Valley.¹⁹⁰ This trend suggests that the use of Bt cotton strains has not solved the problem of insect control among cotton crops, but it has altered the composition and numbers of the different types of insects that infest fields of cotton. It has been argued that the rise in pesticide applications to combat cotton's secondary pests 'is not usually included in estimates of changes in insecticide use on Bt cotton.'¹⁹¹

Other concerns have been raised about the environmental impact of Bt cotton varieties:

¹⁸⁸ Mayer, 'Genetic modification – making cotton more sustainable? A review of GM cotton development'.

¹⁸⁹ Tom Kerby, *Management Considerations for Deltapine Bollgard II Varieties in Australia*, Narrabri: Deltapine Australia, 2006, p. 4.

¹⁹⁰ Agronomist currently employed by the Namoi Valley's cotton growing industry, interviewed by the author via email, March 2005.

¹⁹¹ Mayer, 'Genetic modification – making cotton more sustainable? A review of GM cotton development'.

There is suggestive data that the continuous release of toxins exuded through the plant's roots last for a very long time and may damage both the soil and the micro-organisms that live there. There is also some evidence that Bt crops may threaten the survival of other beneficial species such as butterflies, birds, bees, and beetles, which play a vital roles in pollination and also control pests through the prey-predator balance. However, a comprehensive ecological study of the impact of Bt crops has not yet been conducted, so there are many unknown factors about its ultimate impact.¹⁹²

Given the very brief history of the commercial production of genetically modified cotton varieties within Australia and internationally, the long term environmental consequences of these particular cotton crops remain to be seen.

One of the most critical issues in relation to genetically modified cotton is whether it is a technology that has the potential to endure. Insect resistance to the Bt cotton varieties is the key question. Whether an insecticide is being sprayed on a crop or has been bred into the genes of a cotton plant through genetic engineering, there is the potential for insects to develop resistance and immunity to that insecticide. It has been suggested that insect resistance may emerge between five and fifteen years after the introduction of a genetically modified crop.¹⁹³ Concerns about the potential for insect resistance have been paramount since the commercial release of genetically modified cotton in Australia in 1996. Along with the licensing agreement that farmers utilising Monsanto's Bt cotton crops have to undertake are stipulations about the planting of 'refuge crops' in or near the fields of GM cotton. Ingard cotton was introduced commercially in Australia in 1996, but was soon withdrawn from the market and replaced by Bollgard II to avoid the emergence of insect resistance to Bt. For non-GM cotton varieties, now known as 'conventional' cotton, insect resistance to a particular pesticide was usually overcome by using a different type of pesticide in its

¹⁹² Ashok Kumbamu, 'Ecological Modernization and the "Gene Revolution": The Case Study of Bt Cotton in India', *Capitalism Nature Socialism*, Vol. 17, No. 4, December 2006, p. 17.

¹⁹³ Richard Hindmarsh, 'Agricultural Biotechnologies: Ecosocial Concerns for a Sustainable Agriculture', in Geoffrey Lawrence, Frank Vanclay and Brian Furze (eds.) *Agriculture, Environment and Society: Contemporary Issues for Australia*, South Melbourne: Macmillan, 1992, p. 284. See also: Anna Salleh, 'Wearing out our genes? The case of transgenic cotton', in Richard Hindmarsh and Geoffrey Lawrence (eds.) *Altered Genes II: The future?* Carlton North: Scribe Publications, 2001, pp. 160-172.

place. The situation is more complex with regard to genetically modified cotton crops that employ insecticides internal to the cotton plant.

The relatively high cost of Bt cotton seed compared to ‘conventional’ seed strains is marketed as being offset by the reduction in the cost of insecticide sprays that a farmer will have to apply to the crop from the sowing of the seed until the harvest of the fibre. The marketability of Bt cotton crops is contingent upon the ongoing effectiveness of the insecticide that the cotton plants produce. If insect resistance to the Bt cotton crops emerged, farmers would have to increase the number and frequency of their pesticide sprays, which may negate the apparent advantages of those types of genetically modified cotton strains. A New South Wales Agriculture monitoring program of the Bt cotton variety Ingard found that between 2000 and 2002, some types of the *Helicoverpa* insect species had become ‘less susceptible to the Bt endo-toxin Cry1Ac and this indicates resistance to this toxin may have developed.’¹⁹⁴ The monitoring program determined that the production of that toxin in Bt cotton plants is not at a constant level for the duration of the cotton growing season, but declines as the growth of the crop progresses.¹⁹⁵ Perhaps of greatest significance was the finding that, if insect resistance to the toxin in Bt cotton crops was to emerge, the pesticide sprays that continue to be applied ‘would mask the reduced efficacy’ of those Bt cotton varieties.¹⁹⁶

Industrialised Cotton’s Water Requirements

For cotton production in the Namoi Valley, a critical factor is the availability of water for use in irrigation by the district’s cotton growing industry. Within Australia in recent years, ‘inefficient water use’ in the production of irrigated cotton has been the source of

¹⁹⁴ Ho T. Dang, *Resistance Monitoring and Management of Bt Cotton: Final Report*, Project Codes Dan 118C and Dan 152C, Orange: NSW Agriculture, Cotton Research and Development Corporation and Australian Cotton Research Institute, 2002, p. 18.

¹⁹⁵ Dang, *Resistance Monitoring and Management of Bt Cotton*, p. 3.

¹⁹⁶ Dang, *Resistance Monitoring and Management of Bt Cotton*, p. 21.

criticism, and a broader ‘public debate regarding the allocation of water resources’ has been observed.¹⁹⁷ It has been argued that ‘Australian cotton production systems are amongst the most water efficient in the world’.¹⁹⁸ However, the Second Australian Cotton Industry Environmental Audit conducted in 2003 presented quite a different view. In relation to water storage dams on Australian cotton farms, the 2003 Environmental Audit noted:

Water storages of up to 3800ML were observed, with multiple storages on larger farms. Surface areas of storages were often 50-100 hectares, with high evaporative losses. ... More than half of the individual farmers visited did not appear to give much attention to addressing the issue of minimising water storage and transmission losses. The general consensus was that these issues are expensive to rectify and would not be addressed in the short term.¹⁹⁹

Such water losses are of concern, as is the type of irrigation deployed in the production of cotton within Australia. Although drip irrigation is believed to have many advantages, not only in terms of water usage and crop moisture levels but also in the application and maintenance of fertiliser levels, flood irrigation continues to be the method used to irrigate cotton crops in the Namoi Valley.²⁰⁰ The source of the irrigation water that is applied to the rows of cotton in the Namoi district is not the Keepit Dam alone; water from the Great Artesian Basin is also important. There has been substantial use of this groundwater for irrigating the Namoi region’s cotton.²⁰¹ A study from 1983 explained the trend toward the use of artesian water for irrigation by the Namoi Valley’s cotton growers:

¹⁹⁷ S.B. Tennakoon and S.P. Milroy, ‘Crop water use and water use efficiency on irrigated cotton farms in Australia’, *Agricultural Water Management*, Vol. 61, 2003, p. 179.

¹⁹⁸ Constable, ‘Research’s contribution to the evolution of the Australian cotton industry’, p. 2.

¹⁹⁹ GHD Pty Ltd, *Second Australian Cotton Industry Environmental Audit*, p. 24.

²⁰⁰ G.A. Constable, I.J. Rochester and A.S. Hodgson, ‘A comparison of drip and furrow irrigated cotton on a cracking clay soil’, *Irrigation Science*, Vol. 11, 1990, p. 137.

²⁰¹ Arthington, *State of the Rivers in Cotton Growing Areas: Northern NSW and border rivers with Queensland*, p. 50.

Because of frequent summer droughts, low stream flows and increased demand, farmers soon turned to using the abundant and comparatively reliable ground water supplies. As pumping activities have increased, water levels have dropped, and mining of ground water has started.²⁰²

Measures have been introduced to curtail the overuse of groundwater for irrigation, with groundwater license volumes 'being reduced 51 per cent' in the lower Namoi Valley.²⁰³

The supply of water from the Keepit Dam, the Namoi River, and artesian sources is critical to cotton production in the Namoi district. For the Namoi Valley, the problem remains that 'irrigable land far exceeds the amount of water available to irrigate it'.²⁰⁴

On the question of agricultural sustainability, it has been suggested that:

Any effort to answer the sustainability question through an appeal to farmers' collective experience is confounded by the continuous increase in inputs applied in most farming systems, which increase yield and may offset reductions in the underlying productive capacity. Because many inputs are produced off the farm and often require petroleum products, some people believe that in the long run it will be impossible to continue to rely on their use. Thus, the important question is not whether agricultural productivity is changing. It is whether agricultural productivity gains are occurring at the cost of degradation in the underlying resource base which will eventually result in falling productivity.²⁰⁵

The irrigated cotton growing industry in the Namoi Valley relies more on inputs than most other agricultural endeavours. In recent decades, the cotton growing industry within Australia has sought to make itself more environmentally sustainable through the implementation nationally of its Best Management Practices program and Integrated Pest Management strategies. As part of an Integrated Pest Management strategy, research has been conducted on conserving and encouraging the natural predators of

²⁰² M. Zare and D.T. Howell, 'Conjunctive Use of Surface and Ground Water', *Hydrology and Water Resources Symposium 1983*, Barton, ACT: Institution of Engineers National Conference Publication No. 83/13, 1983, p. 87.

²⁰³ Reeve, et al. *A Scoping Study on Socio-Economic Indicators for the Cotton Industry*, p. 4.

²⁰⁴ P.O. Cull, A.B. Hearn, and R.C.G. Smith, 'Irrigation Scheduling of Cotton in a Climate with Uncertain Rainfall, I: Crop Water Requirements and Response to Irrigation', *Irrigation Science*, Vol. 2, 1981, p. 139.

²⁰⁵ R.W. Herdt and R.A. Steiner, 'Agricultural Sustainability: Concepts and Conundrums', in Vic Barnett, Roger Payne and Roy Steiner (eds.) *Agricultural Sustainability: Economic, Environmental and Statistical Considerations*, Chichester: John Wiley and Sons, 1995, p. 4.

cotton's insect pests through the use of 'food sprays'.²⁰⁶ Such measures, it has been argued, 'should be integrated with other tools such as petroleum spray oils (PSOs)'.²⁰⁷ It appears somewhat paradoxical that the Australian cotton industry, in its efforts to become more sustainable, would look to a finite resource like petroleum.

In broad terms, research in relation to the environmental consequences of the Namoi Valley's cotton growing industry appears to have been conducted in an ad hoc manner. No longitudinal study of cotton's environmental impact has been undertaken to date. When considered together, the environmental studies that have been completed present an assemblage of aspects of the ecological consequences of cotton production within the Namoi Valley. By no means does the existing patchwork of literature represent a comprehensive investigation of the environmental ramifications of irrigated cotton growing in the Namoi district. In many cases, it seems that research into the Namoi Valley cotton growing industry's environmental effects has been undertaken in response to perceived problems associated with the industry. Without a thorough study over time, many questions remain with respect to cotton's consequences for the Namoi Valley's environment.

The analysis provided in this chapter has, nonetheless, raised an important issue regarding how the findings from the environmental studies examined have been received. This thesis has concentrated upon the area of the Namoi Valley where cotton growing was established by American cotton farmers in the early 1960s: the lower part of the Namoi Valley which encompasses the towns of Wee Waa and Narrabri. However, in a separate development, a cotton growing industry was established close to the Namoi Valley town of Gunnedah during the 1980s. The growing of cotton near

²⁰⁶ Robert Kofi Mensah, *Conservation and Utilisation of Beneficial Insects and other Biocontrol Agents for Integrated Pest Management in Conventional Cotton III, July 2001 to June 2004*, Narrabri: Report to the Cotton Research and Development Corporation, NSW Department of Primary Industries, 2004, pp. 10-11.

²⁰⁷ Mensah, *Conservation and Utilisation of Beneficial Insects and other Biocontrol Agents for Integrated Pest Management in Conventional Cotton III, July 2001 to June 2004*, p. 11.

Gunnedah generated substantial local conflict in relation to the application of pesticides from crop-dusting aircraft.²⁰⁸ In contrast to the Gunnedah development, this thesis indicates that there has been an absence of community reaction in Wee Waa and Narrabri to the environmental implications of cotton production. The analysis in this chapter points to the important question: why has there been so little reaction in Wee Waa and Narrabri to cotton's environmental impact? How are the contrasting responses to cotton's environmental impact within different locations in the Namoi Valley to be accounted for? These issues should be investigated further.

While this chapter has examined the environmental implications of cotton in the Namoi Valley, the following chapter analyses the key social ramifications that cotton growing has had for the Namoi district.

²⁰⁸ Jo Immig, *Gunnedah: a community in crisis over pesticides*, Sydney: Total Environment Centre, May 1997.

CHAPTER SEVEN: THE SOCIAL IMPLICATIONS OF THE COTTON INDUSTRY IN THE NAMOI VALLEY

While the establishment and expansion of an irrigated cotton growing industry was reflected in changes to the Namoi Valley's landscape, cotton, too, had an enormous impact upon the region socially. During the decades since Paul Kahl and Frank Hadley grew their first irrigated crop of cotton near Wee Waa in 1961, the Namoi Valley has been altered substantially. Many of the social changes that have occurred in the Namoi Valley since that period were instigated by the introduction and proliferation of the practice of growing cotton crops under irrigation. The industrialised nature of the cotton mode of production that developed within the Namoi Valley has had significant social ramifications for that district. Cotton's progress in the Namoi Valley was, from the early 1960s, most pronounced in the small town of Wee Waa. This chapter examines a number of the key social implications that have arisen from the Namoi Valley's irrigated cotton growing industry. This chapter explores the housing shortage created by the arrival of American cotton farmers, and tensions between the American migrants and locals. This chapter highlights the issue of labour by examining the working and living conditions of seasonal cotton workers in the Namoi Valley during the 1960s and 1970s, and what led to those workers staging a strike in 1973. This chapter also explores the financial burden of industrialised agriculture through the subject of cotton growers' debt levels.

Impact in the Namoi Valley of the Migration of American Cotton Growers

The 1960s marked the years in which irrigated cotton production caused considerable social upheaval in the Namoi Valley. The first indication of the changes cotton farming would create came with the migration to the district of two Californians, Paul Kahl and Frank Hadley, in 1961. When the pair had initially inspected the Namoi Valley's cotton

growing prospects in that year, they had been welcomed by the district's Country Party representative, as well as members of the Namoi Valley Agricultural Development Council.¹ Kahl and Hadley's decision to move to the Namoi Valley attracted much attention both in the United States and Australia. During the four years that followed their move to the Namoi Valley, Kahl and Hadley were interviewed by 'the U.S. Saturday Evening Post, the Los Angeles Times, the Sun/Mirror in Sydney, ABC television and Movietone News.'² In the same period, the two American migrants were visited by Australian government officials and economists, and hosted 'afternoon tea for the NSW Governor, Sir Eric Woodward and his Lady and thirty two escorts'.³

While Frank Hadley and Paul Kahl's activities in the Namoi Valley drew media and government interest, they discovered that many locals viewed their plan to produce irrigated cotton with scepticism.⁴ Paul Kahl has suggested that the majority of Wee Waa residents were anticipating that the pair would fail financially with their cotton growing venture and return to the United States within two or three years of their arrival in Australia.⁵ It was perhaps not unexpected that some members of the local population would regard the two Americans' endeavours with a degree of scepticism, given that cotton growing at the beginning of the 1960s was virtually foreign to the Namoi Valley, where agricultural production was dominated by the grazing of sheep and cattle, and the raising of wheat crops.⁶ When that decade commenced, the production of cotton using irrigation water in the Namoi Valley was still experimental, and cotton had not yet become a component of the district's commercial agricultural sector. Apart from the

¹ Derera, 'Enthusiasm for cotton led to a new industry', p. 23; Kahl, 'Reflections at Sea', p. 25.

² Kahl, *Cotton Pickin' Pioneer*, p. 111.

³ Kahl, *Cotton Pickin' Pioneer*, pp. 100-109.

⁴ Kahl, 'Reflections at Sea', p. 26.

⁵ Kahl, *Cotton Pickin' Pioneer*, p. 97.

⁶ Hudson, 'Change: A cotton culture shock arrived in the 1960's', p. 153.

irrigated cotton growing trials that were being conducted by the Narrabri Agricultural Research Station, only two Australian farmers, Vic Melbourne and Frank Boyle, were growing cotton in the Namoi Valley at that stage, and they were doing so for the specific purpose of generating cotton seed for the Research Station.⁷ As more cotton growers from the United States followed Paul Kahl and Frank Hadley in relocating to the Namoi Valley during the early 1960s, it seems that the doubts of locals about the viability of growing cotton under irrigation dissipated. Some Namoi Valley farmers decided to emulate the American migrants' approach and they too sought licences for water from the Keepit Dam and began to grow cotton crops of their own. By the latter half of the 1960s, the number of Australian farmers growing cotton in the Namoi Valley was greater than the number of American migrants producing the fibre crop within that region.⁸

Although their techniques and style of irrigated cotton production were rapidly taken up by Namoi Valley farmers, many of the Americans drawn to the region by its cotton growing potential 'felt ostracised by the general community'.⁹ Tensions between the American cotton migrants and local residents soon became apparent. This friction was partially created by local resistance to the newcomers' 'systematic American schedule' and what was termed 'the American way of doing things'.¹⁰ One Wee Waa resident explained the discord of the early 1960s as a clash between the expectations and demands of the American migrants and the more casual approach adopted by locals:

Changes were in store as the eager bustling, thrusting "I need it YESTERDAY" Americans, anxious to establish their cotton properties, were faced with not only

⁷ McHugh, *Cottoning On*, p. 8.

⁸ Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', Table IV, p. 24.

⁹ Hudson, 'Change: A cotton culture shock arrived in the 1960's', p. 153.

¹⁰ Campbell, 'Twin Regions Break Farm Records: Namoi and New England Story', p. 81; Dunnet, 'The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972', p. 31.

the general “She’ll be right mate” Aussie, but the deeply entrenched conservativeness of a small, isolated country town.¹¹

The American farmers who relocated to grow cotton in the Namoi Valley may have been unprepared for the slow pace which tended to prevail in that part of New South Wales during the 1960s. The nonchalant conduct and attitude of Namoi Valley residents in that period was alluded to by Paul Kahl:

We never used the term “fortnight” in California but we certainly heard it here. Everything was to happen in a fortnight.¹²

As well as the dissimilitude in the manner and ways of the American farmers and Namoi Valley residents in the early 1960s, there were vast differences between existing farming practices in the district and the methods introduced by those who migrated from the United States.

Underpinning friction between locals and the Namoi Valley’s American cotton migrants in the first half of the 1960s was a contestation on the issue of farming methods. The rivalry that developed between these two groups was attributed by one author to ‘the attitude of the local landholders, long established in traditional types of landuse and resenting the initiative, drive and success of the newcomers.’¹³ It seems, however, that rancour and resentment was elicited from both the American migrants and the local residents. This was evident in Paul Kahl’s recollection that soon after he had moved to the Namoi district:

A couple of identities wanting to be helpful advised us that the property could not sustain four or five workers under Australian conditions. They did not realize that we were not going to be under Australian conditions.¹⁴

¹¹ Hudson, ‘Change: A cotton culture shock arrived in the 1960’s’, p. 153.

¹² Kahl, *Cotton Pickin’ Pioneer*, p. 98.

¹³ Pigram, ‘An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley’, p. 20.

¹⁴ Kahl, *Cotton Pickin’ Pioneer*, p. 97.

Such intimations about the innate superiority of American farming methods may have irked some landowners in the district. The familiarity of the American migrants with irrigated farming on an industrial scale certainly gave them a distinct advantage over Namoi Valley locals in producing intensive, irrigated cotton crops in that region. Nevertheless, resolute convictions regarding the supremacy of the cotton growing techniques developed in the United States proved on occasion to be inappropriate in the new surrounds of the Namoi Valley:

The American cotton grower ... was often puzzled, even amazed at some of the Australian ways of doing things. One prominent American grower, for example, after seeing the amateur efforts of two Australian farmers attempting to grow an experimental crop of cotton with short-cut methods, stated flatly that they would fail. He was wrong. It was he who found that he had to alter American methods to suit Australian conditions.¹⁵

Although a degree of rivalry and resentment existed between some Namoi Valley landholders and the migrants from the United States on the question of contrasting farming practices, there were other causes of the friction that was observed in the Namoi district during the 1960s. It appears that in many cases the tensions that emerged stemmed not from the insularity of Namoi Valley residents, but were the result of specific incidents and issues that involved the American cotton farmers.

Described as a 'focal point of animosity' between Australians and Americans within the Namoi Valley in the early 1960s, the founding of Auscott Pty Ltd by three American farmers, James Blasdell, Richard Rhodes and George Voll, in 1963 was exceptionally controversial.¹⁶ The establishment of the Auscott enterprise was contentious for a number of reasons, not least because it entailed the sale to foreigners of 7,354 acres of 'soldier-settlement' land that had been designated for use by returned Australian servicemen. In the period following the announcement by the New South

¹⁵ Dunnet, 'The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972', p. 31.

¹⁶ Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', p. 18.

Wales Deputy Premier, Jack Renshaw, that the state government was negotiating a ‘multi-million pound investment in Wee Waa-Narrabri district cotton growing by American interests’, considerable debate ensued on the issue within the local community.¹⁷ Jack Renshaw asserted that those who criticised the planned transfer of land to the three Americans:

...overlooked the impetus the Narrabri cotton project would give to local employment; [and] develop the area without calling on the State to provide capital and build an industry in an area which in the past has been very difficult to develop.¹⁸

In contrast to Renshaw’s view, the district’s Country Party member, Geoff Crawford, opposed the project on the basis of ‘fears that water rights available in connection with Keepit Dam storage would get into the hands of too few people.’¹⁹ Crawford also raised concerns about the level of secrecy that surrounded negotiations on the proposed American investment.²⁰

Geoff Crawford was rebuked by members of the Narrabri Municipal Council and the Namoi Valley Agricultural Development Council for expressing his misgivings about the American project.²¹ The Agricultural Development Council sent ‘a telegram of protest’ to Crawford and indicated its support for Deputy Premier Renshaw in his efforts to conclude the land deal with the three Americans.²² Similarly, the Narrabri Municipal Council was unanimously in favour of the American project, with one councillor, Alderman Delaney, stating:

¹⁷ ‘American cotton interests: Multi-Million Pound Investment in Wee Waa-Narrabri Area Expected’, *The North Western Courier*, 6 May 1963, p. 2.

¹⁸ ‘Extraordinary Measures Taken to Up-Set Cotton Farming Project’, *The North Western Courier*, 6 June 1963, p. 1.

¹⁹ ‘Vital Issue in District Progress’, *The North Western Courier*, 16 May 1963, p. 1.

²⁰ ‘Member Replies to N.V.A.D.C. Statement’, *The North Western Courier*, 27 May 1963, p. 1.

²¹ ‘Vital Issue in District Progress’, *The North Western Courier*, 16 May 1963, p. 1.

²² ‘Cotton controversy’, *The North Western Courier*, 20 May 1963, p. 1; ‘Vital Issue in District Progress’, *The North Western Courier*, 16 May 1963, p. 1.

We are all materially interested in the development of this area, and would certainly hate to see a £2,000,000 investment lost to this district.²³

The proposed American venture was discussed and debated in formal meetings of the Narrabri Municipal Council, and was the subject of a number of public meetings called by Geoff Crawford and the Namoi Valley Agricultural Development Council.²⁴

Although the planned project was championed by the Deputy Premier, the Municipal Council and the Agricultural Development Council, the issue created significant divisions amongst local residents. At a public meeting of 600 people in the Narrabri Town Hall in June 1963, a motion for the state government to conduct an urgent review of the land deal was supported by 208 of those in attendance, while 104 rejected the move.²⁵ The letters to the editor of the Narrabri-based *North Western Courier* reflected divergent local opinions on the matter. In reference to Geoff Crawford's opposition to the project, one local, vowing never to vote for the Country Party again, wrote:

I suppose we can await with interest the next move by the Country Party to kick Narrabri and private enterprise in the vitals if they miss out in this round on the cotton development proposals.²⁶

Another citizen of the district questioned the motives of those members of the Namoi Valley Agricultural Development Council who were so adamant in the endorsement of the American cotton farming venture:

The N.V.D.C. is right behind this scheme, and I believe the majority of members are Narrabri businessmen who believe that their sales will take a steep rise, but I believe this is a false hope...²⁷

²³ 'Vital Issue in District Progress', *The North Western Courier*, 16 May 1963, p. 1.

²⁴ 'Vital Issue in District Progress', *The North Western Courier*, 16 May 1963, p. 1; "'Boom town" forecast if project succeeds', *The North Western Courier*, 13 June 1963, p. 1; 'Hip & Thigh', *The Namoi Valley Echo*, 14 June 1963, p. 1.

²⁵ 'No Action Over Cotton Request', *The North Western Courier*, 11 July 1963, p. 1.

²⁶ Just A Voter, 'Disillusioned', Letter to the Editor, *The North Western Courier*, 6 June 1963, p. 2.

²⁷ W. Price, 'Cotton controversy', Letter to the Editor, *The North Western Courier*, 20 June 1963, p. 2.

Regardless of the reservations of some in the Namoi Valley, the state Labor government gave its assent to the land deal in June 1963, and approval of water licence applications for the project followed in August of that year.²⁸ However, the schism that had emerged amongst locals during negotiations for the founding of Auscott Pty Ltd was not immediately resolved with the government's final approval of the enterprise.²⁹

The controversy regarding the creation of the three Americans' Auscott venture brought to the fore the question of access to water from the Keepit Dam. While the establishment of Auscott Pty Ltd on soldier-settler land provoked debate and disagreement amongst Namoi Valley residents, the large number of water licence applications pertaining to Auscott's acreage was no less contentious.³⁰ In the early 1960s, the water licences issued in relation to the Keepit Dam permitted a licence holder to irrigate a 400-acre area of land. With the American founders of Auscott Pty Ltd, Richard Rhodes, James Blasdell and George Voll acquiring more than 7,000 acres for the purpose of irrigated cotton production, they were not content with the prospect of being able to irrigate only a relatively small portion of their land. To evade this constraint, a total of twenty water licence applications were lodged in relation to Auscott's farming land in the Namoi Valley during 1963.³¹ Rhodes, Blasdell and Voll accounted for three of these applications, but the remaining seventeen applications were lodged by 'dummy lessees'. The seventeen applicants were primarily city-dwelling Australians, including an accountant and car salesman. Each of the twenty Auscott

²⁸ 'Ministerial Seal for £1½ Million Cotton Project', *The North Western Courier*, 17 June 1963, p. 1; 'Water Licence Approved for Large Cotton Project', *The North Western Courier*, 12 August 1963, p. 1.

²⁹ Dunnet, 'The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972', p. 34.

³⁰ 'Vital Issue in District Progress', *The North Western Courier*, 16 May 1963, p. 1.

³¹ 'Water Act, 1912-1955', *The Namoi Valley Echo*, 26 July 1963, p. 1.

water licence applications was approved, despite the submission of ten formal objections to the granting of the licences.³²

Although ultimately assented to, Auscott's application for twenty water licences, and the disputation that it caused, served to highlight the issue of the limits of the Keepit Dam's water supply. The Keepit Dam was never posited as a boundless resource, but the allocation to Auscott of considerable water rights raised doubts about how much water would be available to others in the district. The local Country Party member, Geoff Crawford, asserted:

Now either the Government intends to allow cotton growers to use more water than was originally intended and thus deprive riparian land holders of ever having the opportunity of securing a pumping licence, or there will be more water available than was originally stated.³³

As Crawford had surmised, the water stored in the Keepit Dam was rapidly monopolised by farmers who were producing cotton crops under irrigation. Approximately 80 per cent of the water from the Keepit reservoir was being used by farmers of irrigated cotton by 1965.³⁴ The Keepit Dam had been constructed to supplement the region's artesian water supply; it had never been intended to foster an irrigated cotton growing industry. However, once American cotton farmers began to migrate to the Namoi Valley, the New South Wales government was determined to support cotton growing within the state. The Deputy Premier, Jack Renshaw, championed the formation of the Namoi Cotton Co-operative, and the founding of Auscott Pty Ltd, and also used his influence to persuade the state government to guarantee a loan that enabled the Co-operative to purchase its first cotton gin.³⁵

³² 'Water Licence Approved for Large Cotton Project', *The North Western Courier*, 12 August 1963, p. 1.

³³ G.R. Crawford, 'Cotton Seed Supplies', Letter to the Editor, *The North Western Courier*, 16 November 1963, p. 2.

³⁴ McHugh, *Cottoning On*, p. 27.

³⁵ Kahl, 'Reflections at Sea', pp. 27-28; 'American cotton interests: Multi-Million Pound Investment in Wee Waa-Narrabri Area Expected', *The North Western Courier*, 6 May 1963, p. 2.

The desire to encourage cotton production in the Namoi Valley was reflected in the way the Keepit Dam's water supply was being allocated in the 1960s. The over-allocation of water from the reservoir through the provision of too many water licenses indicated a reluctance to curb the irrigation development that was occurring in the district during that decade. In apportioning the Keepit Dam's water supply, cotton production had become the priority. Myles MacRae, a Water Rights Officer with the New South Wales Water Conservation and Irrigation Commission, explained of his time working in the Namoi Valley during the 1960s:

I was only looking to try to service the cotton-growers and I didn't really have much interest or much thought in the health of the river downstream. Because historically the Namoi used to go dry in the lower reaches pre-Keepit Dam days, so my sort of thoughts, I guess, if I had any at all, were, 'well, it used to go dry before, if it's a bit dry for a few days now, they're still better off than they were.' But there were a whole lot of people downstream... that didn't have the same philosophies about this as I did.³⁶

The distribution of irrigation water in this manner caused some tension, and competition over access to artesian water emerged between cotton growers and Namoi Valley graziers in the 1960s.³⁷ Some Namoi Valley residents were disgruntled by the monopolisation of water by the American cotton farmers in particular, but it was claimed that their discontent was 'lost in the Namoi's general appreciation of the American effort to grow cotton at Wee Waa.'³⁸

As with the issue of water rights, the demands of the Namoi Valley's American cotton migrants for access to high-yielding cotton strains proved contentious in the first years of the 1960s. There exist numerous varieties of cotton throughout the world that produce a diversity of staple-lengths and differing qualities of cotton fibre. It was only in 1962 that Miller, a cotton variety which had dominated cotton growing in Australia

³⁶ Myles MacRae, quoted in McHugh, *Cottoning On*, p. 27.

³⁷ McHugh, *Cottoning On*, p. 28.

³⁸ Campbell, 'Twin Regions Break Farm Records: Namoi and New England Story', p. 81.

from the mid-1930s, ceased to be the nation's principal breed of cotton.³⁹ Within the Namoi Valley in the early 1960s, the most common type of cotton planted was a variety known as Empire. A number of the Namoi district's prominent American growers were dissatisfied with the results of Empire cotton crops. Paul Kahl claimed that the yield produced by an American variety from the Delta Pine and Land Company exceeded the Empire yield by more than 30 per cent.⁴⁰ Australia's quarantine laws meant, however, that American cotton seed could not simply be imported and sown immediately. The imported seed had to be subjected to testing to ensure that it was free from disease, a procedure that took time to execute.

While American cotton seed could not be readily obtained in the Namoi Valley during the early 1960s, the quality of the seed that was available was strongly criticised by Auscott's James Blasdell. Blasdell explained, "We are anxious to get better varieties here quickly because the economies of large-scale production demand it."⁴¹ The most effective method for James Blasdell and other Namoi Valley cotton growers to increase their financial returns was to produce greater quantities of lint via higher yielding cotton plants, while at the same time maintaining the quality of the fibre produced. Blasdell's complaints about Australia's quarantine procedures prompted a public response from the local Country Party representative, Geoff Crawford. Crawford wrote to a Namoi Valley newspaper and offered a rebuke to Blasdell by emphasising that quarantine protocols had protected the nation from numerous pests and diseases.⁴² Nonetheless, imported American cotton seed varieties were made available to growers in the Namoi Valley by 1964. Once the Delta Pine breed became available in Australia in that year, it

³⁹ Basinski, 'The Cotton Growing Industry in Australia', p. 216.

⁴⁰ Kahl, 'Reflections at Sea', p. 29.

⁴¹ "'Bigness' Underlined in Cotton Projects', *The North Western Courier Feature Supplement*, 18 November 1963, p. 6.

⁴² G.R. Crawford, 'Cotton Seed Supplies', Letter to the Editor, *The North Western Courier*, 16 November 1963, p. 2.

dominated plantings of cotton within the Namoi district. From 1964 to 1967, the Delta Pine variety accounted for between 89 and 99 per cent of all of the cotton that was sown in the Namoi district.⁴³

According to Frank Hadley, the difference in the yield from Empire and Delta Pine cottonseed was stark. The Delta Pine variety was estimated to have delivered two and a quarter bales per hectare of cotton fibre, whereas the Empire yield had been restricted to only one and a half bales per hectare.⁴⁴ In the years before United States' cotton breeds were made available in Australia, however, some of the Namoi Valley's American migrants resorted to controversial means in order to obtain seed from the US. At least one of the Namoi district's American farmers was arrested in the early 1960s for attempting to smuggle a US variety of cotton seed into Australia.⁴⁵ The exact circumstances of the incident remain unclear:

One story goes that an American flew in with a bag of seed concealed around his waist. A Customs Officer noticed the trail that dribbled from his trousers when the bag burst.⁴⁶

It seems that other smuggled supplies of United States' cotton strains went undetected by Australian quarantine measures, as Paul Kahl has attested that some of the cotton seed sown in the initial years of cotton production in the Namoi Valley had been illegally imported.⁴⁷ This practice was defended by Kahl, who maintained that diseases potentially born by the smuggled American cotton seed were already present in soils in Australia.⁴⁸ Paul Kahl claimed that in 1961, in accordance with Australia's quarantine

⁴³ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 24.

⁴⁴ Matt Deans, 'Farming foresight', *The Northern Daily Leader*, 4 June 2005, p. 22.

⁴⁵ Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', pp. 19-20.

⁴⁶ McHugh, *Cottoning On*, p. 19.

⁴⁷ Kahl, 'Reflections at Sea', p. 29.

⁴⁸ Kahl, 'Reflections at Sea', p. 29.

guidelines, he submitted some imported American cotton seed to the New South Wales Department of Agriculture for disease testing. Kahl alleges that the Department of Agriculture ‘stole’ his American seed as part of an agenda to further the growing of cotton in southern New South Wales and to discourage it in the Namoi Valley.⁴⁹ The perceived disadvantage Namoi Valley cotton growers experienced in regard to obtaining cotton seed was, Paul Kahl argues, justification for the illegal smuggling of American seed:

...Queensland imported some bags of seed from US sources and passed it out to its growers for trial without previous testing. It had now become apparent that politics had taken over. Queensland in the north and Yanco in the south had import privileges denied to us. Therefore, as far as our area was concerned the door was opened. A large part of the 1962 planting was of good seed. After 1962 all of the acreage had good seed from the United States. The seed illegally brought into NSW was acid delinted and heat treated. We had not been advised of any problems relating to the seed that was stolen.⁵⁰

The willingness of some of the Namoi Valley’s American migrants to flout Australian quarantine laws by smuggling cotton seed demonstrated a resolve to recreate Californian-style cotton production no matter what the consequences.

The single-minded approach exhibited at times by a number of the Americans, particularly in the haste to establish their cotton properties in the early 1960s, did little to forge cordial relations with others who were resident in the Namoi Valley. One Wee Waa local expressed her frustration about the American farmers’ ‘high-handedness and blatant disregard for the rights of others’ after a deep trench was dug through a public road to drain a flooded cotton field, rendering the road impassable.⁵¹ Similar incidents created tension between locals and the newly-arrived Americans:

Ill-feeling has been nurtured by thoughtless and selfish actions, particularly on the part of American cotton farmers. Examples include: bulldozing of

⁴⁹ Kahl, *Cotton Pickin’ Pioneer*, p. 99; Kahl, ‘Reflections at Sea’, p. 29.

⁵⁰ Kahl, *Cotton Pickin’ Pioneer*, p. 99.

⁵¹ Olive Maxwell, ‘Old Australian customs’, Letter to the Editor, *The North Western Courier*, 4 July 1963, p. 2.

community telephone lines which obstructed cotton fields; blocking stock routes and roads with water supply channels; erecting unauthorised weirs across creeks; allowing escaping tailwater to flood neighbouring properties and access roads; ignoring summer fire bans...⁵²

Amongst these examples, the preponderance of problems related to the supply, delivery and use of irrigation water is illuminating.

For Namoi Valley farmers in the early 1960s, the implications of the introduction of irrigated cotton production were quite significant. It was not simply a question of locals adjusting to the seemingly brash manner of the American migrants and their unfamiliar irrigated farming techniques. The growing of cotton under irrigation had the potential to materially affect other farmers in the district in times of flood. The construction of irrigation infrastructure on cotton farms could have serious consequences for neighbouring properties during flooding, especially if those properties were carrying grazing animals that could be washed away or drowned:

The issue exacerbated tensions between the long-established graziers and dry-land farmers and the newly arrived irrigators. In the past, landholders had had no need to protect their properties from floodwater, which they mostly considered beneficial, since it increased the productivity of the land. But the levees and banks erected by the irrigators altered the course, depth and velocity of the floodwaters. And if the hastily erected banks gave way, the results could be disastrous.⁵³

The impact of irrigation earthworks on nearby properties during floods emerged as a source of conflict and tension between the American migrants and some Namoi Valley farmers. While this and other issues involving the activities of the American cotton growers became problematic in the initial years of the 1960s, a number of the American newcomers were mindful that their presence in the Namoi Valley was not viewed by locals as being entirely favourable.

⁵² Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', p. 21.

⁵³ McHugh, *Cottoning On*, p. 37.

When Paul Kahl first demonstrated an interest in the Namoi Valley, the Narrabri Agricultural Research Station's Hungarian agronomist, Nick Derera, had cautioned that he may encounter some resistance, as local farmers were 'not accustomed to intensive farming.'⁵⁴ Perhaps with Derera's caution in mind, Paul Kahl and Frank Hadley initiated what could be viewed as a 'cultural offensive' in the first years of cotton growing within the Namoi district. The two Merced farmers, in conjunction with the Department of Agriculture and the Narrabri Agricultural Research Station, held a cotton field day at 'Glencoe' in April 1962 during their first cotton harvest in the Namoi Valley.⁵⁵ Ostensibly a practical demonstration and forum on cotton growing, the field day was intended to encourage residents of the Namoi region to undertake the cultivation of cotton. Catered by the Wee Waa Country Women's Association, and with the Minister for Agriculture, A.G. Enticknap, and more than 1,000 people in attendance, the 'Glencoe' field day represented the first opportunity in the Namoi Valley for the unfamiliar practice of irrigated cotton production to be fused with a community event.⁵⁶ During the field day, Paul Kahl emphasised the need for a co-operative ginnery to be established in close proximity to where the cotton crop is grown, and the economic benefit such an enterprise would bring to the region.⁵⁷ Paul Kahl, when recalling some years later the demands he and Frank Hadley had outlined before deciding to settle in the Namoi Valley, emphasised that, if their efforts to produce cotton were successful, 'we would need a gin, which meant more people would have to

⁵⁴ McHugh, *Cottoning On*, p. 7.

⁵⁵ 'Cotton field day draws big crowd', *The North Western Courier*, 3 May 1962, p. 1.

⁵⁶ 'State-wide interest in Cotton Field Day', *The North Western Courier*, 24 April 1962, p. 1; 'Cotton field day draws big crowd', *The North Western Courier*, 3 May 1962, p. 1.

⁵⁷ 'Facts and Figures of the Glencoe Crop', *The North Western Courier*, 10 May 1962, p. 13. For further details of the events of the field day see: 'Cotton Day: Future promise', *The Namoi Valley Echo*, 4 May 1962; 'Cotton Interest: Field day boom', *The Namoi Valley Echo*, 27 April 1962; 'Cotton Field Day: Widespread interest', *The Namoi Valley Echo*, 19 April 1962; 'Keen Interest', *The Namoi Valley Echo*, 13 April 1962.

follow us in growing cotton.’⁵⁸ Through the ‘Glencoe’ field day, an interest in cotton growing was fostered among the residents of the Namoi Valley, a number of whom would soon join the Americans in the cultivation of cotton.

The American influence upon the town of Wee Waa was not only evidenced by the appearance of American canned foods on the shelves of the grocery store, or the availability of bourbon at the local pubs by 1964.⁵⁹ The staging of a ‘Festival of Cotton’ in Wee Waa during May 1964 represented an intensification of the American cultural offensive upon the Namoi Valley at large. The stated purpose of the festival was to ‘promote Wee Waa and District, and the production of cotton and its by-products.’⁶⁰ The 1964 Festival of Cotton attempted, on a smaller scale, to replicate the United States’ annual ‘Cotton Carnival’. While a ‘King’ and ‘Queen’ of cotton officially open the US Cotton Carnival, a competition was staged in Wee Waa to select a ‘Cotton Countess’ who would act as an ambassadress for the Namoi district.⁶¹ The Festival of Cotton included American flags, a parade of cotton-themed floats and cotton fashions, emulating the American Cotton Carnival.⁶² The Namoi Valley festival also comprised ‘church thanksgiving services, cotton-picking contests, tours of cotton farms, cotton shop-window displays, and a street stomp for the teenagers.’⁶³ A number of the featured events had received sponsorship from large multinational corporations. The

⁵⁸ ‘Think Kahl, think cotton: Kahl and Hadley cotton pioneers’, *The North Western Courier, Special Edition: A Decade of Cotton*, June 1973, p. 14.

⁵⁹ Wallace Crouch, ‘BOOM! Cotton hits placid town of Wee Waa’, *The Daily Telegraph*, 25 May 1964, p. 16.

⁶⁰ ‘Cotton Festival: Purposes outlined’, *The Namoi Valley Echo*, 20 December 1963.

⁶¹ ‘Cotton Carnival Time in the U.S.’, *The North Western Courier: Cotton Feature Supplement*, 18 November 1963, p. 3; ‘Crowds Line Street for Festival Procession’, *The North Western Courier*, 25 May 1964, p. 1; and ‘Miss Patricia Constable: Our First Countess of Cotton’, *The Namoi Valley Echo*, 29 May 1964.

⁶² ‘Cotton Festival: Purposes outlined’, *The Namoi Valley Echo*, 20 December 1963; ‘Cotton Carnival Time in the U.S.’, *The North Western Courier: Cotton Feature Supplement*, 18 November 1963, p. 3; and ‘Crowds Line Street for Festival Procession’, *The North Western Courier*, 25 May 1964, p. 1.

⁶³ Wallace Crouch, ‘BOOM! Cotton hits placid town of Wee Waa’, *The Daily Telegraph*, 25 May 1964, p. 16.

tour by the Cotton Countess of Sydney, Brisbane and Melbourne was partly funded by John Deere, while a donation to the festival was received from the Continental Gin Company, Alabama.⁶⁴ Shell Chemicals sponsored an essay competition for children on the subject of 'The Importance of Cotton to the Wee Waa District'.⁶⁵

From the 'Glencoe' field day to the Festival of Cotton, Paul Kahl was prominent during the early years of the American cultural assault on the Namoi district. At the opening of the Namoi Cotton Co-operative's first gin in May 1963, Kahl was shrewd in acknowledging the efforts of both American and Australian cotton growers in establishing the cotton industry within the Namoi region. He received praise from a Namoi Valley newspaper, which noted that Kahl's 'was the only reference to local interests' made during the official ceremony.⁶⁶ When a Sydney newspaper's feature on the Festival of Cotton provoked indignation among some Namoi Valley residents, Paul Kahl joined them in condemning the article. A report in the *Daily Telegraph* had suggested that, before the arrival of American cotton growers, the Wee Waa district had been 'dying on its feet.'⁶⁷ The article apparently incited a 'wealth of protest' from Namoi Valley residents to a local newspaper.⁶⁸ Paul Kahl asserted that he and the other members of the Namoi Cotton Co-operative were 'greatly disturbed' by the *Daily Telegraph* report and he defended the town of Wee Waa and its 'flourishing livestock, wheat and wool industry'.⁶⁹ The report, Kahl argued, did not assist in the development

⁶⁴ 'Festival Plans: Cottoning-on', *The Namoi Valley Echo*, 13 March 1964.

⁶⁵ 'Essay on Cotton: For the young', *The Namoi Valley Echo*, 10 April 1964; 'Festival Plans: Cottoning-on', *The Namoi Valley Echo*, 13 March 1964.

⁶⁶ 'International', *The Namoi Valley Echo*, 10 May 1963.

⁶⁷ See Wallace Crouch, 'BOOM! Cotton hits placid town of Wee Waa', *The Daily Telegraph*, 25 May 1964, p. 16.

⁶⁸ See Editor's note, following 'Hostile reaction to Sydney article', *The Namoi Valley Echo*, 5 June 1964.

⁶⁹ Paul S. Kahl, President, Namoi Cotton Co-operative Ltd, 'Misleading Article', Letters to the Editor, *The North Western Courier*, 1 June 1964, p. 3.

of a 'friendly relationship between Australian residents and immigrating Americans', which was one of the objectives of the Festival of Cotton.⁷⁰

The presence of American migrants in the Namoi Valley, although often conspicuous, was merely one element of the social impact of cotton upon the region. Arguably, the influence of the district's irrigated cotton growing industry was most obviously reflected in the rapid rise in the population of Wee Waa which occurred during the 1960s. Before the development of cotton growing under irrigation, the number of inhabitants within the small town:

...had remained virtually unchanged since 1947 and there appeared to be little prospect of its growing any larger. Wee Waa was a service centre for the surrounding pastoral area where the agricultural system and the production from it had become stabilized. The rural population was decreasing and, consequently, the flow of goods and services through and from Wee Waa remained static or tended to decline. The growing mobility of the rural population also resulted in the farming population's looking to the bigger centre of Narrabri in preference to Wee Waa for many of the retail supplies required for both the farm operations and the farming households.⁷¹

The establishment of cotton production transformed the town of Wee Waa within a matter of years, alleviating the stagnation that had persisted since the conclusion of the Second World War. Wee Waa in 1961 comprised a population of 1,075.⁷² By 1966, the town's population had swelled to 1,492.⁷³ The migration of American farmers undoubtedly accounted for a portion of this population increase, but their numbers were not as extensive as may have been expected. It was estimated that American cotton

⁷⁰ Paul S. Kahl, President, Namoi Cotton Co-operative Ltd, 'Misleading Article', Letters to the Editor, *The North Western Courier*, 1 June 1964, p. 3.

⁷¹ Irwin, *Cotton Systems of the Namoi Valley*, p. 34.

⁷² Pigram, *The Development and Potential of the Namoi Valley Cotton Industry*, p. 17.

⁷³ J.C.R. Camm and P.G. Irwin, 'Cotton Seed Processing at Narrabri, N.S.W.: Locational Considerations', *The Australian Geographer*, Vol. XI, No. 6, 1971, p. 602.

growers constituted little more than ten per cent of Wee Waa's total population in 1966.⁷⁴

While the American cotton farmers who settled near Wee Waa represented a small group numerically, they were, nonetheless, critical to the transformation that occurred within the Namoi Valley during the 1960s. The first of the district's American cotton migrants, Paul Kahl and Frank Hadley, found commercial success with irrigated cotton production from 1961. Their achievements encouraged other American nationals to relocate to the Namoi Valley, and also motivated local Australian farmers to begin producing the fibre crop. However, it was the style of cotton production that the American farmers adhered to which accounts for the significant increase in Wee Waa's population that took place in the 1960s. The industrialised mode of cotton production established by the Americans in the Namoi Valley entailed the use of cotton seed, heavy machinery, and chemicals including insecticides, herbicides, defoliant and fertilisers. The American cotton migrants' demands for these types of goods necessitated the creation of businesses to supply such products locally. A substantial cotton service industry eventuated in Wee Waa and, along with chemical and machinery retailers, it was made up of cotton processing firms, including Auscott Pty Ltd and the Namoi Cotton Co-operative, and the cotton seed supplier, Cotton Seed Distributors. Irrigated cotton production both created new businesses in Wee Waa and prompted the growth of many of the town's established enterprises within the decade of the 1960s:

...a number of other services (retail stores, stock and station agencies, accounting services, banking facilities, hotels and cafes, medical and hospital services and carrying services) which were in existence prior to 1961 also expanded their activities. Since 1961 the range of services has increased, mostly as a direct consequence of the cotton development. Three oil companies established depots from which petroleum products are distributed. ... Three earth-moving contractors, four aerial spraying contractors, four machinery

⁷⁴ McHugh, *Cottoning On*, p. 21. McHugh suggests that the population of Wee Waa in 1966 was 1,200 while other authors cite the figure of 1,492 from the 1966 census. The discrepancy in relation to the population figure may mean that the estimated percentage of American cotton growers in Wee Waa is inaccurate.

distributors, three chemical supply firms and one engineering firm have established businesses in Wee Waa to cater primarily for the needs of the cotton growers.⁷⁵

Labour, skilled, unskilled and semi-skilled, was attracted to the region to work on the growing number of Namoi Valley cotton farms and to staff these new firms. The population of Wee Waa was enlarged not by an overwhelming migration of farmers from the United States, but by ‘the influx of rural workers and town workers into the district following development of the cotton industry.’⁷⁶

A population surge of almost 40 per cent between the years of 1961 and 1966 had an enormous effect on the small community of Wee Waa. The increase in the number of residents within the town created a shortage of housing almost immediately. Before irrigated cotton production was introduced, the steadiness of Wee Waa’s population had meant that little new housing was required. The eighth Housing Commission residence had been completed in Wee Waa in 1956, for instance, but ‘demand in the town did not warrant any further building’ until 1962, ‘when two houses were put under way.’⁷⁷ By January 1963, the intensified need for housing in Wee Waa prompted the Housing Commission to secure land within the town for the construction of ten additional homes.⁷⁸ As well as the commencement of these Housing Commission building projects in Wee Waa, a growing number of applications for private subdivisions within the town were being heard before the local council.⁷⁹ By 1967, the construction of homes in Wee Waa by both private capital and the Housing Commission had expanded:

⁷⁵ Irwin, *Cotton Systems of the Namoi Valley*, p. 38.

⁷⁶ ‘Town Progress Leads to Housing Problems in Wee Waa’, *The North Western Courier*, 7 November 1963, p. 7.

⁷⁷ ‘Housing Demand: On the increase’, *The Namoi Valley Echo*, 21 December 1962, p. 1.

⁷⁸ ‘Housing Land: Ten home sites’, *The Namoi Valley Echo*, 25 January 1963, p. 1.

⁷⁹ ‘Town Progress Leads to Housing Problems in Wee Waa’, *The North Western Courier*, 7 November 1963, p. 7.

Since 1961 the Housing Commission has built 49 homes at Wee Waa, while privately-constructed houses number 72, plus 5 blocks of flats. In addition, public and private expenditure on buildings other than dwellings in Wee Waa totalled \$3.5 million.⁸⁰

The introduction of irrigated cotton growing was recognised as the impetus for much of the development and construction that transpired within the Namoi Valley in the 1960s.⁸¹ This fact led Country Party representative, Geoff Crawford, to request on behalf of the Namoi Cotton Co-operative and the local council that the Housing Commission grant a 'special allocation of 30 cottages in Wee Waa for cotton industry employees.'⁸² The suggestion that cotton workers should receive priority amongst public housing applicants in Wee Waa was rejected in 1964 by the Minister for Housing, Mr A. Landa, who asserted that the nature of an applicant's employment could not take precedence over those with a longer standing claim.⁸³ While this attempt to secure public housing for employees of the local cotton growing industry was rebuffed, the influence of cotton on the district intensified as the industry grew.

The impact of the emergence of irrigated cotton production in the Namoi Valley was not confined to the rising demand for housing and the increasing size of the population in the town of Wee Waa during the 1960s. At the beginning of that decade, Wee Waa had lacked a number of basic facilities. In 1960, residents of the town were being charged an annual fee for the 'removal and disposal of nightsoil', as the settlement had no sewerage system.⁸⁴ At that time, too, Wee Waa had no town water supply; the majority of the streets were unsealed and most were devoid of guttering and

⁸⁰ Pigram, 'An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley', p. 17.

⁸¹ '£2m. Building Programme in District', *The North Western Courier*, 19 March 1964, p. 1.

⁸² 'No Special Housing for Cotton Workers', *The North Western Courier*, 30 April 1964, p. 2.

⁸³ 'No Special Housing for Cotton Workers', *The North Western Courier*, 30 April 1964, p. 2.

⁸⁴ 'Shire of Namoi: Estimates of Income and Expenditure for the year 1960', *The Namoi Valley Echo*, 29 January 1960, p. 1.

kerbing.⁸⁵ The nearby, larger town of Narrabri was described as unattractive, with a pattern of development that was scattered and sprawling.⁸⁶

The expansion and success of the cotton growing industry in the vicinity of these two towns, however, brought a degree of prosperity to the district. By the early 1970s, Wee Waa had sewerage, a town water supply and, although only half of the township had kerbing and guttering, all of the roads within the town limits were sealed.⁸⁷ In Narrabri, the development of the cotton industry saw many local businesses undertake ‘modernisation and extensions to their establishments’.⁸⁸ Like Wee Waa, Narrabri experienced a population increase as a result of the establishment of cotton production. The population of Narrabri numbered 5,423 in 1961 but by 1966 this had risen to 5,953.⁸⁹ Many employees of the new agricultural industry made Narrabri their home and travelled daily to work in Wee Waa or on cotton properties within the district.⁹⁰ In Wee Waa, the growing prosperity from cotton production also led to the improvement of a range of amenities during the 1960s:

The bowling club has built new greens and a clubhouse; the golf club has an eighteen hole course and grass greens where previously it had a nine hole course with sand greens; a new golf clubhouse was completed in 1969; a new 33 metre swimming pool was built in 1964; and in 1965 a clubhouse was built for the tennis club, which has six courts.⁹¹

As well as the upgrading of these recreational facilities, the emergence of cotton growing in the region had an impact upon religious engagement within the town of Wee

⁸⁵ Irwin, *Cotton Systems of the Namoi Valley*, p. 40.

⁸⁶ Dunnet, ‘The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972’, p. 40.

⁸⁷ Irwin, *Cotton Systems of the Namoi Valley*, p. 40.

⁸⁸ ‘£2m. Building Programme in District’, *The North Western Courier*, 19 March 1964, p. 1.

⁸⁹ Pigram, ‘An Investigation of the Development and Potential of the Cotton Industry in the Namoi Valley’, p. 16.

⁹⁰ Dunnet, ‘The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972’, p. 35; Irwin, *Cotton Systems of the Namoi Valley*, p. 43.

⁹¹ Irwin, *Cotton Systems of the Namoi Valley*, pp. 39-40.

Waa. Many of the district's American migrants were Protestants who became active members of the Wee Waa Presbyterian Church. This American involvement resulted in a considerable injection of funds:

Since 1962, the congregation has constructed a hall and classroom complex at a cost of more than \$60,000 and plans were prepared in 1972 for a new \$70,000 church.⁹²

While the establishment of cotton growing resulted in Wee Waa experiencing a population upsurge, housing boom and various improvements to its religious and recreational amenities, these changes and the sudden population increase in particular placed considerable strain upon some local services and infrastructure.

By the beginning of the 1970s, the Wee Waa Central School's body of students had expanded by 172 per cent, increasing from 214 students in 1960 to 583 in 1970.⁹³ The bulk of this increase in enrolments took place within just three years.⁹⁴ Although the practice of transporting students from outlying areas in school buses accounted for a portion of this enrolment increase, it seems that the rise in numbers stemmed principally from the establishment of the cotton growing industry.⁹⁵ The intensified demand for places in schools in Wee Waa led to facilities being 'greatly expanded'.⁹⁶ As cotton increased the number of students at local schools, the heavy machinery used to produce the fibre crop took a toll on the district's predominantly dirt roads.⁹⁷ This created a rise in demands for the Shire Council to improve black-soil roads used to access a number of cotton farms in the region.⁹⁸ Railway services in the district were strained by the

⁹² Dunnet, 'The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972', p. 36.

⁹³ Irwin, *Cotton Systems of the Namoi Valley*, p. 36.

⁹⁴ Greenland, 'Cotton Farming under irrigation', p. 4.

⁹⁵ Irwin, *Cotton Systems of the Namoi Valley*, p. 37.

⁹⁶ Dunnet, 'The Impact of the Irrigation Industry in the Namoi Valley, 1962-1972', p. 39.

⁹⁷ Greenland, 'Cotton Farming under irrigation', p. 4.

⁹⁸ 'Extra amenities required in cotton growing areas', *The North Western Courier*, 19 December 1963, p. 1.

pressures to deliver equipment, and the goods sheds at Narrabri were described as being congested.⁹⁹ The local electricity supply was also strained by cotton's power consumption, particularly in relation to the energy required for the operation of cotton gins and irrigation pumps.¹⁰⁰ These infrastructure problems of the 1960s were soon overcome through the expansion of services and facilities.

Although irrigated cotton production was instrumental in the development of the Namoi Valley, causing a rise in local trade, population levels and housing construction, the emergence of the cotton industry created a demand for labour that was principally seasonal. In 1964, local branches of the Returned Servicemen's League claimed that unemployed ex-servicemen and their families were seeking financial help from the RSL after 'being "lured to cotton areas" by promise of "non-existent jobs."' ¹⁰¹ It was alleged that, when a period of wet weather had arisen and restricted farming operations in the Namoi Valley, cotton growers had responded by dismissing their workers. This claim was refuted by one cotton farmer, who stated that his employees 'had not "been turned loose," but given rations and shelter.' ¹⁰² While the precarious nature of seasonal employment in the cotton industry was highlighted by this disagreement between the RSL and some Namoi Valley cotton growers, the living conditions of itinerant cotton workers would emerge as a far more inflammatory issue.

⁹⁹ '£2m. Building Programme in District', *The North Western Courier*, 19 March 1964, p. 1.

¹⁰⁰ H.G. Wickham, County Clerk, Namoi Valley County Council, 'The power factor: N.V.C.C. Plans to Progress with District Development', *The North Western Courier Cotton Feature*, 21 May 1964, p. 4; 'NVCC Adopts New Policy for Rural Industries', *The North Western Courier*, 25 June 1964, p. 1; 'Extra amenities required in cotton growing areas', *The North Western Courier*, 19 December 1963, p. 1.

¹⁰¹ 'Jobs Still not Filled Growers Claim', *The North Western Courier*, 6 February 1964, p. 1.

¹⁰² 'Jobs Still not Filled Growers Claim', *The North Western Courier*, 6 February 1964, p. 1.

Housing Shortages and Itinerant Cotton Workers' Camps

The expansion of the cotton growing industry in the early 1960s had created a housing shortage and an upsurge in the building of homes in the town of Wee Waa.¹⁰³ On cotton farms within the Namoi Valley, the construction of additional housing was undertaken to accommodate farm workers.¹⁰⁴ However, that accommodation was essentially for those workers who had found permanent employment on a Namoi Valley cotton property. The district's cotton growers were largely unwilling to provide housing for the seasonal workers who came to the Namoi Valley to chip the weeds from the cotton crops in the summer months, the majority of whom in the early 1960s were Aboriginal.¹⁰⁵

The rapid growth of the cotton industry and the related housing shortage resulted in a rise in the number of camps, makeshift dwellings and caravans both within and around Wee Waa.¹⁰⁶ In November 1963, the Namoi Shire Council had resolved to prosecute two people found to be residing in garages within Wee Waa in an effort to discourage others from continuing to 'live in garages and hovels'.¹⁰⁷ The Namoi Shire Council, which encompassed the towns of Narrabri and Wee Waa, reaffirmed its attempts to regulate and curtail the ad hoc pattern of development in the region by announcing in July 1964 that the occupants of 'movable dwellings' including caravans, and the owners of the land on which the dwellings were located had to apply for

¹⁰³ 'Town Progress Leads to Housing Problems in Wee Waa', *The North Western Courier*, 7 November 1963, p. 7.

¹⁰⁴ See, for example, 'New homes at White Acres Farm', *The North Western Courier Cotton Feature Supplement*, 18 November 1963, p. 7.

¹⁰⁵ Kahl, 'Reflections at Sea', p. 30.

¹⁰⁶ 'Shire replies to Wee Waa cotton growers' charges', *The North Western Courier*, 9 July 1964, p. 1.

¹⁰⁷ 'Town Progress Leads to Housing Problems in Wee Waa', *The North Western Courier*, 7 November 1963, p. 7.

Council permission.¹⁰⁸ This stipulation pertained ‘to all parts of the Shire, and not only to the towns and villages.’¹⁰⁹

A number of the district’s cotton growers alleged that they were being specifically targeted by the Council’s regulations, and that those regulations would impose upon them ‘undue hardship’.¹¹⁰ Members of the Namoi Cotton Co-operative claimed that the ‘Namoi Shire was “picking on” Americans in the district’, and that there ‘was evidence of jealousy of cotton growers throughout the district which was centred at Narrabri’.¹¹¹ Co-operative members contended that, by carrying out evictions on two makeshift dwellings, the ‘Namoi Shire was in effect telling Americans to leave’.¹¹² The Council denied those allegations and reassured a ‘deputation of cotton growing interests’ representatives from the Wee Waa area’ that the Namoi Shire was not ‘against’ them.¹¹³ The conflict between the American cotton farmers and the Namoi Shire Council on the question of dwelling permits reinforced tensions within the district. This was reflected in a letter to the editor that was published in the *North Western Courier*:

It is quite normal practice for wheat farmers and graziers to provide cottages for their workers – why not cotton growers? ...
... Certainly the American interests in cotton-growing have spent very large sums in establishing the industry, and appear to be prepared to spend more. Surely they would be able to find sufficient funds to build cottages for their permanent employees and barracks for casual labour.
In fact, it would appear reasonable to consider such expenditure a normal and natural part of the capital outlay necessary in establishing the industry. It is not much good paying some thousands of pounds for a tractor if the driver is expected to sleep under a tree.¹¹⁴

¹⁰⁸ ‘Shire of Namoi: Movable Dwellings’, *The Namoi Valley Echo*, 3/10 July 1964.

¹⁰⁹ ‘Shire of Namoi: Movable Dwellings’, *The Namoi Valley Echo*, 3/10 July 1964.

¹¹⁰ ‘Cauldron’s Lid’, *The Namoi Valley Echo*, 3/10 July 1964.

¹¹¹ ‘Shire replies to Wee Waa cotton growers’ charges’, *The North Western Courier*, 9 July 1964, p. 1.

¹¹² ‘Shire replies to Wee Waa cotton growers’ charges’, *The North Western Courier*, 9 July 1964, p. 1.

¹¹³ ‘Shire Assurance on Cotton Area Problems’, *The North Western Courier*, 23 July 1964, p. 1.

¹¹⁴ “Aussie”, Narrabri, ‘Letter to the Editor’, *The North Western Courier*, 30 July 1964, p. 2.

The influx of seasonal cotton workers to the Wee Waa area was estimated in 1966 to have comprised approximately 2,000 workers.¹¹⁵ A representative of the Australian Workers' Union, Mr C.T. Oliver, observed that many of these workers 'camped along stock routes and lived in the most appalling conditions.'¹¹⁶ Seasonal workers' 'sub-standard' living conditions, the North West District Medical Officer suggested, 'could lead to both mental and physical degeneration'.¹¹⁷ Despite concerns about health arising from the lack of sanitation and hygiene at the workers' camps near Wee Waa, the issue was largely ignored and remained unresolved during the decade of the 1960s.

As many of the seasonal workers were employed through contractors, the Namoi Valley's American cotton growers were reluctant to accept the responsibility of supplying accommodation for those workers. Paul Kahl suggested that it was 'impossible' to provide housing for seasonal workers that met with the Namoi Shire Council's standards for occupied dwellings.¹¹⁸ However, it seems that the district's cotton growers did not experience such problems in making accommodation available to those workers they employed on a permanent basis. In May 1966:

Mr J. Fisher of Auscott Pty. Ltd. said his company had spent \$110,000 on staff accommodation in the past year, but they found it difficult to provide proper accommodation for all the labour employed in peak periods.¹¹⁹

The provision of adequate housing for employees, whether they were full-time or seasonal, may have been expected from Auscott Pty Ltd, which in December 1967 was

¹¹⁵ 'Accommodation is a problem: Seasonal Workers Live in "Appalling" Conditions', *The North Western Courier*, 5 May 1966, p. 1.

¹¹⁶ 'Accommodation is a problem: Seasonal Workers Live in "Appalling" Conditions', *The North Western Courier*, 5 May 1966, p. 1.

¹¹⁷ 'Accommodation is a problem: Seasonal Workers Live in "Appalling" Conditions', *The North Western Courier*, 5 May 1966, p. 1.

¹¹⁸ Kahl, 'Reflections at Sea', p. 30.

¹¹⁹ 'Accommodation is a problem: Seasonal Workers Live in "Appalling" Conditions', *The North Western Courier*, 5 May 1966, p. 1.

reported to have 'lifted consolidated net profit by \$69,864 to \$655,989 for the year ended June 30.'¹²⁰

It was not coincidental that, during the 1960s, the seasonal labourers employed on the Namoi Valley's cotton farms had not been directly recruited or housed by the district's cotton growers. The issue of having vast numbers of seasonal workers employed for brief, critical periods, such as the harvest, had been problematic in Californian agriculture in the 1920s and 1930s, and questions of responsibility for workers' housing and welfare needs had been extremely contentious.¹²¹ It is notable that the American cotton growers who settled in the Namoi Valley sought to establish as routine a system whereby they obtained a large supply of seasonal workers whom they employed through contractors. It seems that while the Namoi Valley's American cotton farmers were keen to replicate Californian methods of industrialised cotton production, they endeavoured to avoid the difficulties concerning seasonal agricultural workers that had arisen in California.

A 1966 newspaper article from *The Australian* about Americans in Wee Waa highlighted the racist views of a farmer from Louisiana who had migrated to grow cotton 'amid a colony of about 150 Californians' near Wee Waa.¹²² The farmer drew a derogatory comparison of his experience of both African-Americans in Louisiana and Aborigines in Wee Waa.¹²³ The author of the article suggested that the migration of American farmers to Wee Waa had been partly motivated by the intensifying Civil Rights struggle; that the 'Negro stalks the edges of their conversations', and 'the fear of

¹²⁰ 'Big success for American-owned cotton grower', *The Sydney Morning Herald*, 30 December 1967, p. 8.

¹²¹ McWilliams, *Factories in the Field*, pp. 148-150.

¹²² Ian Moffitt, 'The challenge of Wee Waa', *The Australian*, 2 December 1966, p. 9.

¹²³ Ian Moffitt, 'The challenge of Wee Waa', *The Australian*, 2 December 1966, p. 9.

him is the wolf howling behind them.’¹²⁴ Regardless of whether the Namoi Valley’s other American cotton migrants shared the racist perspective of the Louisiana farmer interviewed by *The Australian*, it was the prevailing form of institutionalised racism in Australia that influenced how Aboriginal labourers would be treated by the Namoi Valley’s cotton growing industry. Aborigines were not recognised as Australian citizens until a national referendum was held in 1967, and they were largely excluded from most permanent forms of paid work. Cotton chipping in the Namoi district provided a predominantly Aboriginal labour force with much needed work, but, at the same time, cotton growers capitalised upon the marginalised position of Aborigines in Australian society to pay them low wages for arduous work.¹²⁵ There was an implicit racism in relation to the issue of housing for the mostly Aboriginal seasonal workers who travelled to the Namoi Valley to find temporary employment in the cotton season. This was evident, for example, in comments made by the Namoi Shire Health Inspector, Mr N.B. Turnbull, who suggested to the local cotton growing industry in 1966 that ‘if better accommodation could be provided, it would probably attract a better type of worker and the situation would be improved.’¹²⁶

While little had been done to resolve the problem of housing seasonal workers during the 1960s, the publication of an article in a Sydney newspaper in February 1972 focused attention on the issue of the itinerant workers’ camps near Wee Waa.¹²⁷ The *Daily Telegraph* article argued that the influx of approximately 1,000 cotton chippers between the months of December and February brought to Wee Waa ‘a sharp upsurge in

¹²⁴ Ian Moffitt, ‘The challenge of Wee Waa’, *The Australian*, 2 December 1966, p. 9.

¹²⁵ McHugh, *Cottoning On*, p. 66.

¹²⁶ ‘Accommodation is a problem: Seasonal Workers Live in “Appalling” Conditions’, *The North Western Courier*, 5 May 1966, p. 1.

¹²⁷ John F. Dunnet, ‘Social Crisis in the Cottonfields: Trouble is always around when it’s weed-chipping time in Wee Waa’, *The Daily Telegraph*, 14 February 1972, pp. 14-15.

crime, mainly shoplifting, assault, petty theft and breaking and entering.¹²⁸ In the month of January 1972, 305 arrests were made by the Wee Waa police force, 80 more than had been made in January of 1971.¹²⁹ The workers' camps, established on the outskirts of the town, often on Narrabri Pastures Protection Board land reserved for stock or close to the Namoi River, had no supply of clean drinking water or sewerage or garbage services.¹³⁰ The article suggested that the situation had reached an impasse, with the *Rural Workers' Accommodation Act* requiring 'full accommodation' for workers, and the district's cotton farmers unwilling 'to undertake full-scale accommodation projects which would be used for only a limited period in the year.'¹³¹ The article noted that a committee had been created to assess the issue of accommodation for seasonal workers, which comprised representatives from the Namoi Shire, the Wee Waa Police, the Narrabri Pastures Protection Board, the Wee Waa Urban Committee, the Namoi Cotton Co-operative, the Department of Health, the Department of Labour and Industry, and the Department of Child and Social Welfare.¹³² However, the article neglected to mention that such a committee had been in existence since 1966.¹³³ In the same month the *Daily Telegraph* article was published, a report in *The Australian* emphasised the problems of the workers' camps and depicted Wee Waa as a

¹²⁸ John F. Dunnet, 'Social Crisis in the Cottonfields: Trouble is always around when it's weed-chipping time in Wee Waa', *The Daily Telegraph*, 14 February 1972, p. 14.

¹²⁹ John F. Dunnet, 'Social Crisis in the Cottonfields: Trouble is always around when it's weed-chipping time in Wee Waa', *The Daily Telegraph*, 14 February 1972, p. 14.

¹³⁰ John F. Dunnet, 'Social Crisis in the Cottonfields: Trouble is always around when it's weed-chipping time in Wee Waa', *The Daily Telegraph*, 14 February 1972, p. 14.

¹³¹ John F. Dunnet, 'Social Crisis in the Cottonfields: Trouble is always around when it's weed-chipping time in Wee Waa', *The Daily Telegraph*, 14 February 1972, p. 15.

¹³² John F. Dunnet, 'Social Crisis in the Cottonfields: Trouble is always around when it's weed-chipping time in Wee Waa', *The Daily Telegraph*, 14 February 1972, p. 14.

¹³³ See 'Accommodation is a problem: Seasonal Workers Live in "Appalling" Conditions', *The North Western Courier*, 5 May 1966, p. 1.

‘patch of the Deep South’.¹³⁴ The growing scrutiny of the issue of the camps signalled that the living conditions of the cotton growing industry’s seasonal workers could not continue to be ignored.

By September 1972, the Namoi Shire Council was increasingly concerned about the camping sites near Wee Waa, particularly as some of the camps ‘had become semi-permanent’.¹³⁵ Nevertheless, the Shire Council disputed suggestions that it should take responsibility for the itinerant workers’ camps and claimed instead that ‘Government departments and others with a direct interest in the matter should take the lead.’¹³⁶ One of the Namoi Valley’s American cotton farmers was highly critical of the Shire Council’s stance on the matter. Paul Kahl wrote to a local newspaper:

We realise that summer is nearly upon us when we read last week the complaints by the Shire about the lack of co-operation by the State and Commonwealth Governments in dealing with our seasonal aboriginal problem. It is only another sad chapter in a whole book dealing with buck-passing as far as the aboriginals are concerned. This buck-passing extends through the whole strata of Australian society from the individual down to Canberra.¹³⁷

Such criticism from a cotton farmer appears unexpected if not unreflective, given that it was cotton production in the Namoi Valley which had propelled the influx of seasonal workers, and camps had been established because the district’s cotton growers refused to build proper housing for those workers. The Namoi Shire Council had adopted a position on Wee Waa’s itinerant workers’ camps that essentially mirrored the attitude of the district’s cotton farmers.

The types of shelters within the camp sites varied ‘from caravans, iron humpies and tents to a single sheet of canvas tied between two trees, or abandoned car bodies.’¹³⁸

¹³⁴ Janet Hawley, ‘A patch of the Deep South in northern NSW: Family chips bring in \$400 a week’, *The Australian*, 19 February 1972, p. 8.

¹³⁵ ‘Camping Sites Dispute’, *The North Western Courier*, 21 September 1972, p. 1.

¹³⁶ ‘Camping Sites Dispute’, *The North Western Courier*, 21 September 1972, p. 1.

¹³⁷ Paul D. Kahl, ‘Who will accept the responsibility?’, Letter to the Editor, *The North Western Courier*, 25 September 1972, p. 2.

The problems of the camp sites prompted the formation of the Wee Waa Aboriginal Advancement Association in October 1972 with the objective of improving conditions within the camps.¹³⁹ The Association was headed by a local doctor, and comprised ‘community and cotton industry leaders’, as well as a reverend, but had only two Aboriginal members.¹⁴⁰ The Wee Waa Aboriginal Advancement Association did not demand the closure of the workers’ camps or the erection of accommodation; they sought merely to ensure that the camps had pit toilets, a garbage collection service and a supply of safe drinking water.¹⁴¹ The modest proposals put forward by the Association acknowledged local concerns about the potential for these measures to transform the camps from being seasonal to sites that were occupied throughout the year:

There will be no showers provided, because most of the campers wash in the river, and the Association believes showers would encourage permanent camping.

Pit latrines are to be dug, and iron toilets erected. ...

... At the end of the cotton chipping season, the facilities will be removed and the services will cease, to encourage campers to return to their homes.¹⁴²

The Wee Waa Aboriginal Advancement Association did not operate as a charitable organisation, and instead planned to charge the seasonal workers who used the camp sites a fee.¹⁴³ The chippers’ camps around Wee Waa were ‘seen by many as a festering sore.’¹⁴⁴ The Namoi Shire Council refused to take on the trusteeship of the workers’ camps and was in favour of the Wee Waa Aboriginal Advancement Association

¹³⁸ ‘Housing Problems in Cotton Area’, *North West Magazine*, 30 October 1972, pp. 3-6.

¹³⁹ ‘Committee to assist aborigines’, *The North Western Courier*, 12 October 1972, p. 2.

¹⁴⁰ ‘Committee to assist aborigines’, *The North Western Courier*, 12 October 1972, p. 2; ‘New Group Seeks: Proper Camp Amenities’, *The North Western Courier*, 26 October 1972, pp. 1-2.

¹⁴¹ ‘Housing Problems in Cotton Area’, *North West Magazine*, 30 October 1972, pp. 3-6.

¹⁴² ‘New Group Seeks: Proper Camp Amenities’, *The North Western Courier*, 26 October 1972, p. 2.

¹⁴³ Dr D.J. Penney, Wee Waa Aboriginal Advancement Association, ‘Housing Problem’, Letter to the Editor, *The North Western Courier*, 6 November 1972, p. 5.

¹⁴⁴ ‘Housing Problems in Cotton Area’, *North West Magazine*, 30 October 1972, p. 6.

assuming direct control of the sites.¹⁴⁵ The Shire Council reversed its decision, however, and accepted trusteeship of the camps after pressure from the Minister for Child and Social Welfare, Mr J. Waddy.¹⁴⁶ The Council agreed to lease two camping sites, known as Gunidgera and Tulladunna, to the Wee Waa Aboriginal Advancement Association for a nominal annual fee of fifty cents for a period of five years.¹⁴⁷

Protests and a Strike follow Cotton Chippers' Deaths

While the Namoi Shire Council and the Wee Waa Aboriginal Advancement Association were still negotiating the question of trusteeship of the workers camps, conditions had deteriorated to the point that Shire employees had, for two weeks in December 1972, been delivering 'rain water to Tulladunna camp as an emergency measure, following an outbreak of infections among children there.'¹⁴⁸ The dire circumstances of the workers' camps that surrounded the town of Wee Waa had appeared to be the most critical social issue arising from the establishment of the district's cotton growing industry. However, the deaths of cotton chippers in the Wee Waa area during December 1972 and January 1973 brought the chippers' working conditions to the fore. An Aboriginal woman died while hoeing weeds from rows of cotton near Wee Waa on 23 December 1972, and a 34 year old man collapsed and died while cotton chipping during heat-wave conditions on 4 January 1973.¹⁴⁹ A 17 year old boy was also reported to have died while cotton

¹⁴⁵ 'Camp Sites for Itinerant Workers', *The Wee Waa Echo*, 2 November 1972, p. 1; 'Camp Sites: Way Now Open', *The North Western Courier*, 2 November 1972, p. 1; 'Itinerant workers' camps: Dispute over trusteeship', *The North Western Courier*, 23 November 1972, p. 3.

¹⁴⁶ 'May Accept Trusteeship', *The North Western Courier*, 30 November 1972, p. 2; 'Trusteeship Discussed at Meeting', *The Wee Waa Echo*, 7 December 1972, p. 1; 'Camps issue clearer now', *The North Western Courier*, 18 December 1972, p. 9.

¹⁴⁷ 'Council changes its mind on position', *The North Western Courier*, 21 December 1972, p. 15.

¹⁴⁸ 'Camps issue clearer now', *The North Western Courier*, 18 December 1972, p. 9.

¹⁴⁹ 'Another death in fields', *The North Western Courier*, 4 January 1973, p. 1; 'Two deaths in marathon north-west heatwave', *The Northern Daily Leader*, 5 January 1973, p. 1.

chipping in the district in the same period.¹⁵⁰ The death of these workers and the years of inaction in relation to accommodation, along with a number of other problems, culminated in a series of protests and a cotton chippers' strike at Wee Waa in January 1973.

The issues of 'racial discrimination, poor wages and sub-standard living conditions' were identified as the main causes of protests held by Aboriginal cotton chippers in Wee Waa during January 1973.¹⁵¹ A demonstration held in the main street of the town on the evening of 9 January 1973 was estimated to have involved 300 Aboriginal cotton chippers.¹⁵² The demonstration was aimed at Wee Waa's Imperial Hotel, where, with the exception of 'a selected few', it was alleged that the publican refused to serve Aborigines.¹⁵³ The publican closed and locked the hotel before the protest commenced and refused to speak to the demonstrators or allow them onto the premises.¹⁵⁴ Although the publican denied the protestors' claim, it seems that racial segregation was a routine practice, as documented by a reporter for *The Australian* who visited a hotel in Wee Waa in 1966:

An Aboriginal girl sits in the hotel beer garden, asking white men to play the juke box for her inside. She is not welcome, apparently, in there.¹⁵⁵

The targeting of the Imperial Hotel by the demonstrators had a similar aim to the 1965 'Freedom Ride', where activists had attempted to draw attention to sites of racial

¹⁵⁰ Reverend H. Herbert, *Report on Cotton Chippers Strike at Wee Waa*, Sydney: Australian Council of Churches' N.S.W. State Council, 1973, p. 2.

¹⁵¹ 'Aborigines Will Hold Protest Meeting Tonight', *The Wee Waa Echo*, 11 January 1973, p. 1.

¹⁵² 'Aborigines will hold big protest meeting tonight: Discrimination, poor conditions alleged', *The Northern Daily Leader*, 11 January 1973, p. 1.

¹⁵³ 'Demonstration: Allegations of discrimination', *The North Western Courier*, 11 January 1973, p. 1.

¹⁵⁴ 'Demonstration: Allegations of discrimination', *The North Western Courier*, 11 January 1973, p. 1.

¹⁵⁵ The article does not indicate which of two hotels in Wee Waa the reporter visited. See Ian Moffitt, 'The challenge of Wee Waa', *The Australian*, 2 December 1966, p. 9.

discrimination in country New South Wales, such as white-only swimming pools.¹⁵⁶

The fact that Wee Waa's Imperial Hotel continued in 1973 to exclude almost all Aboriginal customers illustrated that little had changed since the granting of citizenship to Aborigines in 1967.

Following the demonstration on 9 January 1973, the Wee Waa Aboriginal Advancement Association sought immediately to make it clear that it had no connection with the protest.¹⁵⁷ The comments made in response to the demonstration by the secretary of the Association, Mr Peter Suttie, were revealing. He stated:

As an organisation we have no identification with Aboriginal rights in general but we are interested at present in the welfare of Aboriginal women and children in the cotton area.¹⁵⁸

With such a narrow objective and only a couple of Aboriginal members, the Wee Waa Aboriginal Advancement Association's reaction to the demonstration exposed the limitations of the Association.

Where the demonstration on 9 January 1973 had concentrated upon racial discrimination at the Imperial Hotel, a protest meeting held two days later focused on cotton chippers' pay and working conditions.¹⁵⁹ The protest held in Wee Waa's main street on the night of 11 January 1973 attracted similar numbers to the initial demonstration, with approximately 300 Aboriginal cotton chippers again in attendance.¹⁶⁰ Both demonstrations were addressed by Michael Anderson, an activist from Walgett who had been involved with the Aboriginal Tent Embassy in Canberra,

¹⁵⁶ McHugh, *Cotting On*, p. 64; Ann Curthoys, *Freedom Ride: a freedom rider remembers*, Crows Nest: Allen and Unwin, 2002.

¹⁵⁷ 'Demonstration: Allegations of discrimination', *The North Western Courier*, 11 January 1973, p. 1.

¹⁵⁸ 'Demonstration: Allegations of discrimination', *The North Western Courier*, 11 January 1973, p. 1.

¹⁵⁹ 'Protest Meeting', *The Wee Waa Echo*, 18 January 1973, p. 2.

¹⁶⁰ 'Cotton chippers will press for better deal: Aborigines turn to unions for support', *The Northern Daily Leader*, 12 January 1973, p. 1.

and had worked as a cotton chipper at Wee Waa for three consecutive cotton seasons.¹⁶¹ Anderson told the crowd of chippers gathered on 11 January 1973 that a 10-hour working day in extreme heat for only \$12 pay amounted to exploitation, and ‘it was unlikely that white people would chip cotton’ in such circumstances.¹⁶² Michael Anderson suggested that the Australian Workers’ Union investigate cotton chippers’ wages and working conditions at Wee Waa, and he urged the cotton chippers at the protest to take immediate action by going on strike.¹⁶³

On the following day at the Glencoe property, which was owned by Paul Kahl, cotton chippers ‘downed hoes and walked off the farm’.¹⁶⁴ That strike had begun on Friday 12 January 1973, but was forestalled by heavy weekend rain, which ensured ‘that no chipping could take place until the soil dried.’¹⁶⁵ The strike at the Glencoe farm had been relatively small and lasted for only one day.¹⁶⁶ The substantial rainfall meant that the chipping of cotton was interrupted for a week, but the temporary absence of work did not quell the growing discontent of the Aboriginal labourers camped on the outskirts of Wee Waa.¹⁶⁷ In addition to the issues of wage rates and conditions in the camps, allegations were raised about the segregation of Aboriginal cotton chippers at the Wee Waa Hospital, but it was denied that the hospital had a separate ward used to isolate those workers from the other patients.¹⁶⁸ It was asserted, too, that police were

¹⁶¹ ‘Aborigines Will Hold Protest Meeting Tonight’, *The Wee Waa Echo*, 11 January 1973, p. 1.

¹⁶² ‘300 Hear Anderson’, *The North Western Courier*, 15 January 1973, p. 1; ‘Cotton chippers will press for better deal: Aborigines turn to unions for support’, *The Northern Daily Leader*, 12 January 1973, p. 1.

¹⁶³ ‘300 Hear Anderson’, *The North Western Courier*, 15 January 1973, p. 1; ‘Cotton chippers will press for better deal: Aborigines turn to unions for support’, *The Northern Daily Leader*, 12 January 1973, p. 1.

¹⁶⁴ ‘Several Oppose Actions’, *The North Western Courier*, 15 January 1973, p. 1.

¹⁶⁵ ‘Several Oppose Actions’, *The North Western Courier*, 15 January 1973, p. 1.

¹⁶⁶ ‘Quiet returns to Wee Waa – for time being’, *The Northern Daily Leader*, 15 January 1973, p. 1.

¹⁶⁷ ‘Chippers are ready for work again’, *The Northern Daily Leader*, 18 January 1973, p. 1.

¹⁶⁸ ‘Wee Waa is powder keg, says student’, *The Northern Daily Leader*, 13 January 1973, p. 1; ‘The Other Side Of The Story’, *The Wee Waa Echo*, 18 January 1973, p. 1; ‘Young Militants Allege

victimising and harassing Aborigines in Wee Waa, 'with 45 being arrested on one night' in January 1973.¹⁶⁹ An article published in *The Australian* in February 1972 had stated that following 'a good Saturday night, there have been up to 58 chippers in the Wee Waa lock-up'.¹⁷⁰ The article provided an anecdotal account of the police response to drunkenness among Aboriginal cotton chippers:

The police have their own methods of dealing with the problem. According to the locals, they take van loads of drunk Aborigines six miles out of town and make them walk back to sober up.¹⁷¹

A report from December 1972 had noted the significant police presence in Wee Waa, where eight police officers were stationed in the small town comprising an estimated 2,000 permanent residents.¹⁷² In that report, a police spokesman stated that Wee Waa had one of Australia's highest offence rates, recording "about 12,000 arrests" in the ten years to December 1972, primarily in the summer months when cotton chipping took place.¹⁷³ During the unrest in January 1973, police numbers increased in Wee Waa, with around fifteen police officers in attendance at the demonstration held by Aboriginal cotton chippers on 11 January 1973.¹⁷⁴ A broader strike action was initiated by the chippers later in that month.

A general cotton chippers' strike commenced in the Wee Waa district on Monday 22 January 1973 and continued until the chippers decided to return to work on

Discrimination: Cotton town gathers seasonal problems', *The Sydney Morning Herald*, 18 January 1973, pp. 3-10.

¹⁶⁹ 'Wee Waa is powder keg, says student', *The Northern Daily Leader*, 13 January 1973, p. 1; 'Several Oppose Actions', *The North Western Courier*, 15 January 1973, p. 1.

¹⁷⁰ Janet Hawley, 'A patch of the Deep South in northern NSW: Family chips bring in \$400 a week', *The Australian*, 19 February 1972, p. 8.

¹⁷¹ Janet Hawley, 'A patch of the Deep South in northern NSW: Family chips bring in \$400 a week', *The Australian*, 19 February 1972, p. 8.

¹⁷² 'Solving the problems of Aboriginal chippers', *The Sydney Morning Herald*, 21 December 1972, p. 8.

¹⁷³ 'Solving the problems of Aboriginal chippers', *The Sydney Morning Herald*, 21 December 1972, p. 8.

¹⁷⁴ 'Cotton chippers will press for better deal: Aborigines turn to unions for support', *The Northern Daily Leader*, 12 January 1973, p. 1.

Thursday 25 January 1973.¹⁷⁵ In contrast to the one-day stoppage that had occurred earlier in the month, however, the general strike did not affect cotton chipping at the Glencoe property, as owner Paul Kahl explained to the *North Western Courier*:

Mr Kahl said that all the chippers working for him had stated that they wanted to work.

“We have locked the gate and stationed a guard on it to prevent trouble,” said Mr Kahl.¹⁷⁶

The organisers of the cotton workers’ demonstrations and strikes were derided in local newspapers as ‘radical militants’ and ‘professional stirrers’.¹⁷⁷ An editorial in the *Wee Waa Echo* stated:

What is happening in Wee Waa at present is indicative of the kind of strife which radicals and professional trouble-makers can make. Again it is not too fanciful to see the Aboriginal ‘problem’ as the powder keg for Communist aggression in Australia.¹⁷⁸

A number of reports suggested that there was a generational divide amongst the district’s Aboriginal cotton chippers, with some older workers reluctant to join the strike, which was led by ‘young militants’.¹⁷⁹ A group of Aboriginal cotton chippers who opposed the industrial action received almost as much attention as the strikers, although numerically they comprised a far smaller contingent than the striking workers.¹⁸⁰ While newspaper reports had claimed that ‘a considerable number’ of Aboriginal cotton chippers did not want to dispute their wage rates, an observer from

¹⁷⁵ ‘Discontent simmering in Wee Waa’, *The North Western Courier*, 22 January 1973, p. 1; ‘Striking cotton chippers return to work today’, *The Northern Daily Leader*, 25 January 1973, p. 1.

¹⁷⁶ ‘Discontent simmering in Wee Waa’, *The North Western Courier*, 22 January 1973, p. 1.

¹⁷⁷ ‘Social Problems’, *The North Western Courier*, 15 January 1973, p. 2; ‘The Other Side Of The Story’, *The Wee Waa Echo*, 18 January 1973, p. 1.

¹⁷⁸ ‘The Communist Strategy’, Editorial, *The Wee Waa Echo*, 25 January 1973, p. 2.

¹⁷⁹ ‘Young Militants Allege Discrimination: Cotton town gathers seasonal problems’, *The Sydney Morning Herald*, 18 January 1973, p. 3; ‘Thoughts Divided’, *The Wee Waa Echo*, 25 January 1973, p. 1.

¹⁸⁰ ‘Several Oppose Actions’, *The North Western Courier*, 15 January 1973, p. 1; ‘Actions resented’, *North Western Courier*, 18 January 1973, p. 3; ‘The Other Side Of The Story’, *The Wee Waa Echo*, 18 January 1973, p. 1; ‘Chippers are ready for work again’, *The Northern Daily Leader*, 18 January 1973, p. 1; ‘Discontent simmering in Wee Waa’, *The North Western Courier*, 22 January 1973, p. 1.

the Australian Council of Churches concluded that there was 'strong support' for the strike, and that it was 'clearly an important thing psychologically and emotionally' for the participants.¹⁸¹ Although support for the strike was not unanimous, it was verified by the fact that all but 60 of the Aboriginal cotton chippers in the district took part.¹⁸²

A federal Department of Labour investigation of cotton chippers' working conditions and the circumstances of the strike determined that chippers' wages were inadequate, the system of hiring chippers through contractors was 'open to abuse', and that the chippers had 'every justification for their grievances'.¹⁸³ That investigation found that a clause of the award that established cotton chippers' wage rates was being exploited:

One of the anomalies of the award is that an employee is required to work eight hours the day before and after to become eligible for Sunday penalty rates. I found that blatant advantage was taken of this by some employers by working their labour force only seven hours on a Saturday to enable them to employ those workers on the following Sunday at ordinary rates.¹⁸⁴

The question of wage rates would ultimately prove crucial in the ending of the strike. The brevity of the strike was explained in part by its occurrence toward the end of the cotton chipping season when work was becoming increasingly difficult to obtain, and the limited funds available to share among those involved in the industrial action meant that it would not endure for long.¹⁸⁵ However, the key factor in the short duration of the strike was the progress made on the issue of a pay increase for cotton chippers. The strike won support for the chippers from the New South Wales Trades and Labour

¹⁸¹ 'Young Militants Allege Discrimination: Cotton town gathers seasonal problems', *The Sydney Morning Herald*, 18 January 1973, p. 10; 'Nine Aboriginals to Meet Unions', *The North Western Courier*, 18 January 1973, p. 1; Herbert, *Report on Cotton Chippers Strike at Wee Waa*, p. 3.

¹⁸² 'Most Aborigines stay on strike', *The Northern Daily Leader*, 23 January 1973, p. 1.

¹⁸³ See Norman K. Foster, *Report on the Grievances of Seasonal Workers in Wee Waa and Narrabri*, Canberra: Department of Labour, 1973, pp. 1-3, and Foreword to the report by Clyde R. Cameron, then Minister for Labour.

¹⁸⁴ Foster, *Report on the Grievances of Seasonal Workers in Wee Waa and Narrabri*, p. 5.

¹⁸⁵ Herbert, *Report on Cotton Chippers Strike at Wee Waa*, p. 3; 'Thoughts Divided', *The Wee Waa Echo*, 25 January 1973, p. 1.

Council, and saw the workers' case taken before the New South Wales Industrial Commission.¹⁸⁶ The industrial action was concluded after an agreement was reached following a 'compulsory conference' that involved employers, chippers, and representatives from the Australian Workers' Union and the New South Wales Trades and Labour Council.¹⁸⁷ The agreement provided the cotton chippers with a wage increase 'from \$1.16 per hour to \$1.45 per hour.'¹⁸⁸

Subsequent to the strike by Aboriginal cotton chippers in January 1973, the Namoi Valley's cotton growing industry was affected by industrial action in May of that year. At Auscott Pty Ltd, 54 employees voted in favour of strike action and staged a walk-out on 16 May 1973.¹⁸⁹ The Auscott strike endured for three days, with the employees returning to work once the company agreed to grant them a pay increase.¹⁹⁰ The events at Auscott inspired a similar action a week later by the Namoi Cotton Co-operative's gin workers. Beginning on 28 May 1973, approximately 100 of the Co-operative's employees were involved in a three-day work stoppage that ended after an agreement had been reached on a wage rise.¹⁹¹ However, newspaper reports on the strikes at Auscott and the Namoi Cotton Co-operative contrast starkly with the manner in which the Aboriginal cotton chippers' strike was portrayed.

¹⁸⁶ 'Tension eases in Wee Waa: Chippers' Strike Over', *The North Western Courier*, 25 January 1973, p. 1; 'Cotton chippers' wage case hearing', *The Northern Daily Leader*, 26 January 1973, p. 1; Foster, *Report on the Grievances of Seasonal Workers in Wee Waa and Narrabri*, p. 7.

¹⁸⁷ 'Cotton chippers get pay rise', *The Northern Daily Leader*, 27 January 1973, p. 1; 'Aboriginal cotton men get \$15 rise', *The Sydney Morning Herald*, 27 January 1973, p. 11; 'New award for cotton chippers', *The North Western Courier*, 30 January 1973, p. 1; 'Agreement on Chippers Wage Claims', *The Wee Waa Echo*, 1 February 1973, p. 1.

¹⁸⁸ 'New award for cotton chippers', *The North Western Courier*, 30 January 1973, p. 1.

¹⁸⁹ 'Wage demands at Auscott: Strikers to Stay 'Out'', *The North Western Courier*, 17 May 1973, p. 1.

¹⁹⁰ 'Auscott Field Men Go Back', *The North Western Courier*, 21 May 1973, p. 1.

¹⁹¹ 'Gin Workers Stop Work', *The North Western Courier*, 28 May 1973, p. 2; 'Arbitration Commission hearing: Gin Workers' Strike Over', *The North Western Courier*, 31 May 1973, p. 1; 'Gin Workers Return To Work', *The Wee Waa Echo*, 31 May 1973, p. 1.

In January 1973 when Aboriginal cotton chippers staged demonstrations and strikes, it was estimated that Aborigines comprised 90 per cent of those chipping cotton in the Wee Waa area in 1973, but several employers did ‘not engage Aborigines at all’.¹⁹² The American-owned enterprise, Auscott Pty Ltd, was one where an almost exclusively white workforce was employed during the cotton chipping season. The chipping contractor for the Auscott venture explained that he found “the white chippers more reliable”.¹⁹³ In the aftermath of the initial strike at the Glencoe property and the protests held in the main street of Wee Waa, it was reported that a number of cotton growers were ‘seriously considering not using Aboriginal labour in future.’¹⁹⁴ One farm manager ‘predicted more growers would swing to chemical control of weeds’ in subsequent years in order to avoid a recurrence of difficulties with the workers employed to remove the weeds manually.¹⁹⁵

After the agreement on the pay increase was announced, an article in the *Wee Waa Echo* declared that ‘the boom years for Aboriginal cotton chippers are past.’¹⁹⁶ It was suggested that the higher wage rates would attract to the district ‘a better grade of itinerant workman’.¹⁹⁷ The award prohibited the employment of children aged less than fifteen years, and that was expected to have an impact upon the large body of Aboriginal workers, including children, who worked in the cotton fields and camped near Wee Waa in the summer months.¹⁹⁸ A report in the *North Western Courier*

¹⁹² Foster, *Report on the Grievances of Seasonal Workers in Wee Waa and Narrabri*, pp. 1-4.

¹⁹³ ‘Wee Waa is powder keg, says student’, *The Northern Daily Leader*, 13 January 1973, p. 1.

¹⁹⁴ ‘Young Militants Allege Discrimination: Cotton town gathers seasonal problems’, *The Sydney Morning Herald*, 18 January 1973, p. 10.

¹⁹⁵ ‘Wee Waa is powder keg, says student’, *The Northern Daily Leader*, 13 January 1973, p. 1.

¹⁹⁶ ‘Future of Aboriginal Cotton Chippers In Doubt’, *The Wee Waa Echo*, 1 February 1973, p. 1.

¹⁹⁷ ‘Future of Aboriginal Cotton Chippers In Doubt’, *The Wee Waa Echo*, 1 February 1973, p. 1.

¹⁹⁸ ‘Future of Aboriginal Cotton Chippers In Doubt’, *The Wee Waa Echo*, 1 February 1973, p. 1; ‘Thoughts Divided’, *The Wee Waa Echo*, 25 January 1973, p. 1.

anticipated that the cotton chippers' pay increase would alter the structure of the cotton chipping workforce:

Cotton growers have stated that the new conditions will cause them to seek more experienced and reliable workers.

One grower said he believed that families and family groups could no longer be employed, and the younger and older age groups would not be able to obtain work in a competitive labour market for chippers.¹⁹⁹

Similarly, a *Wee Waa Echo* article argued that, by striking and achieving a wage rise, Aboriginal cotton chippers had 'probably sealed the future' by ensuring that their employment on the district's cotton farms was 'in the balance'.²⁰⁰ The report contended that the pay increase presented a resolution on the issue of conditions in the workers' camps:

It is an interesting concept that Michael Anderson may have, in fact, solved Wee Waa's major social problem.

If Aboriginal families do not come back in such large numbers and if the poorer type of worker cannot find work, the possibility of an easing in the social problem becomes very real.

In this sense Michael Anderson may have unwittingly solved a problem that no one else has dealt with effectively.²⁰¹

An inherent racism is apparent in this and other reports on the Aboriginal cotton chippers' strike, particularly when compared with newspaper articles on the later industrial action at Auscott and the Namoi Cotton Co-operative. Local newspaper reports on the Auscott and Co-operative's strikes were brief and recorded only the facts of the strikes' commencement and duration, the strikers' demands and how the strikes were resolved.²⁰² Unlike many of the newspaper articles on the Aboriginal cotton chippers' actions, there was no suggestion that the workers involved in the strikes at

¹⁹⁹ 'New award for cotton chippers', *The North Western Courier*, 30 January 1973, p. 1.

²⁰⁰ 'Future of Aboriginal Cotton Chippers In Doubt', *The Wee Waa Echo*, 1 February 1973, p. 1.

²⁰¹ 'Future of Aboriginal Cotton Chippers In Doubt', *The Wee Waa Echo*, 1 February 1973, p. 1.

²⁰² See 'Wage demands at Auscott: Strikers to Stay 'Out'', *The North Western Courier*, 17 May 1973, p. 1; 'Auscott Field Men Go Back', *The North Western Courier*, 21 May 1973, p. 1; 'Gin Workers Stop Work', *The North Western Courier*, 28 May 1973, p. 2; 'Arbitration Commission hearing: Gin Workers' Strike Over', *The North Western Courier*, 31 May 1973, p. 1; 'Gin Workers Return To Work', *The Wee Waa Echo*, 31 May 1973, p. 1.

Auscott and the Co-operative should lose their jobs or be replaced by other workers. Where the Aboriginal cotton chippers had been condemned in local newspapers, there was a notable absence of any form of criticism in articles on the workers who went on strike at Auscott and the Co-operative.

One year after the January 1973 Aboriginal cotton chippers' strike, there was a marked reduction in the numbers of itinerant workers, 'both black and white', who travelled to Wee Waa to seek employment as cotton chippers.²⁰³ Prior to the strike, ten-year-old Aboriginal children had been among those who chipped cotton in ten-hour shifts on Wee Waa's cotton farms.²⁰⁴ The strike did not bring an immediate end to the use of child labour, as twelve-year-old Aboriginal children were still being employed to chip cotton in the early 1980s.²⁰⁵ In the decades after the strike, there was a greater diversity evident in the Namoi Valley's cotton chipping workforce. From a 90 per cent Aboriginal workforce in 1973, in the mid-1990s it was estimated that Aborigines made up only 30 to 40 per cent of cotton chippers in the Namoi district.²⁰⁶ By the 1990s, the cotton chipping labour force comprised locals, particularly white women, as well as those who came from outside of the region or from overseas.²⁰⁷

It is unknown whether the 1973 strike by Aboriginal cotton chippers was pivotal in instigating this diversification of the cotton chipping workforce. Nonetheless, the changes in the composition of those labourers had consequences for the district, principally in relation to the cotton chippers' camps that had been founded near Wee

²⁰³ Andrew Clark, 'Wee Waa takes a step forward – but it's still not a black paradise', *The National Times*, 11-16 March 1974, p. 4.

²⁰⁴ Andrew Clark, 'Wee Waa takes a step forward – but it's still not a black paradise', *The National Times*, 11-16 March 1974, p. 4.

²⁰⁵ McHugh, *Cottoning On*, p. 62.

²⁰⁶ Foster, *Report on the Grievances of Seasonal Workers in Wee Waa and Narrabri*, p. 1; McHugh, *Cottoning On*, p. 61 and p. 68.

²⁰⁷ Kahl, *Cotton Pickin' Pioneer*, p. 112; McHugh, *Cottoning On*, p. 67.

Waa. By 1974, a water supply, toilets, showers and garbage collection had been established at three of the chippers' camps on the outskirts of the town at the sites known as Tulladunna, Gunidgera and Myall Vale.²⁰⁸ With the chipping workforce drawn increasingly from townspeople, and fewer itinerants travelling to Wee Waa, the Namoi Shire Council decided in the mid-1970s to remove those facilities and close the chippers' camps at Gunidgera and Myall Vale.²⁰⁹ The closure of the Tulladunna camp followed in the early 1980s.²¹⁰

The social dynamics that had been created by the Namoi Valley's cotton growing industry were exposed in 1973 through the Aboriginal cotton chippers' strike and demonstrations, and through the conditions at the chippers' camps. Those social dynamics have, however, changed over the decades of the cotton growing industry's existence in the Namoi Valley. Gone are the chippers' camps that had been populated by thousands in the summer months of the 1960s and early 1970s. The employment of chippers has declined, too, particularly with the emergence of herbicide-tolerant genetically modified cotton varieties.

The Financial Costs of Industrialised Cotton Production

There were other social implications arising from the Namoi Valley's cotton mode of production that have often been overlooked in analyses of the cotton industry. Cotton has been described as the Namoi Valley's 'glamour crop'.²¹¹ Within Australia, the cotton industry has generally been interpreted 'by governments and inland communities

²⁰⁸ Andrew Clark, 'Wee Waa takes a step forward – but it's still not a black paradise', *The National Times*, 11-16 March 1974, p. 4.

²⁰⁹ McIlvanie, 'The Responsibility of People: A Study in Race and Racism, Wee Waa, NSW', p. 33.

²¹⁰ McIlvanie, 'The Responsibility of People: A Study in Race and Racism, Wee Waa, NSW', p. 33.

²¹¹ Kevin Jeffcoat, *Images of Change in North-West New South Wales*, Parramatta: New South Wales Department of Water Resources, 1995, p. 46.

as an economic saviour.²¹² That view has been reiterated in relation to the Namoi Valley, with cotton described as ‘an absolute saviour’ for the Namoi region.²¹³ A narrow focus upon the value of cotton to the Australian economy, for example, may eclipse or obscure the significant costs of cotton production and cotton’s position as ‘one of the more capital intensive rural industries.’²¹⁴ While cotton growing in the Namoi Valley proved to be extremely successful, it involved economic risks.²¹⁵ The numerous inputs required to produce cotton in an industrialised fashion ensured that the Namoi district’s cotton growing industry would be a high-cost agricultural activity.²¹⁶

From the outset, cotton production entailed substantial financial costs for the farmers who embarked upon the growing of the fibre. Before the crop could be planted, the land had to be cleared and levelled. Irrigation infrastructure had to be established on farms, which involved the installation of pumps and the construction of channels and storage dams. Preparing a farm for irrigated cotton production was an expensive endeavour. The financial returns from cotton growing were generally high, as were the production costs.²¹⁷ As Paul Kahl explained, even when the industry experienced difficulties arising from flooding in the early 1970s, apart from growing cotton ‘there was little else at the time that showed a profit on the cost of irrigation development.’²¹⁸ On-farm irrigation infrastructure was just one aspect of the investment undertaken by

²¹² Vaughn Higgins, Stewart Lockie and Geoffrey Lawrence, ‘Governance, ‘Local’ Knowledge and the Adoption of Sustainable Farming Practices,’ in Geoffrey Lawrence, Vaughn Higgins and Stewart Lockie, *Environment, Society and Natural Resource Management: Theoretical Perspectives from Australasia and the Americas*, Cheltenham: Edward Elgar, 2001, p. 217.

²¹³ Ticky Fullerton, *Watershed: Deciding Our Water Future*, Sydney: ABC Books, 2001, pp. 80-81.

²¹⁴ Bureau of Agricultural Economics, *The Australian Cotton Growing Industry: An Economic Survey, 1964-65 to 1966-67*, p. 35.

²¹⁵ Heydon, *The Cotton Story*, p. 5.

²¹⁶ Heydon, *The Cotton Story*, p. 5.

²¹⁷ Heydon, *The Cotton Story*, p. 5.

²¹⁸ Kahl, *Cotton Pickin’ Pioneer*, p. 222.

cotton growers in the Namoi district. The purchase of machinery, such as tractors and mechanical cotton harvesters, was another substantial expense. However, the requisite cottonseed, fuel and chemicals, including pesticides, herbicides, fertilisers and defoliants, represented costs that would be ongoing for farmers. The high costs of the Namoi Valley's cotton mode of production ensured that there was pressure upon the district's cotton farmers to achieve a considerable return on their investment. A Bureau of Agricultural Economics study which contrasted the costs of production for specialist irrigated cotton farms in the 1965-66 and 1966-67 cotton seasons concluded:

Considering the results over both years it is apparent that, given the methods of production used, Namoi growers had to achieve much higher yields in order to produce cotton as cheaply as the Queensland growers.²¹⁹

The pressure to produce high-yielding and greatly profitable cotton crops is closely linked to an issue that is often unacknowledged: the question of debt and Australian cotton farms.

In June 1991, the Westpac Bank's national agribusiness manager, Richard Read, issued a public caution to Australia's cotton farmers:

With an average level of debt of approximately \$620 a hectare, some growers may need to put aside ambitious plans for expansion and look carefully at reducing leverage...²²⁰

In response, the managing director of the company Colly Farms Cotton claimed that Richard Read lacked knowledge of the Australian cotton growing industry's characteristics, structure and markets, however, the debt levels cited by Read were not disputed.²²¹ The issue of debt was highlighted, too, in the economic assessment of

²¹⁹ Bureau of Agricultural Economics, *An Assessment of the Income Situation of Cotton Growers*, Canberra: Australian Government Publishing Service, April 1971, p. 8.

²²⁰ Cathy Bolt, 'Westpac warns cotton growers to tread carefully', *The Australian Financial Review*, 6 June 1991, p. 30.

²²¹ Cathy Bolt, 'Westpac 'lacks knowledge' of cotton industry', *The Australian Financial Review*, 7 June 1991, p. 40.

Australia's cotton industry conducted by the Centre for International Economics. That report found that, based on figures from 1992-93:

Cotton farms have a turnover, and show a cash operating surplus, several times that of average broadacre properties. But cotton farms also have debts of over \$1 million on average, nearly eight times the level of debt for the average agricultural property.²²²

The report did not provide specific data on the rates of debt for Namoi Valley cotton farms, but offered some key observations on the situation within the north-west slopes and plains of New South Wales, the region which encompasses the Namoi Valley.

Despite many Australian cotton farms having substantial average debt levels, cotton as an agricultural commodity retained its high value in north-western New South Wales:

In comparison with other irrigated summer crops on the north-west slopes and plains, gross margins for cotton are much higher than for other crops which could be grown in place of cotton...²²³

The pattern of many Australian cotton farms achieving high returns at the same time as they encounter high production costs and incur significant debt appears to have continued into the twenty-first century. A study from 2001 stated that Australia's cotton farmers 'are carrying large amounts of debt, with debt levels of 40% to 50% being common.'²²⁴

The Centre for International Economics' 1995 report emphasised that the Australian cotton growing industry's relatively high debt levels represented 'an industry borrowing substantially to invest and move ahead, rather than borrowing to survive'.²²⁵

However, the report identified drought as an issue with the potential to exacerbate the

²²² Centre for International Economics and Cameron Agriculture Pty Ltd, *The Australian Cotton Industry: An Economic Assessment*, Canberra: Report prepared for the Cotton Research and Development Corporation by the Centre for International Economics, and Cameron Agriculture Pty Ltd, December 1995, p. 26.

²²³ Centre for International Economics and Cameron Agriculture Pty Ltd, *The Australian Cotton Industry: An Economic Assessment*, p. 26.

²²⁴ *Australian Cotton Comparative Analysis: 2001 Crop*, Narrabri: Cotton Research and Development Corporation and BOYCE Chartered Accountants, 2001, p. 16.

²²⁵ Centre for International Economics and Cameron Agriculture Pty Ltd, *The Australian Cotton Industry: An Economic Assessment*, p. 27.

problem of indebtedness within the Australian cotton industry.²²⁶ The Namoi Valley was affected by a prolonged drought for much of the past decade, and the 2006-07 season recorded 'the lowest level of cotton production in the Namoi Valley in at least the last 25 years.'²²⁷ Although it has been suggested that cotton has made the town of Wee Waa prosperous, the contraction in the production of the crop during the drought had significant ramifications.²²⁸ Within Wee Waa, the drought has had a detrimental impact upon small business income and employment levels, and has led to a decline in student and teacher numbers at local schools.²²⁹ It is likely that the drought may have expanded cotton growers' debt levels in the Namoi Valley, but statistics on that matter are not available.

This chapter has attempted to explore some of the key social implications that have emerged in the Namoi Valley as a result of the establishment of the cotton growing industry. The social impact of the cotton industry was arguably most apparent during the decade of the 1960s, with a significant population increase and a consequent housing boom occurring in the town of Wee Waa in particular. The cotton industry's demand for labourers to hoe the weeds from the cotton crops during the summer months had major ramifications for the Namoi Valley in the 1960s and 1970s. The brief but intensive summer cotton chipping season created a seasonal influx of as many as 2,000 people, many of whom forged temporary camps on the outskirts of Wee Waa. The pay and working conditions of the predominantly Aboriginal cotton chippers, as well as the

²²⁶ Centre for International Economics and Cameron Agriculture Pty Ltd, *The Australian Cotton Industry: An Economic Assessment*, p. 27.

²²⁷ Stacey Spanswick, Guy Roth, Tim Drew and Paula Jones, *2007 Drought Impact Study of Small Business in Wee Waa*, Narrabri: Cotton Catchment Communities Cooperative Research Centre, 2007, p. 4.

²²⁸ Robert Milliken and Lorrie Graham, *On the Edge: The Changing World of Australia's Farmers*, Sydney: Simon and Schuster, 1992, p. 72.

²²⁹ Spanswick, Roth, Drew and Jones, *2007 Drought Impact Study of Small Business in Wee Waa*, pp. 1-18.

substandard circumstances of the workers' camps, culminated in the strike action that occurred in January 1973. While the chippers' camps and the strike were perhaps the most obvious aspects of cotton's social impact in the Namoi Valley, the issue of cotton growers' debt levels remains an important one, although the perception of cotton growing as a highly prosperous industry persists.

CONCLUSION

This chapter presents a summary of the thesis, which is followed by an explanation of the contribution of the thesis to the theoretical perspective of commodity systems analysis and to the literature on the political economy of agriculture.

In Chapter One of this thesis, a review of the literature on the political economy of agriculture identified the following research objectives: 1) to investigate the introduction of industrialised cotton production to the Namoi Valley as a case study of the internationalisation of industrialised agriculture in order to contribute to the existing body of literature on the development and internationalisation of agriculture; and 2) to examine the social and environmental implications of industrialised cotton production in the Namoi Valley as a case study that will expand existing knowledge of the environmental and social impact of industrialised agriculture in different contexts. These research objectives are discussed at the end of this chapter in the context of the contribution made by this thesis to agrarian political economy.

Chapter Two of this thesis sought to explore the origins and development of industrialised cotton production in California, where industrialised production emerged in the 1920s. An historical analysis was employed in that chapter to contrast industrialised cotton production in California with two systems that had previously been key to the production of cotton within the United States, namely slavery and sharecropping. The advantage of employing such an approach in the analysis of the development of industrialised cotton production in California is that the characteristics of that industrialised form of cotton production were illuminated when contrasted with the two earlier American cotton production systems.

In Chapter Two, the comparison of cotton production under slavery and sharecropping in America's South with the later development of industrialised cotton

production in California has demonstrated the significance of the changes that industrialisation represented for the growing of cotton. The analysis in Chapter Two has shown that, under slavery in the South, cotton production was carried out with basic hand tools, such as hoes, and the crop was planted and harvested by hand. Cotton production remained labour-intensive for sharecroppers in the South, although they benefited from the introduction of mule-drawn ploughs and other implements used to till the soil. The historical perspective presented in Chapter Two demonstrated that industrialised cotton production in California was radically different from how cotton had traditionally been grown within the United States.

Foremost among the factors identified as key to the development of industrialised cotton production in California was the construction of irrigation schemes in that state by the early twentieth century. Cotton growing had historically been confined to sub-tropical climates where the crop would receive both high rainfall and high temperatures, as was the case in America's southern states. The construction of dams and vast irrigation systems made possible the production of agricultural crops in arid areas of California, and stimulated a Californian cotton boom in the 1920s. The emergence of cotton production in California contradicted established ideas about how and where cotton could be grown.

While irrigation networks made cotton growing feasible in California, the availability of the tractor was a pivotal factor in the industrialisation of Californian cotton production. The use of the tractor in land tilling, cultivating and planting operations enabled cotton to be produced on a large scale in California. With large-scale cotton growing established in California by the mid-1920s, the industrialisation of cotton production in California continued to develop during the first half of the twentieth century. As the analysis in Chapter Two has shown, the context of the Second World War was critical in propelling the advancement of new technologies and products

that were rapidly adopted by Californian cotton growers. These products included pesticides, such as DDT, herbicides, such as 2,4-D and petroleum-based fertilisers.

The development of the mechanical cotton harvester was particularly important to the industrialisation of Californian cotton production, although an efficient spindled model was not available commercially until 1941. The adoption of the mechanical cotton picker led to the creation of other products designed to aid in the mechanisation of the cotton harvest, such as chemical defoliant. The application of chemical defoliant caused the cotton plants to shed their leaves and ensured that the fibre could be machine harvested without being tainted by foliage. The adoption of the mechanical cotton harvester also had an influence upon the type of cotton plants that would be sown in California. Plant breeding was conducted through Agricultural Experiment Stations in the United States to create cotton plants that would grow the fibre-producing bolls at a height that was virtually uniform. This regularity in the height of the cotton bolls assisted in increasing the efficiency of the mechanical cotton harvester.

As well as examining the key factors in the industrialisation of cotton production in California, the historical analysis presented in Chapter Two highlighted the significance of the changes that industrialisation represented for the role of labour in cotton production. Where cotton production in America's South had previously relied upon slave labour, and sharecroppers had been dependent upon the labour of the family unit, the labour situation in California was quite different. The employment of cheap foreign labour had been a feature of Californian agriculture from the 1880s and, between that period and the 1940s, labourers from China, India, Japan, Armenia, the Philippines and Mexico had at various times provided Californian farmers with a low-wage workforce.

The development of large-scale cotton production in California from the 1920s created a demand for a substantial number of workers. However, it was only for short

periods of the cotton season, principally during the harvest, that this large labour pool was required. The mechanisation of the cotton harvest began to occur with the availability of the spindled cotton picker from 1941, but from its establishment in the 1920s cotton grown in California had been hand-picked, primarily by workers from Mexico. The reliance on cheap Mexican labour for the production of cotton and other agricultural crops in California was formalised through the creation of the Bracero Program in 1942. Introduced to overcome the labour shortages during the Second World War, the Bracero Program gave Californian cotton growers considerable control over the wage rates received by the Mexican workers. On cotton farms in California, a labour hierarchy emerged, exemplified by a small permanently employed on-farm workforce which was supplemented during the harvest by a large pool of low-wage Mexican workers.

The analysis in Chapter Two demonstrated that the key features of industrialised cotton production in California included large-scale production, low-wage labour, and the use of irrigation water, machinery, chemical fertilisers, pesticides and herbicides. The chapter found that Californian cotton production was characterised by the substitution of machinery and chemicals for labour. The historical perspective presented in Chapter Two has highlighted the transformation of cotton growing in the United States from a traditionally labour-intensive activity in the South to one which, in California, was capital-intensive.

Chapter Three offered an historical analysis of cotton growing within Australia, and examined how industrialised cotton production was introduced to the Namoi Valley. In Chapter Three, the historical analysis of cotton growing in Australia prior to the 1960s demonstrated that the intermittent production of the crop was determined by particular economic, political, social and cultural factors. This thesis has shown that, while cotton growing remained a labour-intensive activity, the cost of labour was one

economic factor that was of fundamental importance. In terms of social and cultural considerations that affected pre-1960s cotton production in Australia, racist attitudes during the colonial period have been shown to have influenced the debate about the composition of a potential labour pool to foster the growing of cotton crops. However, the failure of cotton production to become a significant agricultural industry in Australia before the 1960s has been attributed to the issue of labour not being sufficiently inexpensive to lead to the development of a permanent cotton growing industry.

Apart from the issue of labour costs, the intermittent nature of pre-1960s cotton growing in Australia was influenced by the provision and withdrawal by the federal and Queensland state governments of economic incentives designed to encourage cotton production. The discontinuity in cotton growing in Australia was also determined by political economic factors internationally, such as the influence of the American Civil War and the Korean War upon the supply, demand and price of cotton, which led to temporary upsurges in production in Australia. The Great Depression, too, had stimulated an upsurge in Australian cotton production, not through rising demand or increasing cotton prices, but by reducing significantly the cost of labour.

The detailed examination in Chapter Three of the introduction of industrialised cotton production to the Namoi Valley has shown the importance of localised factors in the establishment of cotton growing in that region. The small group of Californian migrants who founded industrialised cotton growing in the Namoi Valley had selected that region specifically because the Namoi Valley's soil, climate and even its location in relation to the equator were believed to be optimum for cotton growing. The availability of a supply of irrigation water and the comparatively inexpensive price of land in the Namoi Valley were similarly important considerations that influenced the Californians' selection of that particular district.

In addition to these localised factors, Chapter Three highlighted the extent of government involvement in the founding of industrialised cotton production in the Namoi Valley. The completion of the New South Wales government's construction of the Keepit Dam by 1960 was crucial to the subsequent development of irrigated cotton growing in the Namoi Valley. The state government's funding of the Myall Vale Experiment Farm, later known as the Narrabri Agricultural Research Station, was also fundamental. It was the successful cotton growing trials conducted at the Experiment Farm which had alerted one of the Californian founders of the Namoi Valley's cotton industry to the district's potential for producing the crop. However, the federal government's provision of a cotton bounty was the overriding factor that drew the group of Californian migrants to actively investigate the prospect of cotton growing in Australia.

Chapter Three also explored aspects of government influence and involvement in the Namoi Valley's cotton growing industry subsequent to the founding of the industry. One case highlighted in Chapter Three concerned the establishment of the Auscott Pty Ltd cotton growing venture by three Americans financed by J.G. Boswell Pty Ltd. By encouraging, facilitating and approving the transfer of water licences and soldier-settlement land to the Auscott enterprise, the New South Wales government demonstrated an extraordinary determination to secure a cotton growing industry in that region.

Chapter Four presented an analysis of the industrialised cotton production system established within the Namoi Valley during the 1960s. The chapter examined the growing, harvesting and processing elements of the industrialised cotton production system, as well as exploring the role of labour within that system. Through the use of an historical perspective, Chapter Four has provided an analysis of how the

industrialised cotton growing system developed in the Namoi Valley, and how that system has been modified since the 1960s.

In order to investigate how the Namoi Valley's industrialised cotton production system first developed, Chapter Four examined the cotton growing techniques introduced by Paul Kahl and Frank Hadley, the two Californian farmers who initiated the American migration to the Namoi district during the early 1960s. The examination of Kahl and Hadley's preparations for growing cotton in the Namoi Valley revealed that the pair sought to replicate precisely the Californian cotton production techniques with which they were familiar. As well as employing Californian cotton growing methods, Kahl and Hadley imported machinery from California that was integral to industrialised cotton production, such as a mechanical cotton harvester and siphons used to irrigate the crop. The industrialised methods used by Kahl and Hadley were of importance because, as the 1960s progressed, local farmers began to grow cotton and it was the example of Kahl and Hadley that was closely followed. Chapter Four has demonstrated that the origins of industrialised cotton production in the Namoi Valley can be traced to the cotton growing efforts of Paul Kahl and Frank Hadley at the beginning of the 1960s.

The analysis in Chapter Four has shown that the introduction of industrialised cotton production in the 1960s entailed significant land clearing on those Namoi Valley farms where the crop was grown. As well as clearing paddocks of vegetation in preparation for cotton production, substantial earthworks were involved in the construction of on-farm irrigation infrastructure. Heavy machinery was used to create storage dams on farms, to carve channels for the passage of irrigation water, and to level the land to a precise gradient to permit the irrigation water to flow evenly. Chapter Four demonstrated that, as in California, the key components of industrialised cotton production in the Namoi Valley comprised the use of irrigation water, and a range of

heavy machinery and chemicals, including herbicides, pesticides, fertilisers and defoliants.

Chapter Four identified a number of modifications that have occurred since the 1960s in relation to the growing phase of the Namoi Valley's industrialised cotton production system. One of the most significant modifications identified concerned the application of pesticides. During the 1960s, Namoi Valley cotton crops in the growing stage were frequently sprayed with the pesticides DDT and Endrin, with those chemicals being applied later in the growing season by crop-dusting aircraft. The analysis in Chapter Four revealed how this over-reliance on DDT and Endrin in the Namoi Valley has been replaced by a more complex system of pesticide rotation, which incorporates principles of 'Integrated Pest Management' in order to avoid insect pests developing resistance to a particular chemical. Chapter Four also examined the development of genetically modified cotton varieties by Monsanto. The chapter highlighted that, although the use of Monsanto's Bt-based cotton varieties may decrease the need for pesticide applications during the growing season, Monsanto's Roundup Ready cotton varieties were designed to withstand more frequent application rates of the Monsanto-owned herbicide Roundup. Chapter Four demonstrated that the use of chemicals during the growing phase of cotton production in the Namoi Valley has undergone considerable change since the 1960s, but that herbicides, pesticides, fertilisers and defoliants remain integral to the production of the crop.

The examination in Chapter Four of how the harvesting and processing stages of the Namoi Valley's industrialised cotton production system have been modified since the 1960s has highlighted changes to machinery. Where a single-row mechanical cotton picker was used to harvest the first industrialised cotton crop in the Namoi Valley in 1962, harvesters capable of picking six rows at once have been used more recently on the Namoi Valley's larger cotton farms. The development of multi-row equipment and

the expanded power, capacity and speed of much of the heavy machinery used in the production of cotton has been shown in Chapter Four to have contributed over time to a greater efficiency in the harvesting and processing of the Namoi district's industrialised cotton crops.

In Chapter Four, the analysis of labour in relation to the Namoi Valley's industrialised cotton production system has demonstrated that, as in California, there has been a tendency to substitute machinery and chemicals for labour. For example, the chapter highlighted how, since the 1960s, increased mechanisation of aspects of the Namoi Cotton Co-operative's ginning operations has reduced the need for labour. The analysis of labour with regard to the Namoi Valley's industrialised cotton production system in Chapter Four identified some similarities with the labour structure that had emerged on Californian cotton farms. The labour hierarchy that had developed in California was a racialized one, with a small, white, permanently employed on-farm workforce that was supplemented during the harvest by a large pool of low-wage Mexican workers. The labour requirements were different in the Namoi Valley, as cotton was industrialised from the outset and, even from the early 1960s, the crops were harvested by machine, not by hand. However, the removal of weeds between the cotton plants prior to harvesting was one element of industrialised cotton production in the Namoi Valley which was labour-intensive. This manual work, known as cotton chipping, was performed in the Namoi Valley in the 1960s and early 1970s primarily by itinerant Aboriginal workers. In that period, there was evidence of a racialized labour hierarchy in the production of cotton in the Namoi Valley, with Aboriginal workers undertaking the labour-intensive work of cotton chipping, while the operation and maintenance of machinery was done by the small, white, permanently employed on-farm workforce. Chapter Four examined how the cotton chipping workforce in the Namoi Valley has been altered over time, with increasing numbers of white women

employed during the 1990s, and the diminishing need for cotton chipping labour following the development of Monsanto's Roundup Ready cotton varieties.

Chapter Four contended that industrialised cotton production within the Namoi Valley can be understood as a 'cotton mode of production', which operates as a component of the wider capitalist mode of production.¹ The historical analysis of the growing, harvesting and processing elements of the Namoi Valley's cotton mode of production in Chapter Four indicated that these elements have undergone only minor modifications since the 1960s. Chapter Four has demonstrated that the Namoi Valley's contemporary cotton mode of production has retained many of the fundamental structures and methods that were introduced from California at the beginning of the 1960s.

Chapter Five sought to investigate from a political economy perspective the impact of the introduction of industrialised cotton production to the Namoi Valley. The chapter examined how the geography of the development of industrialised cotton production was largely determined by the issue of irrigation water. The establishment of industrialised cotton production on farms in the Namoi Valley was concentrated near the Namoi River and the towns of Wee Waa and Narrabri. The proximity to the Namoi River was crucial, as the river and its adjoining creeks were used to deliver the irrigation water that was released and flowed downstream from the Keepit Dam. Although the production of cotton occurred in specific clusters within the Namoi Valley, Chapter Five has shown that the impact of the introduction of industrialised cotton production extended beyond those farms directly involved in the growing of the crop.

¹ The 'mode of production' has been defined as 'how the economy is organised for the purpose of producing goods and services. It involves the use of tangible *forces of production*, comprising the raw materials, capital goods, labour power, and technology. It also involves particular *relations of production*, concerned with how people are organised (e.g. whether by authoritarian/hierarchical means or in democratic/participatory ways).' See Stilwell, *Political Economy: The Contest of Economic Ideas*, p. 390, emphasis in original.

The political economy perspective employed in Chapter Five demonstrated that the introduction of industrialised cotton production to the Namoi Valley initiated an increased involvement of corporate capital in the Namoi district. The industrialised nature of the cotton growing method introduced by the district's American migrants provided opportunities for the entry of corporate capital. The variety of inputs required to produce cotton according to that industrialised method led to the creation of businesses within the Namoi Valley to supply and service the district's cotton growing industry. These businesses included agricultural machinery dealerships, cotton ginning and marketing firms, cottonseed and chemical supply companies, agronomy services, and firms specialising in the aerial spraying of chemicals. As a consequence of the development of industrialised cotton production in the district, many of the world's leading biotechnology, machinery, seed and agrochemical corporations have dealerships or agents located in the Namoi Valley. Chapter Five highlighted that the economic success of industrialised cotton production established cotton farmers as a powerful element within the Namoi Valley's petit bourgeoisie.

Chapter Six investigated the environmental consequences of industrialised cotton production within the Namoi Valley. The chapter sought to provide an historical analysis of industrialised cotton production's environmental impact within the Namoi district by examining what information exists in the public domain on that subject. Beginning from the introduction of cotton production to the Namoi Valley early in the 1960s, the chapter adopted a broadly chronological approach to the analysis of evidence drawn from a diverse range of published sources, including environmental reports, scientific journals and bulletins, and local newspaper articles, as well as unpublished academic theses. While the local newspaper articles may be viewed as 'grey literature', they have been used in Chapter Six as indicators of when and why environmental concerns emerged regarding cotton growing in the Namoi Valley.

The documentary analysis in Chapter Six demonstrated that aspects of industrialised cotton production's environmental impact in the Namoi Valley have been studied, but a comprehensive examination of cotton production's environmental consequences over the decades since its introduction to the Namoi district in the 1960s has not been conducted. The analysis in Chapter Six indicated that much of the published environmental research on the subject has been undertaken in response to the emergence of particular problems perceived in relation to industrialised cotton production in the Namoi Valley, rather than being the outcome of long-term environmental monitoring. Chapter Six highlighted the absence of community reaction in the Namoi Valley towns of Wee Waa and Narrabri to the environmental impact of cotton production.

Chapter Seven sought to explore the social implications of industrialised cotton production in the Namoi Valley through an historical analysis. The analysis demonstrated that cotton's social ramifications were most pronounced in the Namoi Valley town of Wee Waa during the 1960s and early 1970s. The migration of American cotton farmers to the Namoi Valley, and the subsequent development of cotton production, had been concentrated near to Wee Waa, and it is for that reason that the town was selected as the focal point of the analysis in Chapter Seven. The chapter demonstrated that the social ramifications of the introduction of industrialised cotton production included a sharp rise in the population and a housing boom for Wee Waa during the 1960s.

Chapter Seven has shown that the introduction of industrialised cotton production created a demand for labour within the Namoi district, although it was principally a seasonal demand. During the first decades of cotton being produced in the district there was some discord between Namoi Valley locals and the American cotton farmers. The labour requirements of the cotton farmers in the summer months saw an

influx of up to 2,000 itinerant workers in the town of Wee Waa in the 1960s and 1970s who were employed as cotton chippers. Many of those workers established temporary camps on the outskirts of the town for the duration of the summer cotton chipping season. The lack of basic facilities at the camps was one of a number of issues that led to the occurrence of a strike by cotton chippers in January 1973. The analysis of the strike was used in Chapter Seven to explore the issue of labour in the context of the social implications of industrialised cotton production. The examination of cotton farmers' debt levels in Chapter Seven also highlighted the financial burden placed upon farmers by the high costs involved in industrialised agriculture.

The following section presents an explanation of the contribution of this thesis, firstly, to the literature on the theoretical perspective of commodity systems analysis, and, secondly, to the field of research on the political economy of agriculture.

Contribution of the Thesis to Commodity Systems Analysis

This thesis has used an historical analysis to examine the empirical case study of industrialised cotton production within the Namoi Valley. As explained in Chapter One, the purpose of this methodological approach was to investigate whether the theoretical perspective of commodity systems analysis would benefit from the application of an historical analysis, and the examination of the historical development of agricultural commodity systems. In particular, this thesis sought to investigate whether the application of an historical analysis may enable the theoretical perspective of commodity systems analysis to reveal more about a particular commodity system than it otherwise would.

The empirical case study explored in this thesis has presented insights that may have implications for the theoretical perspective of commodity systems analysis. With regard to commodity systems analysis, the key findings from this thesis are drawn from the material analysed in Chapter Four. Chapter Four presented an historical analysis of

the founding of the growing, harvesting and processing components of the Namoi Valley's industrialised cotton production system, and examined how that system has been modified since the 1960s. The historical analysis of the Namoi Valley's industrialised cotton production system revealed: 1) that the growing, harvesting and processing components of that system have undergone only minor modifications since the 1960s; and 2) that the contemporary industrialised cotton production system in the Namoi Valley retains many of the fundamental structures and methods that were introduced when the cotton production system was founded at the beginning of the 1960s.

In *Manufacturing Green Gold*, Friedland, Barton and Thomas had limited their use of an historical analysis to a section of their chapter on the social organisation of lettuce production, where they offered 'a brief examination of the history of lettuce production to illuminate the present production process.'² In contrast, the empirical case study examined in this thesis indicates that there are certain aspects of the contemporary industrialised cotton production system in the Namoi Valley that can only be accounted for through an historical analysis. For example, the flood irrigation method, which is a feature of the contemporary cotton production system in the Namoi Valley, is a legacy of the founding of industrialised cotton production in the Namoi district during a period when irrigation water was seen to be in abundance.

The empirical case study explored in this thesis substantiates Friedland's identification of 'sectoral organization and the state' as an important additional research focus for commodity systems analysis.³ However, for this thesis, it was the application of an historical analysis that revealed the significance of state involvement in relation to industrialised cotton production in the Namoi Valley. Specifically, the use of an

² Friedland, Barton and Thomas, *Manufacturing Green Gold*, p. 65.

³ Friedland, 'Reprise on Commodity Systems Methodology', p. 82.

historical analysis revealed that the establishment of industrialised cotton production through the migration of American cotton growers to the Namoi Valley was largely motivated by the provision of state support in the form of a federal cotton bounty. This thesis has explored an agricultural commodity system which owes its existence to the involvement of the state in its founding, but that aspect may not have been revealed without the application of an historical analysis.

This thesis has demonstrated that the contemporary industrialised cotton production system in the Namoi Valley retains many of the fundamental structures and methods that were introduced when the cotton production system was founded at the beginning of the 1960s. It must be acknowledged that such a pattern may or may not be presented by other agricultural commodity systems. Nonetheless, the findings from the empirical case study examined in this thesis suggest that the theoretical perspective of commodity systems analysis may benefit from giving attention to the historical development of agricultural commodity systems and the application of an historical analysis.

Contribution of the Thesis to the Political Economy of Agriculture

This thesis has identified key themes drawn from the existing literature on the political economy of agriculture, which were examined in Chapter One, and has attempted to explore and contribute to a deeper knowledge of those issues through the empirical study of industrialised cotton production.

One of the key themes in agrarian political economy which this thesis has sought to address concerns the adverse environmental and social impact of industrialised agriculture. With regard to the environmental implications of industrialised agriculture, a survey of the literature indicated that the sustainability of industrialised agricultural production has been a critical issue in agrarian political economy since the development

of the discipline in the 1970s.⁴ Studies in agrarian political economy have emphasised that environmental degradation has been exacerbated by industrialised agriculture.⁵ Declining levels of ecological biodiversity, soil compaction and pesticide and fertiliser contamination are some of the environmental problems that existing research has linked to industrialised agricultural production.⁶

This thesis collated and examined evidence from diverse sources to investigate what is known of the environmental impact of industrialised cotton production in the Namoi Valley. Potentially the most critical environmental issue the documentary analysis revealed was that substantial chemical contamination of the cotton growing areas of the Namoi Valley had been recorded during the 1960s and 1970s. The heavy use of DDT on cotton crops in that period had resulted in the widespread contamination of livestock, fish, wildlife, soil and water courses within the Namoi district's cotton producing areas. Despite this extensive contamination, the documentary analysis in this thesis has demonstrated that no comprehensive long-term study has been conducted on the environmental impact of industrialised cotton production in the Namoi Valley.

This thesis has made an important contribution to agrarian political economy by expanding knowledge of the environmental impact of industrialised agriculture through the empirical study of industrialised cotton production. Moreover, it has highlighted the absence of a sustained investigation into the environmental impact of industrialised cotton production in a local area where widespread chemical contamination had been registered as a result of that production. It has also revealed the lack of community reaction to the environmental impact of cotton production. In this way, this thesis has

⁴ Olkowski and Olkowski, 'Insect Population Management in Agro-Ecosystems', p. 368.

⁵ Ploeg, 'The Food Crisis, Industrialized Farming and the Imperial Regime', p. 100.

⁶ Woodhouse, 'Beyond Industrial Agriculture? Some Questions about Farm Size, Productivity and Sustainability', pp. 438-439.

contributed to the study of the political economy of agriculture by underscoring the critical nature of research on the environmental consequences of industrialised agriculture.

As well as exploring the environmental impact of industrialised agriculture, this thesis has sought to address the issue of the adverse social implications of industrialised agriculture. A survey of the agrarian political economy literature indicated that existing research has examined diverse aspects of the social impact of industrialised agriculture. For example, the growing indebtedness of many farmers has been linked to the increased input and production costs required to engage in industrialised forms of agriculture.⁷ Some studies have highlighted the impact of industrialised agriculture upon rural societies, where it has been observed to have accelerated the trend toward the concentration of land ownership and control.⁸ Other works have examined the social consequences of industrialised agriculture in terms of the human health impact of the pesticides and fertilisers used in industrialised farming.⁹ Another aspect of the social implications of industrialised agriculture, and one that has been fundamental to agrarian political economy since its inception, is the impact of industrialised agriculture on rural labour.¹⁰

This thesis has contributed insights on key aspects of the social impact of industrialised agriculture, including the issue of rural labour, through its analysis of industrialised cotton production in the Namoi Valley. This thesis has expanded knowledge of the economic burden placed upon farmers involved in industrialised agriculture by exploring that issue in relation to the case study of cotton in the Namoi

⁷ Ploeg, 'The Food Crisis, Industrialized Farming and the Imperial Regime', p. 100.

⁸ Woodhouse, 'Beyond Industrial Agriculture? Some Questions about Farm Size, Productivity and Sustainability', p. 439.

⁹ Longo and York, 'Agricultural Exports and the Environment: A Cross-National Study of Fertilizer and Pesticide Consumption', p. 82.

¹⁰ Newby, 'The Rural Sociology of Advanced Capitalist Societies', pp. 3-30.

region. The empirical case study in this thesis offered a depth of analysis at the local level of the social impact of the introduction of a form of industrialised agriculture. By examining industrialised cotton production from its establishment in the Namoi Valley this thesis has revealed the social discord and changes to population and housing that were created by the introduction of this particular type of industrialised agriculture.

The attention to agricultural labour in this thesis has also addressed the question of the social impact of industrialised agriculture. This thesis has examined the establishment of temporary workers' camps on the outskirts of the town of Wee Waa within the Namoi Valley, and the occurrence of a strike by cotton workers in the Namoi Valley during January 1973. The circumstances of the strike were used to illuminate the labour hierarchies created in this case of industrialised agriculture, and the working conditions of the seasonal labourers engaged in industrialised cotton production. Through the exploration of the creation of the demand for seasonal labour, the social impact of the influx of seasonal labourers, and the circumstances of the strike by those seasonal workers, this thesis has presented an empirical case study that has extended knowledge of the social implications of industrialised agriculture for rural labour.

The influence of state policy upon agriculture was identified as a key theme in the literature on agrarian political economy and this thesis has endeavoured to explore it in relation to the Australian context. The existing agrarian political economy literature has examined crucial changes that occurred to state involvement in Australian agriculture during the twentieth century. State policy on agriculture within Australia had historically been protectionist, with both subsidies and tariffs in place to support the agricultural sector, which was central to the national economy.¹¹ After the Second World War, state investment in agriculture declined as the agricultural sector's

¹¹ Lawrence and Cheshire, 'The social consequences of the rural reform agenda', p. 340.

contribution to GDP decreased.¹² The dismantling of tariffs from the 1970s and the rise of neo-liberalism from the 1980s saw deregulation replace protectionist state policy on agriculture.¹³

Through the exploration of the case study of cotton, this thesis has contributed to perspectives of the shift in state policy on Australian agriculture. The investigation of industrialised cotton production in this thesis has highlighted a case of state involvement in agriculture that is quite distinct from the way many other agricultural industries developed in Australia. Where most other agricultural industries have long histories in Australia from the period of white settlement, cotton production only became a substantial agricultural industry within Australia from the 1960s.

This thesis has shown that state support in the form of a federal cotton bounty had been in place for much of the first half of the twentieth century. The provision of that federal cotton bounty ultimately proved crucial to the fostering of an Australian cotton industry during the 1960s. The establishment of an Australian cotton growing industry occurred at a crucial point in terms of state policy regarding agriculture, as the federal cotton bounty was eliminated in the early 1970s. Through the analysis of the federal cotton bounty and the elimination of that subsidy in the early 1970s, this thesis has contributed to an understanding of the transformation that has occurred in relation to government involvement in the Australian agricultural sector. This examination of cotton has contributed to agrarian political economy an empirical case study which encapsulates state involvement in agriculture during a period of significant policy change.

In addition to state agricultural policy, this thesis has sought to address a subject that has been fundamental to agrarian political economy: the industrialisation of

¹² Lawrence, 'Agribusiness and Inequality: Changes in the Bush', p. 86.

¹³ Lawrence and Cheshire, 'The social consequences of the rural reform agenda', pp. 340-342.

agriculture. Industrialisation was a key consideration in the earliest works on the political economy of agriculture.¹⁴ Researchers traced the roots of the industrialisation of agriculture in California, and investigated its development and characteristics.¹⁵ Crucially, in the study of agricultural industrialisation from the perspective of agrarian political economy, it was recognised that the industrialisation of agriculture was not merely a question of technological development. As Michael J. Troughton has explained, for the agricultural sector, ‘the primary expression of industrialization involves the adoption of models of economic and technological efficiency based on economies of scale, specialization of production and capital intensification’, but the process of agricultural industrialisation ‘is also one of social and political change.’¹⁶

In the survey of the agrarian political economy literature on agricultural industrialisation in Chapter One, a gap was identified in relation to the process by which industrialised agriculture has proliferated, particularly through the internationalisation of industrialised agriculture. This thesis has attempted to address that gap by investigating the introduction of industrialised cotton production to the Namoi Valley as a case study of the internationalisation of industrialised agriculture. The case study explored in this thesis suggests that, rather than being a straightforward or direct development, the internationalisation of industrialised agriculture appears to be a multifaceted process, and one which bears some similarities to Troughton’s observations of the complexities of agricultural industrialisation.¹⁷

¹⁴ Newby, ‘The Rural Sociology of Advanced Capitalist Societies’, pp. 3-30.

¹⁵ Buttel, Larson, and Gillespie Jr., *The Sociology of Agriculture*, p. 95; Friedmann, ‘Changes in the International Division of Labour: Agri-food Complexes and Export Agriculture’, pp. 65-87.

¹⁶ Troughton, ‘The Role of Marketing Boards in the Industrialization of the Canadian Agricultural System’, p. 368.

¹⁷ Troughton, ‘The Role of Marketing Boards in the Industrialization of the Canadian Agricultural System’, p. 368.

As a case study of the internationalisation of industrialised agriculture, this thesis has demonstrated that the introduction to the Namoi Valley of the Californian model of industrialised cotton production was highly complicated, even though it involved the migration to the Namoi district of Californian farmers experienced in cotton growing. This thesis has shown that it was only through the convergence of a range of political and geographic factors that the establishment of industrialised cotton production occurred in the Namoi Valley. Despite the fact that the founders of the industry in the Namoi Valley had direct experience of growing cotton in California, it is unlikely that the establishment of industrialised cotton production in the Namoi district would have occurred without government support at the federal, state and local level.

In revealing the complexity involved in this specific case study of the internationalisation of industrialised agriculture, this thesis raises the critical issue of how that process has occurred in other contexts. Although this thesis has contributed to a deeper understanding of the internationalisation of industrialised agriculture, it is clear from the case study of cotton explored in this study that the internationalisation of industrialised agriculture is an area of research in agrarian political economy that requires further investigation.

In summary, this thesis has made an important scholarly contribution by expanding knowledge in key areas of agrarian political economy; namely, the social and environmental impact of industrialised agriculture, the influence of state policy upon agriculture, and the internationalisation of industrialised agriculture. This thesis has also made an important contribution to the theoretical perspective of commodity systems analysis, with the findings from the empirical case study pointing to the potential advantages for the perspective from the investigation of the historical development of agricultural commodity systems and the application of an historical analysis.

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