LOWVELD COTTON:
A POLITICAL ECOLOGY OF AGRICULTURAL FAILURE IN NATAL AND ZULULAND, 1844-1948

by

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Abstract

This dissertation is a study of agricultural failure. It follows the efforts of settlers, then scientists, to impose cotton as a commodity crop in the eastern region of South Africa, known today as KwaZulu-Natal. Touted as a commodity crop capable of remaking land and life in this region in the 1850s, the 1860s, at the turn of the century, and again in the 1930s, cotton never achieved more than marginal status in the agricultural economy. Its story is one of historical amnesia: although faith in the region's cotton prospects dipped following each spectacular failure, it was routinely resurrected once previous failures had been accounted for, or memories of them had faded.

Two crucial issues are at the centre of this episodic history. First, I explore the enthusiasms that underpinned successive efforts to introduce cotton, the logistics of planned expansion, and the reasons for the repeated collapse of cotton-growing schemes. My primary argument is that cotton failed because colonists lacked the technology to overcome natural constraints to production, in the form of temperature, rainfall, soils and insect pests. Settlers and scientists could not remake the land, the climate, or the cotton plant to meet their needs or realize their dreams. They attempted to overcome obstacles to production through settlement schemes, new agricultural inputs, and breeding technologies, but were unable to conquer the ecological incompatibilities between theoretical ambition and practical cultivation. This dissertation stresses the limits of colonial agriculture when confronted with unsuitable growing conditions.

Second, I aim to unravel the side effects of the repeated failures of cotton production in Natal and Zululand. I turn the question of agricultural failure on its head to ask what was achieved through these repeated attempts to develop cotton as a commodity crop. I concentrate on the outcomes of these difficult and disappointing efforts at cotton cultivation – increased settler presence, stronger delineation between settler and African space, expanded state control into rural areas – and argue that, despite repeated failure, cotton facilitated important structural changes to the region's agricultural, political and economic landscape.

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List of Abbreviations

ARC-IIC	Agricultural Research Council – Institute for Industrial Crops
BBB	British Blue Books
BCGA	British Cotton Growing Association
BPP	British Parliamentary Papers
CEN	Department of Entomology
CNC	Chief Native Commissioner
CPC	Cotton Plantation Company
CSA	Cotton Supply Association
CSO	Colonial Secretary's Office
ECGC	Empire Cotton Growing Corporation
ENSO	El Niño Southern Oscillation Event
GG	Government Gazette
GH	Government House
GOV	Governor's Office
IMI	Secretary for Mines and Industries
KC	Killie Campbell Africana Library
LBD	Secretary for Agriculture
LDE-N	Department of Lands
LON	Department of Agricultural Education and Extension
LPS	Department of Irrigation
NA	National Archives of South Africa
NCC	Natal Cotton Company
NLSA	National Library of South Africa
NTS	Native Affairs Department
NVL	Ntambanana Valley Lands
PAR	Pietermaritzburg Archival Depot
PWD	Public Works Department
RHN	Department of Commerce and Industries
SGO	Surveyor's General Office
SNA	Secretary for Native Affairs
URU	Uitvoerende Raad

Note on isiZulu Orthography

In recent years, isiZulu speakers in South Africa have sought to reclaim their language from the phonetic transliterations and distortions perpetrated by newcomers seeking to render an oral language in writing. This poses an unavoidable challenge to historical scholars of the region. In this dissertation, I have attempted to use the standard contemporary orthography wherever possible. To maintain historical accuracy, I have used the anglicized version of names and places found in colonial contexts when quoting from these documents. Generally speaking, current practice has proper names and places preceded by 'u', and capitalizes the second letter: e.g. uThukela River. Prefixes also denote singular and plural, as well as noun classes.

Glossary

ilobola	bride-selling
imizi	homestead
indlu (plural *izind*lu)	huts/home
induna (plural *izinduna*)	headmen
inkosi (plural *izinkosi*)	king
isiZulu	Zulu language
isiXhosa	Xhosa language
umbila	maize
umfecane	early 19th century uprising
umnumzana	male head of household

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**This dissertation is dedicated to my parents,
for the lessons of perspective and balance,
and to Natalie, for everything else.**

Co-Authorship Statement

Matthew Schnurr was the primary investigator and author of this dissertation. Select interviews and focus groups undertaken at kwaJobe, uMboza and uNdumo in January and February 2005 were undertaken in collaboration with Dr. Raj Patel and Dr. Harald Witt of the University of KwaZulu-Natal, Durban.

Chapter 1
Introduction

This dissertation is a study of agricultural failure. It is premised on the notion that stories of failure can reveal as much about the intersections of nature, power, and politics as stories of success. Agricultural achievements – stories about the transformation of the desert into the sown, the clearing of forests, the draining of wetlands, the development of hybrid seeds – have been the focus of a great deal of scholarly work,[1] but agricultural failures have rarely engaged enthusiasm or critical scrutiny. This is unfortunate. In the developing world, agricultural failures far outnumbered colonial ventures that achieved sustained production and export. In Africa, colonial administrators hatched all manner of agricultural schemes designed to encourage the continent's farmers to produce commodity crops.[2] Almost all ended in failure, due to some combination of unsound planning, a misreading of the landscape, poor implementation, and African resistance. These failures deserve more prominence within the historical and geographical literature, for they are emblematic of the realities of colonial rule in Africa.

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[1] Mark Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Seattle, 1999); Ann Vilesis, *Discovering the Unknown Landscape: A History of America's Wetlands* (Washington DC, 1997); Jack Kloppenburg, *First the Seed: The Political Economy of Plant Biotechnology, 1492-2000* (Madison, 1988); Michael Williams, *Americans and their Forests: An Historical Geography* (Cambridge 1989); Michael Williams, *The Making of the South Australian Landscape: A Study in the Historical Geography of Australia* (London and New York, 1974); Henry Clifford Darby, *The Draining of the Fens* (Cambridge 1956); Graeme Wynn, *Timber Colony: An Historical Geography of Early 19th Century New Brunswick* (Toronto, 1981); Andrew Hill Clark, *The Invasion of New Zealand by People, Plants and Animal: The South Island* (New Brunswick, 1949); David J. Wood, *Making Ontario: Agricultural Colonization and Landscape Recreation before the Railroad* (Montreal, 2000).

[2] See for instance Ray Dumett, "Government Assisted Agricultural Development in West Africa: Cotton Growing Experimentation in Ghana in the Early 20th Century," *Agricultural History Review* 23 (1975): 156-172; H.A. Gemery and J.S. Hogendorn, "Comparative Disadvantage: The Case of Sugar Cultivation in West Africa," *Journal of Interdisciplinary History* 9 (1979): 429-449; R.X. Maxon, "Up in Smoke: Peasants, Capital and the Colonial State in the Tobacco Industry in Western Kenya, 1930-1939," *African Economic History* 22 (1994): 111-139; Harald Witt, "'Clothing the Once Bare Brown Hills of Natal': The Origin and Development of Wattle Growing in Natal, 1860-1960," *South African Historical Journal* 53 (2005): 99-122; Allen Isaacman and Richard Roberts, eds., *Cotton, Colonialism, and Social History in Sub-Saharan Africa* (Portsmouth, 1995).

This study is an historical geography of the failure of one crop, cotton, in one place, the region known today as KwaZulu-Natal (KZN) [Illustration 1.1].[3] Generally, one place, one crop micro-histories detail the benefits associated with the transformation of a particular landscape as newcomers implemented their designs upon a territory.[4] But the story of cotton in south-eastern Africa fascinates for other reasons. Cotton has never achieved significant status in the region: at its zenith it accounted for just over 4% of KwaZulu-Natal's exports.[5] Yet hundreds of settlers and scientists, many of them basically unfamiliar with the African environment, made determined and successive attempts to overcome the multiple obstacles to production that hampered cotton cultivation in this part of the world. This dissertation interrogates their efforts, and seeks to explain their failure.[6] It explores the enthusiasm that underpinned successive efforts to introduce cotton, the logistics of planned expansion, and the reasons for the repeated collapse of cotton-growing schemes. It is, in historian Allen Isaacman's terms, a study of historical amnesia, because although faith in the region's cotton

[3] This micro-focus runs contrary to the recent trend in agricultural history: the proliferation of studies that trace the spread of a single commodity across the globe. See for instance Sidney Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York, 1985); Larry Zuckerman, *The Potato: How the Humble Spud Rescued the Western World* (Boston and London, 1998); Stuart Lee Allen, *The Devil's Cup: Coffee, the Driving Force in History* (New York, 1999); Alan MacFarlane, *The Empire of Tea: The Remarkable History of the Plant that Took Over the World* (Woodstock, 2004). These studies are useful in highlighting the global linkages that underpinned the expansion of these commodities, but their broad coverage precludes longitudinal considerations.

[4] James McCann, *Maize and Grace: Africa's Encounter with a New World Crop, 1500-2000* (Cambridge, 2005); Stuart McCook, *States of Nature: Science, Agriculture, and the Environment in the Spanish Caribbean, 1760-1940* (Austin, 2002); Mintz, *Sweetness and Power: The Place of Sugar in Modern History*; Zuckerman, *The Potato: How the Humble Spud Rescued the Western World*.

[5] B. J. Leverton, *The Natal Cotton Company: A Study in Failure* (Pretoria, 1963).

[6] George E. Brooks, "Peanuts and Colonialism: Consequences of the Commercialization of Peanuts in West Africa, 1830-1870," *Journal of African History* 16 (1975): 17-54; Susan M. Martin, *Palm Oil and Protest: An Economic History of the Ngwa Region, South-Eastern Nigeria, 1800-1980* (Cambridge, 1988); Robert M. Maxon, "Where did the Trees Go? The Wattle Bark Industry in Western Kenya 1932-1950," *International Journal of African Historical Studies* 34 (2001): 565-584; Jonathan Crush, "The Culture of Failure: Racism, Violence and White Farming in Colonial Swaziland," *Journal of Historical Geography* 22 (1996): 177-197.

prospects dipped following each spectacular failure, they were routinely resurrected once previous failures had been accounted for, or memories of them had faded.[7]

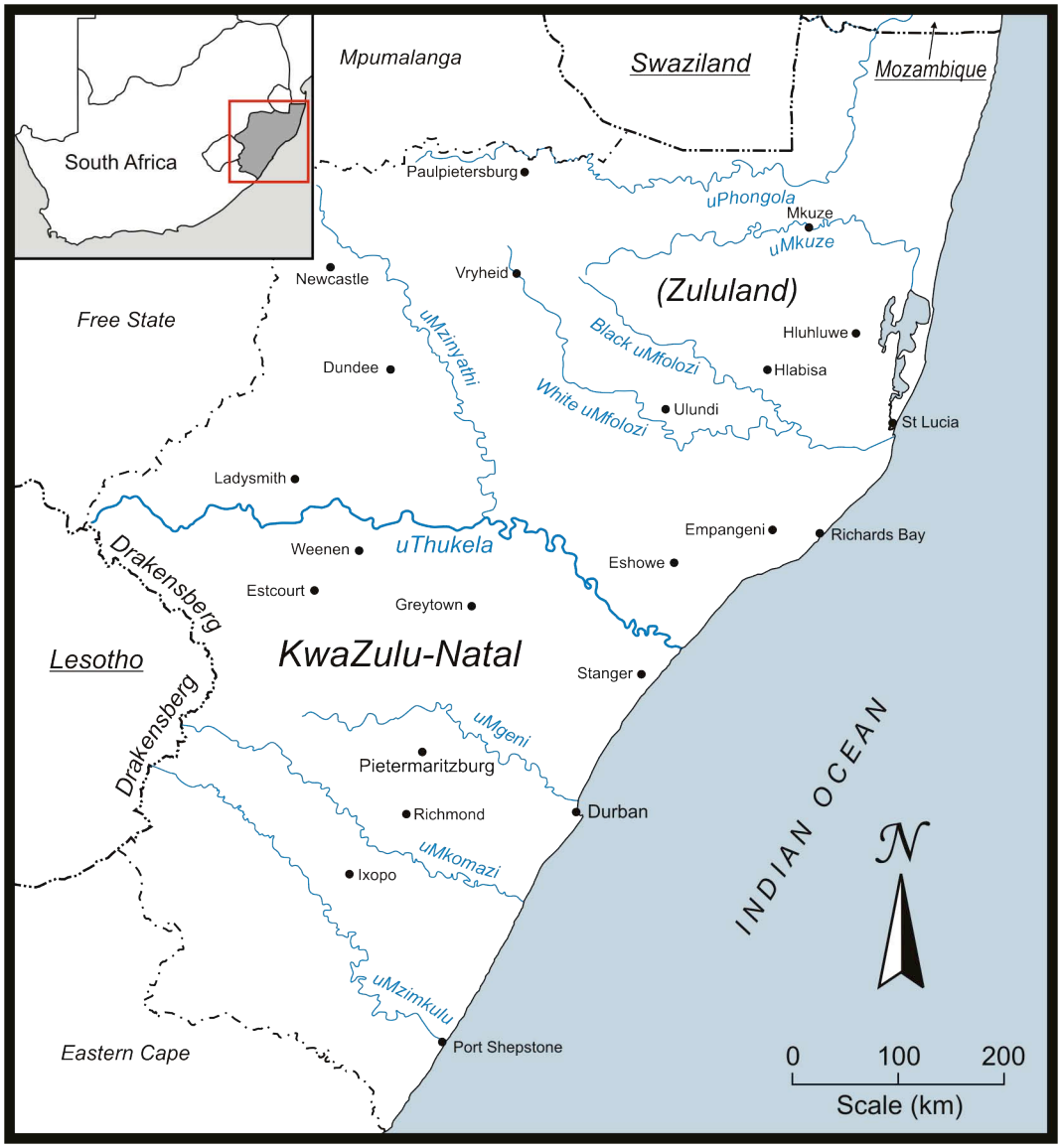

Illustration 1.1: Map of KwaZulu-Natal, South Africa.

Two crucial questions are at the centre of this discontinuous history of cotton in Natal and Zululand. First, how can we account for this persistent cycle of failure: what factors sustained faith in cotton and what explains its repeated collapse? My primary argument is

[7] Allen Isaacman, "Historical Amnesia, or, the Logic of Capital Accumulation: Cotton Production in Colonial and Postcolonial Mozambique," *Environment and Planning D: Society and Space* 15 (1997): 757-790.

that cotton failed because colonists lacked the appropriate technology to overcome natural constraints to production. Settlers and scientists could not remake the land in whatever fashion they wished. They attempted to overcome obstacles to production through settlement schemes, new agricultural inputs, and breeding technologies, but were unable to conquer the ecological incompatibilities between theoretical ambition and practical cultivation. This dissertation stresses the limitations of colonial agriculture when confronted with unfamiliar growing conditions. To emphasize ecological incompatibility is not to make the deterministic claim that cotton failed for environmental reasons alone, however. My goal is to integrate the social and natural elements of successive failures into a single, seamless narrative that accounts for cotton's century-long trajectory of booms and busts. This study highlights political, racial and economic factors as well as ecological obstacles to production in considering cotton's failure.[8]

Second, following James Ferguson, this dissertation aims to unravel the instrumental effects of the repeated failures of cotton production in the area of KwaZulu-Natal.[9] Inspired by Foucault's genealogy of the prison, Ferguson moves beyond simply chronicling the repeated disappointments of rural development in Lesotho, to shift the focus onto what was achieved. He highlights the 'side effects' that were major outcomes of development schemes that purportedly failed. In his view, "planned interventions may produce unintended

[8] This argument is inspired by J. M. Powell, *An Historical Geography of Modern Australia: The Restive Fringe* (Cambridge: Cambridge University Press, 1988). Powell demonstrates how Australia's history was mediated and framed by its physical environment. He points to soil conditions and regional climates that were important determinants in shaping settlement patterns, scientific policies and national identities. Settlers could not recreate these Australian landscapes as they chose: ecological obstacles – in the form of unfamiliar soils, insufficient rainfall, previously unknown pests – proved significant barriers to agricultural production. Colonists needed a significant boost from both science and politics to overcome these obstacles and entrench European agricultural crops and techniques. He refers to Australia as a 'restive fringe' to emphasize the non-human landscape's resistance to settler agriculture.

[9] James Ferguson, *The Anti-Politics Machine: "Development", Depoliticization, and Bureaucratic Power in Lesotho* (Minneapolis, 1994).

outcomes that end up, all the same, incorporated into anonymous constellations of control… that turn out in the end to have a kind of politically intelligibility".[10] Instead of dwelling on the agricultural failures themselves, Ferguson reverses the question to ask whose interests were served by these disappointments. This study similarly turns the question of agricultural failure on its head to ask what was achieved through these cotton failures, and what these outcomes reveal about the underlying motives of agricultural change in southern Africa. I concentrate on the outcomes of these cotton failures – increased settler presence, stronger delineation between settler and African space, expanded state control into rural areas – and argue that, despite its repeated failure, cotton facilitated important structural changes to the region's agricultural, political and economic landscape.

Cotton Episodes

Efforts to make cotton a staple crop in the south-east Africa were far from continuous between 1844 and 1948. Enthusiasm for and commitment to the plant surged and dissipated at irregular intervals. As a result, the narrative that follows is episodic rather than continuous. Each chapter focuses on a particular phase of cotton cultivation, and attempts to unravel what underpinned the particular enthusiasm for cotton at that time, what precipitated its collapse, and what resulted from the failure. Chapter 2 evaluates the crucial role cotton played in boosting Natal's colonial prospects in the wake of British annexation in 1844. The chapter begins by dissecting representations of Natal as a 'cotton colony'. A range of influences, imperial and local, helped fuel this idealized image: concern over Britain's cotton supply, the prevalence of wild cotton in the South African lowveld, and the success of early transplantation and experimentation efforts. Through these representations emerged a

[10] Ibid., 20.

particular construction of Natal as ideal cotton growing territory. In the second part of the chapter I investigate how these idealized representations became integrated into emigration schemes. I conclude that the failure of these emigration schemes was due, in large part, to the incompatibility of idealized representations of cotton's potential in Natal and the reality transplanted settlers encountered on the ground.

Chapter 3 focuses on the impacts of the Lancashire cotton famine in the late 19th century and contrasts two initiatives that sought to capitalize on the corresponding rise in the international price of cotton. A first push was focused on Zulu peasant cultivation. Natal's Secretary of Native Affairs, Theophilus Shepstone, encouraged cotton production as part of the colonial project of establishing a political order. When this venture collapsed, blame was heaped on Zulu growers, who were lambasted for adhering to traditional values deemed incompatible with capitalist economic development. I argue that environmental and economic factors – more than cultural ones – explain the failure of this scheme. A second push for cotton followed soon after. White settlers rushed into the uMkhomanzi Valley, whose suitability for cotton had been proven by Zulu cultivation efforts. Production surged while prices remained high but bottomed-out quickly once they dropped, leading to a mass exodus of settlers after only a handful of seasons. This second push for cotton thus fits better within the broader pattern of satellite production that characterized commodity networks during the Lancashire famine.

Chapters 4 and 5 treat the Zululand cotton boom of the 1920s, the most successful period in the region's cotton history. In Chapter 4, I chronicle the mounting enthusiasm for cotton that characterized the 1910s and 1920s. My primary aim is to understand how cotton came to figure as centrally as it did in national agricultural priorities. I argue that cotton

emerged as a preferred crop within the new Union of South Africa because it fit well within the political and ideological priorities of the new white settler state. Chapter 5 evaluates the abrupt and devastating failure of the Zululand cotton boom. I survey the combined devastation wrought by flood, drought and insects, alongside labour shortages, inadequate transport, and unfavourable international markets. I conclude that ecological obstacles to production were the ultimate cause behind the collapse of the Zululand cotton boom.

Chapter 6 shifts attention to the science of cotton breeding. I examine the Empire Cotton Growing Corporation's breeding program at Barberton, which was designed to overcome the ecological obstacles that had hampered previous cultivation attempts. First, I focus on how the Corporation made use of its trans-national scientific networks to achieve success with insect-resistant breeding. Then, I emphasize the local character of this cotton breeding program, seeking a more thorough understanding of the interaction between science and place. This chapter is an attempt to 'place' science, to reveal the ways in which the landscape of south-eastern Africa informed this research agenda. The cotton breeding program at Barberton is a story of expert knowledge that did not undermine but rather incorporated ecological specificity.

A Brief History of South African Cotton Production, 1844-1948

The history of South African cotton production between 1844 and 1948 is best divided into four distinct phases. During the first phase (1844-1870) production was halted, scattered, and propelled primarily by international demand. Cotton was embraced by enterprising white settlers in the Cape, the middleveld, and Natal as a profitable export

commodity highly desired by British manufacturers [Figures 1.1 and 1.2].[11] Motivated by high prices and the desire to prove South Africa's agricultural potential, many European settlers set aside a few acres of land for cotton experimentation. Most failed. Those who continued for more than a single growing season undertook most of the labour themselves (clearing the land, preparing seed beds, planting, hoeing), though most relied heavily on African labour for picking. Growing regimes (including time of planting, seed choice, spacing, thinning, and planting) were determined exclusively by the individual farmer. All manner of seed was tried, but there was little consistency among different producers.[12] Promising samples were received from South Africa during this period, but sustained production was elusive [Figure 1.3].

[11] Raw cotton was the most valuable international commodity throughout the 19th century. Between 1800 and 1913 average per capita consumption of cotton increased five times faster than any other fibre. British manufacturers became increasingly worried about their over reliance on American supplies, which peaked at 86% of the world crop in 1897/98. Both rising demand and concerns over interruptions in supply fuelled this search for new imperial sources of raw cotton. See Douglas A. Farnie, "The Role of Merchants as Prime Movers in the Expansion of the Cotton Industry, 1760-1990," in *The Fibre that Changed the World: The Cotton Industry in International Perspective, 1600-1990s*, ed. Douglas A. Farnie and David J. Jeremy (Oxford, 2004), 15-56.

[12] Many different varieties of seed were being grown in South Africa including three American Upland types, Griffin, Uganda, Nyasaland Upland, Sea Island, two Egyptian types, Pima, and Watts long staple. "Cotton Growing in South Africa", *Bulleting of the Imperial Institute: A Quarterly Record of Progress in Tropical Agriculture and Industries and the Commercial Utilization of the Natural Resources of the Dominions, Colonies, and India* XXI (1923): 629.

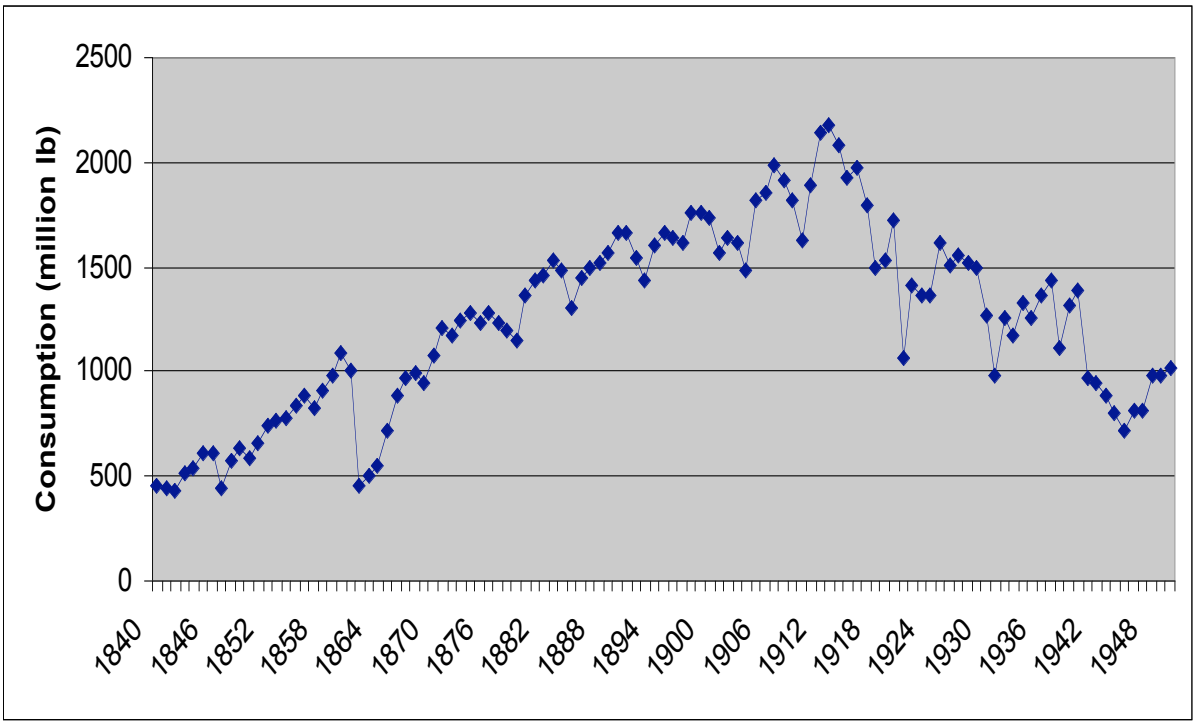

Figure 1.1: Britain's Cotton Consumption, 1840-1950. Source: R. Robson, *The Cotton Industry in Britain* (London, 1957), 331-333.

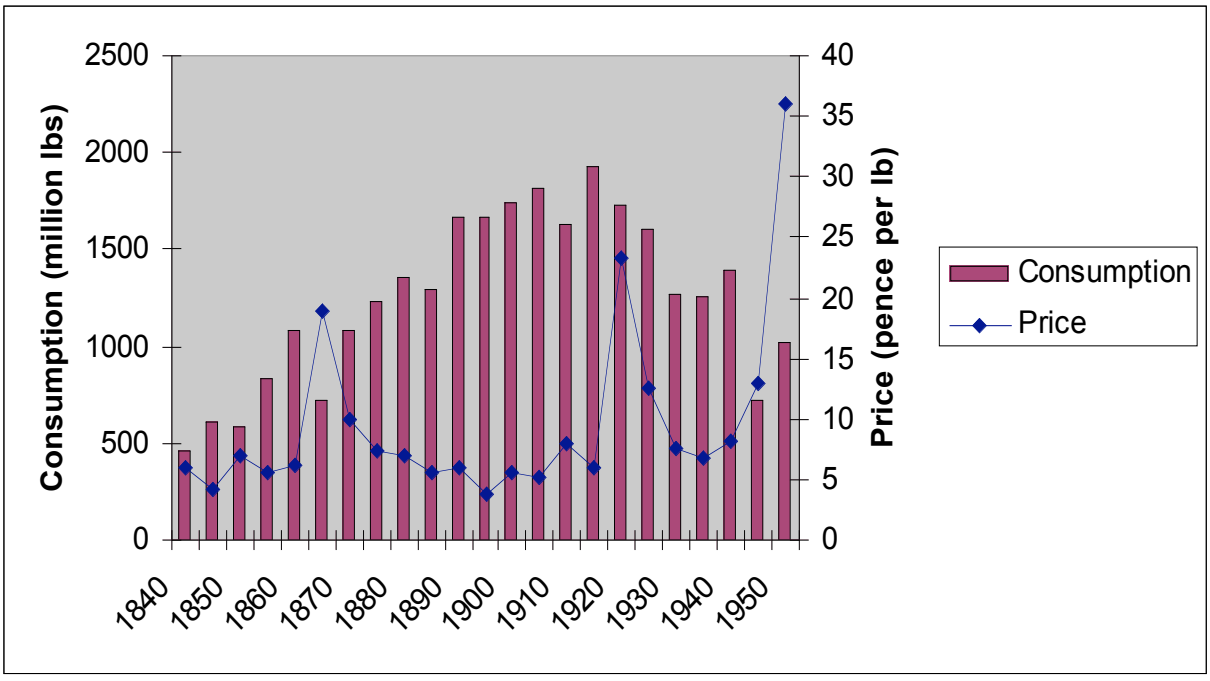

Figure 1.2: Raw Cotton Consumption and Prices in Britain, 1840-1950. Source: B.R. Mitchell, *British Historical Statistics* (Cambridge, 1988), 332/333 and 760.

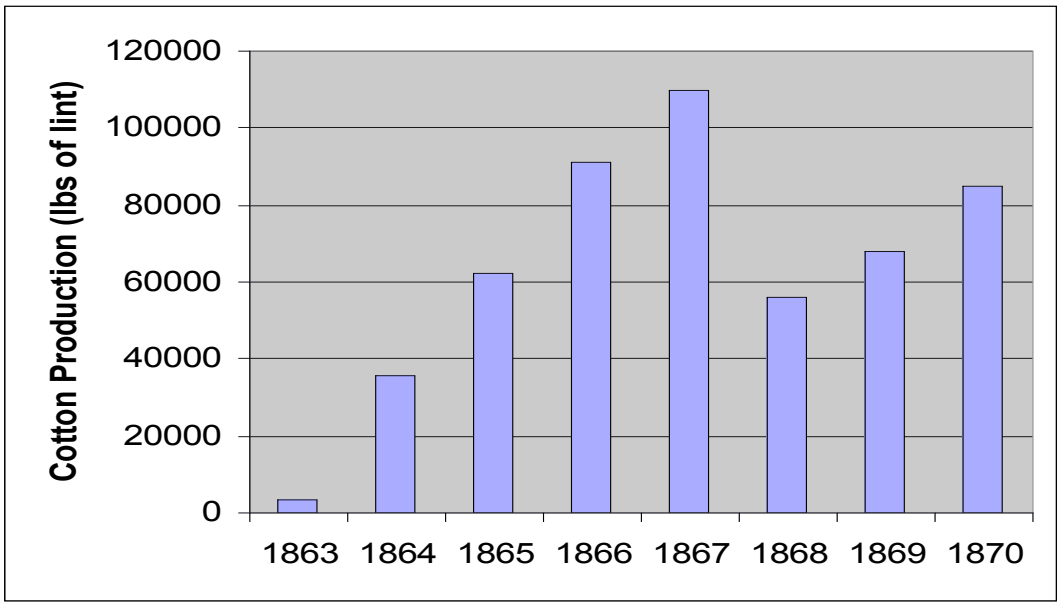

Figure 1.3: South African Cotton Production, 1863-1870. Source: F.M. du Toit, "South African Cotton Prospects", *Farming in South Africa* I (1926: 265). Note that there are no production figures available before 1863.

The lack of success during this initial period of experimentation led growers to focus on crops that were better adapted to local growing conditions. Virtually no cotton was cultivated in any of the South African colonies between 1870 and 1910. Still, settler agriculture made significant gains: total area under cultivation increased more than fivefold, as settlers focused increasingly on the large-scale cultivation of sugar, maize, and wool.[13] In Natal especially, these three commodities surged between 1870 and 1910: acreage under maize expanded from 18 200 to 123 000 acres, while sugar expanded from 5 900 to 41 200 acres.[14] The number of sheep in the colony rose from 300 000 to 952 000.[15] Despite these

[13] Zbigniew A. Konczacki, *Public Finance and Economic Development of Natal, 1893-1910* (Durham, N.C., 1967), 8.

[14]Charles Ballard and Giusseppe Lenta, "The Complex Nature of Agriculture in Colonial Natal: 1860-1909," in *Enterprise and Exploitation in a Victorian Colony: Aspects of the Economic and Social History of Colonial Natal*, ed. Bill Guest and John M. Sellers (Pietermaritzburg, 1985), 151-180. See also Bill Guest, "The Natal Regional Economy, 1910-1960," *South African Journal of Economic History* 5 (1990): 16-39. Another important characteristic was the rapid expansion of European settler agriculture relative to that of Africans: European agriculture in Natal increased from 36 800 acres in 1870 to 451 000 acres in 1908, while African agriculture increased from 145 000 acres to 500 000 acres during this same period.

[15] Konczacki, *Public Finance and Economic Development of Natal, 1893-1910*.

increases, agriculture's overall share of the South African economy declined, as the discovery of diamonds at Kimberley and gold at the Witwatersrand shifted capital and labour away from agricultural enterprise.[16] Increasingly, South Africa came to rely on food imports.

The formation of the Union of South Africa ushered in the third and most successful phase of cotton cultivation (1910-1925). The Department of Agriculture's newly created Tobacco and Cotton Division initiated a centralized experimentation network that investigated all aspects of cotton's growth and development. The results of these efforts were assimilated into 'best practices', which were then widely disseminated to growers throughout the Union. This coordinated push towards cotton was part of the broader capitalization of white agriculture, as the state used resources drawn from the mining sector to underpin the expansion of the white agriculture. Funds were set aside for loans, cooperatives, widening agricultural research programs, and a proliferation of trained experts who oversaw this new national emphasis on cotton. As a result, the volume of the Union's agricultural output increased by more than 70% between 1911 and 1933, by which time South Africa was once again self-sufficient in food production.[17] This government assistance, targeting highly capitalized, large-scale farming ventures, impelled cotton to its fastest growth ever experienced in South Africa [Figure 1.4].

[16] Francis Wilson, "Farming, 1866-1966," in *The Oxford History of South Africa*, ed. Monica Wilson and Leonard Thompson (Oxford, 1971), 104-172.
[17] Stuart Jones and Andre Muller, *The South African Economy, 1910-1990* (New York, 1992), 30.

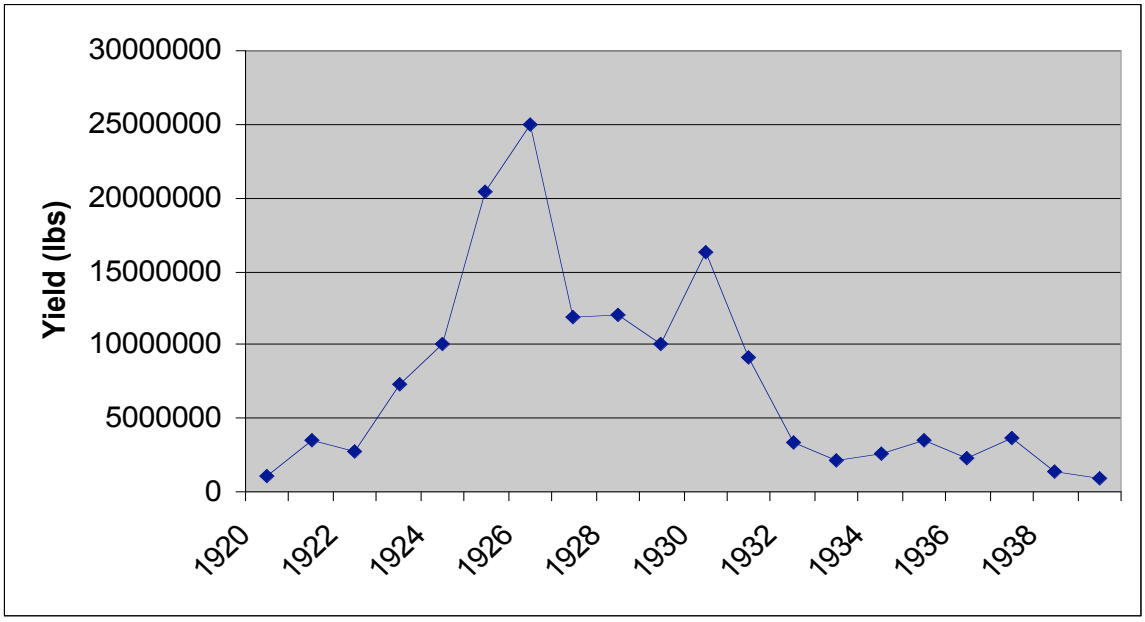

Figure 1.4: South African Cotton Cultivation, 1920-1939. Sources: W.H. Scherffius, "The Tobacco and Cotton Industries", *Journal of the Department of Agriculture* (1922): 453; *Yearbook of the Union of South Africa* (1935): 471; *Yearbook of the Union of South Africa* (1941): 733.

The fourth and final phase of South African cotton cultivation (1925-1948) focused on addressing those obstacles to production that precipitated the collapse of the cotton boom in 1925. This period was marked by a regionalization of research: officials within the Department of Agriculture realized that local growing conditions varied significantly between the Cape, the middleveld and lowveld. They established three separate research centres to investigate place-specific impediments to production. Generally, though, enthusiasm for cotton declined during this period, as emphasis shifted instead to citrus, fruits, dairying and tobacco.

Cotton and Colonialism in Sub-Saharan Africa

Cotton's role in advancing colonial interests has been investigated in various parts of the African continent. The most comprehensive survey of the relations between cotton and colonialism in Africa is Allen Isaacman and Richard Roberts' superb edited volume *Cotton, Colonialism and Social History in Sub-Saharan Africa*. Contributions offer a compelling vision of how cotton fit within European aspirations across a wide range of British, French, Portuguese and German African colonies, though regrettably there is no reference to South African cotton efforts. This volume is especially useful for understanding how agricultural policy prescriptions and African resistance played out in different continental contexts. Each chapter is squarely focused on the social and economic dimensions of production; most are explicitly committed to reasserting the agency of African peasants in shaping agricultural outcomes.[18] Little attention is paid to the environmental dimensions of colonial cotton ventures, however. The editors do situate environmental considerations prominently in the first substantive chapter, but the brief four page 'note' on cotton and climate reduces ecological and agricultural considerations to the background in the substantive case studies that form the core of this volume.[19]

In their individual assessments of cultivation efforts, most contributors echo the editors' conclusion that the high incidence of failure "must be explained in terms of the

[18] The editors are committed to confronting five issues of particular significance in the social history of cotton: "1) the encounter between dynamic local processes in Africa and the world capitalist system 2) the impact of cotton on the organization of rural work 3) the ways in which cotton exacerbated the process of rural differentiation 4) the effects of cotton production on household food security 5) the efforts of growers to cope with and at times to struggle against the oppressive demands of cotton colonialism" Allen Isaacman and Richard Roberts, "Cotton, Colonialism, and Social History in Sub-Saharan Africa," in *Cotton, Colonialism, and Social History in Sub-Saharan Africa*, ed. Allen Isaacman and Richard Roberts (Portsmouth, 1995), 1-42.

[19] Philip W. Porter, "Notes on Cotton and Climate: A Colonial Conundrum," in *Cotton, Colonialism, and Social History in Sub-Saharan Africa*, ed. Allen Isaacman and Richard Roberts (Portsmouth, 1995), 43-49. There is also a brief reference to ecological factors in on pp. 14/15 of the Introduction.

uneven consequences of Africa's incorporation into the world capitalist system".[20] The chosen case studies emphasize fluctuations in international supply as the major catalyst behind the colonial push for cotton. They stress that African cultivators mediated this colonial imposition through their labour and resistance; that they were active agents in determining agricultural outcomes.

Other histories of African cotton production similarly privilege issues of peasant resistance and international markets over discussion of environmental change and growing regimes. Research in Cote d'Ivoire,[21] Chad,[22] Sudan,[23] and Mali[24] has stressed peasant agency, labour resistance, and the differentiated impact of forced cotton schemes, but has remained relatively silent on how local growing conditions impacted outcomes.[25] This dissertation puts the African environment front and centre. Here the biophysical environment is treated not simply as a stage upon which colonial ventures played out, but rather as a major factor shaping cotton histories. The pages that follow demonstrate a fundamental concern to understand the role of local growing conditions in sustaining cycles of failure.

Another notable absence in many histories of cotton cultivation in the continent is a critical treatment of the cotton plant as an agent within human-formulated production schemes. Most research into the intersections of cotton and colonialism treats the plant

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[20] Isaacman and Roberts, "Cotton, Colonialism, and Social History in Sub-Saharan Africa," 2.
[21] Thomas J. Bassett, *The Peasant Cotton Revolution in West Africa 1880-1995* (Cambridge, 2001).
[22] Ulrich Sturzinger, "The Introduction of Cotton Cultivation in Chad: The Role of the Administration, 1920-1936," *African Economic History* 19 (1983): 213-224.
[23] Cleophas Lado, "Some Aspects of Cotton as a Cash Crop Development in an Historical Perspective in Maridi District, Southern Sudan," *Journal of Eastern African Research and Development* 18 (1987): 24-43.
[24] R. L. Roberts, *Two Worlds of Cotton: Colonialism and the Regional Economy in the French Soudan 1800-1946* (Stanford, 1996).
[25] Exceptions are Elias Mandala, *Work and Control in a Peasant Economy: A History of the Lower Tchiri Valley in Malawi, 1859-1960* (Madison, 1990); Jamie Monson, "Rice and Cotton, Ritual and Resistance: Cash Cropping in Southern Tanganyika in the 1930s," in *Cotton, Colonialism and Social History in Sub-Saharan Africa*, ed. Allen Isaacman and Richard Roberts (Portsmouth, 1995), 268-284; Allen Isaacman, *Cotton is the Mother of Poverty: Peasants, Work, and Rural Struggle in Colonial Mozambique, 1938-1961* (Portsmouth, 1996) which emphasize how environmental factors framed attempts at peasant cultivation. See also John Tosh, "The Cash-Crop Revolution in Tropical Africa: An Appraisal," *African Affairs* 79 (1980): 79-94.

unproblematically, paying scarce attention to its particular physiology and growing requirements.[26] In doing so, these accounts reduce cotton to an homogenous and even anonymous cash crop that could just as easily be replaced by tea, sugar, coffee, or any other commodity highly desired by the metropolitan economy. The plant itself becomes nothing more than a "leafy, green backdrop to a story of colonialism and coerced labour".[27]

Understanding cotton's botany is crucial to understanding the stories of agricultural failure unfolded in these pages.[28] Cotton is unusual in that temperature is often a more potent limit to its growth than rainfall. It is a heat-loving plant that only succeeds where growing-season temperatures are consistently high. Optimum temperatures for growth are between 24^0C and 32^0C,[29] while low temperatures (below 20^0C) inhibit germination rates, shoot elongation, and primary root development.[30] Growth and development cease when temperatures fall below 10^0C. Generally speaking, cotton requires a minimum of two hundred days above 20^0C, though ultimately it is the accumulation of sunlight hours that determine heat availability. In terms of heat units – the most common value used to estimate accumulated temperature effect – KwaZulu-Natal's Department of Agriculture and Environmental Affairs estimates that cotton requires between 2100-2700 units during the

[26] Though for an exception see Osumaka Likaka, *Rural Society and Cotton in Colonial Zaire* (Madison, 1997), whose account of cotton in colonial Zaire recognizes how the particularities of cotton's growing regime were crucial to its acceptance by peasant cultivators.
[27] William K. Storey, *Science and Power in Colonial Mauritius* (Rochester, 1997), 4.
[28] There are hundreds of distinct cotton varieties with significant differences in growing requirements. This general discussion on growing requirements is intended only to outline the plant's basic pattern of growth and development.
[29] J.L. Hatfield, J.R. Mahan, and J.J. Burke, "Crop-Specific Thermal Kinetic Windows in Relation to Wheat and Cotton Biomass Production," *Agronomy Journal* 80 (1988): 553-556. See also V.R. Reddy, K.R. Reddy, and D.N. Baker, "Agroclimatology and Modeling," *Agronomy Journal* 83 (1991): 211-217.
[30] P.J. Wiatrak, D.L. Wright, and J.J. Marois, "Influence of Meteorological Factors on Cotton," *Soil and Crop Science Society of Florida Proceedings* 64 (2005): 91-97. See also J.R. Gipson and H.E. Joham, "Influence of Night Temperature on Growth and Development of Cotton (Gossypium hirsutum L.): Fruiting and Boll Development," *Agronomy Journal* 60 (1968): 292-295. Extreme high temperatures (generally considered above 35^0C) can also impede plant development.

October-March growing season.[31] Heat accumulation is the single most important determinant for morphological development.

Although cotton is generally considered to be a hardy and drought-resistant crop, it is quite demanding in its water requirements. Dryland (as opposed to irrigated) cotton needs an initial burst of rain to allow planters to prepare the seedbed and for germination to begin. A minimum of 90 to 120 mm of rainfall is required in the first two months after planting to nourish the seedlings.[32] Steady, regular rains are required throughout the flowering and development stages: too little will stifle boll development, too much might pose problems of flooding or waterlogging, or damage the cotton already on the bolls. Generally, lint yield, boll density, boll weight, and lint percentage are positively correlated with rainfall, up to a threshold.[33] Within southern Africa, the optimal precipitation distribution lies between 700 and 1100mm.[34] Poor stands will result if rains are late, irregular, or insufficient.

Cotton tolerates a range of soil types. It thrives on a medium-textured loam or alluvium, sandy loam, or heavy clay. Soil depth is crucial: soils must be soft and permeable to allow cotton's extended tap roots (as long as three metres) to penetrate. If root expansion is stunted then above-ground plant growth will not reach full potential.[35] Soils that are vulnerable to waterlogging can also retard vegetative growth significantly.

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[31] K. Camp, "The Bioresource Groups of KwaZulu-Natal," (1999). Monthly heat units values are obtained by subtracting the base temperature (the temperature under which the crop will not grow; in cotton's case the base temperature is 10^0C) from the mean temperature and multiplying this figure by the number of days in that month.

[32] Isaacman, "Historical Amnesia, or, the Logical of Capital Accumulation: Cotton Production in Colonial and Postcolonial Mozambique". See also A.B. Hearn and G.A. Constable, "Cotton," in *The Physiology of Tropical Food Crops*, ed. P.R. Goldsworthy and N.M. Fisher (Chichester, 1984), 495-427.

[33] D.L. Shaw, "Boll Weight, Yield and Quality Relationships, Irrigated and Dryland Cotton, Texas 1986-1994" (paper presented at the Proceedings of Beltwide Cotton Conference, San Antonio TX, Jan 4-7 1995).

[34] Isaacman, "Historical Amnesia, or, the Logic of Capital Accumulation: Cotton Production in Colonial and Postcolonial Mozambique," 760.

[35] A.N. Prentice, *Cotton: With Special Reference to Africa* (London, 1972).

Science and the State

A second important theme in this dissertation concerns the role of science in the repeated cycles of boom and bust in South African cotton cultivation. By focusing on this question, this study moves to address a long-standing criticism of political ecology: that it neglects the social relations which produce and legitimize science.[36] In the following pages, I attempt to reveal the politics imbedded within the science of cotton cultivation by deepening understanding of how scientific knowledge became institutionalized, and how particular constructions of expertise underpinned the legitimacy of these cyclical cotton ventures.

Two recent studies offer promising avenues for investigating the role of science within colonial agricultural development. Both ask how professional specialists achieved their revered status. In *Rule of Experts*, Timothy Mitchell examines how scientific authorities were crucial to the formation of what he terms 'techno-science', which underpinned the British ideal of colonial improvement in areas of resource management and population control. Mitchell argues that expertise was an outcome rather than a given: he stresses the role of multiple interactions that give rise to expertise, understanding it as an alloy whose components "are both human and non-human, both intentional and not".[37] Joseph Hodge investigates this process of expertise formation on a broader scale by focusing on the British scientific apparatus of the late colonial period. Like Mitchell, he is concerned with the interactions that produce expertise, especially those linking practitioners operating in

[36] Piers Blaikie, "A Review of Political Ecology: Issues, Epistemology, and Analytical Narratives," *Zeitschrift furWirtschaftsgeographie* 43 (1999): 131-147. See also similar calls in Tim Forsyth, *Critical Political Ecology* (London and New York, 2003), 10; A.P. Vayda and B.B. Walters, "Against Political Ecology," *Human Ecology* 27 (1999): 167-79; Peter A. Walker, "Political Ecology: Where is the Ecology?," *Progress in Human Geography* 29 (2005): 73-82.
[37] Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley, 2002), 43.

different sites and contexts. But Hodge also focuses on the political outcomes that these colonial experts facilitated. He contends that officials sought to frame problems in technical terms "that provided the rationale for administrative solutions that promoted external intervention and control over local resources and practices".[38] Hodge concludes that the lasting legacies of colonial experts were centralized, bureaucratic interventions that extended state control over both people and resources.

Lowveld Cotton builds upon these studies to expose the messy, complex process of expertise formation as well the political outcomes achieved by those afforded expert authority in the context of cotton production. It is especially concerned with the relationship between science and the state. In the colonial period, enthusiasm for cotton in Natal and Zululand was predicated on its perceived ability to reinforce imperial goals: increasing colonial revenues, expanding settler numbers, solidifying the divide between settler and African space. Cotton became a 'tool of empire', mobilized by the state to advance its political objectives.[39] Other instances of agricultural science in the service of empire have been well-documented.[40] Helen Tilley's work on the African Research Survey shows how

[38] Joseph Morgan Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Athens, 2007), 12.
[39] Daniel R. Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (New York, 1981).
[40] See for instance Roger Knight, "Sugar, Technology, and Colonial Encounters: Refashioning the Industry in the Netherlands Indies, 1800-1942," *Journal of Historical Sociology* 12 (1999): 218-250; Roy MacLeod, ed., *Nature and Empire: Science and the Colonial Enterprise*, Osiris (Chicago, 2000); J. H. Galloway, "Botany in the Service of Empire: The Barbados Cane-Breeding Program and the Revival of the Caribbean Sugar Industry, 1880s-1930s," *Annals of the Association of American Geographers* 86 (1996): 682-706. Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, 8 also speaks to these issues: "the most striking feature of British colonialism in the 20th century is the growing confidence it placed in the use of science and expertise, joined with the new bureaucratic capacities of the state, to develop the natural and human resources of the empire and manage the perceived problems and disorder generated by colonial rule".

the project was underpinned by the political goal of entrenching colonial control.[41] William Storey's account of agricultural initiatives in colonial Mauritius stresses that the state's research agenda was set primarily by the political and cultural priorities of agricultural experts.[42] In India, Matthew Edney's work on the cartographic vision of empire explores how British administrators viewed their possessions through a 'scientific gaze' that ordered chaotic and unknown colonial landscapes.[43] This dissertation similarly argues that cotton cultivation in the 19th century was advanced primarily as a means of cementing colonial control, while paying special attention to the specific, local factors that complicated the imposition of this imperial vision.

This convergence of scientific and state interests strengthened following the formation of the Union of South Africa in 1910. A new scientific bureaucracy emerged – a professionalization of colonial administration – which in turn spawned a culture of expertise that embraced cotton as an ideal crop for commercial farmers in the new Union. Cotton emerged as a favourite of agronomists and state policy makers alike by offering to extend the reach of white control into African agricultural spaces. This dissertation focuses on the individual experts who underpinned this cotton boom, and how they used their elevated status to extend state control into the most inaccessible parts of the Union. It attempts, in Roy MacLeod's terms, to unravel the role of the expert – this "protean image of authority and rational knowledge" – in providing scientific justification for what was primarily a

[41] Helen Tilley, "African Environments and Environmental Sciences: The African Research Survey, Ecological Paradigms, and British Colonial Development," in *Social History and African Environments*, ed. Joanne McGregor and William Beinart (Oxford 2003), 109-130.
[42] Storey, *Science and Power in Colonial Mauritius*.
[43] Matthew. H. Edney, *Mapping an Empire: The Geographical Construction of British India, 1765-1843* (Chicago, 1997).

political project.[44] Though cotton eventually failed, agricultural experts paved the way for administrative solutions that enlarged the political influence of the newly consolidated white state.

One final emphasis that permeates this study is an effort to 'place' science. The science that underpinned cotton cultivation did not emerge in a vacuum: it was shaped by the local environment, the approaches and knowledge that transplanted experts imported with them, and the exchange of specimens and ideas with colleagues at other agricultural sites around the globe. This dissertation seeks to unpack the science of cotton cultivation and reveal the complex interactions that characterized it. To achieve this I focus on what Alan Lester terms 'geographies of connection', unravelling how the science of cotton cultivation was "forged…across a network linking these sites together".[45] Understanding the science of cotton cultivation as a web underscores the fact that colonialism was simultaneously both a process and a structure.[46] I argue that this drive towards cotton was produced – both materially and discursively – within imperial networks of exchange.

A Political Ecology of Agricultural Failure

This dissertation employs a political ecology perspective to investigate this historical series of agricultural failures. Although political ecologists have debated the contours of

[44] Roy MacLeod, *Government and Expertise: Specialists, Administrators, and Professionals, 1860-1919* (Cambridge, 1988), 1. See also Roy MacLeod, *The 'Creed of Science' in Victorian England* (Aldershot, 2000).
[45] Alan Lester, *Imperial Networks: Creating Identities in Nineteenth-Century South Africa and Britain* (London and New York, 2001), 5. See also Alan Lester, "Imperial Circuits and Networks: Geographies of the British Empire," *History Compass* 4 (2006): 124-141; Kapil Raj, *Relocating Modern Science: Circulations and the Construction of Knowledge in South Asia and Europe, 1650-1900* (New York 2007); Ann Laura Stoler and Frederick Cooper, "Between Metropole and Colony: Rethinking a Research Agenda," in *Tensions of Empire: Colonial Cultures in a Bourgeois World*, ed. Frederick Cooper and Ann Laura Stoler (Berkeley and Los Angeles, 1997), 1-56.
[46] As Alan Lester writes: "these relations were always stretched in contingent and non-deterministic ways, across space, and they did not *necessarily* privilege either metropolitan or colonial spaces. They remade both metropolitan and colonial places in the act of connecting them". Lester, "Imperial Circuits and Networks: Geographies of the British Empire, " 131 [original emphasis].

their scholarly project at length, there is still a great deal of uncertainty about what exactly the term encompasses.[47] Most scholars agree that Piers Blaikie's *Political Economy of Soil Erosion in Developing Countries* laid out the five central tenets of political ecology: an understanding of the natural and social as co-constitutive, the incorporation of multiple methodologies, an emphasis on multi-scalar analysis, empirical data collection at the micro level, and a focus on 'chains of causation'.[48] This study certainly stresses the inextricability of natural and social elements in the repeated failures of cotton cultivation schemes. I take from other political ecologists the push to disrupt simple nature/culture binaries, and seek to understand long-term land use patterns as the result of iterative processes that incorporate natural and social dynamics simultaneously. As Goldmann and Schurman remarked in their review of social theory as it pertains to society and nature: "studies of nature-society relations need to consider ecological processes, political-economic structures, and meanings, values, and agency as necessary and complimentary components of analysis".[49] James Fairhead and Melissa Leach accomplish this brilliantly by integrating social and ecological explanations to uncover the misrepresentation of land use change by western scientists in Guinea. Throwing off what they refer to as the "nature-culture straightjacket", their project reveals "how ecological phenomena are socialized and social phenomena are ecologized" in an effort to

[47] See for instance the section entitled "Building Coherence in Political Ecology" in Raymond Bryant and Michael K. Goodman, "A Pioneering Reputation: Assessing Piers Blaikie's Contributions to Political Ecology," *Geoforum* (2007). More comprehensive surveys of political ecology include Paul Robbins, *Political Ecology: A Critical Introduction* (Malden MA, 2004); Karl Zimmerer and Thomas J. Bassett, *Political Ecology: An Integrative Approach to Geography and Environment-Development Studies* (New York, 2003); Forsyth, *Critical Political Ecology*.

[48] Piers Blaikie, *The Political Economy of Soil Erosion in Developing Countries* (London and New York, 1985). See also Dianne Rocheleau, "Political Ecology in the Key of Policy: From Chains of Explanation to Webs of Relations," *Geoforum* (2007).

[49] Michael Goldman and Rachel A. Schurman, "Closing the 'Great Divide': New Social Theory on Society and Nature," *Annual Review of Sociology* 26 (2000): 563-584. See also William Adams, *Green Development: Environment and Sustainability in the Third World*, 2nd ed. (London, 2001), 252. Research in the political economy of agriculture has also provided important insight into the specific ways that capitalist enterprise interacts with and seeks to overcome natural constraints to production. See for instance: Susan Archer Mann, *Agrarian Capitalism in Theory and Practice* (Chapel Hill and London, 1990).

understand the demonization of local land use practices within deforestation discourses.[50] Similarly, this dissertation integrates both natural and social factors into a single seamless narrative that unravels this cycle of booms and busts.[51]

Other elements of Blaikie's 'regional political ecology' approach have been important in framing this study. Blaikie and Brookfield's *Land Degradation and Society* is fundamentally concerned with understanding local processes of agricultural change, in which relationships between farmers and their physical environments are analyzed within their "historical, political, and economic context".[52] More recently, Dianne Rocheleau has reaffirmed political ecology's focus on the micro-context as an "unflinching commitment to empirical observation of biophysical and socio-economic phenomena in place".[53] Micro-scale processes are then linked up with broader patterns of regional, national and international events through 'chains of causation', providing explanations that consider how events that transpired at multiple scales intersected and overlapped to produce changing land use patterns.[54] The emphasis is thus on layered or nested scales of explanation. A political ecology of agricultural failure begins on the ground, but works up to connect these local

[50]James Fairhead and Melissa Leach, *Misreading the African Landscape: Society and Ecology in the Forest-Savanna Mosaic* (Cambridge, 1996), 8. See also Christian Kull, *Isle of Fire: The Political Ecology of Landscape Burning in Madagascar* (Chicago, 2004).

[51] Two volumes that survey the different theoretical approaches useful in disrupting this nature/culture binary are Bruce Braun and Noel Castree, *Remaking Reality: Nature at the Millennium* (London and New York, 1998), and Noel Castree and Bruce Braun, *Social Nature: Theory, Practice, and Politics* (Malden MA, 2001). See also Dianne Rocheleau, "Rooted Networks, Relational Webs and Powers of Connection: Rethinking Human and Political Ecologies," *Geoforum* 38 (2007): 433-437.

[52]Piers Blaikie and Harold Brookfield, *Land Degradation and Society* (London and New York, 1987). Peet and Watts are equally committed to political ecology that begins by studying the politics of production at the local level. Michael Watts and Richard Peet, "Liberating Political Ecology," in *Liberation Ecologies: Environment, Development, Social Movements*, ed. Richard Peet and Michael Watts (London and New York, 2004).

[53] Rocheleau, "Political Ecology in the Key of Policy: From Chains of Explanation to Webs of Relations", 716.

[54] See for instance Thomas J. Bassett, "The Political Ecology of Peasant-Herder Conflicts in the Northern Ivory Coast," *Annals of the Association of American Geographers* 78 (1988): 453-472, and Richard Black, "Regional Political Ecology in Theory and Practice: A Case Study from northern Portugal," *Transactions of the Institute of British Geographers* 15 (1990): 35-47.

processes within broader patterns of land use change, political transitions, and economic trends, focusing on connections between events taking place at different scales.

This emphasis on multi-scalar analysis extends across time as well as space. Studying nature-society interactions over the long-term helps identify those factors that are consistently important in determining patterns of land use change.[55] A wide historical lens allowed Michael Mortimore to underline the crucial impact of population pressure in creating sustainable land management practices in Kenya.[56] Likewise, Christopher Conte utilized a longue-duree approach to identify the continuities in state forest management practices in Tanzania through the transition from pre-colonial times through colonial rule to independence.[57] As a political ecology of agricultural failure, this dissertation considers how regional, national, and international processes intersect with local ones over an extended time-frame, to reveal the periodicity of the cycle of cotton booms and busts, and offers analysis of the factors that sustained this repetitive cycle of failure.

The Physical and Human Geography of South-Eastern Africa

Natal is a diamond-shaped territory on the eastern flank of southern Africa, located between 29^0 and 31^0 S and 29^0 and 31^0 E. The colony's southern and northern boundaries have fluctuated significantly over time; generally speaking Natal is bounded to the south by Griqualand East and Pondoland (marked first by the uMzimkhulu and later by the

[55] See the special issue of *Land Degradation and Development* dedicated to "Environmental Histories, Access to Resources and Landscape Change" 10 (1999), especially the introduction: Tony Bebbington and Simon Batterbury, "Environmental Histories, Access to Resources and Landscape Change: An Introduction," *Land Degradation and Development* 10 (1999): 279-289.
[56] Michael Mortimore, *Roots in the African Dust: Sustaining the Sub-Saharan Drylands* (Cambridge, 1998).
[57] Christopher A. Conte, "The Forest Becomes Desert: Forest Use and Environmental Change in Tanzania's West Usambara Mountains," *Land Degradation and Development* 10 (1999): 291-309. Another instance of longitudinal analysis helping to reveal long-term process of land use change is Phillip Porter, *Challenging Nature: Local Knowledge, Agroscience, and Food Security in Tanga Region, Tanzania* (Chicago and London, 2006).

uMthavuma River), and to the North by Zululand (marked by the uThukela and uMzinyathi Rivers).[58] Natal's eastern and western borders have been more permanent: the Indian Ocean bounds it to the east, while the Drakensberg Escarpment rises in the west. Natal is sandwiched between these two set barriers.

The Drakensberg escarpment, which rises steeply to elevations of 2500-3000m, is Natal's most dramatic topographical feature. This physiographic barrier acts as a climatic wall arresting much of the moisture brought inland from the Indian Ocean. From the Drakensberg peaks the land slopes down in a series of ridges before it flattens into the wide basins and rolling hills of the midlands, and then descends more gently and evenly down to the coast [Illustration 1.2]. Natal is crossed by a dozen major rivers that flow eastwards from the Drakensberg Mountains to the Indian Ocean. These rivers are characterized by steep gradients and are interrupted by heavy turbulent rapids. They are also quite narrow due to their small catchments areas and limited rainfall, making vessel navigation impossible.

[58] Prior to the annexation of Alfred's County in 1866, the uMzinkhulu River marked the southern boundary of Natal. Post-annexation the southern border became the uMtamvuna River.

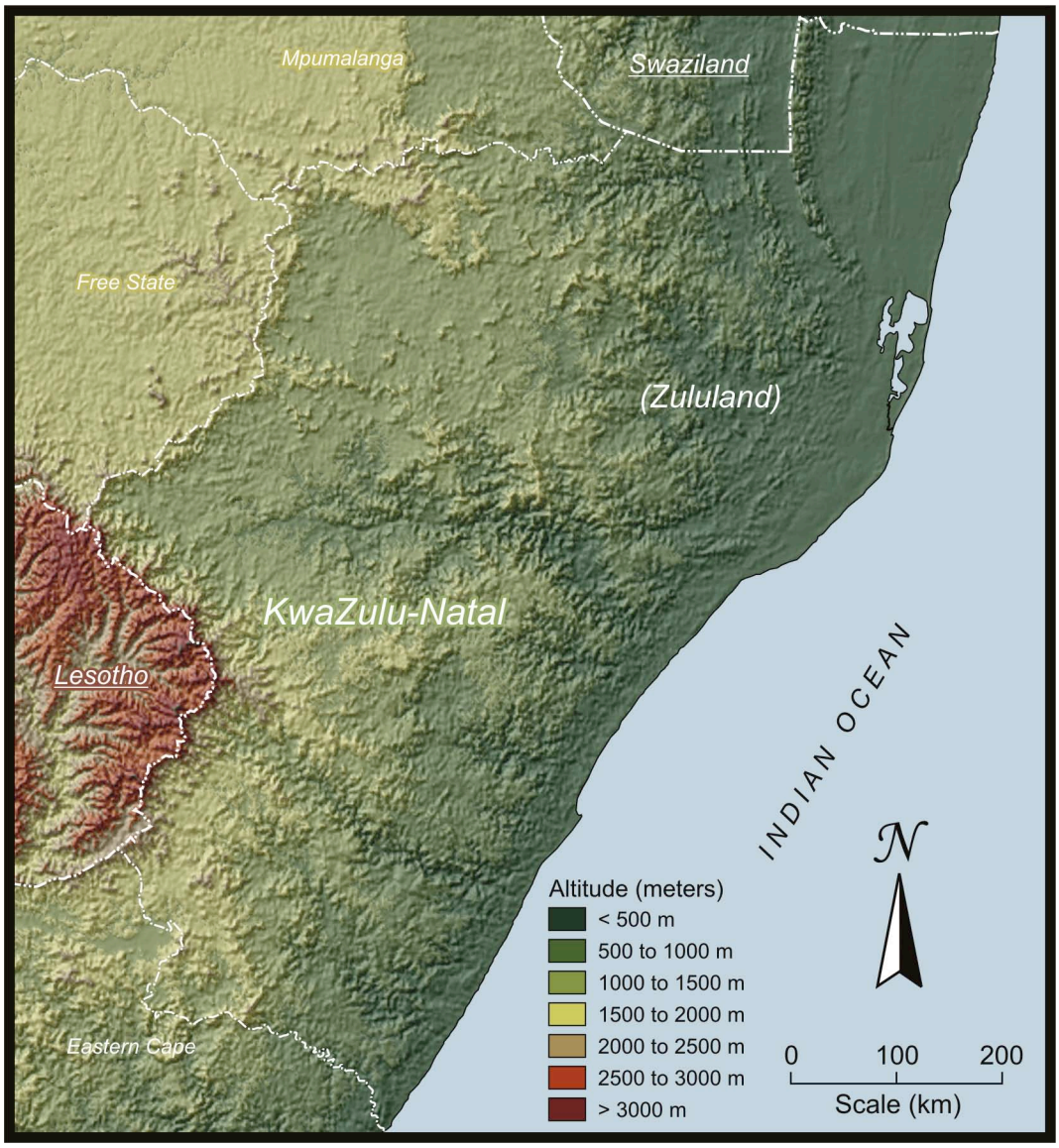

Illustration 1.2: Topography of Natal and Zululand.

Natal's first inhabitants were (Stone Age) hunters and gatherers who migrated seasonally between the mountains in summer and the humid coast in winter. The late Iron Age (*c.*1000 CE) brought significant increases in population density, along with the first records of settled agriculture and metallurgy. Botanical research suggests that the heavy rainfall regions along the coast and above 500m remained densely wooded. The landscape

began to change in the 13th century, with the arrival of Bantu[59] agriculturalists extending south from Equatorial Africa.[60] Expanded settlement and accompanying fire use, farming, and livestock grazing gradually thinned the forests, allowing savannahs and mixed woodlands to dominate in these higher elevation zones.

By the beginning of the 18th century, the land that would be known as Natal was home to two groups of inhabitants: small bands of San hunters and gatherers who lived in the foothills of the Drakensberg, and settled Bantu communities living together in clusters, who engaged in both agriculture and cattle-keeping.[61] These Bantu communities subsisted primarily on cereals: sorghum, millet, and especially maize, which had become the primary crop by the 19th century.[62] These crops were favoured because they required relatively little labour, they were fairly resistant to variations in temperature and precipitation, and they yielded better than other crops. Bantu communities were organized in *imizi* (homesteads), which consisted of *izindlu* (huts) arranged in a circle, with a *uMnumzana* (male head) who often had multiple wives and children. Major uNguni chiefdoms included the uHlubi, the uNgwane, the uNdwandwe, the uMthetwa and the uQwabe.

Early in the 19th century most of southern Africa was embroiled in a widespread series of upheavals known as the *mfecane*, an Nguni word describing the violence and dislocation which accompanied the rise and consolidation of the Zulu kingdom.[63] Clan-

[59] The term 'Bantu' was appropriated by the apartheid regime as a derogatory term for all black South Africans. Here it is being used strictly as a designation for a linguistic and cultural grouping of settled agriculturalists.
[60] Aron Mazel, "The Stone Age Peoples of Natal," in *Natal and Zululand from Earliest Times to 1910*, ed. Andrew Duminy and Bill Guest (Pietermaritzburg, 1989), 1-27.
[61] Cattle occupied a central place in Zulu culture: it was the only currency in which *lobola* (bride sale) could be paid; it was used as a sacrifice for rituals, and a sign of social status. The cattle enclosure was the centre of every Zulu homestead. For more see John Lambert, *Betrayed Trust: Africans and the State in Colonial Natal* (Pietermaritzburg, 1995).
[62] Jeff Guy, *The Destruction of the Zulu Kingdom* (Pietermaritzburg, 1979).
[63] Much debate exists over the roots of the *mfecane*. Some scholars emphasize Zulu aggression and expansion under uShaka Zulu, while others stress the impact of the slave trade at Delagoa Bay, a production and

based tribes were replaced by a centralized Zulu monarchy, which, under the expansionist rule of uShaka Zulu, conquered, assimilated and exerted control over most of the eastern coast and interior from the uThukela River north to Delgoa Bay (modern-day Maputo). The *inkosi* (king) ruled through his personally appointed *izinduna* (headmen) officials, who exercised authority over the scattered homesteads of the region, uniting them politically and collecting surpluses from them.

When settlers of European origin began to enter this native space in significant numbers, after its annexation by the British in 1844, they quickly concluded that Natal was divided geographically into three ecological zones paralleling the Indian Ocean coast.[64] The coastal strip extended approximately fifteen kilometers inland. This was a hot humid zone with dense sub-tropical vegetation constantly fed by the rain clouds brought in by the ocean breeze. Its soils were predominantly sandy, leached and shallow. This thin strip received much higher rainfall than did the rest of the territory, often as much as 700mm annually. The change of seasons was less distinct here than further inland as wet, humid conditions prevailed for most of the year.

Beyond this coastal strip rivers cut deeply into the earth, forming valleys and spurs that dominated the terrain below an altitude of approximately 1500m [Illustration 1.3]. Moving westward from the coast the vegetation thickened into a 'transitional thicket': a closed shrubland dominated by evergreen, schlerophyllous, or succulent trees alongside

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population crisis, and the increasing labour demands of Cape settlers. Still others question the usefulness of the *mfecane* as a historiographical construct. The most comprehensive account of these conflicting perspectives is found in: Carolyn Hamilton, *The Mfecane Aftermath: Reconstructive Debates in Southern African History* (Johannesburg, 1995).

[64] The most comprehensive description of Natal's environment in the mid 19th century is found in R.J Mann, "The Physical Geography and Climate of the Colony of Natal " *Journal of the Royal Geographical Society of London* 37 (1867): 48-67.

shrubs and vines, most of which had stem spines.[65] This coastal hinterland gave way after approximately thirty kilometres to savannah and mixed woodlands, dominated by a wide range of vegetative species composed mostly of broad, arching trees with thick grassy undergrowth. Primary vegetation in this area included the Acacia family (e.g. *Acacia karroo, Acacia tortilis*) along with tall common thatchgrass (*Hyparrhenia hirta)*, redgrass (*Themeda triandra*), and speargrass (*Heteropogon contortus*).[66] Rainfall was more sporadic and uneven with distance from the coast; species with thorns – which enhanced their drought resistance – came to dominate.[67] Scattered shrubs mingled with tall, long grasses to form a thick undergrowth. The soils on the tablelands were fairly shallow and sandy, but settlers soon learned that those at the bottom of the river valleys were deep and rich in alluvium.

[65] Roy Lubke, "Thicket Biome," in *Vegetation of South Africa, Lesotho and Swaziland*, ed. A.B. Low and A.G. Robelo (Pretoria, 1996).
[66] Ed Granger, "Natal Central Bushveld," in *Vegetation of South Africa, Lesotho and Swaziland*, ed. A.B. Low and A.G. Robelo (Pretoria, 1996).
[67] A.J. Christopher, *South Africa* (London and New York, 1982).

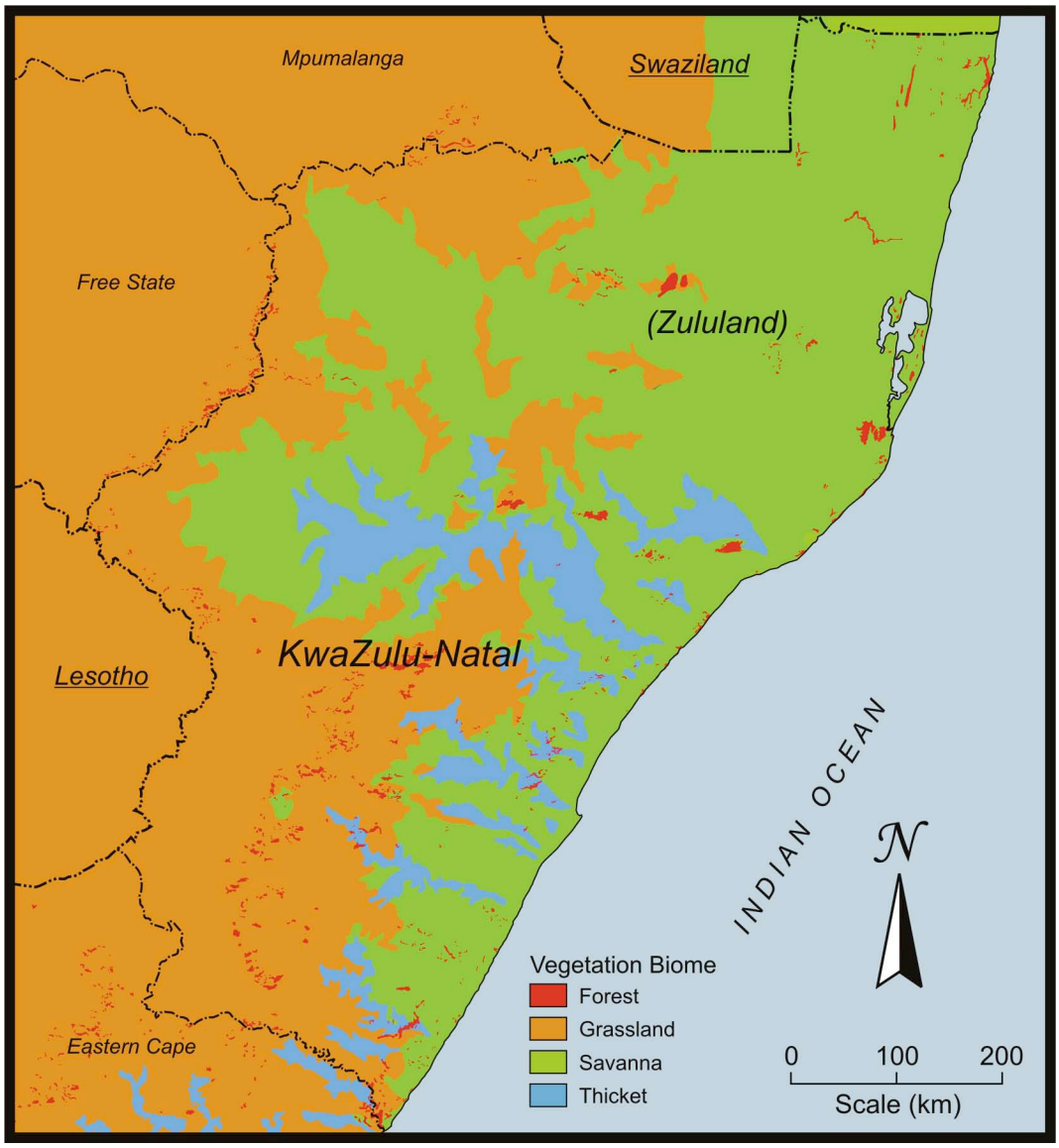

Illustration 1.3: Vegetation Biomes in Natal and Zululand. Source: R.E. Schulze, *South African Atlas of Agro-hydrology and Climatology*. (Pretoria, 1997). Water Research Commission Report TT82/96.

The transition to grasslands began between 1500 and 2000m. The topography became increasingly undulating; the river valleys flattened out into large basins separated by steep ridges. Sweet grass varieties dominated in the river valleys: these tended to be shorter due to their lower fibre content, and were limited to the drier areas of the grasslands where soils were clayey and brackish. Sour varieties thrived in wetter areas; they were generally

taller (over three metres), with a higher fibre content, but were only palatable to grazers in the spring and summer when nutrients were contained in the stem. The climate inland was far more temperate: summers were warm and wet, winters cold and dry, with severe frosts increasingly common as the altitude increased [Illustration 1.4]. Soils were fairly deep and considerably leached.[68]

[68] Beverly Ellis, "The Impact of the White Settlers on the Natural Environment of Natal, 1845-1870" (University of Natal 1998).

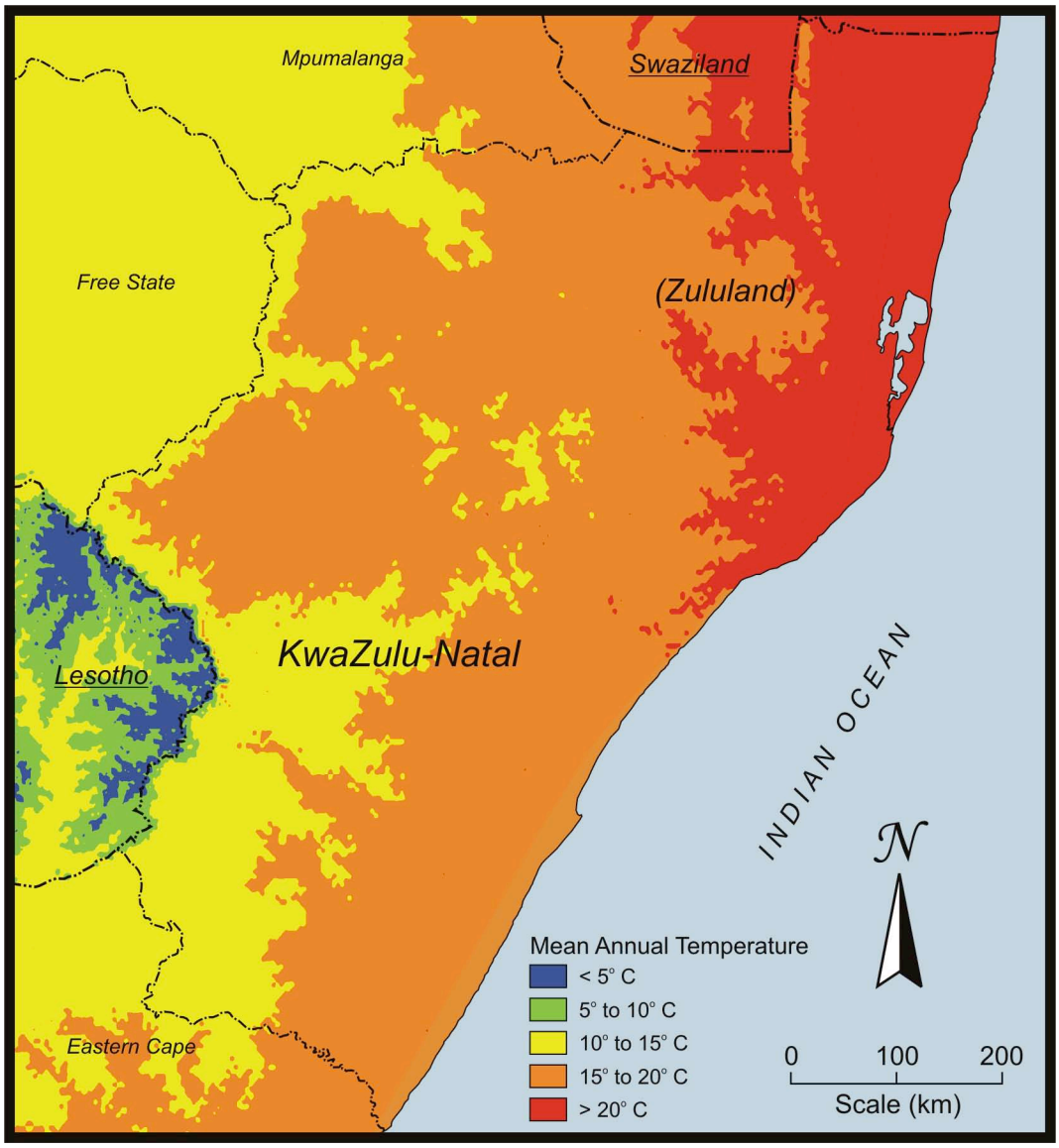

Illustration 1.4: Temperature in Natal and Zululand. Source: R.E. Schulze, *South African Atlas of Agro-hydrology and Climatology*. (Pretoria, 1997). Water Research Commission Report TT82/96.

The British appropriated the territory with which this study is concerned in two stages. The land south of the uThukela River was claimed in 1844. Zululand, which stretched north from the uThukela to the uPhongola River, and west into the valley of the uMzinyathi River, was annexed by the British in 1887 and incorporated into the colony of Natal in 1897. The major topographic features of Zululand mirror those in Natal: the land

slopes steadily out from the Escarpment in the West, crosscut by five major river systems: the uThukela, the uMhlatuze, the uMfolozi, the uMkuze and the uPhongola. These are separated from one another by high plateaus (often as much as 1000m).[69]

The climate within south-eastern Africa is generally sub-tropical. The rainy season extends from October to March, with occasional showers in the shoulder months but practically no rain at all in winter. Spring and summer rains fall in short, sharp bursts, often accompanied by violent storms, which occur predominantly in the late afternoon and early evening. Precipitation is heaviest near the coast and declines steadily as the elevation rises inland [Illustration 1.5].

[69] Guy, *The Destruction of the Zulu Kingdom*, 4-12.

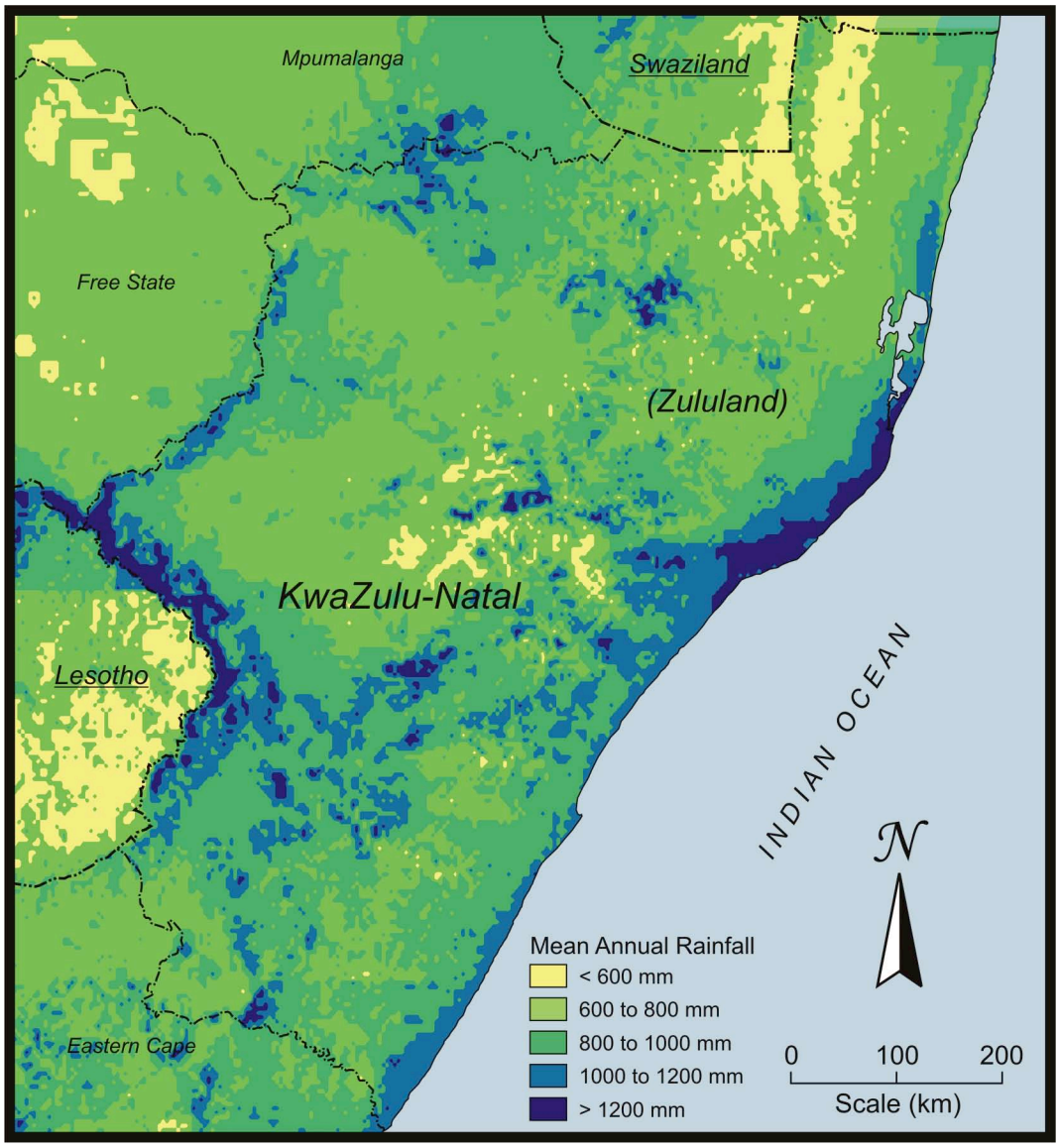

Illustration 1.5: Precipitation in Natal and Zululand. R.E. Schulze, *South African Atlas of Agro-hydrology and Climatology*. (Pretoria, 1997). Water Research Commission Report TT82/96.

The impact of the Drakensberg Mountains diminishes in the far north of Zululand. The land gradually flattens and smoothes into the southern African lowveld, which extends north through the eastern portion of Swaziland and Mpumalanga (the former Transvaal) [Illustration 1.6]. The lowveld lies below 3 000m and extends westwards to the uBombo Mountain Range. It varies from 60 to 200 km in width. The entire area is drained by the tributaries of three rivers: the Limpopo, the Komati and the Usuthu-Phongola. The climate

is similar to that further south, although winters are warmer and drier, and summers hotter and rainier than southward.

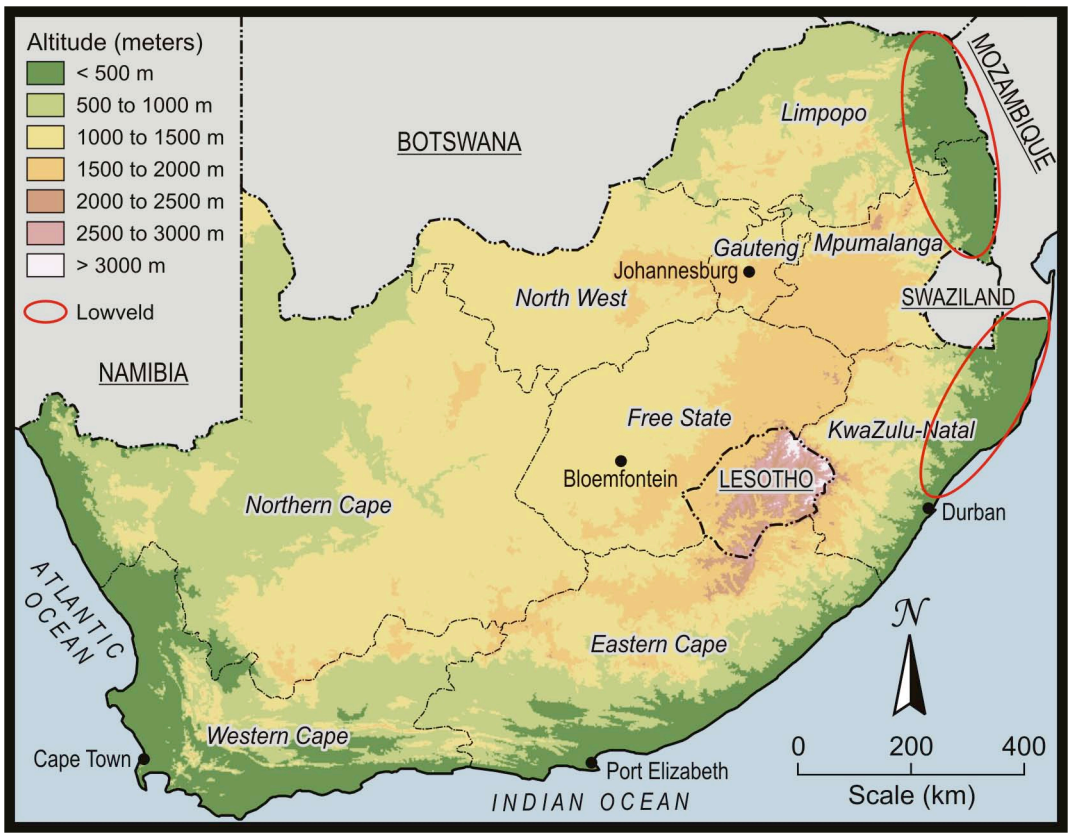

Illustration 1.6: The South African Lowveld.

A Note on Methodology

Studying cotton cultivation in south-eastern Africa forced me to rely on a variety of research methods. I lived in Pietermartizburg – the capital of KwaZulu-Natal – for eleven months in 2004/2005 and then returned for a two month follow-up research trip early in 2006. I spent the bulk of my time reading articles, reports, newspapers, and communiqués housed in South African archives. The most fruitful sources for archival material were the Pietermaritzburg Archival Repository, the National Archives in Tshwane, the Cedara

Agricultural library, the Killie Campbell Africana library in Durban, and the Agricultural Research Council's Institute for Industrial Crops at Rustenburg.

I encountered a number of challenges while attempting to comprehend agrarian change during this period: the relative availability and reliability of agricultural data, biases and gaps in the colonial archives, and the absence of African voices within most records.[70] Researchers have begun to become more reflexive about their encounters with colonial archives. There is now widespread acknowledgement of the power relations imbedded within the archive: colonial sources offer histories almost exclusively from the perspective of the colonialist. They are, in Foucault's terms, "documents of exclusions" that serve as "monuments to particular configurations of power".[71]

This recognition of colonial archives as sites of contested knowledges has led researchers to adapt their methodologies: according to Antoinette Burton (who may exaggerate the objectivist naiveté of earlier generations of historians), archival research is moving beyond simple fact-retrieval towards a "complex process of selection, interpretation, and exclusion".[72] When examining archival sources I tried not to read them "as is", but rather, as Ann Stoler suggests, "against the grain".[73] This involved reading the archives in the context in which they were written, trying to unearth the power dynamics that infiltrated these narratives, and searching for voices that were silent, or silenced. I tried my best to

[70] Bassett, *The Peasant Cotton Revolution in West Africa, 1880-1995,* 21-23.
[71] Michel Foucault, *The Archaeology of Knowledge; And, the Discourse on Language* (New York, 1972), 79-134.
[72] Antoinette Burton, *Archive Stories: Facts, Fictions, and the Writing of History* (Durham and London, 2005).
[73] Ann Laura Stoler, "Colonial Archives and the Arts of Governance: On the Content in the Form," in *Refiguring the Archive*, ed. Verne Harris Carolyn Hamilton, Jane Taylor, Michele Pickover, Graeme Reid (Dordretch, 2002), 83-100. See also James S. Duncan, "Notes from the Archive: Complicity and Resistance in the Colonial Archive: Some Issues of Method and Theory in Historical Geography," *Historical Geography* 27 (1999): 119-128.

interrogate these sources and critically evaluate the degree to which they were exclusivist documents.

During my time in southern Africa I also gained significant insight into the region's agricultural systems through what Simon Schama terms the "archive of the feet".[74] I travelled extensively for research purposes and conducted interviews with government officials and scientists. I have now spent more than two years learning isiZulu, and have progressed to a level where, while not sufficiently proficient to conduct entire interviews in the language, I am able to introduce myself and enjoy casual conversations. This has helped me to form relationships and obtain insight that would otherwise have been inaccessible for a white, Canadian researcher. My research on the formation of expertise within cotton cultivation benefited substantially from interviews with researchers at the KwaZulu-Natal Natural Resources Institute, the Agricultural Research Council's Institute for Industrial Crops at Rustenburg, and agricultural scientists at the Cotton Research Station at Jozini.

When I set out to South Africa I had hoped that oral histories would become a cornerstone of my thesis. Shortly after my arrival I began a collaboration with two professors at the University of KwaZulu-Natal, Dr. Harald Witt and Dr. Raj Patel, to investigate the social and economic dimensions of contemporary cotton cultivation in the northern section of Zululand known as Makhathini. Assisted by three isiZulu-speaking research assistants, a substantial portion of our project focused on revealing historical patterns of cotton cultivation: we convened focus groups of cotton farmers and asked them to recount a history of crop choice, climate, water availability, labour constraints. We also conducted more than twenty individual farmer interviews trying to reconstruct individual cotton histories.

[74] Simon Schama, *Landscape and Memory* (New York, 1995), 24.

Unfortunately these oral histories offered little direct evidence of value for this dissertation. Many farmers did not have any direct recollections of cotton farming prior to the introduction of apartheid in 1948. Most participants were also much more interested in speaking about urgent contemporary problems associated with the introduction of Genetically Modified Cotton in the region.

Still, these focus groups and interviews provided me with important contextualization on historical agricultural trends within northern Zululand. This collaboration allowed me to participate in several "walk-throughs" with cotton farmers, examining their crops, talking about market structures, insect pests, and climatic constraints. These conversations proved valuable in providing me with insight into the region's contemporary and historical patterns of cotton cultivation.

Chapter 2
False Beginnings: Imported Cotton and Emigrant Settlers in the Post-Annexation Period, 1844-1850.

The territory north of Pondoland and south of the uThukela River, bounded to the east by the Indian Ocean and to the west by the Drakensberg Mountains, became known as Natal when Vasco de Gama, sailing from Portugal to India on Christmas Day 1497, named the coast in honour of the natal day of his Lord. The first non-Africans to settle there were English settlers from the Cape of Good Hope, under the leadership of Francis Farewell and Henry Francis Fynn, who established a trading post at Port Natal in July 1824. This vulnerable settlement wavered in imperial obscurity for more than a decade, until Piet Retief and Gerrit Maritz led a group of Afrikaner Voortrekkers across the Drakensberg Mountains, pushed east by expanding British control in the Cape.[75] There they wrested much of the fertile plains away from the local African population led by the Zulu king uDingane, and established the Republic of Natalia in 1838.

The Afrikaner presence forced the British to take notice of this distant place. They seized control of Port Natal in 1838, ostensibly to prevent the mistreatment of Africans by the Voortrekkers. Finding it of little strategic value, they withdrew in December 1839. Steady lobbying by prospective merchants and concerned officials led the British government to annex the area on May 31 1844. This ambivalent annexation left the European population of Natal, numbering fewer than three thousand settlers, scrambling for resources that would solidify their economic position. With no extractable minerals or timber, and with initial estimates of coal deposits having been proven exaggerated, officials were left with only agriculture as a potential export industry. But despite extravagant reports

[75] For more on the Great Trek see Norman Etherington, *The Great Treks: The Transformation of South Africa, 1815-1854* (London, 2001).

of the land's potential, early settler production stuttered. Most Europeans found more profit hunting for hides, skins and ivory to trade with Africans north of the uThukela River. Those who did manage to cultivate focused on subsistence crops such as maize, potatoes, and papaya. African *imizi* (homesteads) accounted for most of the early agricultural production in the colony, supplying potatoes, maize and beans to newly arrived settlers.[76]

This stagnating settler production had severe consequences for the colony's finances. Natal remained in the red after annexation. Export values rarely exceeded £15 000 per year while imports increased from just under £42 000 in 1846 to over £111 000 by 1850 [Table 2.1]. With zero revenues from export agriculture, customs and taxes made up more than 74% of colonial revenues.[77]

Year	Exports	Imports
1846	£15 406	£41 958
1847	£13 699	£46 981
1848	£10 683	£46 204
1849	£11 265	£55 921
1850	£15 613	£111 015

Table 2.1: Imports and Exports in the Colony of Natal for the First Five Years after Annexation. Source: PAR, *Natal Blue Books*, 1854.

The political situation was also unstable. 100 000 Africans surrounded the colony's 3 000 European settlers. Most settlers were afraid of an African attack or fearful that the British would turn the colony into an African Reserve.[78] Writing from the Colonial Office to Cape Governor Sir Peregrine Maitland, Earl Grey made it clear he was open to suggestions

[76] In areas with low settler penetration, such as the south-western portions of Natal, Africans were able to expand their acreage under maize and sell much of the surplus to new European arrivals. During the 1840s and 1850s, African-grown maize was being exported to the Cape and Mauritius, while others were transporting their surpluses north to Zululand or east to the Orange Free State to barter for cattle. See John Lambert, *Betrayed Trust: Africans and the State in Colonial Natal* (Pietermaritzburg, 1995), 47.
[77] Pietermaritzburg Archival Repository (PAR), *Natal Blue Books*, 1854.
[78] *Natal Mercury*, 3 March 1863.

about how to increase European numbers: "If you are prepared to suggest any mode in which an emigration to Natal of persons of a small capital could be successfully promoted without expense to the British territory, I shall be glad to give the subject my best attention".[79]

Officials within Natal longed for a reliable export crop that could stimulate economic growth and boost settler numbers. For this they turned to cotton, which was mobilized as an agent of colonial development to advance the twin goals of commodity supply and European penetration. This chapter aims to unravel cotton's role in advancing these two separate but complementary strands of British colonialism and to evaluate the reasons for its failure. The first part of the chapter dissects representations of Natal as a 'cotton colony'. A range of influences, imperial and local, helped fuel this idealized image: concern over Britain's cotton supply, the prevalence of wild cotton in south-east Africa, and the success of early transplantation and experimentation efforts. This enthusiasm for cotton was premised on very specific impressions of Natal gleaned from speculators and promoters with little first-hand knowledge of the land itself. Through these representations emerged a particular construction of Natal as ideal cotton growing territory.

Recent scholarship has emphasized that representations of colonial landscapes often reflected the ideals and visions of the colonizer more than the landscape itself. Mary Louise Pratt, Richard Grove, and Matthew Edney have all investigated the power of these Europeanized constructions of 'other' lands.[80] Such representational practices were,

[79] PAR, British Parliamentary Papers (BPP) Vol. 908, Correspondence…on the Establishment of the Settlement of Natal 1848, Earl Grey to Maitland 1848, 108-110, n.d. In: Rebecca Ablett, "The Byrne Emigration Scheme to Natal, 1849-51" (B.A. Hon, University of Natal, 1984), 21.

[80] Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London, 1992); Richard H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860* (Cambridge, 1995); Matthew. H. Edney, *Mapping an Empire: The Geographical Construction of British India, 1765-1843* (Chicago, 1997); Derek Gregory, *Geographical Imaginations* (Cambridge, 1994); Dan

according to Edward Said, acts of 'geographical violence', techniques of encapsulating and appropriating space from a distance. Foucault investigated this mode of seeing, ordering and extending the administration of space more broadly, terming it governmentality: "the right disposition of things, arranged so as to lead to a convenient end".[81] In investigating the construction of Natal as a 'cotton colony', this chapter is fundamentally concerned with the ways in which state power is consolidated through technologies and rationalities that privilege certain types of knowledge, and allow faraway spaces to be governed at a distance.

Following a key element of Foucault's understanding of governmentality – that modes of seeing induce effects of power – the second part of this chapter investigates how cotton-emigration schemes in the post-annexation period imposed idealized constructions of Natal's cotton growing potential onto the land with disastrous results. Colonial officials and speculating adventurers sought to realize a rationalist vision by allocating land through settlement plots that were incompatible with the messy realities of colonial land occupation.[82] Ultimately, as the final part of the chapter argues, the failure of these cotton schemes was attributable to the implosion of these representations made from a distance.

Clayton, *Islands of Truth: The Imperial Fashioning of Vancouver Island* (Vancouver, 2000); Bruce Braun, *Intemperate Rainforest: Nature, Culture, and Power on Canada's West Coast* (Minneapolis, 2002).

[81] Michel Foucault, "Governmentality," in *The Foucault Effect: Studies in Governmentality*, ed. Colin Gordon Graham Burchell, and Peter Miller (Chicago, 1991), 87-104. David Stott has usefully applied this concept to colonial rule and sketched out the manner in which colonial power produces effects of rule. He focuses on "the problem of the formation of historically heterogeneous rationalities through which political sovereignties of colonial rule were constructed and operated." See David Stott, "Colonial Governmentality," *Social Text* 43 (1995): 191-220.

[82] As Kaviraj argues about colonialism more generally, this system of land settlement was a product of an imperial rationalist discourse that views the world as clear, precise, and manageable. Sudipta Kaviraj, "On the Construction of Colonial Power: Structure, Discourse and Hegemony " in *Contesting Colonial Hegemony: State and Society in Africa and India*, ed. Dagmar Engels and Shula Marks (London, 1994).

Cotton Fever

The early nineteenth century brought great prosperity to the cotton mills of Lancashire. Demand for cotton goods rose at an unprecedented rate.[83] Exports of cotton yarn expanded from 5 million lbs at the turn of the century to just under 150 million lbs by 1849. Cotton cloth exports jumped from 12 million lbs to over 240 million lbs during the same period. By 1850 cotton manufactures made up more than 40% of Britain's total exports.[84] They remained Britain's single most valuable export between 1803 and 1938.

Rising markets for cotton manufactures led to corresponding concerns over supply. Raw cotton was Britain's most important import between 1825 and 1873.[85] With cotton manufacturing forming such an integral part of the British economy, securing a cheap, reliable and diversified supply became a matter of national importance. Increasingly heavy dependence on American suppliers, who accounted for less than 1% of total imports at the turn of the century, but over 75% by 1846-50, was a cause of strategic concern.[86] By 1840 cotton industrialists were openly fretting about the possibility of domestic conflict, especially a slave insurrection, or a fissure in Anglo-American relations that could interrupt supply.

This dependence on American supply prompted an empire-wide search for alternative sources of raw cotton. Cultivation was re-energized in the West Indies (most extensively in

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[83] Consumption for British cotton manufactures (both domestic and foreign) jumped from 52 million lbs at the turn of the century to over 630 million lbs by 1849.

[84] R. Robson, *The Cotton Industry in Britain* (London, 1957), 331-335. As Robet Marks has shown, the rise of the British cotton manufacturing industry was buoyed in large part by higher tariffs on Indian imports which undercut their comparative advantage. See Robert B. Marks, *The Origins of the Modern World: A Global and Ecological Narrative from the Fifteenth to the Twenty-First Century*, 2nd ed. (Lanham 2007), 96-98.

[85] D.A. Farnie, *The English Cotton Industry and the World Market, 1815-1896* (Oxford, 1979), 135.

[86] Douglas and David Jeremy Farnie, *The Fibre that Changed the World: The Cotton Industry in International Perspective, 1600-1990s* (Oxford, 2004), 68. The most useful discussion on the international search for a reliable cotton supply to the British manufacturing sector is Farnie, *The English Cotton Industry and the World Market, 1815-1896*, 81-134.

Jamaica and British Guyana), and attempted anew in Australia and India, among other sites. Africa especially was imagined as an ideal site for cotton supply.[87] Cotton fever soon spread to Natal, generating much enthusiasm about the prospects of turning it into a 'cotton colony'.

European-based merchants and travelers had often reported that indigenous cotton grew luxuriously throughout southern Africa. This was *Gossypium herbaceum* var. *africanum*, an African cotton, whose range extended through much of southern Africa including contemporary Botswana, Mozambique, Zimbabwe, and the lower Free State and KwaZulu.[88] This cotton thrived in the semi-arid conditions of the southern African lowveld. It was a shrubby perennial plant, wide-branching, with a heavy, woody stalk and small bolls. It could reach between two and five feet in height. Early visitors reported the widespread occurrence of this wild variety of cotton as proof that the region was ideally suited to the introduction of domesticated varieties.[89]

Like other 'old-world' cottons, *Gossypium herbaceum* var. *africanum* was smaller in size, and had less robust stems, as well as smaller leaves, flowers, and fruits than American cottons. These 'new world' varieties were the cottons of industrial capital, which had been bred for their fruit size and the quantity of fibre produced in the seed. By the mid-19th century, myriad varieties of 'new world' cotton existed with characteristics designed to maximize cotton's exchange value: early germination, increased size and number of fruit per

[87] This interest in Africa's cotton growing potential stemmed largely from one man, Thomas Bazley, Chairman of the Manchester Chamber of Commerce, who was convinced that the soils and climate of west and southern Africa were ideal for cotton. Bazley predicted that Africa would emerge as Britain's primary supplier of raw cotton. See B.M. Ratcliffe, "Cotton imperialism in West Africa: Manchester Merchants and Cotton Cultivation in West Africa in the mid-19th Century," *African Economic History* 11 (1982): 87-113.

[88] All cottons belong to the family Malvaceae, genus Gossypium. There are two familial divisions of cotton based on the number of haploid chromosomes: old world cottons have thirteen hapoild chromosomes (diploids), new world (American) cottons have twenty-six (tetraploids).

[89] Walter Peace, *Our Colony of Natal: A Handbook for the Use of Intending Immigrants* (London, 1884).

plant, and the annual habit at the expense of the perennial.[90] African cotton demonstrated none of these qualities, and, even more crucially, it was a short-stapled variety, which precluded its suitability as a desirable import for processing at English mills.[91] Despite being well-adapted to growing conditions in most parts of the colony, the cotton indigenous to southern Africa was devalued because it was poorly adapted to the mechanized production of the Lancashire cotton mills.

Early British settlers of Natal imported cottons that had been transformed by selective breeding. The first was Sea Island cotton (*Gossypium barbadense*), an arching, wide-spreading, delicate plant, which reached heights of between six to eight feet. It produced only small quantities of lint, but its long staple length, which averaged about 1.61 inches, made it the most highly valued variety. The second was American Upland (*Gossypium hirsutum*), a hardier variety than Sea Island, with thicker stems and branches, fruits that matured lower on the stalks, and a maximum height of only two to four feet. But with an average staple length of only 0.93 inches, it fetched a price considerably lower than did Sea Island.[92]

By the mid-1840s a handful of European settlers were cultivating imported American cotton seed in Natal, mostly in plots adjacent to rivers. Usually, these growers plowed the

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[90] Paul Fryxell, *The Natural History of the Cotton Tribe* (College Station, 1979).

[91] The mechanization of cotton processing was responsible for this new emphasis on fibre length. Previously, fibre length determined the convenience of spinning, as spinners mostly preferred longer staples because they were easier to handle. But with mechanization consistent fibre-length became a key determinant of quality, as the drafting rollers (which grip the moving fibres at an early stage in the spinning process), were fixed at a distance from one another by the length of the raw cotton and adjusted accurately in increments of 1/16 (0.0625). The longer the lint, the finer the thread that could be spun to a given strength and the finer the eventual cloth. Fibre length thus became directly proportional to quality and, by extension, value. A long-stapled fibre such as *G. Barbadense* (Sea Island) had a staple of between 1.125 to 2 inches long, a medium staple fibre such as *G. hirsutum* (American Upland) had a staple of between 0.875 to 1.125 inches long, a short-stapled fibre such as *G. herbaceum var. africanum* had a fibre that was under 0.75 of an inch. See A.N. Prentice, *Cotton: With Special Reference to Africa* (London, 1972).

[92] Harry Bates Brown and Jacob Osborn Ware, *Cotton* (New York, 1958). Egyptian cotton, also derived from a Peruvian group but with a shorter staple than Sea Island, was not imported into Natal until the early 1860s.

land, then planted at least two crops of maize to break-up the soil. Cotton planting took place after the spring rains in October or November. The first crop would normally be ready for picking within four months, and after cutting down existing shoots another would appear four months later. Generally these experimental patches were limited to between three and five acres on farms that spanned thousands.

Results were encouraging. Some plots yielded well over 300 lbs per acre, with costs of production (comprising labour, spades, bagging, etc.) under two pennies per lb.[93] At current market prices this implied a profit of £3 to £4 an acre.[94] News of this success filtered back through travelers' accounts to London merchants. By 1845 broadsheets in both Natal and Britain were advertising cotton lands for sale.

The most significant endorsement of cotton's potential came from the farm of Jonas Bergtheil, located about ten miles north of Port Natal along an undulating plot of coastal land, well-watered and rich in thick grasses.[95] In 1846, Bergtheil instructed his manager to gauge the relative merits of Sea Island and American Upland cotton varieties. These experiments revealed that Sea Island, the variety most desired in Britain, was ill-suited to the colony's growing conditions. Such long-staple types require deeper soils than the sandy, poorly drained soils that dominated the coastal areas of Natal. High winds off the Indian Ocean threatened to injure the bolls by twisting them around the twigs. American Upland, with its thicker stalks, fewer branches, and bolls closer to the ground, was better suited to the

[93] Details on the contribution made by African labourers to these cotton ventures remain unknown. Only a few passing acknowledgements of African labour exist in the records, mostly during the picking season. The preparation of land, ploughing, planting and tending of the crops were primarily undertaken by European settlers. This remained true for settlers planting cotton under the Natal Cotton Company and Byrne schemes discussed below.
[94] R.J. Mann, *The Colony of Natal* (London, 1859), 94.
[95] *Natal Witness*, 1 December 1848. See also PAR, Colonial Secretary's Office (CSO) Vol. 40 no. 1, Bergtheil to Moodie, 1 January 1847.

high winds and shallow soils of the coast. By 1847 Bergtheil had over one hundred acres planted with this variety.

Bergtheil was the first to import European settlers to boost cultivation efforts. After some delay, he convinced thirty-five poor families from his native Germany to provide labour for his cotton fields. On 27 November 1847, 189 men, women and children sailed from Bremen aboard the *Beta*, each promised 210 acres.[96] Once they were settled, Bergtheil offered cash prizes for both the quantity and quality of cotton they produced, leading his settlers to plant over five hundred acres with cotton in 1848. But only a fraction of what was planted was ever reaped. Productivity languished because of inferior seed and poor cultivation techniques. By the following growing season, all of Bergtheil's settlers had abandoned cotton in favour of potatoes, maize, beans and vegetables planted with seed brought from Germany and sold to the settler populations of Pietermaritzburg and Durban. These crops proved more remunerative and less time-consuming than cotton.

Despite their unwillingness to continue with cotton, Bergtheil's German settlers did reap thirty bales in their first and only growing season. Bergtheil shipped these bales to Manchester to be inspected by the Chairman of the Manchester Chamber of Commerce, Thomas Bazley. They sparked considerable interest among buyers when Bazley declared that he had "not seen more beautiful samples of cotton suitable for the manufactures of Lancashire for some years, and if we could have a sufficient supply, I cannot imagine a more important and valuable boon to this country than Port Natal could confer".[97] All thirty bales were bought up at prices ranging from seven pence to one shilling five pence per lb.[98]

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[96] *Natal Witness*, 7 April 1848.
[97] Thomas Bazley, President of the Manchester Chamber of Commerce, n.d. In: J.S. Christopher, *Natal, Cape of Good Hope: A Grazing, Agricultural, and Cotton-Growing Country* (London, 1850), 41.
[98] A.F. Hattersley, *The British Settlement of Natal* (Cambridge, 1950), 133.

Concern over dwindling imperial supply, the proliferation of wild cotton in south-eastern Africa, and the limited but nonetheless consequential early successes of cotton transplantation and experimentation efforts all solidified Natal's reputation as ideal cotton growing country. Officials began to rave about the colony's potential for cotton production. In his annual report, Natal's highest ranking official, Lieutenant-Governor Martin West, asserted: "the soil and climate of the district are particularly adapted for the purpose".[99] Writing from the Colonial Office, Earl Grey left no doubt about the importance he ascribed this venture in the grander goals of imperial advancement: "This district appeared to afford a very desirable field for British enterprise, and especially to give some promise that it might admit of being converted into a source for the supply of cotton, which may at the present time be justly regarded as an object of national importance".[100] Local broadsheets projected yields of over 600 lbs (and profits of £5) per acre for all who grew cotton in Natal.[101]

These extravagant claims began to filter into first-hand accounts of the colony, written mostly by entrepreneurs and speculators who painted evocative images of Natal's cotton producing prospects.[102] Nearly every account emphasized how easily cotton could be cultivated among the colony's rolling hills and lush valleys.[103] One land speculator estimated that the soil in Natal would be over 50% more productive than that found in America. Another envisaged a wide cotton belt stretching across Natal south from the uThukela River,

[99] PAR, BPP Vol. 141 Eighth General Report of the Colonial Land and Emigration Commissioners 1848, 27-29. West further praised the fertility of the soil and suitability of the climate for cotton in the following year's report: PAR, BPP Vol. 141 Ninth General Report of the Colonial Land and Emigration Commissioners 1849, 24-25.

[100] PAR, Government House (GH) 328 No. 52, Earl Grey to Sir Harry Smith, 24 December 1849.

[101] *Natal Witness*, 11 December 1846. This estimate of Natal's production potential being around 600 lbs to the acre seems to have originated within the Manchester Chamber of Commerce, but was quoted often in different reports. See A.F. Hattersley, *Portrait of a Colony: The Story of Natal* (Cambridge 1940), 10.

[102] These laudatory appraisals were largely self-serving. Most of these writers were speculators or entrepreneurs with a vested interest in the appreciation of land values in Natal.

[103] See for instance William Holden, *A History of the Colony of Natal* (Cape Town, 1855), 257; Walter Peace, *Our Colony of Natal* (London, 1883), 73; A. Coqui, *Practical Remarks on the Colony of Natal* (London, 1857), 11.

continuing through Pondoland into eastern portions of the Cape Colony.[104] The most often cited figure was that the colony would be exporting in excess of 500 000 bales within ten years.

The Natal Cotton Company

The first scheme that sought to profit from Natal's representation as a 'cotton colony', the Natal Cotton Company (NCC), was another brainchild of Jonas Bergtheil. He convinced a group of land owners from the Cape to undertake large-scale settler production on a tract of land along the coast north of Durban. These speculators sought to capitalize upon rising enthusiasm for cotton, hoping that it would inflate the value of their land holdings in the colony.

In March 1847, the NCC Directors floated two thousand shares of £10 each to London-based investors to raise the four installments of £5000 needed to get their venture off the ground.[105] The Company was ambitious in its financial projections. It expected that every acre of land would yield a minimum of 600 lbs of clean cotton, which, at a projected price of four pence per lb, would provide a gross income of £10 per acre. Erring on the conservative side, the NCC estimated a net income of only £4 per acre, which on a 35 acre allotment would leave each emigrant family with a total income of over £140 per year. The NCC predicted the dividends on each £10 share would be at least £2 10s per year.

In 1848, after nearly a year of negotiation with the government, the NCC acquired 22 750 acres along the north bank of the uMhloti River on very generous terms (2s per acre, or

[104] B.J. Leverton, *The Natal Cotton Company: A Study in Failure* (Pretoria, 1963), 10 and footnote #36.
[105] PAR, BPP Vol. 16, Correspondence…on the Establishment of the Settlement of Natal 1848, Letter from H. Jargal and P.J. Jung on behalf of the Natal Joint-Stock Company to LG West, 8 April 1847. See also PAR, Accessions, Natal Cotton Company, A1658.

half the established price) [Illustration 2.1]. But this delay put the Company in a precarious financial position. Bergtheil and his partners had spent most of the first £5000 shareholder installment negotiating with the government over the conditions of the land sale. The second installment had been used to cover debts accumulated during the delay.[106] Anxious to commence operations at once, the NCC hastily arranged to divert British emigrants aboard the *Duke of Roxburgh* – destined for the Cape of Good Hope – to their cotton lands in Natal. Twenty disheveled emigrants with no agricultural training arrived on the NCC lands soon after.

[106] PAR, CSO Vol. 10 no.79, Bergtheil to D. Moodie, 14 November 1849.

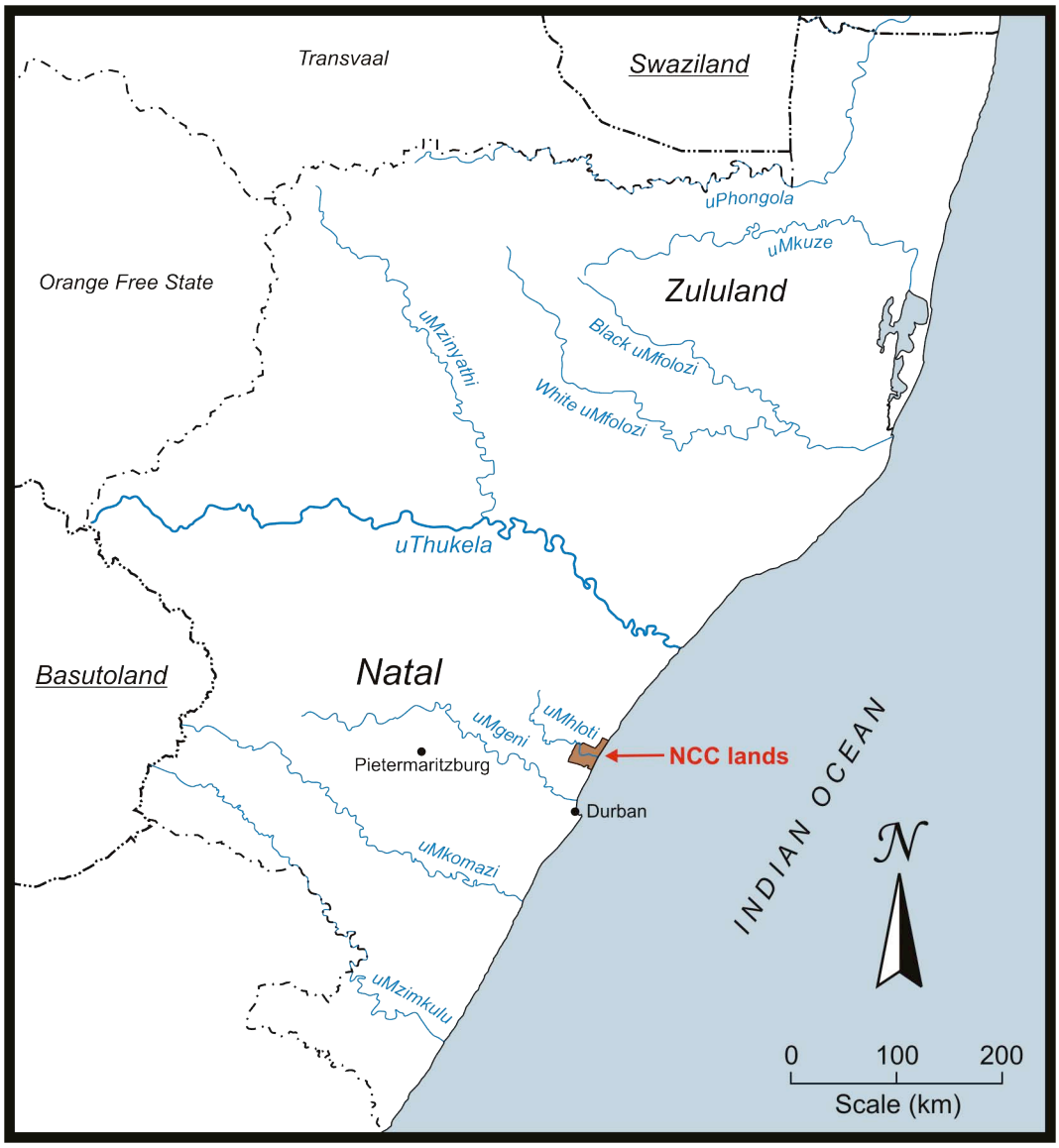

Illustration 2.1: The Location of the Natal Cotton Company Lands. Adapted from: John Clark, *Natal Settler-Agent: The Career of John Moreland, Agent for the Byrne Emigration Scheme, 1849-51*. (Cape Town, 1972): 1.

More than a shortage of money and suitable emigrants plagued the Company. None of the Directors had set foot on the land apportioned to them. They were dismayed to find that barely a fifth of their purchase was suitable for cultivation. The rest, according to their land manager, the only NCC representative to have seen the land, was "a slight shadow of

earth [free from] rocks and stone".[107] More recent soil sampling confirms these findings: two-thirds of all soils in the region are now classified as either sandy or shallow.[108] Much of the 4500 acres suitable for cultivation was blanketed by dense bush that would prove extremely difficult to remove. The most prominent species in the vegetation was the Acacias (notably *A. karroo, A. mearnsii*, *A. nilotica*), all of which were particularly arduous to fell due to their size (they can reach up to 12 metres), low branching patterns, and prominent thorns. They were enormous, costly barriers to development.

Another major obstacle for cotton cultivation was the topography of the selected plot. Ralph Clarence, a grower who had attempted and abandoned cotton cultivation on his farm near the uMhloti River, dismissed the NCC plan outright, arguing the land was too undulating for cotton to succeed. He predicted that any cotton grown on those steep ridges and valleys would be unable to withstand the severe winds that came in off the ocean. He also confirmed previous soil quality assessments, dismissing it as too "poor and hungry" to allow cotton's long, lateral roots access to sufficient nutrients.[109]

The NCC scheme folded in 1849 after less than a year in operation. Investors refused to provide the third £5000 installment needed to initiate cultivation until they received the land title deed from the government The government in turn was unwilling to hand over the deeds until the balance of land payment was received.[110] The NCC land was repossessed early in 1849 without any cotton having been planted.

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[107] PAR, CSO Vol. 10 no. 88, Letter from Mr. Bailie, Land Manager, quoted in: Chairman of the NCC to Sir Harry Smith, n.d.

[108] K. Camp, "The Bioresource Groups of KwaZulu-Natal," (1999). These contemporary samplings do not offer an exact replica of conditions growers would have faced 150 years ago, but they do serve as a useful indicator of the soil's capabilities.

[109] Clarence's assessment of the NCC land is relayed in letter by James Ecroyd to his mother in Killie Campbell Africana Library (KC), James Ecroyd papers, 12 November 1850.

[110] By winter 1849 the Natal government had become suspicious of the NCC's motives and management. Donald Moodie, the Colonial Secretary, pressed the NCC to reveal the expenses spent for the benefit of the

The NCC venture was a product of the swirling enthusiasm over the expected value of cotton to Natal. The Directors were seduced by the inflationary benefits they expected this boom to have on their existing holdings. But poor financial planning and a lack of ecological understanding stymied their efforts. The NCC Directors realized too late that representations of cotton's potential in Natal did not match up with reality on the ground.

Joseph Byrne's Vision of Cotton Colonialism

The prospect of integrating cotton cultivation and emigration reached its climax between 1848 and 1850 with a scheme initiated by Joseph Charles Byrne, the son of an Irish cattle-dealer. Byrne possessed a larger-than-life presence, due both to his imposing frame and a keen sense of charm and style.[111] He had traveled extensively throughout the British Empire, and was committed to finding his fortune by facilitating the emigration of English urbanites to far-off colonies. Having previously had a hand in marketing settlement schemes to Australia and America, Byrne was an experienced promoter by the time he set his sights on Natal in 1847.

Byrne relied heavily on his oratorical skills to overcome his lack of capital and reputation, in order to convince officials, investors, and potential emigrants of the reliability of his propositions. After creating some initial momentum for a large-scale emigration plan to Natal through feverish communications with the Colonial Office in early 1847, Byrne set about canvassing investors to secure the capital needed to implement a large-scale emigration

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emigrants as stipulated in their agreement. The Secretary provided a detailed breakdown of the Company's expenditures, which listed £4480 as having been emigration-related, but this was contradicted soon after by the Chairman, Bergtheil, who listed the actual value much lower at £2599. At this point Moodie dismissed the entire enterprise for their "crooked books". See PAR, CSO Vol. 10 no. 79, Bergtheil to Moodie, 14 November 1849.

[111] Hattersley described Byrne as "an adventurer, an eloquent and plausible speaker, by no means lacking in personal charm, but imprudent and unscrupulous". His gifted oratory skills help account for both the rise and fall of his scheme. Hattersley, *Portrait of a Colony: The Story of Natal*, 21.

project primarily based on cotton. After a number of false starts, Byrne finally cobbled together a patchwork of investors made up mostly of ship-owners based in London and Liverpool who recognized the profit potential of increased sea traffic embedded in Byrne's vision. By 1848 he had accumulated capital worth more than £40 000 in money, shipping and goods.[112]

Byrne then set about selling his vision of large-scale emigration through numerous public talks and a manifesto, *The Emigrants' Guide to the Port of Natal*. His arguments rested on three separate but complementary strands. First, Byrne painted a picture of the ideal conditions for settlement and land ownership in Natal. He opened his *Emigrant's Guide* by boasting that the colony: "has been described by all who visited it as one of the most naturally fertile and salubrious regions on the face of the earth".[113] He was quick to dispel notions of deserts, fever and plague which dominated representations of Africa in Britain, arguing that the majestic Drakensberg Mountain range acted as a buffer, making Natal into an oasis with a benign, moderate, sub-tropical climate. He lauded Natal's advantages over other possible emigration destinations, especially its accessible Port and the large African population that could be easily converted into a large-scale labour force serving the needs of British settlers.[114] He finished his review with a flourish, staking his own

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[112] KC, H.M. Robertson, "The 1849 settlers in Natal Part II: The Byrne Scheme and its Smaller Rivals " *South African Journal of Economics* (n.d.): 416-442.

[113] J.C. Byrne, *Emigrant's Guide to Port Natal* (London, 1848), 18. While Byrne wrote about Natal with a familiarity and expertise that conveys many visits undertaken, Hammond suggests that Byrne never actually visited the colony prior to initiating his emigration scheme, and that his guide was a clumsy amalgamation of Blue Book reports and travelers' impressions. In his bankruptcy defense, Byrne testified that he had visited Natal sometime in 1843 or 1844, though no one in Durban or Pietermaritzburg could confirm this. See E. Hammond, "The Settlement of the Byrne Immigrants in Natal, 1849-1852" (MA, University of Natal, 1926), 27.

[114] This point about Natal's sizeable Native population allowed Byrne to offer Natal up as a site that offered more opportunities for middle-class emigrants than did other competing destinations such as Australia or New Zealand (Byrne, *Emigrant's Guide to Port Natal*, 62). Byrne further tied the appeal of this wealth of untapped labour within an idyllic vision of a pioneer farm, where any hard-working, industrious farmer would have sufficient land and labour at his disposal to make himself successful. For more on how deeply this discourse of

reputation to Natal's salubrious climate. Of all the colonies he had visited first-hand – India, Australia and New Zealand among them – he had never encountered a land "blessed by a bounteous Providence with a more fertile soil than Natal".

The second element of Byrne's strategy was to convince potential emigrants that Natal's generous climate provided growing conditions that were ideal for cotton. To this end, he quoted such luminaries as Sir Harry Smith, Governor of the Cape, Lieutenant-Governor Martin West and Earl Grey, all convinced of Natal's cotton producing potential. He presented testimonies from over a dozen local farmers who had cultivated successfully in the early 1840s. When the public tired of listening to his exaltations, he showed them instead. In many of his public lectures Byrne displayed samples of cotton grown in Natal and revealed them in order of ascending value, climaxing with a sample of the Sea Island variety valued at between sixteen and eighteen pence per lb. Thus he declared: "It is proved beyond doubt, that cotton will grow in Natal – that it grows well – and that every description of cotton will grow there".[115]

The final piece of Byrne's strategy was to tie the merits of large-scale emigration and cotton cultivation into the British colonial project. Byrne peppered his addresses with doom-and-gloom assessments of Britain's population crisis.[116] He played upon the fears of urban dwellers by focusing on the ills associated with uncontrolled city growth: overcrowding, unemployment, pestilence, famine. He positioned colonization "as the great remedy for an

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land ownership seeped into the psyche of potential emigrants see Chapter 1: Agrarian Myths of English Immigrants, in Charlotte Erickson, *Leaving England: Essays on British Emigration in the 19th Century* (Ithaca, 1994).

[115] PAR, Accessions A1598, *Byrne's Emigrant's Journal and Natal News*, June 1840, 44.

[116] A long history of colonial theorists had engaged with these issues, including Jeremy Bentham, James Mill, and Edward Wakefield. For a thorough review see Donald Winch, *Classical Political Economy and Colonies* (Cambridge MA, 1965). A similar nationalistic argument for emigration was articulated by Herman Merivale, who argued that emigration was essential to reduce the strain of overpopulation at the metropole. Herman Merivale, "On the Utility of the Colonies as Fields of Emigration," *Journal of the Statistical Society of London* (1862).

increasing population".[117] He further played upon exaggerated concerns of conflict breaking out in the United States, the supplier of three-quarters of Britain's cotton supply, and moral concerns over the use of slave labour in that country's cotton sector. He concluded that freeing Britain from its dependence on American supply was an object of national importance.

Byrne's marketing of cotton colonialism in Natal was thus portrayed as a two-way benefit to Britain. He promoted cotton as a means of ensuring a steady supply of raw materials back to Britain. He promoted emigration as a means of assuaging concerns over overpopulation and creating a consumer base for imperial products abroad. This rhetoric was modeled on the broader goals that guided emigration during the Victorian period. As Robin Haines has shown in Australia, this discourse visualized "the conversion of the United Kingdom's non-consuming poor into re-invigorated consumers of British manufactured goods who would, in return, deliver primary produce to the UK market, sustaining and propelling the interests of Empire".[118] Byrne's version of cotton colonialism incorporated both elements of this colonial aspiration.

Byrne's embrace of cotton as a means of furthering colonial goals resonated with prospective emigrants. He delivered more than fifty lectures on the subject of 'National Emigration' between July and December 1848, and all drew well into the hundreds, with one meeting at the London Stock Exchange topping out at over nine hundred attendees. Between 1847 and 1849 over a quarter million people were emigrating from Britain annually.

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[117] PAR, Accessions A1598, *Byrne's Emigrant's Journal and Natal News*, June 1840, 42. This pessimistic account appealed to many prospective emigrants who viewed their departure as a "defensive measure, a means of not slipping backwards as the nation did". Charlotte Erickson, *Invisible immigrants: the adaptation of English and Scottish immigrants in nineteenth-century America* (Coral Gables, 1972), 25.

[118] Robin F. Haines, *Emigration and the Labouring Poor: Australian Recruitment in Britain and Ireland, 1831-60* (New York, 1997), 167.

Previous studies of Victorian emigration schemes have emphasized that information dissemination was a key determinant in shaping emigrants' decision choosing between competing destinations.[119] Recent research suggests that the impact of a promoter's presentation was as significant as his content. Byrne understood that his role as a promoter was to craft what one student of emigration literature has termed "carefully orchestrated exercises in persuasion",[120] and his charming and affable nature was particularly well-suited to this. Almost all prospective emigrants came away with a positive and enthusiastic impression of the man and the land.[121] His ships began filling up faster than he could accommodate applicants for passage.

With his financial backing secured, and deluged with requests from potential emigrants, Byrne approached the Colonial Office to negotiate the specifics of his cotton-emigration scheme. Byrne, as the promoter, agreed to a deposit of at least £1000 with the Colonial Land and Emigration Board towards the purchase of Crown Land in Natal. Subject to approval by the emigration commissioners, he was free to recruit and select suitable emigrants for passage, provided he charge them no more than £10 for the voyage. He agreed to secure their safe passage, and to survey and allot twenty acres of suitable

[119] The major proponent of this information hypothesis is D. Baines, *Emigration from Europe, 1815-1930* (Basingstoke, 1991). See also Paul Hudson, "English Emigration to New Zealand, 1839-1850: Information Diffusion and Marketing to a New World," *Economic History Review* 54 (2001): 680-698. Byrne further recognized the importance of selling the prospect of emigration in southern Africa to a public that was largely deaf to the merits of settlement there. A.J. Christopher estimates that southern Africa accounted for less than one-half of one per cent of total British emigration undertaken between 1845-1854. A.J. Christopher, "Natal, the Nineteenth Century English Emigrant's Utopia? An Appraisal of Emigration Literature," *Historia* 18 (1973): 112-124.

[120] Robert D. Grant, *Representations of British Emigration, Colonization and Settlement: Imagining Empire 1800-1860* (Hampshire, 2005), 16. For a more general overview of how Byrne's tactics compare with those employed by other promoters see Grant's Chapter 4, Colonial Promoters: Tactics, Rubrics and Rhetorics, 57-78.

[121] Jane Arbuthnot, who arrived on the *Unicorn*, described Byrne as "plausible and kind" after meeting him for the first time. In KC, Jane Arbuthnot Reminiscences MS ARB. Another settler praised Byrne's presentation style in a culinary metaphor: "the dish was so nicely cooked and presented with such grace and pleasantry that there could be no wonder that it took with so many of us". *Natal Independent*, 14 August 1851 from John Clark, *Natal Settler-Agent: The Career of John Moreland, Agent for the Byrne Emigration Scheme, 1849-51* (Cape Town, 1972), 10.

agricultural land for each settler upon their arrival.[122] Once the Natal Government had certified that the emigrants had been landed safely and were in possession of their land, Byrne would be entitled to reimbursement of his deposit at the rate of £10 per approved adult.

Byrne's expected profit lay in the land. With the price of Crown land set at 4s per acre, Byrne would be allocated 5000 acres for each £1000 deposited, which would then be reimbursed to him at £10 per settler.[123] One hundred emigrants would be enough to get his entire deposit back, and to satisfy his responsibilities he had only to part (at minimum) with two thousand acres (at twenty acres per emigrant), leaving him with a profit of three thousand acres of land. Each settler paid his or her own steerage fee, so Byrne was in a position to recoup thirty acres per settler (assuming no land allocations for dependent children) for facilitating their recruitment and transport, as well as the survey and allotment of land. Byrne recognized that twenty acres would be insufficient for farmers to survive and they would clamor for adjoining land, which he would then sell at an inflated price. The more emigrants he recruited, the greater the inflationary pressure on land values, and the greater his potential profits.[124] This potential windfall motivated Byrne to import just over 2700 settlers into the colony in just eighteen months.

[122] Twenty acres per settler was the basic allotment, plus an additional five for every child. Settlers also had the option of purchasing more land from Byrne prior to departure or upon arrival.
[123] The full details of the final agreement agreed to between Byrne and the Colonial Land and Emigration Board is found in PAR, Accessions 1577 Byrne Immigration Scheme, Correspondence on the Establishment of the Settlement of Natal and the Recent Rebellion of the Boers, (London, 1859), 92/93.
[124] In his bankruptcy hearing, Byrne acknowledged that his sole source of revenue was the expected profit from the land: "all expenses, all profits, and part of the actual cost of the conveyance of emigrants were to come from the land". *Natal Witness*, 23 May 1851.

The Byrne Settlers and their Land

The first two shiploads of Byrne emigrants arrived in the colony in May and July 1849; the *Wanderer* arrived with fifteen settlers on 16 May, and the *Washington,* with 74 passengers, on 18 July. Emigrants were underwhelmed by the scene that greeted them. Durban was a dusty assemblage of shacks and teetering homes made of wattle and mud, flanked to the east and west by putrid marshes.[125] Its streets were covered by a layer of sand nearly knee-deep. Despite promises to the contrary, there were no tents or barracks provided for the new arrivals. Most had to endure their first African nights outdoors. The lands that were supposed to be theirs were neither surveyed nor allocated.

It was up to Byrne's agent in Natal, John Moreland, who arrived on the *Washington*, to address the details Byrne had left unattended. Many histories endorse Byrne's selection of his colonial agent, praising him as a resourceful and hard-working foil to Byrne's exuberance and carelessness.[126] Moreland worked tirelessly to alleviate the hardships faced by his fellow travelers. Immediately after his arrival he scrambled to find suitable agricultural land within a few kilometers of Pietermaritzburg. He purchased suburban allotments along the uMsunduzi (Bushman's) River at Slang Spruit, only four kilometers outside of town, but paid dearly for them, most at over six shillings an acre [Illustration 2.2]. He divided this land into long, narrow lots, providing all with river access so that at least a portion of each section was irrigable. The soil was clayish and shallow, but sufficient for market gardening, which most settlers undertook immediately.

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[125] Beverly Ellis, "White Settler Impact on the Environment of Durban, 1845-1870," in *South Africa's Environmental History: Cases and Comparisons*, ed. Stephen Dovers, Ruth Edgecombe, and Bill Guest (Cape Town, 2002), 34-47.
[126] A.F. Hattersley, *The Natalians: Further Annals of Natal* (Pietermaritzburg, 1940), 55.

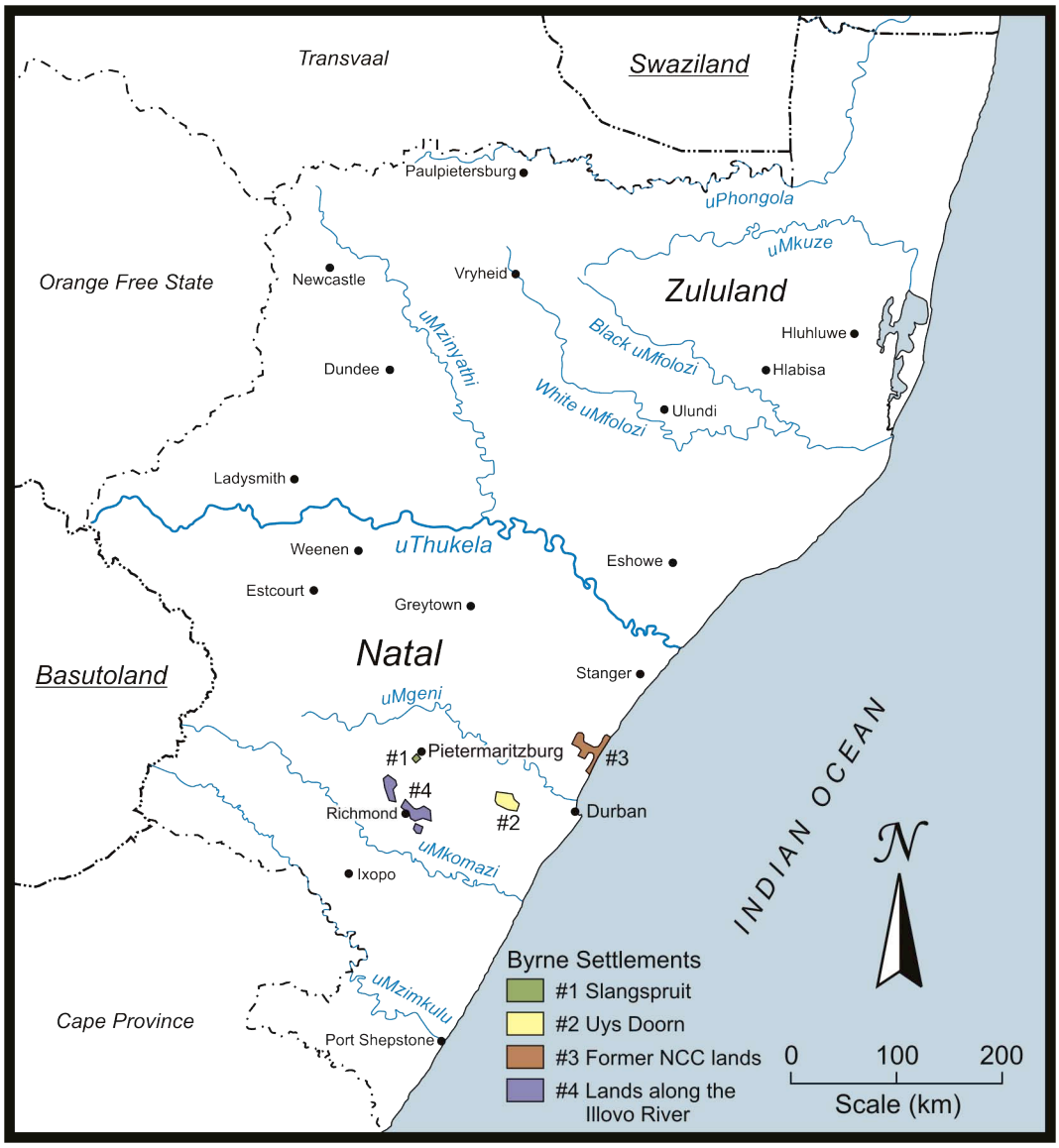

Illustration 2.2: Location of Byrne Settlements within the Colony of Natal. Adapted from: A.J. Christopher, "The British Settlement of Natal 1848-1851: A Geographical Appraisal." *Journal for Geography* 3, no. 5 (1969): 485-499, p. 492.

Despite the favourable location and growing conditions, many settlers were unhappy with their allotments. One, George Holgate, expressed his displeasure in a letter to the Colonial Office. He argued that Byrne had promised them land that was well-wooded and well-watered, capable of growing cereals, cotton and tobacco. But there was no timber on his plot at all, and while he had direct river access, he was unable to irrigate three-quarters of his land. Even worse, the allotment was "of a most disadvantageous form, being in the shape

of an enormously long wedge almost literally pointed at the best end, and growing – as ill weeds grow – larger and larger as it becomes worse and worse and still more worthless…"[127] He estimated that only 30 of the 150 acres allotted to him were fit for the plow.[128] The rest was too dry, barren, and hilly to be fit for anything more than grazing. Many of his fellow settlers agreed with his assessment: just under half of the plots allocated were abandoned within two years.

Those who remained along the uMsunduzi River were relatively happy with their allotments and managed to stay on their lands by focusing on market production for Pietermaritzburg. These were the lucky ones. The next wave of arrivals was assigned to two tracts of land Byrne had bought directly from a Cape merchant named Francis Collison. The first of these was Middle Bosch, on the uMgeni River about forty five kilometers north-west of Pietermaritzburg. Upon inspecting this site Moreland found it to be well-watered and amply supplied with timber, but too far from town to ensure reliable transport of the cotton crop for export.[129] The second plot, known as Uys Doorn, was even less appealing. Though located along the route connecting Pietermaritzburg and Durban, it was almost entirely without water and was covered with scrubby, dense undergrowth and stone. The low, sprawling branches of the Acacia trees were everywhere, blanketing the land with clumps of prickly thorns.[130] Upon inspecting the land Moreland surmised that it could at best serve as a poor cattle farm. He recognized that settlers would never be able to clear the lands properly, let alone cultivate cotton, but as Byrne had finalized the purchases in London, Moreland had

[127] PAR, CSO Vol. 14 no. 6, George Holgate to A. Roberts, 18 January 1850.
[128] Holgate accumulated 150 acres by pooling together his individual allotment with that of his wife, his children, and by purchasing additional land from Byrne.
[129] Clark, *Natal Settler-Agent: The Career of John Moreland, Agent for the Byrne Emigration Scheme, 1849-51*, 24.
[130] Charles Barter, *The Dorp and the Veld or Six Months in Natal* (London, 1851). Other species such as *Euclea daphnoides* and *Scarcostemma viminale* also contributed to the bush's denseness.

no choice but to offer these lands to newcomers. His diary entry masked his pessimism: "the land is ill-adapted for emigration purposes, though I hope it will eventually turn out not so bad as is expected".[131]

When Moreland brought the new batch of arrivals from the *Henry Tanner* and the *Dreadnought* to these lands, they responded with bitterness, or resigned laughter. Most sold their plots for as little as six pence per acre. Others abandoned them without any compensation at all. Those who endeavoured to stay were overwhelmed by the poor quality of the land. One settler, Mrs. Leonard Wright, described her family's property as "chiefly large stones, and unfit for cultivation". Another settler on a nearby farm referred to his plot as "bare rock and iron crag".[132] Still another spent weeks attempting to break through the thick layer of thorn trees, most close to the ground and stunted. [133] He abandoned the land soon after.

Moreland's problems extended beyond the poor quality of the allotments. Byrne had made a basic error that put the entire scheme in jeopardy. Upon approaching the Colonial Emigration and Land Board for his drawbacks based on the safe arrival of the first handful of ships, Moreland was refused, both because of the smattering of complaints about the quality of land being offered, and because Byrne had bought two of these tracts of land directly from Collison, a violation of the original agreement.[134] With the reimbursements on his deposit being refused, and no market for the sale of extra lands, Byrne was left with no incoming revenue. This triggered a backlog that was fatal to the scheme. Without funds to acquire

[131] PAR, Accessions 1273, Moreland Papers I, 21 January 1850.
[132] Hattersley, *The British Settlement of Natal*, 210-211.
[133] *Natal Witness*, 11 April 1851.
[134] PAR Accession 1577, Byrne Immigration Scheme, Correspondence on the Settlement of Natal (London, 1850), Moodie to Smith, 16 April 1849, 29.

new lands or pay the survey fees, there were no allotments awaiting the steady stream of emigrants who arrived during the summer of 1849/50.

Moreland was further handicapped by a dearth of suitable land. All the good agricultural land within twenty kilometres of Pietermaritzburg and Durban was in the possession of wealthy landowners waiting for the price of their holdings to inflate. This unbalanced distribution of land had long been a sore point for Natal administrators. Initially, British officials were able to lay blame for this disorganized and haphazard system of land distribution on the *Volksraad*, the government of the early Afrikaner Republic. Records of land transactions were in disarray, making it impossible to account for the thousands of acres that had been appropriated during this period. Sir Harry Smith, Governor of the Cape, exacerbated the situation even further by offering vast tracts of land at depressed prices, often no more than one or two pence an acre, in a misguided attempt to stem the flow of Afrikaner families out of the colony.[135] Most of this land ended up in the hands of wealthy speculators based in London or the Cape. By 1847 nearly three million acres were divided among 360 claimants. Over eighty-five percent of this land was idle, unused, and unavailable for settlement.[136]

Disgruntled settlers convened meetings early in 1850 to address these obstacles. Committees were formed to synthesize grievances, culminating in a twenty-two page amalgam of dissatisfaction that was presented to the government. The settlers' major complaint centered on the insufficient size of their allotments, a deficiency with which

[135] Henry Slater, "Land, Labour, and Capital in Natal: The Natal Land and Colonization Company, 1860-1948," *Journal of African History* 16 (1975): 257-283. This policy was decried by many in Natal, who, while agreeing with Harry Smith's intentions in trying to stem the flood of Boers out of the province, realized that too little land would be left over for well-suited and well-intentioned settlers. See for instance *Natal Mercury*, 7 April 1859.

[136] Edgar H. Brookes and Colin de B. Webb, *A History of Natal* (Pietermaritzburg, 1965), 61. See also A.J. Christopher, "The British Settlement of Natal 1848-1851: A Geographical Appraisal," *Journal for Geography* 3 (1969): 485-499.

Natal's newly-appointed second Lieutenant-Governor, Benjamin Pine, sympathized. Pine acquiesced to the settlers' request for extra land and extended the size of each emigrant's allotment by twenty-five acres (at no extra cost to Byrne). He further allowed Moreland to circumvent existing regulations for the sale of Crown Land and initiated a direct transfer of the 22 000 acres belonging to the now-defunct NCC along the uMhloti River. It was upon this land that Moreland settled the next wave of emigrants who arrived almost simultaneously on the *King William*, the *Sovereign* and the *Edward* in early 1850. Most of these two hundred or so settlers were recruited through a Wesleyan Methodist settlement scheme that had been folded in with Byrne's. As these new arrivals requested to be settled together, the former NCC land seemed an ideal location.

After a delay of about four months during which most of the emigrants occupied hastily erected tents on Durban's beaches, the settlers took possession of their forty-five acre plots along the uMhloti. The Wesleyans settled on the south side of the river and established the city of Verulam. It seemed an advantageous location: near the highroad that traders took north into Zulu country, it had enough timber for the construction of homes and church, and the river wound its way through most of the allotments. Though the soil was shallow and sandy, rainfall averaged just over one thousand millimetres a year, providing ample water for most produce and grain. But the land was heavily covered in trees, bush and roots, including the notoriously difficult-to-remove Acacias. European settlers had been assured that their land would be well-wooded but were completely unprepared for the dense, low-lying tangle that blanketed their plots. One settler, John Akerman, summed up this gulf between the representation Byrne had crafted prior to departure and the reality his settlers encountered on the ground: "what Mr. Byrne in England called 'good land' is a dense forest of such a

character as to be quite beyond the means of the ordinary English emigrant to clear".[137] It took most settlers over a year to get even a few acres of their land ready for the plow. This delay put farmers in such a precarious financial position they were unable to contemplate any crops other than those of immediate necessity. Most ended up relying primarily on maize and potatoes. The Wesleyans also encountered the same constraints to production that had thwarted NCC plans only a few years earlier: steep inclines, heavy winds, and shallow soils.

The settlers at Verulam, as elsewhere, were further lured away from cotton by the comparative economic advantage offered by other crops. An inadvertent consequence of Byrne's success at importing large numbers of emigrants into the colony was inflation in the market for local foodstuffs. By early 1850 the price of maize had shot up to between eight and ten shillings a bushel from only two shillings two years before.[138] Potatoes were fetching up to two pence per lb with ships waiting to export surplus crops to Mauritius. French beans were priced at over six shillings a bushel, sorghum was up to seven shillings a bushel. Success stories about Byrne settlers who opted for foodstuffs over cotton began to circulate among the new arrivals. One settler on the uMgeni River sowed five acres with oats and realized a profit of over £22 per acre before expenses.[139] Another, who had come to the colony as a cotton buyer for a British manufacturing firm, confessed that the prices for foodstuffs were too attractive to ignore and settled along the Isipingo River planting potatoes and oats.[140] These high prices for foodstuffs gave settlers yet another reason to abandon Byrne's original vision of cotton cultivation.

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[137] Clark, *Natal Settler-Agent: The Career of John Moreland, Agent for the Byrne Emigration Scheme, 1849-51*, 90.
[138] Holden, *A History of the Colony of Natal*, 267.
[139] KC, James Ecroyd Letters, Ecroyd to his Mother, 10 November 1850, 74. Ecroyd's letters provide the most valuable contemporary data on the comparative prices offered for foodstuffs within the colony and the disincentive these high prices offered to cotton growers.
[140] Ibid, Ecroyd to his brother Benjamin, 6 February 1851.

Despite these setbacks Byrne continued to enjoy success in recruiting settlers to his scheme. Boatloads kept turning up through the winter of 1850; over one thousand emigrants landed between May and July. Once again, Moreland scrambled to find suitable land, eventually securing 31 000 acres along the Illovo River, obtained on loan from the government. While many of these settlers were successful with mixed farming and sustained agricultural production (many stayed on this land for generations afterwards), no cotton was ever grown there. The plots allocated along the Illovo River were at an elevation of over 1100 metres, in the area now known as the Mist Belt, which is characterized by extreme weather ranging from desiccating hot winds from the Drakensberg Mountains, to cold, enveloping mists in the spring and summer, and frequent frost in the winter, caused by rapid cooling as air descends into the area's deep valleys.[141] The region receives rainfall between 800 and 1 280 mm per year, with the main source of precipitation being heavy, intense thunderstorms during the late afternoons of the rainy season. Historical analyses of the region's precipitation patterns reveal a cyclical pattern of variance, with alternating periods of extended drought and unusually heavy rains.[142]

The Byrne settlers soon recognized that local conditions were poorly suited to the cultivation of cotton. Ellen McCleod, who arrived on the *Minerva*, laughed at her brother-in-law's suggestion that cotton cultivation would be profitable, scoffing that "[he] forgets that we are half way up to the mountains of perpetual snow, Drakensberg".[143] Her letters home during the growing seasons of 1850-1853 chronicled the regular incidence of thunderstorms

[141] Margaret Mary Sandwith, "The Diminution of the Mist Belt Grasslands of KwaZulu-Natal: An Historical Investigation of Land-Use Change" (M.A., University of Natal, 2002), 66.
[142] Charmian Coulson, *Beaulieu-on-Illovo, Richmond, Natal: Its People and its History* (Richmond, 1986), 14.
[143] Ruth E. Gordon, *Dear Louisa: History of a Pioneer Family in Natal, 1850-1888* (Cape Town, 1970), 42. Another settler who arrived on the *Minerva*, George Mason, was also struck by the regularity and severity of the region's thunderstorms. See George Mason, *Life with the Zulu of Natal, South Africa* (London, 1868).

and hailstorms, even an occasional hurricane. Both she and her husband were convinced that these climatic conditions were too volatile for cotton to succeed.

Colonial Imagination and Ecological Realities

Byrne's cotton scheme failed because of the gulf between his exuberantly crafted representations of Natal's cotton potential and the realities his settlers encountered on the ground. There were three dimensions to this: First, Byrne's selective use of the grid as a means of dividing up land into symmetrical plots abstracted Natal's ecological realities, leaving many settlers with plots completely unsuitable for cotton. Most of the Byrne settlers whose land had been allocated through the grid refused their allotments outright. Second, Byrne deliberately underestimated the size of plots needed for cultivation, hoping that settlers would then rush to purchase extra land from him at inflated prices. Even those settlers who ended up with well-positioned sections of land found that twenty acres per person was insufficient for successful cotton cultivation.[144] Third, and most crucially, Byrne assembled lands that were too far inland and too cold to allow a heat-loving plant such as cotton to succeed.

Having never visited the colony himself (despite his claims to the contrary), Byrne required a means of generalizing and abstracting Natal's geographical particularities, making the specific and the local accessible within his London office. To accomplish this Byrne employed a grid, which, as Hildegard Binder Johnston has argued in the context of the United States, was favoured because it facilitated the "orderly transfer of an immense, poorly

[144] Of course, twenty acres was the standard allotment per individual, so many families accumulated holdings far exceeding this size. A J Christopher estimates that just over 40% of total holdings were twenty acres in size. The average holding of all the Byrne settlers was 53 acres. See Christopher, "The British Settlement of Natal 1848-1851: A Geographical Appraisal".

known territory to private ownership through sales".[145] In Bruno Latour's terms, the grid was a code of translation, through which the foreign, distant land of Natal become mobile, stable and combinable.[146] Byrne's grid allowed him to divide up the land into symmetrical allotments without any consideration for the agricultural possibilities confronted by growers on the ground.[147]

Illustration 2.3 shows Byrne's grid imposed on the former NCC lands along the uMhloti River. The townships of Verulam and Mount Moreland are visible, surrounded by plots on all sides. Upon viewing the lands for themselves European settlers quickly realized that Byrne's grid was flawed. The topography of this coastal land was undulating, with sharp crests and valleys, leaving much of the land incorporated within the grid too steep for any type of cultivation. As Johnson has argued with respect to the United States, such right-angled planning is suitable for level, uninterrupted land, but is foiled by hilly areas.[148] Byrne's grid was unable to make allowances for these marginal growing conditions: many allotments in the former NCC lands were too steep for cultivation.

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[145] H. B. Johnson, "Towards a National Landscape," in *The Making of the American Landscape*, ed. M. Conzen (Boston, 1990), 127-145.

[146] Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, 1987). Other accounts have stressed the utility of the grid as a means of control which rendered the land increasingly available for colonization. See for instance Nicholas Dirks, "Introduction," in *Colonialism and its Forms of Knowledge*, ed. Bernard Cohn (Princeton, 1996), and Hildegard Binder Johnson, *Order Upon the Land: the U.S. Rectangular Survey and the Upper Mississippi Country* (New York and Toronto, 1976).

[147] This theme of colonial imaginations clashing with ecological realities looms large in much of imperial environmental history. See Michael Williams, *The Making of the South Australian Landscape: A Study in the Historical Geography of Australia* (London and New York, 1974); John C. Weaver, *The Great Land Rush and the Making of the Modern World, 1650-1900* (Montreal and Kingston, 2003).

[148] Johnson, *Order Upon the Land: the U.S. Rectangular Survey and the Upper Mississippi Country*, 220.

Illustration 2.3: Byrne's Grid on the Former NCC Lands along the uMhloti. Source: PAR Image Collection, M1/98.

Illustration 2.4 shows Byrne's grid applied to the lands along the Illovo River. Fewer than half of these plots were allocated direct river access, a necessity for irrigation. Settler reports confirm that water availability was sporadic all along the Illovo, as both the river and its tributaries were vulnerable to periodic drought and excessive flooding.[149] The grasslands in this area were dotted intermittently with timber, consisting primarily of yellow-woods, sneeze woods and wild peach-trees. Some plots were covered in clumps of dense bush that made plowing impossible, while others lacked timber for the construction of fences or homes. One settler, whose plot was located on the outer edge of the grid, complained that his

[149] Gordon, *Dear Louisa: History of a Pioneer Family in Natal, 1850-1888*, 2.

land was over four miles away from the nearest water source, and covered with interminable bush.[150] In the interior of Natal, water and wood were distributed too unevenly to ensure their availability on each grid plot.[151]

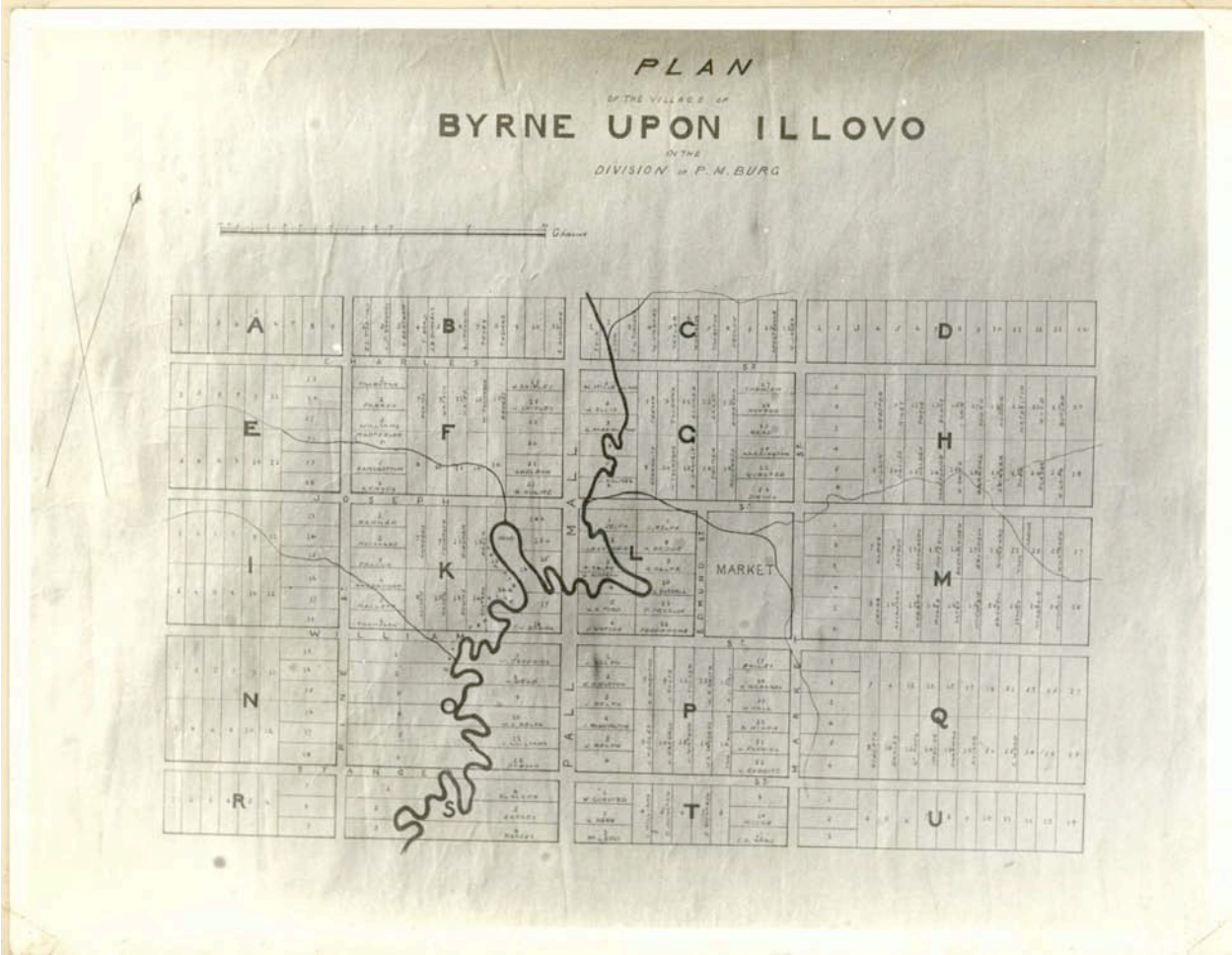

Illustration 2.4: Byrne's Grid applied to Allotments along the Illovo River. Source: PAR, Accessions 1598 Ref 3, Byrne Immigration Scheme, Moreland Miscellaneous Notes.

Byrne's impractical imposition of the grid caused many of his settlers to reject their land outright. 42% of all plots were unoccupied or abandoned within the first year.[152] As

[150] Clark, *Natal Settler-Agent: The Career of John Moreland, Agent for the Byrne Emigration Scheme, 1849-51*, 89.

[151] Only a few years earlier the British had recognized this gulf between the agricultural potential of coastal and inland plots and made adjustments to accommodate differences in growing conditions. Farms allotted to Voortrekkers between 1843 and 1849 were double the size in inland areas as compensation for the high aridity and inferior growing conditions. See A.J. Christopher, "Colonial Land Policy in Natal," *Annals of the Association of American Geographers* 61 (1971): 560-575.

has now become well understood, following the arguments of Foucault and the many who have borrowed his insight, representations from afar privilege political imperatives and exclude potentially damaging or detrimental externalities. The grid made the lands of Natal visible, in one way, to Byrne in England and allowed him to divide and allocate them among his settlers from afar: the process of representation facilitated intervention.[153] But Byrne's grid simultaneously determined the outcome of this settlement scheme. The grid extracted these lands from their immediate socio-spatial contexts. It enframed a particular view of Natal's cotton growing potential that left many settlers with plots wholly unsuitable for the goal of cotton cultivation.[154]

But the failure of Byrne's cotton scheme was not due to the grid alone. Even those settlers who were lucky enough to receive plots on prime agricultural land were unable to grow cotton due to the small size of their allotments. Natal's second Lieutenant-Governor, Benjamin Pine, who assumed his post as Byrne's venture collapsed, was the first to recognize that settler plots were undersized:

> The first and fundamental error in the scheme is that it is based upon a mistaken notion of the physical nature of the district. It is founded on the opinion that the country is capable of being divided for agricultural purposes into allotments of 20 acres in extent. No opinion can be more erroneous, and I cannot help expressing my

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[152] Approximate 32 500 of the total 78 000 acres administered under the Byrne scheme were rejected outright. PAR, Records of Registrar of Deeds, n.d. In: Hattersley, *The British Settlement of Natal*, 494.

[153] For other examples of how spatial representations influence political outcomes see Jonathan Murdoch and Neil Ward, "Governmentality and Territoriality: The Statistical Manufacture of Britain's 'National Farm'," *Political Geography* 16 (1997): 307-324; Roger J. P. Kain, "The Role of Cadastral Surveys and Maps in Land Settlement from England," *Landscape Research* 27 (2002): 11-24; David Demeritt, "The Statistical Enframing of Nature's Limits: Forest Conservation in the Progressive Era United States," *Environment and Planning D: Society and Space* 19 (2001): 431-459.

[154] As Edward Said notes, colonialism could not have succeeded without "important philosophical and imaginative processes at work in the production as well as the acquisition, subordination, and settlement of space". Edward Said, "Representing the Colonized: Anthropology's Interlocutors," *Critical Inquiry* 15 (1989): 205-225. Derek Gregory investigates how conceptions of space were a vital part of the colonizing process more broadly in his book *Geographical Imaginations*.

> surprise that it should ever have been entertained by anyone who had visited, and even superficially examined, the district.[155]

He was emphatic that plots needed to be expanded at least ten-fold for farmers to have even a chance of success with cotton:

> It is impossible to divide the country advantageously into 20 acre farms. The banks of the rivers and streams may admit such divisions, but then the land above them would be rendered valueless, even for grazing purposes, by being cut off from the water. I am therefore of opinion, and it is that of all practical men with whom I have conversed on the subject, that as a whole the country is incapable of being advantageously divided into farms of less extent than from 200 to 500 acres.[156]

Settlers also realized that twenty acres was insufficient and petitioned to have their acreage expanded.[157] In response, Lieutenant-Governor Pine more than doubled the minimum allotment to forty-five acres. But still these were woefully undersized. Plots of forty-five acres were too small to ensure that each plot received sufficient water and wood, especially in the drier interior. A similar point was made by John Wesley Powell with respect to the application of the "forty" – the 40 acre modular base unit for surveying – west of America's 100th Meridian. Powell maintained that while the eastern United States contained sufficient water and wood to allow for such modular divisions upon the land, scarcity west of the 100th Meridian was so acute that settlement plots needed to be expanded to take these more arid conditions into account. He suggested: "an adjustment of the survey to geographic conditions".[158] The same held true in Natal: Byrne applied his grid evenly within the humid coastal region and the drier inland river valleys (along the Illovo). Plots that did not reflect local geographic conditions were destined for failure.

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[155] PAR, Accessions 1577 Byrne Immigration Scheme, Further Correspondence on the Settlement of Natal, (London: 1851). See also PAR, GH 270 no. 78, LG Pine to Governor of Cape Colony, 30 August 1850 in Leverton, *The Natal Cotton Company: A Study in Failure*, 8.

[156] Ibid. Sir Harry Smith, Governor of the Cape, endorsed Pine's assessment of the failure. He called the twenty-acre allotments the "radical defect" of the scheme and agreed with Pine's conclusion that allotments of no less than two hundred acres should never have been contemplated. Smith's comments are found in this same document.

[157] See for instance KC, Jane Arbuthnot Reminiscences.

[158] Johnson, *Order Upon the Land: the U.S. Rectangular Survey and the Upper Mississippi Country*, 220.

Byrne's undersized plots also prevented settlers from replicating the only production strategy that had ever succeeded in exporting cotton from Natal. The early agricultural successes that had helped fuel the colony's cotton fever grew the crop on plots of three to five acres, on farms that numbered in the hundreds, often thousands of acres. Cotton made up one element of a diversified farming strategy that included the production of foodstuffs for local markets, cattle rearing, and often dairying.[159]

Most crucially, Byrne's cotton scheme focused on inland areas at elevations in excess of 1000m, where frosts, and violent storms were frequent.[160] Modern-day estimates reveal average temperatures of between 18.3 and 20.7^{0}C during the October-March growing season at Byrne's sites along the Illovo River.[161] This meant that some 1500 to 1950 heat units were available for crops on this land, well below cotton's minimum threshold of 2100. Byrne settlers allocated plots closer to Pietermaritzburg faced similar constraints, with average temperatures of 19.6^{0}C translating into a heat unit value of 1742. Byrne chose plots that were too high, too far inland and too cold for cotton to succeed. These unsuitable lands offered insufficient heat for cotton's morphological development.

Other, non-land related failings also contributed to the downfall of Byrne's scheme. Byrne readily accepted any emigrant with funds, regardless of his or her suitability as a colonial agriculturalist. Almost 1000 of the 2700 new arrivals were towns-people without any agricultural experience.[162] Both Lieutenant-Governor Pine and Moreland put the percentage of European settlers with useful farming skills much lower, the former estimating

[159] Byrne was locked into twenty acre allotments as part of his agreement with the government. Any increase in plot size would have had to come out of his profit margin.
[160] The Natal Cotton Company lands along the coast being the only exception.
[161] Camp, "The Bioresource Groups of KwaZulu-Natal".
[162] Hattersley, *The British Settlement of Natal*, 109.

that only 2% of Byrne emigrants had been employed in agriculture prior to emigration, the latter putting this figure at only 1%.[163] Focusing his recruitment efforts on urban emigrants had lowered the chances of successful cotton cultivation even further.

Another major handicap was the chronic delay in surveying allotments. Most new arrivals stayed in Durban for weeks, often months before their land was surveyed. During this time they typically exhausted whatever capital they had brought with them to the colony. Waiting times worsened as Moreland was unable to access reimbursements of Byrne's deposits. By mid-1850 three months was the norm and this soon extended to six and even to nine months.[164] The situation was worse for settlers who arrived later in the year. At least one arrival on the *British Tar* in late September 1850 had to wait more than fourteen months for his land to be surveyed.[165]

There were still other instances of baffling mismanagement on Byrne's part. He chartered vessels that drew too much water to enter the Port. The sand bar at the entrance of Durban harbour prevented ships of greater than ten feet draught from entering, yet no fewer than three of Byrne's ships exceeded this capacity, forcing settlers to incur an unloading charge of 29 shillings per ton. Byrne also neglected to budget for the cost of moving settlers from the Port to their allotted land. Moreland ended up paying transportation costs in excess of £3 10s. per ton per fifty miles. In another instance, Byrne accepted deposits of large sums

[163] Lieutenant-Governor Pine's estimate is from Hammond, "The Settlement of the Byrne Immigrants in Natal, 1849-1852", 100. Moreland's estimate is found in Hattersley, *The Natalians: Further Annals of Natal*, 59. Moreland described with great style how Byrne fiddled with his records to get non-suitable emigrants past the emigration commissioners: "By the mere flourish of a pen a hairdresser and perfumer…was speedily turned into an experienced agriculturalist; if he had not strictly speaking been accustomed to handle the scythe, the spade or the plow and cultivate the land, he had nevertheless cut many a crop, either with the scissors or the razor…a professor of music or a dancing master, was transformed as if by a magician's wand, into a burly farmer…a carver or a guilder…turned into a carpenter or joiner". From Hattersley, *The Natalians: Further Annals of Natal*, 68.
[164] KC, James Ecroyd Papers, Diary Entry, 12 November 1850.
[165] PAR, Accessions 1273, Moreland Letter Book I, Moreland to Byrne, 5 July 1850

of money from settlers prior to departure, but failed to establish any means by which newly arrived settlers could approach Moreland and access their funds upon arrival.[166] These managerial shortcomings exacerbated the already tenuous situation into which settlers had been placed by Byrne's land allocation strategies.

By the end of 1850, Byrne's scheme had broken down completely. The negative cycle of Moreland's rebuffed attempts to obtain reimbursements, coupled with mounting settler complaints over the poor conditions of their allotments, stalled any further land purchase or survey. European settlers began vacating their lands en masse without any compensation. The towns of New Glasgow and Mount Moreland were completely abandoned; the populations of Verulam and Richmond fell by half. Settlers flooded to Pietermaritzburg and Durban in search of work. Reports vilifying Byrne and Moreland filled Natal's broadsheets, as settler after settler recounted his or her harrowing experience.[167] Caricatures appearing in these same pages depicted Byrne as a weasel and scoundrel [Illustrations 2.5 and 2.6]. By the time emigrants arrived on the last of Byrne's ships, the *Devonian*, which reached port on 31 October 1850 and the *Emily* which arrived 2 December 1850 Moreland was penniless and unable to assist the new arrivals. Three weeks later Byrne was ordered to appear in a London bankruptcy court.[168]

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[166] Clark, *Natal Settler-Agent: The Career of John Moreland, Agent for the Byrne Emigration Scheme, 1849-51*, 88.

[167] See for instance *Natal Witness*, 14 June 1850.

[168] Byrne's deficiency in his bankruptcy proceeding was £2 090. As always, his oratory skills served him well, as he eloquently blamed Sir Harry Smith and the land grab Smith had spawned for the scheme's failure: "The lavish land grants of the Land Commission destroyed the basis of my land calculation, reduced to a few pence an acre the price of land in private hands, absorbed all the good lands in the Colony with a reasonable distance of the port". From the *Natal Witness*, 30 May 1851. The judge was impressed and conceded that Byrne's intentions were noble. He awarded him a first-class bankruptcy.

Illustration 2.5: Sketch of Joseph Byrne (1852) by John Sanderson entitled 'A Weasel Asleep'. Source *Natal Witness*, 1852, Local History Museum, Durban.

Illustration 2.6: Sketch of Joseph Byrne (1852) by John Sanderson entitled 'Emigration Vulture'. Source *Natal Witness*, 1852, Local History Museum, Durban.

Conclusion

The cotton settlements schemes initiated by Byrne and the NCC were more about settlement than they were about cotton. Both were initiated by speculators keen to take advantage of Natal's embryonic land market. Both seized upon cotton's desirability and upon lofty and unreliable accounts of its suitability for cultivation in Natal to amass cheap land. Both sought to advance to the political goals of the state, namely commodity production and European settlement. And both schemes were devised from afar with little direct understanding of growing conditions on the ground.

The NCC and Byrne schemes failed because they were unable to bridge this gulf between representation and reality. As the political and social theorist Timothy Mitchell has

noted, relationships between representations and their objects "are never simple…objects of analysis do not occur as natural phenomena, but are partly constructed by the discourse that describes them".[169] Idealized visions of Natal's growing conditions were buoyed by rising imperial demand, speculative accounts of the land's cotton potential, and the early success of scattered cultivation efforts. The positioning of Natal as a cotton colony reflected the desires of those who promulgated this vision rather than the land's agricultural potential. In common with settlement schemes initiated in Australia, the United States and Canada, these cotton ventures were motivated by imperial ambition and predicated on idealized representations of the land. Like those other ventures elsewhere, they failed in large part due to lack of environmental understanding.[170]

[169] Timothy Mitchell, "The Object of Development," in *Power of Development*, ed. Jonathan Crush (New York, 1995), 129-157.

[170] See D.W. Meinig, *On the Margins of the Good Earth* (Chicago, 1962); R.L. Heathcote, *Back of Bourke: A Study of Land Appraisal and Settlement in Semi-Arid Australia* (London and New York, 1965); Nelson Riis, "The Walhachin Myth: A Study in Settlement Abandonment," B.C. Studies 17 (1973): 3-25; Cole Harris and Elizabeth Phillips, *Letters from Windermere, 1912-1914* (Vancouver, 1984);William Wyckoff, *The Developer's Frontier: The Making of the Western New York Landscape* (New Haven, 1988).

Chapter 3
Cotton as Containment: Commodity Cropping and the Delineation of Agricultural Space for Settlers and Africans, 1852 – 1872.

The 1850s and 60s brought considerable anxiety for the British cotton industry. Concerns about Britain's excessive dependence upon American suppliers sparked interest in alternative sources of raw cotton. American imports, which accounted for 75% of British supply from 1851 to 1860, totaled over 2.5 million bales annually by the end of the decade.[171] These imports dropped off dramatically in 1861, due primarily to the outbreak of the American Civil War. This crash in cotton supply, known as the Lancashire famine, persisted until American production recovered in 1865.

Anxiety about an interruption in American supply preceded the so-called cotton famine by more than a decade. A Select Committee on the Growth of Cotton in India had been convened in 1848, as industry leaders fretted about Britain's increasing dependence on American cotton and sought to establish a reliable colonial source immune from foreign interruption. These concerns culminated in the formation of the Cotton Supply Association (CSA) in 1857. The CSA distributed over one thousand tons of seed in north and central India in less than a decade, offered prizes for quantity and quality of cotton grown, and sent out gins and presses to suitable applicants. It also initiated operations to expand infrastructure development (especially the construction of ports and roads) into the Indian interior.[172] As a result of these efforts, cotton exports increased by more than 300% in less

[171] D.A. Farnie, "Cotton Famine in Great Britain," in *Great Britain and her World, 1750-1914: Essays in Honour of W.O. Henderson*, ed. B. Ratcliffe (Manchester, 1975), 153-179.
[172] P. Harnetty, "India and British Commercial Enterprise: The Case of the Manchester Cotton Company, 1860-64," *Indian Economic and Social History Review* 3 (1966): 396-416.

than five years.[173] Indian cotton's short staple, however, made it poorly suited for British mills.

Less coordinated efforts at stimulating cultivation were undertaken by business associations and aspiring entrepreneurs in the British West Indies, Egypt, Brazil, Paraguay, Angola and Mozambique.[174] The trajectory of efforts to stimulate cotton production in these satellites is well-rehearsed: concern over an interruption in supply fuelled increased prices, a surge in production followed; this declined once elevated prices fell. Micro-studies have recently been incorporated within a global analysis that has stressed the linkages between these peripheral supply sites and the cotton famine, describing these networks as a "worldwide web of cotton production".[175] This perspective reduces each cotton production site to a cog in the global machine, a supply satellite whose production was sustained exclusively by demand emanating from the core.

In Natal, however, local, internal factors were at least as important as imperial concerns over Britain's raw cotton supply in driving efforts to expand cotton production after 1852. A first push was focused on African peasant cultivation.[176] The colony's Secretary for Native Affairs, Theophilus Shepstone, moved to encourage cotton production by Natal's

[173] Exports of cotton from India increased from 563 000 bales in 1860 to 1 390 000 in 1863 andt then to 1 866 620 in 1866. See W. O. Henderson, *The Lancashire Cotton Famine, 1861-65* (New York, 1969), 41 and J.F. Richards and M.B. McAlpin, "Cotton Cultivation and Land Clearing in the Bombay Deccan and Karnata," in *Global Deforestation and the Nineteenth-Century World Economy* ed. R.P. Tucker and J.F. Richards (Durham, 1983).

[174] For more on the search for reliable supply during the famine see P. Harnetty, *Imperialism and Free Trade: Lancashire and India in the Mid-Nineteenth Century* (Vancouver, 1972), 36-58 and Henderson, *The Lancashire Cotton Famine, 1861-65*, 35-51.

[175] Sven Beckert, "Emancipation and Empire: Reconstructing the Worldwide Web of Cotton Production in the Age of the American Civil War," *American Historical Review* 109 (2004): 1405-1438.

[176] African identities were still relatively unstable in the 1850s and 60s as the region continued to suffer from dislocation and unrest stemming from the violence which accompanied the rise and consolidation of the Zulu kingdom of the early 19th century, known as the *mfecane*. While I refer to 'Zulu' cultivators in this chapter, I recognize that such identities remained quite fluid during this time period.

Zulu population as part of the colonial project of establishing political order.[177] When this venture collapsed, blame was heaped on Zulu growers who were criticized for adhering to traditional values deemed incompatible with capitalist economic development African producers were dismissed as inferior, lacking the constitution necessary to cultivate a sophisticated commodity crop like cotton.

But environmental and economic factors were perhaps more important than cultural reasons for the failure of Shepstone's scheme. Poor planning, inferior soil conditions, and persistent drought combined to constrain Zulu cotton cultivation. As Colin Bundy's seminal work on the South African peasantry points out, dismissing African agriculture as inferior or rudimentary ignores a large proportion of growers who reacted enthusiastically to the expanding market economy with its new pressures and opportunities.[178]

This rise in cotton production hinged on a broader political issue that engulfed Natal in the 1850s and 60s: the 'Native Question'. How fully, contemporaries wondered, should Africans be brought within the jurisdiction of British law and influence? Shepstone's cotton scheme was designed to entrench his vision of spatial segregation against those who favoured a more assimilationist policy.[179] This chapter argues that this cotton scheme was motivated by goals that were more political than agricultural, that it was first and foremost a means of anchoring Zulu producers within bounded Locations rather than a commercial scheme to

[177] This emphasis on the political rather than the economic motivations behind cotton's imposition on an African population has also been made, in reference to another setting, by Victoria Bernal, "Cotton and Colonial Order in Sudan: A Social History with emphasis on the Gezira Scheme," in *Cotton, Colonialism and Social History in Sub-Saharan Africa* ed. Allen Isaacman and Richard Roberts (Portsmouth, 1995), 96-118. See also Osumaka Likaka, *Rural Society and Cotton in Colonial Zaire* (Madison, 1997), 45-71.
[178] Colin Bundy, *The Rise and Fall of the South African Peasantry* (London, 1979).
[179] As will be explained below, Shepstone favoured a policy of bounded African Locations, where Africans would be exposed to European 'civilizing' influences which he believed would help accelerate the long-term process of assimilation. Others opposed his vision, favouring instead a more immediate integration of Africans as labourers in European enterprise.

increase commodity production. Cotton was a means to an end, a tool, to assist in delineating settler and African space.

When Shepstone's scheme foundered, a second push for cotton emerged, almost exactly coincident with the jump in international demand for the commodity. White settlers sought to take advantage of this price rise. They rushed into the uMkhomanzi Valley, whose suitability for cotton had been proven by Zulu cultivation efforts. Production surged while prices remained high, but bottomed-out quickly once they dropped, leading to a mass exodus of settlers. This second push for cotton thus fits better within the broader pattern of satellite production that characterized commodity networks during the Lancashire famine.

Cotton as an African Crop

The notion that Africans were better suited than Europeans to catalyze Natal cotton production originated with Alfred Southam, a Mancunian with ties to the cotton manufacturing sector. Motivated by the exaggerated prospects of Natal's potential as a cotton colony in circulation in Britain (as elaborated in the previous chapter), Southam arrived in Natal early in the 1840s to plant Sea Island cotton along the coast north of Durban. However, he left the colony after failing to produce a single viable crop in three seasons . In an address to the Cotton Supply Association in 1850, he blamed his failure on cotton's demanding growing regime, arguing that European farmers lacked the constitution for this intensive labour. The only way cotton would succeed in Natal, he argued, was as an African enterprise: "Blacks grow it in America; blacks grow it in India, and blacks must grow it

wherever it is grown, as no white man could work at it under a broiling hot sun; nor could he compete with the black man in point of cheapness of labour".[180]

Southam's proposal languished during the early 1850s while production efforts remained integrated within the broader goal of colonial emigration. It was revived by Henry Francis Fynn, one of the first Europeans to arrive at Port Natal in 1824. Fynn had served in a variety of government positions before becoming Assistant Resident Magistrate for the Lower uMkhomanzi Division in the southern-most part of the colony in 1853, a post he retained until his death in 1861.[181]

In 1855 Fynn proposed the establishment of an 'industrial village' where Africans would learn to cultivate export crops. His vision was to engage Zulus in commodity agriculture in order to expose them to European crops, technologies and cultivation methods. His was a civilizing project. Fynn's aim was to "assimilate [African] customs to the Europeans whose government has saved them from destruction".[182] He expected that the adoption of European crops would serve to eradicate the barbaric practices of cannibalism and the drowning of their own children, which he contended sensationally (and inaccurately) were rampant among the Zulu population.

Fynn's push for cotton reflects a broader movement by British administrators to use agriculture as a civilizing force among colonized populations. In North America, agriculture was perceived as the great panacea for the ills of the continent's indigenous peoples, as it was

[180] Southam's address was reprinted in the *Natal Witness*, 29 January 1858.
[181] Fynn is best known for his infamous diary which recounts his largely exaggerated relationship with uShaka Zulu. See Dan Savage, *Savage Delight: White Myths of Shaka* (Pietermaritzburg, 2000).
[182] PAR, Secreatry for Native Affairs, (SNA) 1/3/6 Ref. 194, H.F. Fynn to Acting Colonial Secretary, 31 August 1857.

believed to impart an appreciation of private property and encourage a sedentary existence.[183] Colonial administrators viewed agriculture as a means of uplifting and molding Aboriginals into the European ideal, and of bringing them one step closer to assimilation into European culture. In Australia, Kay Anderson argues that this linking of cultivation and human potential cemented a politics of exclusion by creating a "cultivated space of white-nation building".[184]

In the southern African context, the anthropologists Jean and John Comaroff have expounded upon the civilizing, and especially the religious, dynamic that lay behind the encouragement of agriculture among the baTswana, noting that cultivation and salvation were inextricably linked. Agriculture, it was believed, would make Africans both civil and servile: "blighted no more, the dark continent would become a 'fruitful field', a rich rural periphery of the metropolitan centers of civilization abroad".[185] In southern Rhodesia, Wolmer and Scoones have revealed that scientific agricultural practices were founded upon a vision of linear, evolutionary agricultural change, in which each technocratic intervention was a "step along the ladder of advance".[186] Fynn's industrial village was founded upon a similar belief in agriculture's civilizing potential: his introduction of modern, scientific practices provided an opportunity for Africans to escape their barbaric existence.

Convinced that persuasion alone would not overcome initial reluctance, Fynn proposed cultivating large, communal plots that would allow Zulu growers to experience the

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[183] Sarah Carter, *Lost Harvests: Prairie Indian Reserve Farmers and Government Policy* (Montreal, 1990), 5. Carter's book examines similar themes on the 'civilizing' element of agricultural policy in the early 20th century Canadian context.

[184] Kay Anderson, "White Natures: Sydney's Royal Agricultural Show in Post-Humanist Perspective " *Transactions of the Institute of British Geographers* 28 (2003): 422-441.

[185] Jean Comaroff and John L. Comaroff, *Of Revelation and Revolution Volume 2: The Dialectics of Modernity on a South African Frontier* (Chicago and London, 1997), 124.

[186] Michael Wolmer and Ian Scoones, "The Science of 'Civilized' Agriculture: The Mixed Farming Discourse in Zimbabwe," *African Affairs* 99 (2000): 575-600.

superiority of European crops first-hand. Fifty acres were to be planted to Sea Island cotton in 1857/58 and another fifty acres the following year, alongside smaller plots of coffee, sesame, and arrowroot. Fynn aspired to have all 1133 African residents living between the uMzinto and uMkhomanzi Rivers cultivating cotton.[187]

Fynn established a village at Inyangwimi, a range of hills a few kilometers from the coast, south of the uMtwalume River [Illustration 3.1]. Elevations were as high as 500m and most of the land undulated steeply. The vegetation was primarily moist coastal forest that benefited from the heavy rains brought in off the ocean. Among the wide range of soil types, were shallow clays and deeper and better drained loams. Fynn believed these ecological conditions were ideal for cotton, and estimated that there were between 12 000 and 15 000 acres of similar land located along Natal's South Coast.[188]

[187] PAR, SNA 1/3/7 no. 168, H.F. Fynn to SNA, 20 November 1858.
[188] PAR, SNA 1/3/7 no. 121, H.F. Fynn to SNA, 30 August 1858.

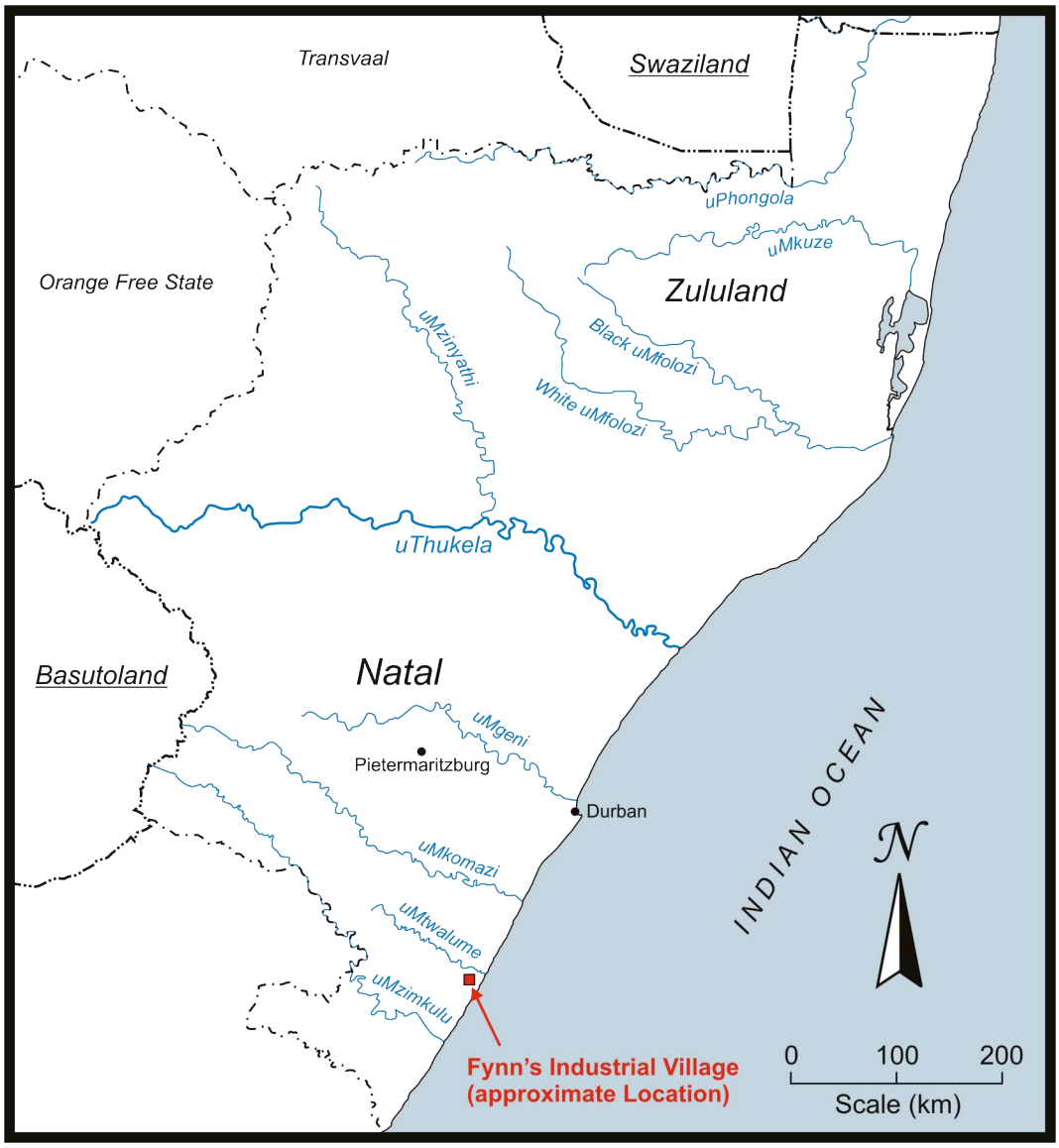

Illustration 3.1: Approximate Location of Fynn's Inyangwimi Industrial Village. Adapted from: Robert Mann, *The Colony of Natal* (London, 1859): 7.

In 1857, Fynn was allocated a Superintendent, Robert Struthers, to oversee the village's day-to-day operations, as well as a builder, a ploughman, a driver, and dozens of African labourers to aid in the erection of buildings and the preparation of land. Work began on 31 May 1857; delays began soon after. Heavy spring rains retarded construction; the site initially chosen for much of the planting had to be abandoned as it was saturated with water. A single team of oxen had to be rotated between the erection of buildings and the cultivation

of plots. Total expenses for the year were just under £300.[189] Input costs ballooned to over £2 per acre, putting the project's financial viability in jeopardy.

Despite delays, Fynn's growers planted some cotton before the end of 1857. Cultivation efforts continued throughout the spring rains of 1858, and by April 1859 they had over thirty acres of cotton under cultivation. Some growers achieved yields of almost 300 lbs per acre. By the end of the 1858/59 season, 3700 lbs of seed cotton had been picked.[190] Fynn predicted that more than 50 000 cotton plants would be in full bloom by the following growing season.

Cotton and Containment

Southam's arguments in favour of African cotton cultivation and the early successes of Fynn's industrial village inspired Theophilus Shepstone, the architect of Natal's Native administration policy, to implement a colony-wide cotton program. The son of a Methodist missionary, Shepstone spent his youth among Africans in the Cape and became fluent in many of the southern uNguni languages, including isiXhosa and isiZulu. He spent his early professional years working as an interpreter for his father's missionary colleagues, and then applied his linguistic skills in the service of the British administration. He rose quickly through the ranks and, after being stationed in Grahamstown for seven years as Diplomatic Agent to Neighbouring Tribes, was promoted to the newly-created post of Diplomatic Agent to the Native Tribes in Natal in 1845.[191]

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[189] PAR, SNA 1/3/6 Ref. 193, Report of Preliminary Operations for the Formulation of a Native Industrial Village at Inyangwini, 31 August 1857.
[190] PAR, SNA 1/3/8, H.F. Fynn to SNA, 17 October 1859, 48.
[191] Ruth E. Gordon, *Shepstone: The Role of the Family in the History of South Africa, 1820-1900* (Cape Town 1968), 117.

At much the same time, over 100 000 African refugees flooded into Natal to escape aggression in the north. In 1847 a Native Commission was formed to manage this influx, with Shepstone as its most influential member.[192] Shepstone's missionary ideals framed his approach. He remained deeply committed to ideals of improvement, as he sought to undertake the "Christianizing and civilizing [of these] 100 000 degraded human beings".[193] He mapped out a system of centralized control in which Africans would be spatially segregated from settlers within vast tracts of land known as Locations [Illustration 3.2]. Shepstone reaffirmed tribal hierarchies – refugees without specific allegiances had new ones created for them – and used this authority to maintain law and order, while positioning his personally-appointed magistrates as Supreme Chiefs with consolidated executive, legislative and judicial power. Thus, the administration of Natal's Africans flowed entirely through Shepstone, the top tier of the pyramid, who entrenched his hierarchical system of control by allowing Africans to govern "according to the principles of their own laws, customs and usages".[194] He expected that the influence of centralized European control and private property, alongside heavy investment in Native Police, European schools and agricultural instruction would convert these enclaves into "active agencies of civilization", in which outdated and barbaric African notions of polygamy, witchcraft and *ilobola* (bride-selling) would be easily eradicated.[195]

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[192] The Commission originally consisted of Shepstone and two others, Natal's Surveyor-General Dr. W. Stanger and an American Missionary, Reverend Newton Adams. A Lieutenant and a second Missionary were added later. Shepstone's intimate knowledge of African languages and customs made his the most influential voice at the table.

[193] PAR, SNA 1/8/3, Shepstone to Secretary of Government, April 1846 in David Welsh, *The Roots of Segregation: Native Policy in Colonial Natal, 1845-1910* (Cape Town and New York, 1971), 19.

[194] Memorandum by T. Shepstone, 12 August 1848 In Benjamin Kline, *Genesis of Apartheid : British African Policy in the Colony of Natal, 1845-1893* (Lanham, 1988), 13.

[195] Edgar Brookes and Colin de Webb, *A History of Natal* (Pietermaritzburg, 1965), 59. Herman Merivale was another proponent of the ideal of 'Native improvement'. See his Lectures XVIII and XIX delivered at Oxford

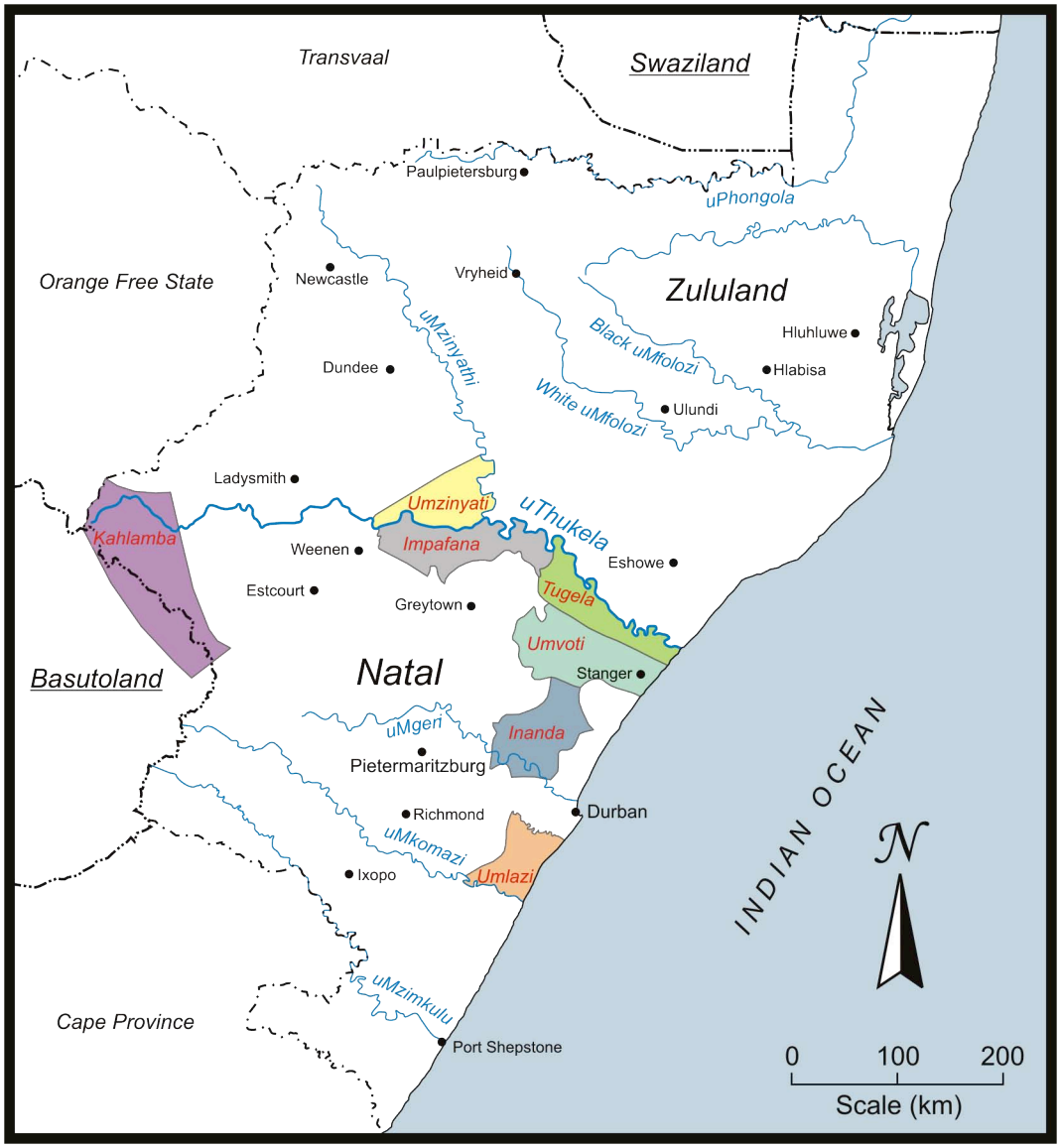

Illustration 3.2: Native Locations in Natal *c.*1860. Adapted from: John Lambert, *Betrayed Trust: Africans and the State in Colonial Natal*. (Pietermaritzburg, 1995): insert, and Robert Mann, *The Colony of Natal* (London, 1859): 7.

Shepstone realized that humanitarian justifications alone would be insufficient to convince his superiors in London of the merits of his Location System. To realize his vision of spatial segregation Shepstone also needed to sell his plan as financially viable. As the

University: Herman Merivale, *Lectures on Colonization and Colonies : Delivered Before the University of Oxford in 1839, 1840 & 1841* (London, 1861).

most influential member of the Location Commission of 1847, Shepstone outlined his vision for creating enclosed African spaces which would serve both economic and humanitarian ends. He argued that the key to wealth generation in the colony was in solidifying the exploitation of Natal's rural economy based on African production:

> The native Locations will become centres of industry and improvement, the whole of the native population in the district and gradually those beyond it, will become consumers of imported articles and producers of articles for export, and after a time with a judicious system of taxation will defray the expenses of their own establishments and furnish an excess to the treasury of the district[196]

Inspired by Fynn's success at Inyangwimi, Shepstone made cotton the central component of his plan to augment African tax revenue through the cultivation of export crops. In 1856 he wrote that his goal was to "induce [Africans] to raise from the soil some exportable and permanently marketable product".[197] He saw cotton as the most suitable choice because it could be grown successfully through the whole district, its cultivation was very simple and similar to that of maize, it could be planted once and then yield returns for many years, and its market value did not fluctuate so it would always fetch a good price.[198]

To undergird his grand design, Shepstone sought revisions to the colonial tax structure to provide incentives for cotton cultivation. He recommended that cotton be accepted in payment of the Native hut tax initiated in 1849 as a means of bolstering stagnating colonial revenues.[199] As further incentive, those who refused to cultivate cotton would be charged ten shillings instead of the usual hut tax of seven shillings. Shepstone

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[196] PAR, CSO 179/5, Report of the Location Commission, 1847. In: Henry Slater, "The Changing Pattern of Economic Relationships in Rural Natal, 1838-1914," in *Economy and Society in Pre-Industrial South Africa*, ed. S. Marks and A. Atmore (London, 1980), 148-170, p.157.

[197] PAR, SNA 1/1/6 no. 116, T. Shepstone, Memorandum on the Feasibility of Inducing the Native Population of Natal to Grow Cotton and the Manner in which it is Proposed this hould be Accomplished, 11 May 1856.

[198] PAR, Selected Documents Presented to the Legislative Council (LC) 4/1/1/-4/1/1/3 C52 no. 1, Native Reserve Fund, 1858.

[199] PAR, *Natal Blue Book,* 1854. The annual 7s. tax had raised more than £8 000 in its first year and contributed over one-third of Natal's revenues throughout the 1850s.

estimated that every acre of Location land would produce just under 100lbs of seed cotton. Assuming even the low price of one penny per pound, a single acre planted to cotton would yield enough to cover the hut tax and more.

The strongest opposition to Shepstone's plan for cotton cultivation came from Natal's second Lieutenant-Governor, Benjamin Pine, who arrived in the colony in 1850.[200] Pine resented the autonomy with which Shepstone ruled over the colony's Native Affairs. Reflecting the interests of coastal farmers and large landowners, Pine criticized Shepstone's Location System for creating "enormous and unwieldy reserves" which he considered dangerously large.[201] Pine appointed a Commission of Inquiry into Native Administration in 1852 dominated by land-owning colonists, a direct rebuke to the previous Commission of 1847 that had articulated Shepstone's vision of spatial segregation. Pine's Commission predictably concluded that the Locations were far too large, having "dried up the source whereby an abundant and continuous supply of Kaffir labour for wages might have been procured".[202] Pine's vision, articulated by his new Commission, envisaged a process of gradual assimilation. He urged that the Locations be broken up into smaller, more integrated

[200] Natal's first Lieutenant-Governor, Martin West, died abruptly in 1849 following a bout with dysentery. Described as "an unimaginative, stodgy sort of civil servant", West lacked the decisiveness and the desire to contest Shepstone's plans. He allowed Shepstone free reign to implement his vision for African-settler relations in the colony. See Gordon, Shepstone: The Role of the Family in the History of South Africa, 1820-1900, 156. More on the personal antipathy between Shepstone and Pine can be found in ibid., 156-171, and Justin L. Hall, "Government Policy and Public Attitudes during the Administration of Natal by Lieutenant-Governor Benjamin C.C. Pine, 1850-1855" (M.A., University of Natal 1969), 31-48.

[201] The plantation sugar industry was a high-capital, high-input enterprise, requiring a steady supply of labour on a much larger scale than inland farmers (mostly mixed farmers with a combination of sheep, cattle and maize) whose labour requirements were much lower, and who were unwilling to support measures that provided incentive for Africans to abandon their lands to seek work on coastal plantations. Coastal farmers also had in their corner the colony's large absentee-landlords. The two largest, Jonas Bergtheil and Adolph Coqui, with holdings of 106 100 acres and 62 165 acres, respectively, campaigned heavily in favour of developing a new Native Policy that would force Africans to seek employment with white farmers. The competing interests of coastal and inland farmers was a major axis for conflict within the white community of Natal. See Henry Slater, "Land, Labour and Capital in Natal: The Natal Land and Colonisation Company, 1860-1948," *Journal of African History* 16 (1975): 257-283 and footnote #46.

[202] PAR, Report on Land Settlement 1852, 4, from Brookes and de Webb, *A History of Natal*, 69.

plots where Africans could be more readily assimilated into settler culture, an idea that was anathema to Shepstone.

Cotton emerged as the hinge upon which these competing visions for African-settler relations within the colony turned. For Shepstone, cotton was a means of anchoring Africans within his Location system, and it would thus help to entrench his vision of spatial segregation:

> I think it unnecessary for me to [detail] at any great length upon the special advantages which would follow the attainment of the object I propose in this paper – industry, and among savages that kind of industry especially which induces the cultivation of soil is essentially a civilizing element – it affords the most perfect guarantees for the peace of the country because it fixes in their minds a practical and ready manner the individual property in land, and most effectively checks the disposition to move from place to place.[203]

Pine opposed cotton because it threatened his vision of an African proletariat. He sought to break up the Locations to undermine their viability and force Africans out of *imizi* (homestead) production into cheap and ready labour on coastal sugar plantations.[204] The struggle over cotton was fundamentally a struggle over how economic surplus should best be extracted from the colonized population.[205]

Zulu Cultivation Efforts

Shepstone's plans were much more favourably regarded by Natal's third Lieutenant-Governor, John Scott, who arrived in the colony to replace Pine in 1855. He immediately supported both Shepstone's vision for Native Locations and the use of cotton to entrench

[203] PAR, SNA 1/1/6 no. 116, T. Shepstone, Memorandum on the Feasibility of Inducing the Native Population of Natal to Grow Cotton and the Manner in which it is Proposed this should be Accomplished, 11 May 1856.
[204] Pine also had a considerable personal stake in heading the campaign to free up labour for the colony's sugar farmers and large landowners. He was a landowner himself and accepted a post as one of the directors of the Umzinto Sugar Company upon his retirement. See *Natal Mercury*, 14 May 1857 in B. J. Leverton, *The Natal Cotton Company: A Study in Failure* (Pretoria, 1963), 43.
[205] Slater, "Land, Labour and Capital in Natal: The Natal Land and Colonisation Company, 1860-1948".

their permanency. He recognized that "there are many difficulties to overcome in this experiment" but considered that "any scheme pointing at such great advantages as would result from this colony becoming, through the instrumentality of its numerous natives, a cotton-growing company... merits every exertion".[206]

In November 1858, Lieutenant-Governor Scott allocated funds to Shepstone's scheme from the £5000 set aside for the benefit of Natives under the 1856 Charter by which Natal was separated from the Cape colony and administered independently.[207] Shepstone focused his efforts along the uMkhomanzi River, where Fynn was having success with his industrial village. He appointed two Superintendents in charge of cotton cultivation, Fynn's former manager Robert Struthers in the Lower uMkhomanzi and his younger brother, John Wesley Shepstone, in the Upper uMkhomanzi.[208] In all other districts Resident Magistrates were charged with implementing Shepstone's vision: he informed them that seed would be forthcoming, and instructed them to convince the Africans residing in their district of the merits of cotton cultivation.

Seed was dispatched a few months later. Although records are fragmentary, it appears that Shepstone favoured the Sea Island variety. His instructions on how best to introduce Africans to the crop were vague: "your own good sense will suggest to you arguments most prudent to be used in enforcing the importance to the natives themselves as

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[206] PAR, BPP Vol. 127, X Report on The Past and Present State of Her Majesty's Colonial Possessions 1857, 195.

[207] This move infuriated members of the newly elected Legislative Council who objected to the continued administration of this fund by the Crown. The Department of Native Affairs thus constituted a sort of "*imperium in imperio* which, without responsibility to the legislature, was able to thwart settler attempts to gain a regular labour force from Natal's African population". From Patrick Harries, "Plantations, Passes and Proletarians: Labour and the Colonial State in Nineteenth Century Natal," *Journal of Southern African Studies* 13 (1987): 372-399, p.374. For more on this tension between the Legislative and Executive branches over control of Native Affairs see Kline, *Genesis of Apartheid : British African Policy in the Colony of Natal, 1845-1893* 40-44, and John Lambert, *Betrayed Trust: Africans and the State in Colonial Natal* (Pietermaritzburg, 1995), 63-64.

[208] Each superintendent was given a salary of £150, plus £50 for traveling expenses. PAR, SNA 1/8/6, Memorandum from the Office of the SNA, 23 November 1858, 456.

well as to the colony".[209] He recommended a growing regime for cotton identical to that of maize, noting only that cotton should be more thinly spaced. He further encouraged his magistrates to visit growers from time to time, as it was their responsibility to explain to Africans the "benefit that will accrue to themselves should they persevere to success in producing the article".[210]

The first growing season of 1858/59 was a marginal success. All seven magisterial districts reported some cotton planted. By June 1859 Africans were cultivating over 120 acres with 50 acres in the Lower uMkhomanzi and 39 acres in the Upper uMkhomanzi. Over 6500 lbs of cotton were picked within Natal's Locations.[211]

The success in the Upper uMkhomanzi division was due largely to John Wesley Shepstone's six month tour undertaken in late 1858/early 1859, during which he distributed seed to growers while exalting cotton's potential, and often stayed with each *induna* long enough to help set up a cotton garden in each *imizi.* But he was unable to replicate his success the next growing season. Instead he reported widespread failure which he attributed to inferior growing conditions.[212] He noticed a discernible pattern to this collapse. All the cotton planted on the exposed ridges and hills around the Ifafa and uMzimkhulu Rivers had failed. Only cotton planted in five gardens, situated on the immediate banks of the

[209] PAR, SNA 1/8/7, Shepstone to Mr. G. Potter, 10 April 1861, 346.
[210] PAR, LC 4/1/1/1-4/1/1/3 C67 no. 8, Circular from T. Shepstone, Native Affairs, 1859.
[211] PAR, LC 4/1/1/1-4/1/1/3 C90 no. 18 1860, Circular from T. Shepstone, Native Reserve Fund, 12 July 1860. The impact of coerced production schemes on African families differed according to a multitude of social factors including gender, kinship, and class. While there is little archival evidence attesting to the specifics of these differentiated impacts within Shepstone's scheme, other studies elsewhere on the continent have underlined the unequal impacts of forced cotton cultivation. See for instance: Allen Isaacman, "Chiefs, Rural Differentiation and Peasant Protest: The Mozambican Forced Cotton Regime 1938-1961 " *African Economic History* 14 (1985): 15-56, and some of the chapters in Allen Isaacman and Richard Roberts, eds., *Cotton, Colonialism, and Social History in Sub-Saharan Africa* (Portsmouth, 1995).
[212] PAR, SNA 1/1/10 no. 22, J.W. Shepstone to T. Shepstone, 22 March 1860.

uMkhomanzi River and amounting to about ten acres in total, had flourished.[213] Planted on the deep alluvial soils of the valley floor, this cotton was also sheltered from the wind and hail that pelted the crops planted on higher land. There was so much fibre on the bolls by mid-July that Shepstone requested an extra four dozen sacks for collection.

This led John Wesley Shepstone to focus cotton cultivation in protected valleys during the 1860/61 growing season. Over 1300 lbs were cultivated, exclusively in the low-lying areas of the uMkhomanzi Valley.[214] Although only six bales reached buyers in Britain, the Cotton Supply Association lauded the cotton's potential, declaring it ideally suited for British mills. [215] Reports were so encouraging that the younger Shepstone requested extra seed for the following growing season in hope of expanding production even further.

But then output fell. Magistrates and Superintendents across the colony reported a sharp drop-off in African cultivation, beginning in the summer of 1861. Africans nearly unanimously shifted their efforts away from cotton towards traditional foodstuffs. Within twelve months cotton had been completely abandoned by Zulu growers. This failure stunned officials. All blame was focused on the African growers. Fynn argued that Zulus were too sluggish and too slow for cotton's demanding growing regime. During the planting stage, he alleged, they were unwilling to dig deep into the soil, preventing cotton's deep roots from extending more than a few inches, and thus limiting germination.[216] During the picking stage, Fynn claimed that they accumulated cotton that was too soiled and dirty to have any

[213] PAR, SNA 1/1/10 no. 9, J.W. Shepstone to T. Shepstone, 20 September 1860.
[214] PAR, SNA 1/1/11 Ref 26, J.W. Shepstone to T. Shepstone, 18 March 1861. All the residual cotton planted on high ground by Illovo and uMkhomanzi Rivers failed again this year. See PAR, SNA 1/1/11 Ref 38, J.W. Shepstone to T. Shepstone, 1 April 1861.
[215] PAR, SNA 1/1/11 Ref: 51 G.R. Haywood, Cotton Supply Association to T. Shepstone, 3 May 1861.
[216] PAR, SNA 1/3/7 no. 121, H.F. Fynn, Magistrate of the Umkhomanzi to SNA, 30 August 1858.

real value. He estimated that over 60% of the total cotton planted at Inyangwimi was lost due to neglect.[217]

Resident Magistrates argued likewise. The Magistrate of the northernmost uThukela Division complained that Zulus were disinclined towards any type of meaningful labour. He was convinced that stronger methods of coercion were needed for them to adopt a new labour-intensive crop like cotton.[218] The Magistrate in Victoria County was pessimistic about Zulu willingness to adopt any crop that did not satisfy the grower's immediate needs: "hunger alone will rouse the native to labour – that though he loves tobacco and sweet potato he is, generally, too lazy to cultivate them – it is no longer a matter of surprise that the prospect of merely gain should fail to induce him to cultivate the cotton plant".[219] Theophilus Shepstone also reserved his greatest criticism for the Zulu grower, whose work ethic and inexperience with picking he listed as the major impediments to success:

> With reference to the cultivation of cotton by the natives, I have come to the conclusion that as long as they remain in their present savage state they will never, generally, steadily continue the cultivation of any article which they do not themselves use, or which will not bring them a decidedly higher money value than they are able to obtain by their own customary article of cultivation. They are easily discouraged by failure, and are deficient in the perseverance which is necessary to prosecute an enterprise which does not accord with their natural habit and customs[220]

This refrain, demeaning Africans as lazy and incompetent, reduced the explanation of cotton's failure to cultural distinctions.[221] As Anne McClintock explains in other colonial contexts, officials emphasized this discourse of idleness – this "stigmata of

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[217] PAR, Natal Almanac 1863, Report on the Growth of Cotton in Natal, 45. See also PAR, Fynn Papers 1/1/7/7 A1382 no. 273, Struthers to Fynn, 11 December 1859.
[218] PAR, SNA 1/3/12 Ref 81, Resident Magistrate of the Tugela Division to SNA, 25 April 1863.
[219] PAR, SNA 1/3/8, Magistrate of Inanda Division, County Victoria, to SNA, 11 October 1858, 53.
[220] PAR, *Natal Almanac* 1963, 45.
[221] Carter, *Lost Harvests: Prairie Indian Reserve Farmers and Government Policy*, and Comaroff and Comaroff, *Of Revelation and Revolution, Volume 2: The Dialectics of Modernity on a South African Frontier.*

degeneration…[this] stigma of racial unworthy" – to mark themselves from the colonized.[222] This denigration of African labour was a discourse on work, used to distinguish between desirable and undesirable labour. Demeaning Zulu growers was part of the broader imperial agenda to replace subsistence livelihoods with revenue-generating export crop production. It exaggerated the degree to which Africans were culturally or temperamentally resistant to growing cotton as it neglected the contextual factors – environmental and economic – that help explain the failure of Shepstone's push for cotton cultivation.

Environmental and Economic Contexts

The sharp decline in African cotton production in the summer of 1861 coincided with a prolonged drought that began in November. The absence of rain stunted the crop; both planting and germination require immediate moisture to be successful. John Wesley Shepstone reported that the entire crop of the Upper uMkhomanzi, suffered heavily from the extreme dry weather.[223] All cotton planted without direct water access had shriveled up and died. Even Shepstone's own prized ten acres planted directly alongside the river, which had produced the bulk of the region's cotton over the previous two years, was reduced to almost nothing.

The drought had similar consequences for African growers in the Lower uMkhomanzi. Robert Struthers, Cotton Superintendent for the region, listed dozens upon dozens of growers whose crops were destroyed by the absence of rain.[224] One farmer, uDumisa, had planted with some success in 1859/60, but his next two plantings were

[222] Anne McClintock, *Imperial Leather: Race, Gender and Sexuality in the Colonial Context* (New York, 1995), 252/253.
[223] PAR, SNA 1/1/12 Ref 37, J.W. Shepstone to T. Shepstone, 8 April 1862
[224] PAR, SNA 1/1/12 Ref 5, R. Struthers to T. Shepstone, 14 January 1862.

scorched by the sun. Another nearby farmer, uMasimula, had planted in each of the two preceding seasons, but in the first the seed did not germinate due to the lack of rain, and in the second the plants shriveled up due to droughts. So severe was the shortage of water that many farmers took their cattle south of the uMzinkhulu River to find water; many cotton fields were abandoned and burnt by grassfires.

Historical ecological research has revealed the cyclical occurrence of drought in southern Natal during the last half of the 19th century. A deficiency in rainfall occurred on average every six or seven years. Data from the Pietermaritzburg rainfall monitoring station – the only station operating at this time – reveal that dry conditions prevailed during the length of Shepstone's scheme: 1859-1861 were the three driest consecutive years in Natal between 1850 and 1890.[225]

Year	Pietermaritzburg	Gardens Cliffe	Durban	Ottawa
1854	50.56	-	-	-
1855	42.77	-	-	-
1856	50.98	-	-	-
1857	-	-	-	-
1858	27.42	-	-	-
1859	28.40	-	-	-
1860	30.60	-	-	-
1861	22.41	-	-	-
1862	29.97	-	-	-
1863	34.66	-	-	-
1864	37.31	-	-	-
1865	31.08	-	-	-
1866	30.27	-	48.54	-
1867	31.49	25.95	33.08	-
1868	-	44.36	-	-
1869	-	30.83	-	-
1870	-	30.63	-	34.87
1871	-	32.26	-	36.22

[225] W. B. Tripp, "Rainfall of South Africa 1842-86," *Quarterly Journal of the Royal Meteorological Society* 14 (1888): 108-123. See also Charles Ballard and Giusseppe Lenta, "The Complex Nature of Agriculture in Colonial Natal: 1860-1909," in *Enterprise and Exploitation in a Victorian Colony: Aspects of the Economic and Social History of Colonial Natal*, ed. Bill Guest and John M. Sellers (Pietermaritzburg, 1985), 151-180, p.125.

Year	Pietermaritzburg	Gardens Cliffe	Durban	Ottawa
1872	-	44.98	-	56.71
1873	-	36.50	42.22	41.33
1874	-	45.60	53.80	49.78
1875	-	37.08	54.78	30.31
1876	-	38.52	35.22	26.56
1877	-	33.91	35.65	35.37
1878	-	26.72	28.24	26.57
1879	-	42.29	44.46	41.13
1880	-	46.18	47.63	-
1881	-	37.62	37.08	38.77
1882	-	39.25	36.21	28.72
1883	-	37.49	44.52	37.43
1884	-	38.33	44.56	40.15
1885	-	-	34.48	-
1886	-	-	31.79	-

Table 3.1: Rainfall Recorded at Rainfall Monitoring Stations in Natal, 1854-1886, in inches. Source: W.B. Tripp " Rainfall of South Africa 1842-86, " *Quarterly Journal of the Royal Meteorological Society* 14 (1888): 108-123, p. 116/117.

As Table 3.1 shows, the most severe drought conditions occurred in 1861/62: this coincided with the third planting of Shepstone's cotton scheme, and the most dramatic drop-off in planting rates recorded by Magistrates and Superintendents.[226] El Nino Southern Oscillation (ENSO) events appear to have contributed to these drought episodes in 1857 and 1862; twentieth-century climatologists have estimated that these low phase (warm weather) events triggered below average rainfalls further exacerbating drought conditions.[227] Climatologists estimate that just over 20% of rainfall variance during this period was due to ENSO events.

Harsh rainfall conditions were made worse by red locusts (*Nomadacris septemfasciata*). Locusts had caused only minor damage in previous growing seasons, but the

[226] Dendroclimatological records confirm that the 1861/62 growing season was one of the driest on record. See Martin Hall, "Dendroclimatology, Rainfall and Human Adaptation in the Later Iron Age of Natal and Zululand," *Annals of the Natal Museum* 22 (1976): 693-703.

[227] J.A. Lindesay and C.H. Vogel, "Historical Evidence for Southern Oscillation-Southern African Rainfall Relationships," *International Journal of Climatology* 10 (1990): 679-689.

dry conditions were particularly suited to the hatching of eggs, which produced an irruption of these creatures and intensified the devastation they wrought on all types of vegetation.[228] Although locusts generally prefer monocotyledons such as grass, maize or sugar cane, the widespread drought had greatly reduced growth of these species, with the result that locusts turned to almost any living plant for food, and devoured hundreds of young cotton plants. Heavy losses were reported throughout the colony. In a last-ditch attempt to rekindle the enthusiasm of African residents for cotton John Wesley Shepstone convinced farmers in his district to put sixty acres of good land on the protected uMkhomanzi Valley floor under cotton in 1861/62. By January the crop was wilted, and locusts were attacking what remained. Not a single boll of cotton was plucked from the entire sixty acres.[229]

African foodstuff production also suffered heavily from these poor conditions. Food shortages were widespread throughout Natal. The younger Shepstone reported that growers were increasingly reluctant to devote their efforts to cotton, "there being such a scarcity of food".[230] Most growers gave the prevailing famine as their primary reason for abandoning cotton. One unnamed African grower who had previously enjoyed significant success with the crop pleaded with Struthers:

> Look at our lean bodies, where is our strength to cultivate cotton, we are eating wild roots like pigs, and it requires all our strength to dig them up, we are starving, we have no mealies to plant, and you white people bring them out here in your waggons [sic] and demand an ox for a sackfull, which we used to sell you for three or four shillings…we are dead.[231]

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[228] Charles Ballard, ""A Year of Scarcity": The 1896 Locust Plague in Natal and Zululand," *South African Historical Journal* 15 (1983): 34-52.
[229] PAR, SNA 1/1/11 Ref. 38, J.W. Shepstone to T. Shepstone, 1 April 1861.
[230] PAR, SNA 1/1/11 Ref 173, J.W. Shepstone to T. Shepstone, 9 December 1861, and SNA 1/1/11 Ref 178, J.W. Shepstone to T. Shepstone, 23 December 1861.
[231] PAR, SNA 1/1/12 Ref 5, R. Struthers to T. Shepstone, 14 January 1862.

Struck by these objections, Struthers refused to press cotton cultivation: "against such reasoning any arguments I could induce in [its] favour were of little avail".[232] Fynn confirmed a similarly desperate state of affairs at Inyangwimi. Zulu growers who had opted to cultivate cotton when growing conditions were more favourable were now refusing en masse:

> So great is the scarcity of food in [this] division, that the natives are mostly depending on wild roots, the consequences are that very few have seed to plant, or strength to cultivate in preparation for the seed which their first crops may produce…it therefore becomes a heavy task to require their cultivation of cotton one day in seven in their present famished state.[233]

Maize cultivation in Fynn's district had dropped to the point that even European settlers were unable to procure any, despite their willingness to pay inflated prices.[234] He was forced to request 30 lbs of grain as rations to nourish his own staff.[235]

Severe food shortages led Zulu growers to deemphasize cotton and shift their efforts to subsistence production. Cotton growing entailed a burdensome addition to the agricultural routine of peasant households, to the effect that cotton could only be grown at the expense of foodstuffs. During times of famine, crops whose value was only in exchange were de-emphasized as African growers chose to privilege subsistence over commodity production.

Even before the drought, officials reported widespread Zulu resistance towards cotton cultivation. This was rooted in the growers' unwillingness to abandon maize as their favoured crop. Struthers noted that many growers in the Lower uMkhomanzi refused cotton for financial reasons, suggesting that maize provided a more remunerative return.[236] Fynn's experience at Inyangwimi confirmed these accounts: when he approached growers and told

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[232] Ibid.
[233] PAR, SNA 1/3/7 no. 168, H.F. Fynn to T. Shepstone, 20 November 1858.
[234] PAR, SNA 1/3/7 no. 135, H.F. Fynn, Magistrate of the Umkhomanzi Division to SNA, 2 October 1858.
[235] PAR, SNA 1/3/7 no. 147, H.F. Fynn, Magistrate of the Umkhomanzi Division to SNA, 23 October 1858.
[236] PAR, SNA 1/1/12 Ref: 5, R. Struthers to T. Shepstone, 14 January 1862.

them cotton would be a means of assisting in the payment of the hut tax, they answered that "they had enough money for that, without cultivating cotton".[237] In his 1861 assessment of the failure of Shepstone's scheme, Lieutenant-Governor James Scott emphasized "the difficulty to induce the native to grow it, on account of its being less remunerative than the crops of Indian corn (maize) which they are accustomed to grow".[238] In the following year's report Scott was even more precise, arguing that the plan to introduce cotton cultivation among Africans failed because the current price of cotton on the international market was so much lower than the local price of maize it gave no incentive to turn to cotton.[239] Theophilus Shepstone also recognized that cotton would never succeed while maize offered such significant returns: "so long…as mealies command so high a price, it is not likely that the Natives will enter very largely into the cultivation of cotton".[240]

As historian John Tosh notes, the success of African cash cropping was crucially dependent on the relationship between the particular cash crop and the established complex of food crops.[241] The Zulu farmers' resistance to cotton was rooted primarily in their preference for *umbila* (maize), which functioned as both a subsistence crop and a commodity sold to settler markets. Maize was by far the dominant crop in 19th century Natal: invariably, it accounted for more than half of all the acreage cultivated by Zulu farmers. This was especially true in the northern sections of the Upper and Lower uMkhomanzi districts which were within easy reach of the major settler markets in Pietermartizburg and Durban,

[237] PAR, SNA 1/3/8 Fynn to T. Shepstone, 27 January 1859, 326. Elsewhere, Fynn maligned the prosperity that most Africans found themselves in, complaining that until their "wealthy, independent" state was changed there would be no motivation for them to adopt cotton. See PAR, SNA 1/3/8 Fynn to SNA, 27 January 1859, 326.
[238] PAR, BPP Vol. 128, XII Report on the Past and Present State of Her Majesty's Colonial Possessions 1861, 33.
[239] PAR, BPP Vol. 128, XIII Report on the Past and Present State of Her Majesty's Colonial Possessions 1862, 34.
[240] T. Shepstone quoted in Welsh, *Roots of Segregation*, 186.
[241] John Tosh, "The Cash-Crop Revolution in Tropical Africa: An Appraisal," *African Affairs* 79 (1980): 79-94.

respectively. Historian John Lambert argues the relative absence of settler agriculture in these districts offered a boon to Zulu farmers who took advantage of rising maize prices to expand their acreages the 1860s and 70s.[242] Maize sales remained the most significant form of income for almost all *imizi*.

Cotton's growing cycle clashed with that of maize. Both needed to be sown after the first rains in October/November, and both had to be harvested in early autumn. Labour requirements for cotton were also notoriously demanding: carefully-timed planting, seeds sown at precise intervals, regular thinning, and quick and careful harvesting to avoid spoilage. Other studies on cotton cash cropping in Africa have concluded that cotton offered a lower return for labour than did most food crops: "given the choice between traditional production of food and other crops for local markets plus leisure and heavy labour on an uncertain and unremunerative new export crop, peasant farmers quite naturally chose the former".[243]

Other constraints hampered the realization of Shepstone's cotton scheme. Growing practices initiated by his Superintendents were inadequate. At Inyangwimi, where growers received the most instruction, seeds were sown in lines, with four or five seeds planted in holes, three feet apart, and a space of six feet between the rows. The intent was to weed out the extra plants leaving only the healthiest stock. The agreement entered into with local *izinkosi*, however, limited the availability and flexibility of labour. One agreement between

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[242] Lambert, *Betrayed Trust: Africans and the State in Colonial Natal*, 47. Maize prices rose due to expanding European settler numbers. Settler agriculture was hindered by a lack of capital and equipment and an irregular supply of labour, leaving Africans as the major maize producers in the colony through most of the 19th century.

[243] Ray Dumett, "Government Assisted Agricultural Development in West Africa: Cotton Growing Experimentation in Ghana in the Early 20th Century," *Agricultural History Review* 23 (1975): 156-172. Ugandan farmers rejected cotton in favour of food crops for similar reasons around the turn of the century. See Margaret J. Hay, "Economic Change in Kowe, Luoland, 1890-1945" (Ph.D., University of Wisconsin, 1972), 138-139, and John Tosh, "Lango Agriculture during the Colonial Period: Land and Labour in a Cash Crop Economy " *Journal of African History* 19 (1978): 415-439.

Fynn and one local *inkosi* uMakuta, for instance, limited the availability of ten workers on the fifty acres under cotton at Inyangwimi to every Monday for eight weeks during the planting season. Generally speaking one acre of cotton under hoe cultivation requires about a minimum of 200 hours of work per year. Without sufficient thinning, young plants compete for water and sunlight and hamper each other's development. Weeds became rampant.[244]

Seed arrived late and prevented growers from planting immediately after the spring rains. In the 1858/59 planting was set back into February and March when seed did not arrive until early in the new year.[245] Not surprisingly, yields were paltry. Cotton planted in dry soil had little chance of germination. Young plants that did germinate were overtaken by frost before the cotton was ready to pick.

A lack of proper tools also constrained cultivation efforts. Fynn recognized that soil conditions at Inyangwimi were marginal and that growers needed implements – oxen, horses, plows – to help them break up the soil sufficiently to allow cotton's deep roots to penetrate.[246] But Shepstone refused requests for such tools, strictly adhering to Lieutenant-Governor Scott's message to minimize expenses.[247] Zulu growers were left with only indigenous hoes made primarily from sneezewood which were prone to breakage and rot.[248]

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[244] PAR, SNA 1/3/8 Fynn to SNA, 27 January 1859, 326.
[245] PAR, SNA 1/3/7 no. 121, H.F. Fynn to T. Shepstone, 30 August 1858.
[246] PAR, SNA 1/3/7 no. 138, H.F. Fynn to T. Shepstone, 4 October 1858, and PAR, SNA 1/3/8, H.F. Fynn to T. Shepstone, 12 March 1859, 268.
[247] PAR, SNA 1/8/7 Ref 43, T. Shepstone to H.F. Fynn, 28 March 1859. See also SNA, 1/8/7 T. Shepstone to H.F. Fynn, 28 March 1859, 43. Fynn and Shepstone did eventually come up with a plan in which fifteen ploughs would be loaned out to African growers which were to be paid back in cotton revenue after three years. The cotton scheme ended in failure before this was initiated, though this program did end up lasting all the way until 1872, with sales increasing every year until the program's termination. See PAR, SNA 1/3/8, H.F. Fynn to T. Shepstone 20 October 1850, 45.
[248] PAR, SNA 1/3/6 Ref 193, Report of Preliminary Operations for the Formation of a Native Industrial Village at Inyangwimi, 31 August 1857.

Fynn recounted one instance in which 150 growers arrived on site without a single agricultural implement between them.

Transport was also inadequate. Shepstone was inundated with requests from Magistrates who had collected some cotton but lacked the means to get it to market. Fynn had a wagon full of cotton transported up the coast to Durban destroyed by rain, yet his follow-up request for a covered wagon was still refused. Subsequent requests for better storage facilities to prevent collected cotton from being damaged by rain and rats were also ignored.[249] Further north, in uMvoti County, the Magistrate suggested that the poor returns in his district (only three sacks were ever collected), were primarily a function of the great distance – between 15 and 20 miles – that growers had to transport cotton to market.[250]

Shepstone's cotton plan failed not because Zulu growers were inherently resistant to commodity production, but due to a specific interplay of ecological and economic factors that made the prospects of cotton cultivation less attractive. As other continental case studies of peasant commodity production reveal, Africans responded to export crops when they were remunerative and easily integrated into local growing systems.[251] Zulu growers were willing experimenters with cotton while growing conditions remained favourable. When faced with scarcity, African growers chose to re-dedicate their agricultural efforts to foodstuff production.

[249] PAR, SNA 1/3/8, H.F. Fynn to T. Shepstone, 17 September 1859, 86 and PAR, SNA 1/3/8, R. Struthers to T. Shepstone, 3 September 1859, 94.
[250] PAR, SNA 1/3/10, H Windham, Resident Magistrate of Umvoti County to SNA, 28 March 1861, 67.
[251] See Thomas J. Bassett, *The Peasant Cotton Revolution in West Africa 1880-1995* (Cambridge, 2001), and R. L. Roberts, *Two Worlds of Cotton: Colonialism and the Regional Economy in the French Soudan 1800-1946* (Stanford, 1996).

Renewed Focus on Settler Production

The collapse of Shepstone's cotton venture coincided almost exactly with the first shockwaves emitted by the Lancashire cotton famine. American supply dropped off drastically in 1861: raw cotton imports to England were halved within twelve months, dropping from 1 121 400 lbs in 1861 to just 533 100 lbs in 1862.[252] In response, the price of American middling in Britain almost tripled in the space of a few months, from 6d. per lb to 1s. 5d. per lb.[253] Local prices within the uMkhomanzi Valley rose similarly, from 6d. per lb in 1860 to over 1s. 6d. per lb by 1863. [254] Broadsheets urged local growers to fill this profitable vacuum: "there is no doubt that the manufacturers will for some years need all the supplies that can be secured from every quarter of the earth's surface".[255]

Domestic anxieties also encouraged settlers to refocus their efforts on cotton production. Natal's reliance on sugar as virtually its only export crop was a source of considerable anxiety. The sugar industry was undergoing the fastest period of growth in its history. Acreage under cane expanded from just 338 acres in 1854 to 12 781 in 1866.[256] Many fretted about what they perceived as the colony's over-reliance on sugar: "Natal is still only removed from being a land of samples by her sugar export".[257]

Again, cotton found advocates as a potential solution to the colony's financial troubles: "in the cultivation of one article, of cotton, we have the means of immensely

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[252] See Henderson, *The Lancashire Cotton Famine, 1861-65*, 35.
[253] M. Pitcher, "Sowing the Seeds of Failure: Early Portuguese Cotton Cultivation in Angola and Mozambique 1820-1926," *Journal of Southern African Studies* 17 (1991): 43-70.
[254] PAR, *Natal Blue Books* 1863 and 1864.
[255] PAR *Natal Almanac* 1866, 52.
[256] Peter Richardson, "The Natal Sugar Industry, 1849-1905: An Interpretative Essay " in *Enterprise and Exploitation in a Victorian Colony: Aspects of the Economic and Social History of Natal* ed. J. Sellers and B. Guest (Pietermaritzburg, 1985), 181-199, p.183. Richardson suggests this rapid development was due to a combination of high prices, low wages to labourers, and a protective tariff structure.
[257] *Natal Mercury*, 18 November 1869.

bettering our own condition, and consequently, the colony at large".[258] Cotton was positioned as the ideal complement to sugar. What sugar had done for the coastal regions of the colony, it seemed that cotton could do for the interior, as more than two million acres within Natal's midlands were thought to be suitable for its cultivation.[259] Cotton and cane also had complementary labour regimes, demanding workers in opposite seasons, so that promoters believed that they could share a single labour force between them.[260] Cotton emerged as the salvation crop in these accounts, the plant that would finally give Natal stability and its identity:

> Cotton culture would be well fitted for those farmers whose introduction we regard as being essential to the adequate settlement of the country…what tobacco is to the peasants of Syria, the vine to the peasants of Italy, silk to the mountaineers of Switzerland or Piedmont, beetroot to the peasants of France, and corn to the peasants of Germany, might cotton be to the farmers of Natal.[261]

These international and local calls for cotton resonated with settlers seeking to profit from escalating prices. Individual cultivators began to flock to the uMkhomanzi Valley, where Zulu growers had achieved their most successful yields, focusing their efforts on the low-lying valleys where cotton would be shielded from high winds and cooler air. They sought out deep alluvial soils, close to water, using horse-ploughs to prepare the land and hand-hoes to weed regularly. Young Zulu men were hired to pick cotton between April and August. Estimates swirled around the valley that cotton would yield 350 lbs per acre for at least three years without the sample deteriorating.[262] Cotton production in Natal increased from 16 322 lbs in 1863 to just under 300 000 lbs in 1865.[263]

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[258] *Natal Witness*, 20 April 1857.
[259] *Natal Times*, 18 May 1870.
[260] *Natal Mercury*, 2 April 1863.
[261] *Natal Mercury*, 18 November 1869.
[262] *Natal Almanac*, 1870.
[263] PAR, *Natal Blue Books*, 1863-1865.

The largest and most ambitious project initiated to capitalize upon rising cotton prices emerged in the north of the colony. The Cotton Plantation Company (CPC), established in 1863 on borrowed capital, bought £20 000 of land along the uThukela and uMhlanga Rivers, and invested heavily in state-of-the-art machinery, including steam ploughs, rollers and gins.[264] Finding labour inadequate, the Company imported between 150 and 200 indentured Indian labourers in a bid to replicate strategies that had been so successful for the coastal sugar plantations.[265] But the Company soon found itself undercapitalized. Within a few years it was saddled with £12 000 of debt and unable to maintain the £5 000 in annual fees for the indentured labour. The CPC also achieved yields lower than expected, due mostly to damage from an insect pest known initially only as the 'green fly'. At first, most thought the fly was introduced along with the Egyptian cotton the Company had imported into the colony, but after spreading to nearby farmers the fly was diagnosed as a species of indigenous cotton bollworm. The CPC declared insolvency in 1867, after three years of operation.

Losses from bollworm began to spread southward and became a major problem for growers within the uMkhomanzi Valley. Cotton bollworm (*Heliothis armigera*) fed on other South African staples such as maize, sorghum, tobacco, tomato and beans, but proved especially devastating for cotton stands. The female lays eggs (often between 700 and 1500) on the upper surface of the leaves; the resultant larvae burrow into flower buds or young bolls for food.[266] Larvae will often feed on multiple bolls without finishing any of them which increases the damage even further. Though endemic to most of sub-Saharan African, the bollworm proved particularly damaging in South Africa. Farmers noted that attacks

[264] B.J. Leverton, "Cotton in Natal: A Study in Failure" (M.A., University of Natal, 1963), 33.
[265] PAR, CSO 168 no. 352, Colonial Secretary to Gillepsie and Co., 4 February1863.
[266] E. O. Pearson, *The Insect Pests of Cotton in Tropical Africa* (London, 1958).

spiked with the appearance of early buds and young bolls. As the South African growing season is often short due to delayed rains, or interrupted by drought, the attacks are frequently very damaging. One frantic farmer conveyed the extent of the devastation:

> If they only devoured the leaves and then disappeared there would be some hopes [sic] as it is they remain and eat or kill all the young leaves as they attempt to come out; if you destroy the trees they only fly to another portion of the estate where there are some green leaves to light upon…hundreds of acres are completely stripped of leaves.[267]

Valley farmers began intercropping with maize and beans to try to minimize the damage, but the cotton crop still suffered heavily. Bollworms were literally eating farmers out of their profits. Average costs (comprising land preparation, labour, packing and transport) shot up from an estimated £3 per acre to over £5 6s per acre as farmers attempted to mitigate the devastation through intercopping.[268] The end of the Civil War in the United States compounded matters even further: World cotton prices began to dip as regular supply channels reopened [Figure 3.1]. The final death knell came with the discovery of diamonds at Kimberley in 1867. Many abandoned cotton to pursue an easier route to riches.

[267] *Natal Mercury*, 17 January 1865.
[268] KC, Report on Cotton Cultivation in Natal, 1870. Read at the Natal's Farmer's Club, 13 May 1870. (Pietermaritzburg, 1870).

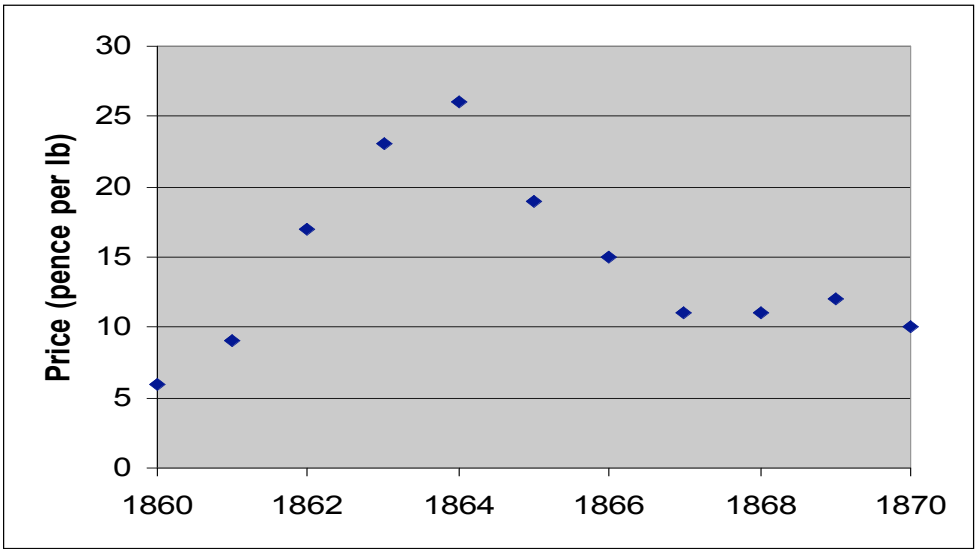

Figure 3.1: International Price of American Middling, 1860-1870. Source: B.R. Mitchell, *British Historical Statistics* (Cambridge, 1988), 332/333 and 760.

The most famous cotton farmer in Natal during this period was Cecil Rhodes, and his experiences paralleled this trajectory. Rhodes arrived in Natal as a 17 year old. He joined his elder brother Herbert, who was cultivating cotton along a flat alluvial plain along the uMkhomanzi River. Herbert had planted twenty acres with cotton in 1869/70, but spaced them too close together, which left the crop tangled and twisted. The crop was also damaged heavily by bollworms, though Herbert still managed to gross just over £32.[269] With Cecil's help he managed to clear an additional forty acres the following season, planting American seed that Cecil had brought from England. They spaced the rows seven feet apart, and planted maize as a trap crop to divert bollworm. That year the crop was severely damaged by a violent hail storm that blew the roof off their storage shack. The Rhodes brothers continued for another two growing seasons with little success, opting instead to pursue their

[269] Robert Rotberg, "Cecil Rhodes in the Cotton Fields," *Ethnic and Racial Studies* 9 (1986): 288-305, p.291.

fortunes in diamond mining. Cecil delivered this parting verdict: "It really seems an ill-fated valley…I believe if one only kept on, it has a capacity to absorb any amount of capital".[270]

The cotton growers who flocked to the uMkhomanzi Valley were not trained agriculturalists with extensive knowledge of the land. Most were get-rich-quick schemers whose interest in cotton was impelled primarily by the inflated prices that accompanied the Lancashire cotton famine. The majority abandoned cotton once prices recovered, closing the book on Natal cotton cultivation in the 19th century.

Conclusion

The control and management of colonial subjects was the most pressing issue facing British colonial administrators in the nineteenth century.[271] The 'Native Question' – how far should Africans be brought within the jurisdiction of British law and influence? – was considered the greatest moral dilemma of colonization. Herman Merivale's *Lectures on Colonies and Colonization* capture much of the British soul-searching over this question.[272] Merivale preached the ideals of protection and civilization which British rulers owed to their colonial subjects.[273] He remained unequivocal that the assimilation of indigenous peoples was the only viable option for ensuring long-term political stability within the British colonies.

Such uncompromising visions for Native-settler relations often became muddled by colonial realities. Alan Lester has shown how spatial strategies for addressing the 'Native

[270] B. Williams, *Cecil Rhodes* (London, 1921).
[271] See Ronald Robinson and John Gallagher, *Africa and the Victorians: The Official Mind of Imperialism* (London and Basingstoke, 1961); John Galbraith, *Reluctant Empire: British Policy on the South African Frontier, 1834-1854* (Berkeley and Los Angeles, 1963). For the Canadian context see Leslie Upton, "The Origins of Canadian Indian Policy," *Journal of Canadian Studies* 8 (1975): 51-61.
[272] David McNab, "Herman Merivale and the Native Question, 1837-1861," *Albion* 9 (1977): 359-384.
[273] Merivale, *Lectures on Colonization and Colonies : Delivered Before the University of Oxford in 1839, 1840 & 1841* 511.

Question' in the Cape were determined largely by local political and cultural forces.[274] Lester chronicles the contradictory strategies implemented by the British to manage the Xhosa majority, arguing that policies shifted according to local perceptions of security: when the British population felt threatened they favoured strict policies of containment, when they felt secure about their military capabilities (usually following a Xhosa defeat), they became more lenient and inclusive towards their colonial subjects. This 'grounded' example shows how important local, contextual factors were within this process of delineating African and settler space.

Attempts to integrate cotton as a commodity crop in Natal in the 1850s and 60s hinged largely on this contentious political question. Theophilus Shepstone seized upon cotton as a means of anchoring Zulus within his carefully carved out Locations. Such a profitable and highly desirable commodity crop was key to making production within the Locations financially viable. It would also serve to quell the increasingly vocal objections from Lieutenant-Governor Ben Pine and white agriculturalists who favoured breaking up the Locations to make more Africans available for work on white farms. Shepstone embraced cotton as a means of entrenching his vision of spatial segregation, which viewed as the most effective strategy for the European assimilation of Africans.

When cotton failed, Shepstone and his cotton superintendents blamed Zulu laziness and incompetence. But such explanations minimized the role of Zulu growers in rejecting cotton based on sound economic and environmental rationale. This chapter has argued that this cotton failure was the result of a specific interplay of economic and ecological factors that convinced Zulu growers to abandon the crop.

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[274] Alan Lester, "Cultural Constructions and Spatial Strategy on the Eastern Cape Frontier, 1806-1838," *South African Geographical Journal* 78 (1996): 98-107.

After this initial collapse, a second push for cotton cultivation focused on settler production. Unlike Shepstone's scheme, the motives behind these cotton ventures were primarily economic: get-rich-quick farmers were seduced by the success Zulu producers had achieved in the uMkhomanzi Valley and were keen to take advantage of rising prices impelled the Lancashire Cotton Famine. This second wave of cotton interest was underpinned by global more than local factors. Similarly, its failure – while impacted by both insect pests and violent storms – was due primarily to the resurgence in American cotton supply and the corresponding dip in international prices.

Chapter 4
Experts, the State, and the Zululand Cotton Boom, 1900-1925

Agricultural crisis marked the turn of the twentieth century in southern Africa. Between 1890 and 1908 drought, locusts, and cattle disease struck in quick succession, crippling agricultural production. Drought hit Natal in the early 1890s. Locusts followed, with swarms devastating stands of maize and sugar cane and reducing yields by as much as 80% between 1894 and 1896.[275] The ensuing food shortages were further exacerbated by the spread of rinderpest, an infectious viral disease known as cattle plague. In the worst year, 1897, settler cattle losses were estimated at 40%, with African losses as high as 90%.[276] The cumulative effects of these events handicapped the population's ability to feed itself. In 1901, 2.5 million lbs of agricultural produce had to be imported into Natal to sustain the local population.[277]

The political situation was also unstable. Natal suffered heavily following the end of the South African War in 1902. The mass departure of British troops triggered a decline in the market for local produce. Overall colonial revenues declined from £4 334 175 in 1902/03 to £3 510 350 in 1907/08, and the colony ran a deficit in five of these six years.[278] Property values dropped, triggering land sales. The 1906 Bambatha Rebellion – in which a band of Zulus revolted against the imposition of a poll tax, leading to the death of thirty settlers and

[275] Charles Ballard, ""A Year of Scarcity": The 1896 Locust Plague in Natal and Zululand," *South African Historical Journal* 15 (1983): 34-52, p.137.
[276] Charles Ballard, "The Repercussions of Rinderpest: Cattle Plague and Peasant Decline in Colonial Natal," *The International Journal of African Historical Studies* 19 (1986): 421-450, p.457. See also Narissa Ramdhani, "The Effects of Climate and Disease on African Farming in Natal, 1895-1905," *The South African Journal of Economic History* (1989): 79-91.
[277] PAR, Governor Gazette (GG) Vol. LIV no. 3264, 5 August 1902.
[278] Leonard M. Thompson, *The Unification of South Africa, 1902-1910* (Oxford, 1960), 50.

over three thousand Africans – heightened settler anxiety.[279] The white population dipped from 97 109 individuals in 1904 to 91 443 in 1908. With Africans outnumbering Europeans ten to one, Natal's settlers estimated they needed an additional 10 000 arrivals to solidify their position within the colony.

Natal's settlers thus had many reasons to embrace the unification of the four South African colonies in 1910. The Union was first and foremost about unifying the two groups of white settlers, British and Boer, in order to better control and exploit the African population.[280] Jan Smuts, who was responsible for drafting much of the Union's constitution and who would eventually become its second Prime Minister, was explicit about this aim: "unless the white race closes its ranks, its position will soon become untenable in the face of the overwhelming majority of prolific barbarism".[281] With agricultural production reeling after two decades of decline and high insecurity over another African rebellion, the white population of Natal welcomed the stability offered by the formation of the Union.

This chapter examines the link between the formation of the Union of the South Africa and the biggest cotton boom ever experienced in Zululand, which occurred between 1910 and 1925.[282] It is fundamentally concerned with explaining how cotton came to figure so centrally within national agricultural priorities. It argues that cotton emerged as a preferred crop within the Union because it fit well within the political and ideological priorities of the new white settler state.

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[279] Shula Marks, *Reluctant Rebellion: The 1906-08 Disturbances in Natal* (Oxford, 1970); Jeff Guy, *The Maphumulo Uprising: War, Law and Ritual in the Zulu Rebellion* (Scotsville, 2005).
[280] Bernard M. Magubane, *The Making of a Racist State: British Imperialism and the Union of South Africa, 1875-1910* (Trenton, 1996), 279.
[281] Jan Smuts in Ibid, 279.
[282] Zululand refers to the conquered territory north of the uThukela River which was appropriated by the British in 1887 and incorporated into the colony of Natal in 1897.

A new culture of expertise fuelled enthusiasm for cotton during these years. The Zululand cotton boom was impelled by a particularly nationalistic, modernist vision for agricultural production that stressed a discourse of progress, improvement, and technocratic optimism. Timothy Mitchell has narrated a similar phenomenon in colonial Egypt, terming it techno-science, in which technocratic alternatives are trumpeted and modernity is regarded as the answer to all problems. In particular, Mitchell has emphasized the spatial dimensions of this discourse, in which large technocratic ventures reorganized the distribution of expertise by obscuring local knowledge and concentrating technical control at one site.[283] Similarly, the Union's new agricultural experts seized upon the Zululand cotton boom to spatially reorganize agricultural knowledge. Cotton was favoured as a means of centralizing expertise and entrenching the authority of the national Department of Agriculture.

The 1910s and 20s were crucial decades for state intervention in white agriculture, especially in the provision of capital and credit, the dissemination of improved methods and techniques, and the subsidization of inputs. This substantial state intervention catalyzed an explosion in agricultural production: total value of agricultural output on South African farms jumped from £29 million in 1911 to nearly £200 million in 1948.[284] Cotton was well-suited for this state drive to prop up white agriculture, because it reinforced the Union's broader political and ideological goals. Cotton was used as a means of extending state control into Zululand and as a means of entrenching segregationist ideals. This chapter argues that the motivations for cotton were more political than economic: it was the state, more than the market that underpinned the Zululand cotton boom.

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[283] Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley, 2002), 19-53.
[284] Alan Jeeves and Jonathan Crush, "Introduction," in *White Farms, Black Labor: The State and Agrarian Change in Southern Africa, 1910-50*, ed. Alan Jeeves and Jonathan Crush (Pietermaritzburg, 1997), 1-28. See also Timothy Keegan, "Crisis and Catharsis in the Development of Capitalism in South African Agriculture," *African Affairs* 84 (1985): 371-398.

The 'New' Agriculture

The first steps toward the development of a centralized, integrated network of cotton cultivation were taken just after the turn of the century by E. R. Sawer, Director of Natal's Division of Agriculture and Forestry. Sawer was a new breed of South African expert: trained in Britain, he gained exposure to the southern African climate as Assistant Secretary for Agriculture in southern Rhodesia before being promoted to Director of Agriculture in Natal in 1902. Sawer dismissed as insular and short-sighted prevailing attitudes to agriculture that focused on subsistence farming. He was committed instead to expanding Natal's production of crops that would prove both profitable to the colony and useful to the empire.[285] Sawer wanted Natal's agriculture to serve imperial needs first: to this end he cultivated a close relationship with the Imperial Institute, with its commitment to serving Britain's interests through the dissemination of agricultural knowledge and techniques.[286] Described by one supporter as the 'brain' of the global drive for progressive agronomy, the Institute began studying the quality and defects of empire cotton in 1902. In the next six years its scientists studied more than one thousand samples of raw cotton, offering suggestions and disseminating promising samples to agricultural officials throughout the empire. Coinciding with Sawer's tenure in Natal, these efforts convinced him to see cotton

[285] According to Sawer this insular approach to agriculture was rooted in "the relative isolation of the farming community, which has been necessarily engaged in the production of the prime necessities of life – grain, meat, milk and wool. A closer intercourse with the world of commerce is, however, forcing upon South Africa new conditions and responsibilities. In natural sequence has followed the organization of the export trade in foodstuffs, bringing with it a further incentive to sustained activity and improvements in agricultural practice. The new outlook necessarily embraces the possible cultivation of crops furnishing such raw materials as oil and fibres as a necessary preliminary to the establishment of local industries for their further preparation." E.R. Sawer, *Cedara Memoirs of South African Agriculture: The Cultivation of Fibre Crops* (Pietermaritzburg, 1912), 165.

[286] William Golant, *Image of Empire: The Early History of the Imperial Institute, 1887-1925* (Exeter, 1984). For more general history of the Imperial Institute see John M. Mackenzie, *Propaganda and Empire: The Manipulation of British Public Opinion* (Manchester, 1984), and Michael Worboys, "The Imperial Institute: The State and the Development of the Natural Resources of the Colonial Empire, 1887-1923," in *Imperialism and the Natural World*, ed. John M. Mackenzie (Manchester and New York, 1990), 164-186.

as offering the best prospects for establishing Natal as an important contributor to imperial agriculture.[287]

Sawer's expert status emerged out of a turn-of-the-century emphasis on science as a means of advancing imperial interests. Calls for a more interventionist attitude towards colonial development originated with Joseph Chamberlain, Secretary of State for the Colonies (1895-1903), who campaigned for an expansion of state scientific capacities to better capitalize on the natural resources of the colonies. Applied science in the service of the empire, he reasoned, was the key to accelerating economic extraction from the colonies.[288] Sir William Dunstam, the Head of the Imperial Institute's cotton operations and one of Sawer's mentors,[289] was another proponent of this model of scientific imperialism: in his view, there was "a pressing need that the Imperial Government should recognize much more fully than it has hitherto done…the claims of scientific investigation as the pioneer instrument of this work as the essential first step in the material and commercial development of our possessions".[290] The early 20th century marked the beginning of the expert era: a professionalized bureaucratic authority dedicated to harnessing the economic potential of the colonies. Sawer exemplified this new breed of rational expert as he remained committed to the simultaneous advance of science and empire.

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[287] In addition to cotton, Sawer initiated experiments exploring the possibilities of growing sugar, tea and hemp in Natal.

[288] Joseph Morgan Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Athens, 2007), 21-24 and 39-47. See also Richard Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (New Haven, 2000), 221-229.

[289] Dunstam (1861-1949) was a renowned chemist who became Director of the Institute in 1903. He lamented that the accumulated knowledge about cotton's habit was in a "state of chaos" and recommended a preliminary period of experimentation before extensive planting should be attempted: examination and classification of indigenous cottons, chemical analysis of the soil, finding suitable manures, determining suitable rotation crops, testing different varieties of cotton to achieve the quality desired by manufacturers. See Golant, *Image of Empire: The Early History of the Imperial Institute, 1887-1925*, 16.

[290] William Dunstam, "Some Imperial Aspects of Applied Chemistry", Presidential Address to the British Association, 1906 in Golant, *Image of Empire: The Early History of the Imperial Institute, 1887-1925* 14.

Sawer took the previous century's failures as his starting point, arguing that those cotton disasters were the result of scattered, isolated cultivators attempting to grow cotton without access to standardized experimental results. Since then, he insisted, "we have progressed and learnt [sic] how to fight the obstacles which they were unable to overcome".[291] Inspired by Dunstam's recommendations, Sawer initiated a coordinated system of acclimatization and experimentation sites administered through a centralized hub that would disseminate these results to farmers. He reasoned: "In South Africa, the problem is undoubtedly to find the best type of exotic cotton to introduce and, if necessary, to improve it".[292] Sawer termed his approach the 'New Agriculture': an agricultural revival premised on a centralized network of experimental sites.

Sawer's agricultural vision was particularly new and distinctive because it integrated a network of experts, ideas, and specimens that transcended multiple sites of colonial administration. Colonial and metropolitan sites were linked materially as well as discursively; specimens and experts connected distant sites together as much as ideas and techniques.[293] Sawer's expanded domestic networks brought local cotton farmers into contact with imperial inputs via a web of visits, specimens, and correspondence. His 'new' agriculture was an attempt to link both local and global knowledges.

Sawer established over fifty experimental plots in Natal and Zululand. The nexus was the Cedara Experimental Station, built on 3200 acres between Hilton and Howick, just

[291] E. R. Sawer, *Cotton in Natal* (Pietermaritzburg, 1910).
[292] Ibid., 13
[293] Alan Lester, *Imperial Networks: Creating Identities in Nineteenth-Century South Africa and Britain* (London and New York, 2001), 6. See also: Richard Grove, *Ecology, Climate and Empire: Colonialism and Global Environmental History, 1400-1940* (Cambridge, 1997); Richard Grove, *Green Imperialism : Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism, 1600-1860* (Cambridge, 1995); Roy MacLeod, *Nature and Empire: Science and the Colonial Enterprise* (Chicago, 2000).

under twenty kilometres north of Pietermaritzburg, in 1904.[294] Satellite stations were later established along the coast at Stanger and Winkle Spruit, at Empangeni in southern Zululand and Weenen in the west of the colony. A comprehensive soil survey was initiated to identify which regions' soils were best-suited for cotton: investigations were conducted into organic matter content, soil temperature, moisture, water retention, capillary action, deficiency of humus and phosphoric acid, and the influence of iron salts. Sawer also imported cotton varieties from Brazil, Egypt, America and Australia – obtained through the Imperial Institute – and then disseminated these to his experimental stations to determine which varieties were best suited to specific locales.

Results from Natal's southern and coastal regions were disappointing. All twenty-four samples grown at the Winkle Spruit experiment station on the coast were classified by the Imperial Institute as of "inferior quality". The most striking defect reported was the presence of "stained, immature, and withered cotton", due primarily to uneven rains and strong ocean winds.[295] Sea Island and Egyptian varieties were particularly vulnerable to gusts and heavy rains. American Upland fared a bit better, but was criticized for faults attributed to careless harvesting and its cultivation was deemed unprofitable at current prices. These data convinced Sawer that the limiting factor to cotton cultivation in Natal was not soil conditions, as had been previously thought, but rather irregular rains and low inland temperatures. He concluded that northern Natal and Zululand, with their warmer climates,

[294] "The Central Experimental Farm," *Agricultural Journal and Mining Record* V (1902): 135. Sawer's vision for Cedara was that it would become a hotbed of training and experimentation, which would then disseminate its experts, techniques and specimens out across Natal. Cedara's initial agricultural training prospectus advertised training in Forestry, Horticulture Dairying, Veterinary Science, Chemistry, Elementary Mathematics, Bookkeeping, Farm Surveying, Zoology and Fish Husbandry.
[295] Sawer, *Cedara Memoirs of South African Agriculture: The Cultivation of Fibre Crops*, 167.

lower incidence of frost and fewer destructive storms, held the most promise for cotton cultivation.

Sawer's search for a long-stapled cotton that could succeed in the warmer, northern regions of the colony drew him to an imported Australian variety known as Caravonica Tree cotton. Caravonica cotton was first imported by a Zululand farmer, Daniel Fields, who had established links with an Australian breeder in hope that the climatic similarities between Natal and Zululand would lead to success for the transplanted tree.[296] Caravonica was a hybrid of Sea Island and Peruvian cotton, and demonstrated a number of advantages over Sea Island and American Upland strains. Like these, Caravonica was perennial and produced excellent quality cotton for as many as six or seven years after planting. It boasted both a large production per acre and a heavy yield of lint. It was also noticeably immune to bollworm – a pest whose larva had eaten into 19th century cotton cultivation efforts by feeding on leaf tissue and bolls – due mostly to its early fruiting, especially in the second and third year of growth.[297] Most crucially, both demand and price for Caravonica's long-stapled fibre (averaging between 1.2 and 1.7 inches in length) were expected to remain high.

Caravonica was originally tried in northwest Zululand near Vryheid in 1907, with encouraging results. Planters there enthused that the tree cotton was the highest yielding variety ever planted that far north; the lint quality was lauded as consistent and fine.[298] Three samples sent by Sawer to the Imperial Institute for evaluation confirmed these reports: each was praised for its good colour and long staple. All three samples were valued at over 7

[296] PAR, Surveyor's General Office (SGO) Vol. III/1/210 Ref: SG3014/1906, Daniel Fields to Minister of Agriculture, 9 February 1906.
[297] Sawer, *Cotton in Natal*, 25.
[298] PAR, SGO Vol. III/1/277 Ref: SG998/1910, Chas Hill to Surveyor-General, 13 April 1910.

pence per lb, which Sawer bragged disingenuously was an especially notable achievement given that cotton prices were exceptionally low at the time.[299]

Other Zululand farmers were quick to capitalize on this enthusiasm. In 1908 Caravonica was planted in a number of Zululand's inland regions, including uGingindlovu, uNongoma and uBombo. Again Sawer sent representative samples to the Imperial Institute and again the reviews were enthusiastic: Caravonica cotton was praised for its cleanliness and its lint length, though the samples were criticized for uneven colour and weak character. All samples were deemed saleable, at about 70% of the price currently being offered for Egyptian cotton (8 1/2 d. per lb compared with 12 ½ d. per lb for the latter). Individual farmers who sent samples to the Institute received similar praise. One farmer at uBombo received a valuation of over 11d. per lb for his Caravonica sample. Another, further west at uNongoma, received praise for his cotton's good colour and long staple, (between 1.3 and 1.5 inches), with associated values pegged at between 12d. and 14d. per lb.[300] These positive reviews were soon matched by buyer demand. Export companies in Durban were making colony-wide offers to buy "any quantity of Caravonica cotton unginned at the highest market rates".[301] Soon farmers in various parts of Zululand were clamoring for Caravonica seed.[302]

But success was short-lived. Yields declined sharply after three growing seasons, as the tree cotton proved susceptible to heavy storms and jassid attacks. Jassid (*Empoasca facialis*) is a small-winged leaf-hopper that breeds on the underside of plant leaves and sucks

[299] Sawer, *Cedara Memoirs of South African Agriculture: The Cultivation of Fibre Crops*, 167. Cotton prices fluctuated very little between 1906 and 1910: the price of American Middling in Britain remained between 7.8 to 8.6 d. per lb.
[300] *Ibid*, 170.
[301] PAR, SGO Vol. III/1/277 Ref: SG998/1910, S. A. Nathanson Commandite to Hill, 12 April 1910. See also: PAR, SNA Vol. I/1/463 Ref: 1559/1910, S.A. Nathanson, Commandite to Office of the Chief Native Commissioner, 28 August 1911.
[302] See for instance requests from Mr. G. H. Lennard and Mr. Harvey Wright, both of Johannesburg, applying for cotton growing land in Zululand. In: PAR, SGO Vol. III/1/300 Ref: SG1329/1911, and PAR, SGO Vol. III/1/298 Ref: SG572/1911.

sap from their veins, causing them to dry out and shrivel up. Jassid was endemic to south-eastern Africa, where it fed primarily on sweet potato, groundnut, beans, and cowpea. But it took a particular liking to cotton sap.[303] Plants are most vulnerable to jassid attacks later in the growing season (February/March) when most of the earliest bolls are mature but still not ready to be picked. Caravonica's early fruiting capabilities, which had been favoured by farmers for their bollworm resistance, made it especially vulnerable to these attacks. By 1910 almost all Caravonica stands had been destroyed by jassids.

Sawer's experimental networks provided only a small boost to cotton cultivation. His reports contain no data on overall acreage or output, only anecdotal evidence of individual farmers who achieved success with cotton. It appears that after the enthusiasm for Caravonica died out, most farmers abandoned cotton, leaving fewer than one hundred acres under cotton in 1910. Still, Sawer believed in the potential value of Natal's cotton production within the empire, and he encouraged the state to explore and examine resources to expand cotton production. His emphasis on experimentation and acclimatization paved the way for a centrally administered, national-scale network dedicated to the promotion of cotton cultivation.

South African Cotton Experts

Following the formation of the Union of South Africa in 1910, provincial departments were abolished and Sawer's experimental networks were absorbed within the Union's new Department of Agriculture. Cotton occupied a central position on the national agenda, signaled by the establishment of a Tobacco and Cotton Division in the Department of Agriculture. The head of this division, William Scherffius, would soon become the most

[303] E. O. Pearson, *The Insect Pests of Cotton in Tropical Africa* (London, 1958), 215-226.

famous cotton man in the Union. Scherffius had been pried away from his position as the head of the Kentucky Experiment Station and charged with expanding South African cotton cultivation, which was stagnating at a lowly thirty bales when he arrived in 1909.

Like Sawer, Scherffius began his South African work on cotton with a 'what-went-wrong' analysis of previous cultivation attempts. He argued that the major impediment to success was that growers had nothing more than "a limited knowledge of the best methods of procedure in the production of quality and quantity".[304] To overcome this, he initiated a comprehensive set of experiments to gauge cotton's compatibility with South Africa's climatic conditions. He began by investigating all elements of cotton cultivation: seed selection, land preparation methods, insect control, replanting options. His aim was to maximize yields and his evaluation criteria reflected this: he tested for plant size, number of bolls, pounds of lint per acre, total estimated value. The results of these tests were then made quickly and widely available, in a range of agricultural publications, to planters throughout the Union.[305]

These experiments confirmed on a national level what Sawer had concluded in Natal: it was climate, not soils, that would determine the success, or otherwise, of cotton cultivation within the Union.[306] Scherffius' experiments revealed that successful cotton cultivation was primarily correlated with heat exposure and inversely related to damage from wind and frost. To maximize returns, Scherffius recommended early planting in late October or early November, and focusing cultivation in the northern parts of the country where temperatures

[304] W. H. Scherffius and J. P. du Oosthuizen, *Cotton in South Africa* (Pretoria, 1924), 27.
[305] Publications included *Official Yearbook of the Union* (first published in 1917), *Journal of the Department of Agriculture* (1920), *South African Cotton Growers' Journal* (1925), and *Farming in South Africa* (1926).
[306] Scherffius dismissed the rich alluvial bottom soils which planters in the 1870s had devotedly sought out, contending that such soils "have a tendency to develop large stalks with heavy foliage and a small proportion of lint". See W.H. Scherffius, "Cotton", *Agricultural Journal of South Africa* 3 (1912): 603-624.

were milder. He was especially enthused about the possibilities in Zululand. He estimated that over 80% of the region – approximately 350 000 acres – was suitable for cotton. [307] Zululand was free of the frost and flash storms that plagued planting further south in Natal. Rainfall was limited but evenly distributed, estimated to be between 18 and 20 inches annually.[308] Scherffius predicted that a Zululand farmer would net a profit of over £8 for every acre put under cotton. He stated confidently that ecological factors would not be the limiting factor to cotton cultivation.

Scherffius' enthusiasm about the possibilities for cotton production in Zululand was contagious. Broadsheets began to carry editorials praising the area's climate as "singularly suitable to cotton growing".[309] Speculators bragged about the lack of insect damage (especially in comparison with the devastation being wrought by the boll weevil in the United States), and the enthusiasm with which shipments of Zululand cotton were being received in Liverpool.[310] America's production was denigrated as "antiquated", "wasteful", and "uneconomic" while Zululand's was exalted as a bright prospect for the future.[311] Acreage under cotton surged from only 100 acres in 1917 to 250 acres in 1918 to 4000 acres in 1919.[312]

Scherffius' cotton agenda reflected the modernist agricultural discourse that dominated the post-Union period. His agents were the nation's new experts: providing information that was centralized, standardized, and disseminated widely to growers, connecting them with the centre. These agents spoke a language of progress, improvement,

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[307] W.H. Scherffius, "Tobacco and Cotton", *Journal of the Department of Agriculture* IV (1922): 394.
[308] PAR, Chief Native Commissioner (CNC) Vol. 293 Ref 19/17/2514, Cotton Growing in Zululand, Mr. B. Wilson, Itinerant Instructor in Tobacco and Cotton, to the Chief Native Commissioner, 1 April 1918.
[309] *Zululand Times*, 11 October 1923.
[310] *Zululand Times*, 27 March 1924 and 6 February 1920.
[311] *Zululand Times*, 13 March 1924.
[312] *Official Yearbook of the Union of South Africa* 4 (1920).

and an increasing reliance on the state as the primary determinant of agrarian change.[313] South African science became inextricably tied with the emergence of a white national consciousness and was crucial in giving shape to this vision: as the historian Karen Brown has argued, "the creation of a professional scientific elite was an important component in the construction of a white Anglo-Afrikaner identity".[314] The science of cotton cultivation became interwoven with the political ideals of the new South African state.

Other agricultural branches were similarly transformed by the new culture of expertise. The work and objectives of the nation's new entomologists, for instance, were determined largely by the state's growing centralizing and supervisory priorities. These experts successfully campaigned for more legislation and regulatory controls to convert all farmers to their improved methods, so that "science…underpinned and legitimized an expansion in state powers".[315] Weed eradication was similarly transformed: experts fought both the weeds themselves and those outmoded and inefficient farming practices that exacerbated their spread. They relied primarily on moral metaphors and legislation to force agriculturalists in outlying districts to conform to the practices favoured by the state.[316] Within the realm of conservation more generally, historian William Beinart argues that

[313] Timothy Keegan, *Rural Transformations in Industrializing South Africa: The Southern Highveld to 1914* (London, 1987), 166, and Jeeves and Crush, "Introduction".
[314] Karen Brown, "Tropical Medicine and Animal Diseases: Onderstepoort and the Development of Veterinary Science in South Africa 1908–1950 " *Journal of Southern African Studies* 31 (2005): 513-529, p.522; Saul Debow, *A Commonwealth of Knowledge: Science, Sensibility and White South Africa 1820-2000* (Oxford 2006), 158-202; Karen Brown, "Progressivism, Agriculture and Conservation in the Cape Colony circa 1902-1908" (D. Phil, Oxford University, 2002).
[315] Karen Brown, "Political Entomology: the Insectile Challenge to Agricultural Development in the Cape Colony, 1895-1910," *Journal of Southern African Studies* 29 (2003): 529-549, p.548.
[316] Lance Van Sittert, "'The Seed Blows About in Every Breeze': Noxious Weed Eradication in the Cape Colony, 1860-1909," *Journal of Southern African Studies* 26 (2000): 655-674.

science became inextricably linked with the nation's social and economic agenda: science became a means of advancing the twin priorities of white domination and segregation.[317]

Cotton was embraced as a preferred crop in this state-led agricultural expansion because it furthered the Union's political imperatives. Both Sawer's and Scherffius' experiments identified cotton's ideal growing zones as the warmer, northern parts of the country, which were at once the most remote and least governable. More than four million acres of land within South Africa was earmarked for white settlement by virtue of its status as ideal agricultural country.[318] Cotton thus legitimated an extension of administrative control into the furthest peripheries of the Union.[319]

Cotton experts used their elevated positions to expand the state's influence. They coerced individual farmers to conform to the state's singular vision of progressive agriculture. One example of this process is provided by the way in which the state's experts demonized the common practice of ratooning. Ratoon cotton is grown by cutting back old stalks, allowing new sprouts to shoot up without having to plant anew. Cotton growers in both the middleveld and the lowveld had long relied upon ratooning as a low-risk strategy that offered favourable returns when rains were late or irregular. It saved costs on the purchase of new seed, as well as labour associated with seedbed preparation and replanting.

Scherffius and his fellow experts viewed ratoon cotton as an obstacle to establishing a standardized and centralized network of cotton production. Because the growing cycle for ratoon cotton was between two and three months (rather than five or six months for newly

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[317] William Beinart, *The Rise of Conservation in South Africa: Settlers, Livestock, and the Environment, 1770-1950* (Oxford and New York, 2003), 17-29.
[318] *Official Yearbook of the Union of South Africa* 10 (1927): 455.
[319] Fiona Mackenzie recounts a similar process occurring in Kenya. See A. Fiona D. Mackenzie, "Contested Ground: Colonial Narratives and the Kenyan Environment, 1920-1945," *Journal of Southern African Studies* 26 (2000): 697-718.

planted cotton), it allowed farmers to fit their crop's growing cycle to local conditions. This individualistic strategy undermined attempts by the Department of Agriculture to standardize the cotton growing cycle throughout the Union by publishing accepted dates for hoeing, planting, and picking. Ratooning was, in James Scott's terminology, an 'illegible' farming strategy that was impossible for the state to regulate and control.[320]

Cotton experts were equally concerned about the threat that ratoon cotton posed to the reputation of the South African crop as a whole. Experts were convinced that ratooning produced lower yields and, more crucially, inferior cotton that was stained and rough. Officials from the Tobacco and Cotton Division denounced ratooning as a "lazy, selfish" practice that undermined the collective enterprise of South African cotton cultivation: "for the sake of the community it must be abandoned".[321] Another editorial written by agricultural officials argued that:

> The story of ratooning is the gradual spoiling of all neighbouring lands owing to the scope given to root-pests to multiply without hindrance, until the day inevitably arrives when skeleton crops of weak cotton have to be accepted as waste and the reputation of the country for the production of marketable cotton is gone.[322]

Scherffius set out to prove the pernicious consequences of this practice. He initiated a set of experiments at the Rustenburg Experiment Station between 1917 and 1921 comparing ratoon and non-ratoon crops for yield, lint quality, and insect damage. The Department boasted that the results were indisputable: ratoon was inferior according to all criteria tested.[323] The raw data, though, support more ambiguous conclusions: yields for the

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[320] James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven and London, 1998).
[321] "Ratooning" *South African Cotton Growers' Journal* (August 1925): 5.
[322] "Ratooning Cotton" *African Sugar and Cotton Planter* 1 (June 1925): 17. See also NA, Secretary for Agriculture (LBC) Vol. 4044 Ref: QC15, Chief Entomologist C. Haines, Cotton Insect Investigations, 1925.
[323] The full results of these experiments are detailed in J du P Oosthuizen "Cotton: Ratooning Experiments", *Journal of the Department of Agriculture* IV (1922): 125-131. See also the results from experiments

first growing season were actually lower than those for any of the ratoon years (Scherffius discounted these as the result of an "unfavourable season"), while lint quality was judged by the officials themselves without relying on testing tools for determining strength and length, which was considered standard practice.[324] Led by conviction as much as by conclusive evidence, cotton experts were unequivocal in their condemnation of ratooning.

The state's aggressive campaign against ratooning reveals its commitment to standardizing cotton farming practices. Ratoon cultivation was an individualized, local, diffuse practice that was impossible for the state to regulate. It was anathema to cotton experts who preached uniformity and consistency in both product and practice. Ratooning undermined the national venture of cotton growing which was dependent on farmers conforming to the regulations disseminated by cotton experts. It was vilified as an enemy of Scherffius' vision for progressive agriculture.

Cotton experts also seized upon the state's ideological priorities to advance their agricultural enterprise. The most pressing social issue facing the new Union was that of the 'poor whites', the swelling class of Afrikaner farmers who had been abandoning rural areas since the 1880s. Their numbers spiked after the turn of the century, as thousands more left their farms and migrated to the cities in search of work. These impoverished, uneducated, poor white people were left to compete for work with the non-white urban population. Many

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undertaken by the Division of Entomology in C. Haines "Cotton Insects", *Journal of the Department of Agriculture* II (Jan-June 1921): 205.

[324] Scherffius complained of "heavy rains" in the 1917/18 season which stunted yields. But rainfall during this first growing season was not dramatically more than the three following growing seasons: 31.90 inches compared with 31.92 inches (1918/1919), 18.67 inches (1919/1920), and 29.25 inches (1920/21). Oosthuizen, "Cotton: Ratooning Experiments", 126. The inconclusive findings of these experiments were confirmed years later in a comprehensive review undertaken by L.J. Henning, "Has Cotton a Place in our Agriculture?" *Farming in South Africa* XXIII (1948): 570-575.

barely eked out livings.[325] Their plight became a major concern for the South African state: many worried about impoverished whites mixing with non-whites in these crowded cities and blurring the boundaries of racial distinction.[326] The state was committed to safeguarding their position relative to non-whites.

Scherffius seized upon the poor white problem to advance his own agenda by championing cotton as the ideal crop to empower the low-capital, low-input grower. Scherffius was confident that any white farmer could make a good living on 25 to 100 acres of South African cotton land with minimal start-up capital.[327] He drew, frequently, on the example of the United States, in which cotton was the primary earner for hundreds of poor white families with small holdings. The state's resources were needed to capitalize on cotton's potential and solve the crisis: "If a plan could be devised, embracing…the settlement of suitable crown lands of the country, with cotton growers, the cotton industry would make tremendous strides, bringing wealth into the country and helping to settle the

[325] For more see The Carnegie Commission of Investigation on the Poor White Question in South Africa, *The Poor White Problem in South Africa*, Vol. 1-5 (Stellenbosch, 1932); Robert Morrell, ed., *White but Poor: Essays on the History of Poor Whites in Southern Africa, 1880-1940* (Pretoria, 1992); Stanley Trapido, "Landlord and Tenant in a Colonial Economy: the Transvaal 1880-1910," *Journal of Southern African Studies* 5 (1978): 26-58. The conditions that precipitated this massive displacement are a source of some contention. Most authors agree that these farmers had difficulty adapting to the increasingly capitalist dimension of agricultural production and changing market demand (see for instance Monica Wilson and Leonard M. Thompson, *The Oxford History of South Africa*, vol. II (Oxford, 1971), 104-71). Other significant factors which exacerbated the livelihoods' of these poor whites included population pressure, the process of land subdivision, and the devastation of the rinderpest and locust attacks in the 1890s. Other scholars, though, have generalized about the character of the Afrikaner farmer. Two accounts Bethuel Setai, *The Political Economy of South Africa: The Making of Poverty* (New York, 1979), and Ralph Horowitz, *The Political Economy of South Africa* (New York, 1967) make reference to laziness, indifference and an unwillingness to change on the part of the Afrikaner farmer. Horowitz terms this a "preferred idleness", while Setai suggests Afrikaner farmers lacked "an enterprising spirit".

[326] See for instance Carnegie Commission, *The Poor White Problem in South Africa*, xix.

[327] W.H. Scherffius, "Union Cotton", *African Sugar and Cotton Planter* 1 (Feb/March 1925): 9-12. Other programs targeting the elevation of these poor whites included direct aid, social welfare programs such as pension and invalidity grants, price supports, and other protection measures such as subsidies and price supports. See Wilson and Thompson, *Oxford History of South Africa*, 173.

problem that has given the Government so much worry". Cotton was the nation's most promising means of converting this "state liability into an asset".[328]

Scherffius also tapped into the state's preoccupation with racial segregation to further his campaign for the preservation of pure-bred cotton seed. Scherffius was convinced that the major threat to cotton's viability as an export crop was inferior seed quality. European manufacturers had expressed concern that South African cotton was a mixture of different varieties with varying staple lengths. Officials responded with a stern edict to growers:

> No success can be achieved with poor and mixed seed: indeed, we are already hearing the first rumbling of a storm of complaint gathering around an industry of which such high hopes are entertained in the Union. Without a determined effort on the part of the grower to secure by careful and judicious selection an adequate supply of good seed, and thereby raise the standard of his product to the requirements of the trade, the industry is likely to lag and fall behind.[329]

Broadsheet editorials denounced the "mongrelizing of cotton" as the single biggest retardant to South Africa's emergence as a major cotton producer.[330] The Tobacco and Cotton Division established cotton-seed stations throughout the country that were completely insulated so as to prevent contamination by inferior strains.

Buried within these calls for a spatial segregation of cotton varieties was a racialized discourse anchored within the creation of a new South African white identity. Fears over racial mixing and the deterioration of pure strains via interbreeding were heightened in the new Union, as poor whites and black labour flooded to the urban areas in bigger waves than ever before, crashing together as urban dwellers in close quarters. Only one year after the formation of the Union, over 50% of the white population, 46% of Indians and 12% of

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[328] Scherffius and Oosthuizen, *Cotton in South Africa*, 37

[329] "The Improvement of Cotton by Seed Selection", *Journal of the Department of Agriculture* II (Jan-June 1921): 482.

[330] *Zululand Times*, 17 March 1924. See also *Zululand Times*, 4 October 1923, 30 July 1920, and 4 June 1920.

Blacks were living side-by-side in dense urban areas.[331] Anti-miscegenation ideologies arose in response, as white South Africans began to articulate the fear of being engulfed and diluted by non-whites.[332]

Calls for the conservation of homogeneous, pure cotton strains echoed calls for carving out demarcated, homogeneous spaces where whites would be immune from the inevitable deterioration associated with racial mixing. Calls for preserving white South Africans from the pollution of interbreeding seeped into debate over cotton breeding, with the aim of preserving the purity of the crop's integrity from dilution from inferior strains.[333] As Timothy Keegan argues, agriculture reflected a broader "ideological crisis of racial survival and racial purity".[334]

Scherffius seized upon this metaphor of white-on-white procreation to trumpet his goal of pure bred South African seed. He expressed concern about the situation of poor whites "in towns, the great rendezvous of this class of people, [where] many of them become physical and moral degenerates".[335] He then connected these anxieties over racial dilution with parallel concerns in cotton breeding: "we propose to start a vigorous campaign with the object of improving the grade of our cotton by selecting the best strains in the field. No doubt some of the cotton grown in the country is good, but it is rather badly mixed".[336] Other

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[331] Census Report, 1911 in Wilson and Thompson, *The Oxford History of South Africa*, 173.

[332] Barbara Bush, *Imperialism, Race and Religion: Africa and Britain, 1919-1945* (London and New York, 1999), 141. Legislation passed during this period sought to retrench the possibility of interracial mixing. Examples include the Immorality Act of 1926, which prohibited the mixing of white and non-white stock, and the Urban Areas Act of 1923, which applied the doctrine of segregation within urban areas.

[333] Aaron Bobrow-Strain has explored these connections between racial and agricultural discourses in the context of early 20th century American bread making. He argues that the American propensity for white bread was underpinned by discourses of racial purity: "urgent questions of diet were never far from racial anxieties". Aaron Bobrow-Strain, "White Bread Bio-Politics: Purity, Health, and the Triumph of Industrial Baking," *Cultural Geographies* 15 (2008): 19-40, p.25.

[334] Keegan, *Rural Transformations in Industrializing South Africa: The Southern Highveld to 1914*, 180.

[335] Scherffius and Oosthuizen, *Cotton in South Africa*, 37.

[336] W.H. Scherffius, "Cotton Culture: Practical Advice for the South African Grower", *Journal of the Department of Agriculture* II (Jan 1921): 161.

publications advocating cotton production expounded on these miscegenation undertones even further, demonizing the interbreeding of pure strains as a loss to the nation: "no success can be achieved with poor and mixed seed".[337] These concerns over miscegenation provided a strong impetus for the drive towards pure, consistent breeding techniques.

Scherffius was equally convinced about the racial roles required for successful cultivation: cotton needed the white man to supervise and the black man to labour. The subjugation of African labour would give South Africa a comparative advantage over other producers. Scherffius boasted: "think of what it would mean to this country if the latent energy of the black race was turned into account in South African cotton fields".[338] While American growers had to pay as much as 6 or 8 shillings per 100lbs of harvested cotton, South African growers needed only pay 3 shillings for their black labour.[339] It was left to white South African growers to pocket the difference.

Under Scherffius' leadership the national Department of Agriculture heralded a new era in South African cotton cultivation. This push for cotton was tied to the emergence of a new coordinated, centralized agricultural infrastructure. Cotton was an enticing commodity because its cultivation regime mirrored the racial roles that whites were attempting to carve out within the Union. Cotton was a means of uplifting the white agricultural sector and simultaneously containing the black; it thus fit perfectly with the ideological priorities of the new white South African state. [340]

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[337] "Improvement of Cotton by Seed Selection", *Journal of the Department of Agriculture* II (Jan 1921): 482.
[338] W.H. Scherffius, "Cotton", *Agricultural Journal of South Africa*, 3 (1912): 603-624, p. 604.
[339] "Cotton", *Natal Sugar and Cotton Planter* (Jan 1925): 11.
[340] The Union's commitment to labour-repressive policies aimed at increasing white agricultural production is evident in its legislation; for instance the Native Land Act (1913), the Native Service Contract Act (1932), and the Native Trust and Land Act (1936). Taken together, these Acts forbade Africans from owning land anywhere in South Africa. They were forced onto Reserves where overcrowding and limited opportunities made wage labour in white enterprise the only viable option for survival. See Stanley Greenberg, *Race and*

The State and Zululand

Interest in Zululand's agricultural potential had risen through the 1880s and 90s. Natal's expanding settler population and the dearth of suitable land within the colony (due to holdings by absentee landlords, a burgeoning Indian peasantry and the presence of African Reserves) turned many eyes north toward the agriculturally promising land beyond the uThukela River. Successive invasions and British military victories had weakened the Zulu Kingdom and, following their 1880 victory at the Battle of Ulundi which effectively ended the Anglo-Zulu war, the British annexed the scattered remnants of the Zulu people and their land. After a ten year period of direct British rule, Zululand was officially incorporated into the colony of Natal on 29 December 1897.[341] White settlement proceeded slowly through the 1880s and 1890s, as administrators resisted calls to open large tracts of Zululand to white settlers.[342]

By the turn of the century, demands that Zululand be opened for settlement had reached a crescendo. The process of land division was delayed by the South African War (1889-1902). Once the fighting ended in 1902, the Zululand Delimitation Commission was established to set aside Reserve land for Africans and to appropriate the remainder as Crown Land which could be opened up to white agriculture [Illustration 4.1]. On the face of it, their allocation of 2.4 million acres to Reserves and 2.7 million acres for settlement seemed to divide the territory more or less equitably. But the division was hardly balanced. Almost all

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State in Capitalist Development: Comparative Perspectives (New Haven and London, 1980), 87-91, and Jeeves and Crush, "Introduction," 11.

[341] For details on the political wrangling that precipitated the decision towards annexation see: Phillip Warhurst, "The Colonial Office and Natal's Annexation of Zululand," *Journal of Natal and Zulu History* 19 (2001): 95-107.

[342] Shirley Brooks, "Changing Nature: A Critical Historical Geography of the Umfolozi and Hluhluwe Game Reserves, 1887-1947" (PhD, Queen's University, 2001). Brooks argues that at the root of this divide was an ideological schism that pitted Zululand's administrators - trained in Natal and adherents to the Shepstonian vision of Zululand as an African Reserve - against Natal sugar and stock farmers keen to take advantage of Zululand's 'uninhabited' lands.

superior agricultural land ended up in white hands.[343] Twenty-one Reserves were established, mostly in the north and west, where malaria and marginal agricultural potential made land less enticing to white settlers.[344] The land most heavily desired by whites was in the more accessible southern sections of the territory near Eshowe, St. Lucia, and Richards Bay; here large tracts were thrown open for settlement. The Natal Land Board oversaw the allotment of these lands to eligible settlers: over 300 000 acres were distributed between 1904 and 1914, almost all of them in Zululand's coastal and southern regions.[345]

[343] Aran Stuart MacKinnon, "The Impact of European Land Delimitation and Expropriation on Zululand, 1880-1920" (M.A, University of Natal, 1990), 154.
[344] Few of the Reserves were contiguous with one another which limited African mobility even further. Most were bounded on all sides by white settlements.
[345] A.J. Christopher, *The Crown Lands of British South Africa, 1853-1914* (Kingston, 1984), 91.

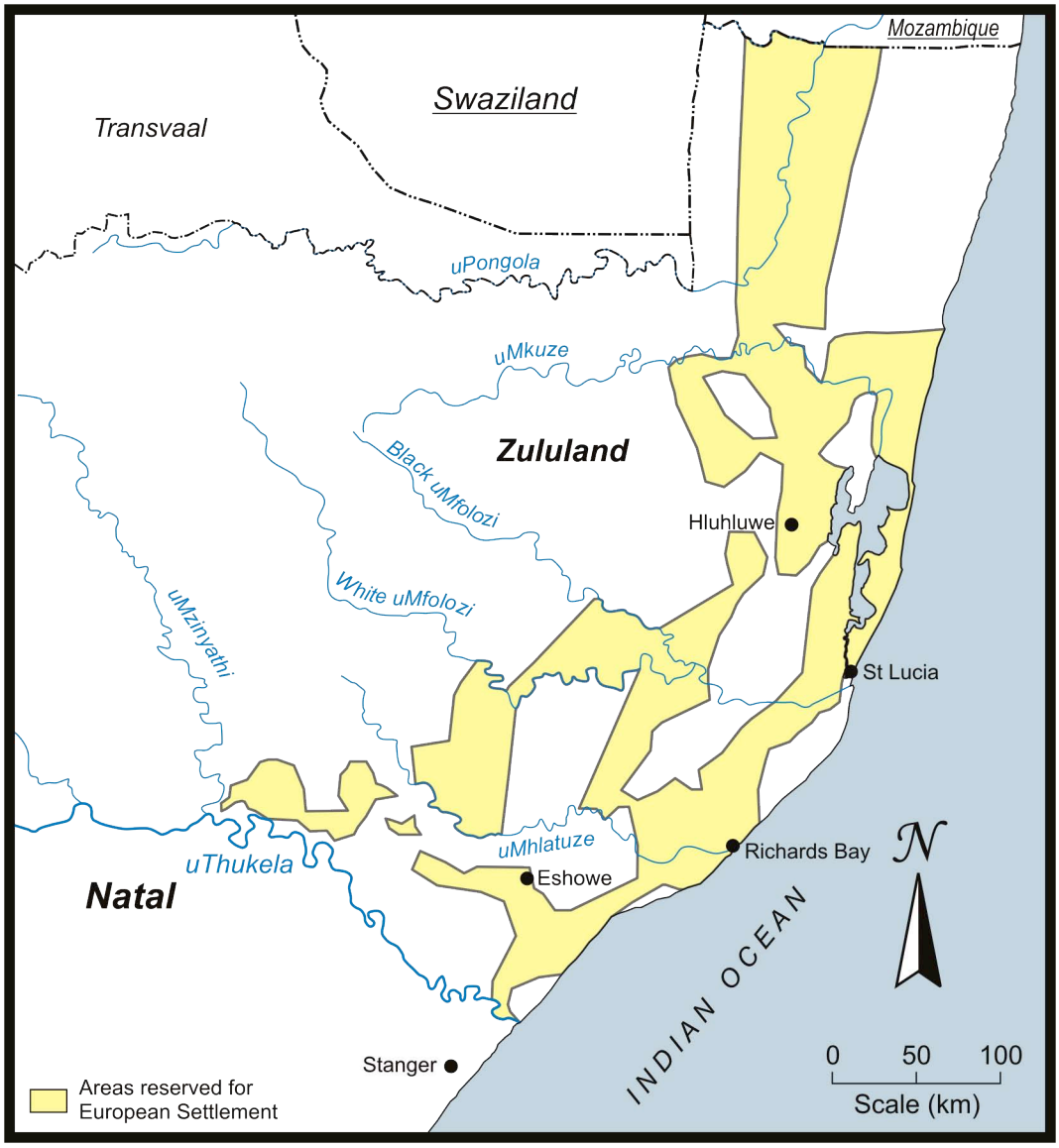

Illustration 4.1: Areas Reserves for European Settlement in Zululand, 1904. Adapted from: Shirley Brooks. "Changing Nature: A Critical Historical Geography of the Umfolozi and Hluhluwe Game Reserves, 1887-1947." (Queen's University, 2001): 291.

Land settlement in Zululand was further accelerated by the Union-wide Land Settlement Act (No. 12) of 1913. Couched in terms of progress and development, the Land Act was a simple land grab, ostensibly intended to free up under-utilized agricultural land for settlement, but actually a means of expropriating land designated for African use to elevate

the lower class of white agriculturalists.[346] The Act forbade the payment of rents in cash or crops by black tenants, and allowed payment only as labour service.[347] It also prohibited African ownership of land beyond designated Reserves, leaving only about 7% of South Africa's land (approximately 22 million acres) available to the nation's African population. This legislation allowed Zululand settlers to evict thousands of Africans from their lands, to seize their cattle, and to consolidate their monopoly control over both land and labour.[348]

Almost all white farmers who settled in Zululand made sugar their primary crop. Growing conditions on newly-opened lands within fifteen kilometres of the coast, marked by warm temperatures and high humidity, were ideal for cane sugar. The area under cane expanded five-fold in less than a decade, from 800 hectares in 1908 to over 4 500 in 1917.[349] Wealthy Natalians also invested significant amounts of capital in mills to process the cane during the second decade of the century.[350] South African sugar production more than

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[346] According to Keegan: "The framers of the Land Act, then, were providing a legislative definition of a future ideal, but which was as yet unattainable: a capitalist agriculture in which *all* the productive resources were the property of and put into motion under the organizing authority and supervision of the white employer of labour." Keegan, "Crisis and Catharsis in the Development of Capitalism in South African Agriculture," 393 [original emphasis]. See also Harvey M. Feinberg, "The 1913 Natives Land Act in South Africa: Politics, Race, and Segregation in the Early 20th Century," *The International Journal of African Historical Studies* 26 (1993): 65-109.

[347] Historians continue to debate the motivations that underpinned the passing of the Land Act. Some maintain that it followed from the political motivation of segregation (see for instance Saul Dubow, *Racial Segregation and the Origins of Apartheid in South Africa* (Houndmills, Basingstoke, Hampshire 1989), while others insist it was motivated more by various sectors of capital, especially the mining sector, who sought to flush Africans out of subsistence economies and into their roles as wage labourers (see for instance Keegan, *Rural Transformations in Industrializing South Africa: The Southern Highveld to 1914).*

[348] The Zululand Delimitation Commission (1902-04) had similarly excluded Africans from inhabiting lands outside the Reserves, however in the intervening years this practice was not rigorously enforced and many Africans continued to squat on white-owned land. The passing of the Land Act in 1913 ended this practice. Thousands of Africans were evicted from white farms. See MacKinnon, "The Impact of European Land Delimitation and Expropriation on Zululand, 1880-1920" ; Aran Stuart MacKinnon, "Land, Labour and Cattle: The Political Economy of Zululand c.1930-1950" (University of London, 1995).

[349] Prices were set at 2s. per acre for first-class lands, 1s. per acre for second-class lands, and 6d. per acre for third-class lands. All farms were leased to growers for 99 years. Alan Jeeves, "Sugar and Gold in the Making of the South African Labour System: The Crisis of Supply of the Zululand Sugar Estates," *The South African Journal of Economic History* 7 (1992): 7-33. See also A de V Minaar, "Labour Supply Problems of the Zululand Sugar Planters, 1905-1939," *Journal of Natal and Zulu History* 12 (1989): 53-72.

[350] The largest, Hulett and Sons, invested more than £500 000 in Zululand during the decade. Reynold Bros. embarked a massive expansion program into Zululand. The Umhlatuzi Valley Sugar Company began

doubled in less than a decade, from 82 000 tons in 1910 to just under 200 000 tons in 1919, and much of this growth was due to the industry's expansion into Zululand [Figure 4.1].

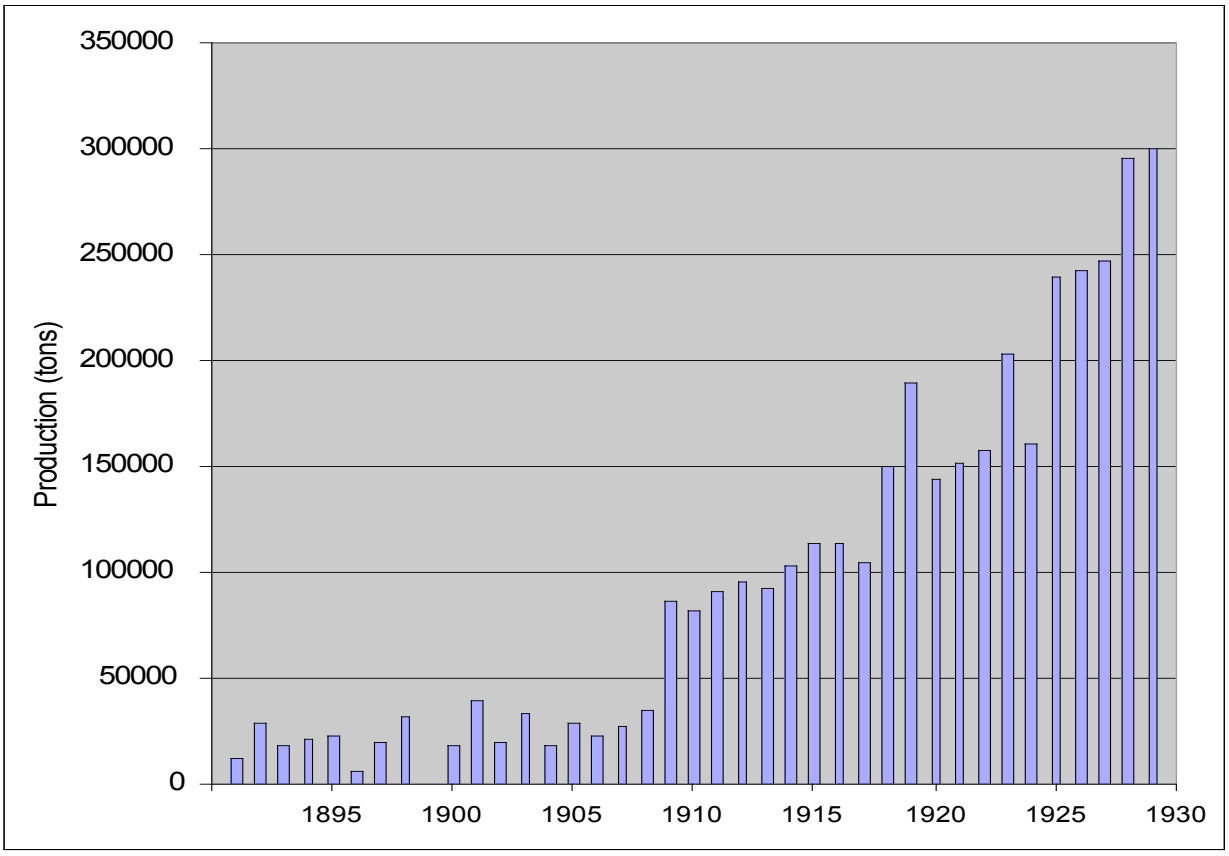

Figure 4.1: Sugar Production in South Africa, 1891 to 1929. Note there are no data available for 1899 due to the South African War. Source: *South African Sugar Yearbook and General Directory* (1891-1929).

In the 1920s, however, the South African sugar industry experienced a hiccup due to global overproduction (especially in Cuba, but also in Java and Mauritius) and declining prices.[351] Zululand producers were also affected by the expansion of sugar production in southern Mozambique, which held a comparative advantage in supplying Transvaal markets.

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construction of a new sugar mill at Empangeni. See David Lincoln, "An Ascendant Sugarocracy: Natal's Millers-Cum-Planters, 1905-1939," *Journal of Natal and Zulu History* 11 (1988): 1-39.

[351] "Crisis of Sugar Production", *African Sugar and Cotton Planter* 1 (July 1925): 2.

South African sugar production dipped abruptly from 190 000 tons in 1919 to 142 000 in 1920, the first significant decline in more than a decade.[352]

Efforts to arrest this decline created a deep schism within the Union's agricultural sector. Sugar millers and growers persuaded the government to increase the duty on imported sugar from £3 10s to £4 10s per ton to provide domestic producers with greater protection from the competition of foreign growers.[353] Increased in subsequent decades, this protective tariff succeeded in insulating South African markets: sugar imports declined from 32 000 tons in 1910/1911 to under 2 000 tons in 1938/39.[354]

The geographical isolation of the sugar industry and the cozy relationship between its leaders and members of the government made it an easy target for critics. Many were angry at such significant government intervention directed at an industry that benefited so few. Zululand broadsheets were constantly on the defensive, shielding sugar from those who decried the government's price protection: they pointed to similar duties on tobacco, maize, and potatoes, which escaped criticism because these crops were grown by a larger number of South African farmers. They denounced the "significant antagonism" leveled at the industry by other agricultural sectors.[355] The sense of isolation that grew from these struggles intensified the efforts of Zululand officials to find an agricultural staple that would give them common cause with farmers in other parts of the nation. Embracing cotton, a crop that was being adopted widely, both in the Transvaal and in parts of the Cape Province, offered an opportunity to deflect some of the criticism directed at the sugar industry.

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[352] As a corollary, prices offered to South African growers dipped from £46 per ton in 1920 to £29 per ton in 1921. South African Sugar Association, "1930/31", *Sugar Year Book and General Directory* (1930/31): 173.

[353] For a thorough account of the government's intervention in the sugar industry see Lincoln, "An Ascendant Sugarocracy: Natal's Millers-cum-Planters, 1905-1939, " 7-9.

[354] Jeeves and Crush, "Introduction," 6. Protection increased through the 1920s with the Fahey sugar agreement of 1926 which raised the import duty on sugar from £8 per ton in 1926. See F. J. Van Biljon, *State Interference in South Africa* (Westminster, 1939), 141-168, and Wilson and Thompson, *The Oxford History of South Africa*

[355] *Zululand Times,* 11 May, 1922.

The sugar industry was increasingly controlled by big capital. By the turn of the century, it was dominated by a handful of wealthy sugar barons. The increased capital demanded by the expansion into Zululand allowed these individuals to extend their influence even further, as they consolidated their operations along the coast, from northern Pondoland to southern Mozambique. Through the 1920s and 30s, more and more independent white growers were bought out by large milling operations: between 1926 and 1934, consolidated estates increased their output by 110%, while independent planters increased their output by only 47%.[356] The monopolistic structure of ownership and increasing concentration of corporate capital and control has led one historian to dub the privileged entrepreneurs who dominated the industry a "sugarocracy".[357]

In contrast, cotton farming fostered communalism. In South Africa cotton was farmed by many poor, diffuse growers who had few resources to offset the risks posed by poor seasons or fluctuating prices. Many decided to pool their resources in an effort to minimize these risks and consolidate their market position.[358] Cotton cooperatives gained increasing popularity in the early 1920s. By and large they sought to ensure that farmers got fair prices for their crops, to increase their opportunities to obtain credit, and to provide accurate information regarding the grade and quality of each member's crop.[359] Ultimately local cooperatives were amalgamated into the Zululand Cooperative Cotton Association in

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[356] Van Biljon, *State Interference in South Africa*, 146.
[357] Lincoln, "An Ascendant Sugarocracy: Natal's Millers-Cum-Planters, 1905-1939".
[358] *Zululand Times*, 21 January 1921 and 26 January 1922. The Union government subsidized the creation of cooperative societies as part of its broader strategy to aid the fortunes of small white farmers. The national Land Bank, established in 1912, heavily financed agricultural cooperatives. The Cooperatives Act of 1922 cemented this commitment leading to the rapid establishment of cooperative mills, dairies, grain elevators and wineries through the 1920s.
[359] *Zululand Times*, 9 May 1923. This shift towards cooperatives to preserve the independence of the small producer occurred in other industries and locations throughout the interwar period. See for instance David Demeritt, "Visions of Agriculture in British Columbia," *BC Studies* 108 (1996): 29-60.

1924, with its headquarters in Empangeni.[360] Scattered and disparate cotton growers were united within one organization committed to advancing the position of the small producer.

Led by Scherffius, proponents of cotton cultivation championed the crop as the people's choice, a commodity in the service of the nation's poor, white underclass. One expert exalted cotton farming as a payable proposition for the man of limited means: "cotton gives a quicker return than sugar and requires less capital". Any grower with 200 acres could – according to this account – bank on an annual profit of between £800 and £1000.[361] This allegiance with the plight of working whites was anathema to the dynastic sugar barons and further buoyed cotton's standing relative to sugar. By 1922 the *Zululand Times* was calling for the replacement of sugar with cotton.[362]

Crucial to this development trajectory was the identification of a long-stapled cotton variety that could thrive in Zululand. The sudden decline of Caravonica tree cotton had been attributed to difficulties stemming from its transplantation from Australia into Natal. This dulled enthusiasm for the acclimatization of imported varieties and convinced officials that the key to success in cotton production lay in the development of improved, pure seed from local, assimilated varieties. Again, Scherffius resorted to modernist solutions and mounted a broad testing campaign at experimental stations throughout the Union: over twenty cotton varieties were tested for yields, staple strength and lint quality.[363] But these experiments failed to reveal a variety well-adapted to Zululand's growing conditions with a staple longer

[360] Soon after the Cooperative purchased a plot of eighteen acres of Crown Land adjacent to the railway line, with the intent of erecting a ginnery to process its members' cotton crop. See NA, Uitvoerende Raad (URU) Vol. 1041 Ref 611, Issue of Crown Grant to the Zululand Coop Cotton Association in Respect of Holding Known as Lot 18, Empangeni Rail, 1923. See also *Zululand Times*, 31 January 1924.
[361] *Zululand Times*, 5 February 1924.
[362] *Zululand Times*, 11 May 1922. See similar calls in *Zululand Times*, 4 January 1923.
[363] W.H. Scherffius, "Cotton", *Agricultural Journal of the Union of South Africa* 3 (1912): 603-624.

than 1.25 inches. [364] "Unless we can secure the service of a qualified man to assist in this matter," Scherffius concluded, "we cannot hold out hope of rapid improvement in the quality of seed to be supplied. This is a line of work that requires the sole attention of a properly equipped man".[365]

The man who stepped in to fill this void would become Zululand's most famous cotton breeder. Edward Loffler started growing cotton on his farm in the hot, northern reaches of Zululand at Buluwana, about fifteen miles from uNongoma, near the uPhongola River. His farm was rich in deep soils, free of frost, and sheltered from strong winds.

Though Loffler had received no formal agricultural training, Scherffius' calls for individual breeding programs tailored to local growing conditions resonated with his own experiences using transplanted seed. Through years of experimentation Loffler had become convinced that existing long-stapled varieties such as Sea Island and Egyptian did not survive well in Zululand's harsh heat and occasional violent rain storms. He decided that his only chance of competing with American cotton was to develop a high-priced long-stapled variety well adapted to local conditions. He set about crossing the long-stapled Sea Island with the more resilient American Upland, and then selected the most viable progeny to re-cross in following years. By 1920 he had achieved his famed Zululand Hybrid, a long-staple variety (1.5 inches) with large bolls that was ideally suited to the British market.[366] It was also very

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[364] J. de P. Oosthuizen, "The Improvement of Cotton by Seed Selection, *Journal of the Department of Agriculture* II (1921): 505-516.

[365] W.H. Scherffius, "The Tobacco and Cotton Industries", *Journal of the Department of Agriculture* II (1921): 454. See also "The Improvement of Cotton by Seed Selection", *Journal of the Department of Agriculture* II, (1921): 482 and A.R. Pullen, "Improved Cotton Seed", *Farming in South Africa* II (May 1927): 93.

[366] Loffler's trials with Zululand Hybrid were initially hampered by heavy rains and a lack of pickers. Eventually he secured the provision of fifty young African boys from the Eshowe Reformatory to serve as labourers, which greatly accelerated the progress of his experimentation efforts. See PAR, CNC Vol. 369A Ref: 1919/2342, Senior Inspector, Zululand to Department of Native Affairs, 7 February 1919 and NA, Native Affairs Department (NTS) Vol. 7412 Ref 370/327, Cotton Growing in Natal and Zululand 1917-1940, Senior Inspector of Native Reserves, Zululand, to CNC, 8 September 1920.

resistant to jassid which was rapidly emerging as the number one pest faced by Zululand cotton growers.[367] Zululand Hybrid was extremely well-received in Lancashire, where it fetched a higher price than most American cottons.[368] Within two growing seasons, Loffler's hybrid emerged as the premier variety for Zululand farmers.

Loffler's discovery of Zululand Hybrid catalyzed the sharpest jump in cotton production ever experienced in Natal and Zululand. Yields jumped from just over 800 000 lbs in 1922 to 4 million lbs in 1923, to 6 million lbs in 1924, and 8.5 million lbs in 1924.[369] Growers in Natal and Zululand put more than 30 000 acres under cotton during the 1924/25 growing season, accounting for just under half of total Union production of 67 500 acres.[370]

Conclusion

Cotton experts were crucial in underpinning the Zululand cotton boom. Scientists – led by Sawer and Scherffius – initiated experiments and accumulated what they considered to be comprehensive knowledge of cotton's growing requirements. They established centralized information networks that consolidated their knowledge and expertise, and used this authority to ensure that diffuse growers throughout the Union followed these accepted, standardized practices. They transformed cotton cultivation into a national undertaking.

But these South African cotton experts did not represent a monolithic or undifferentiated form of state control. They interacted with local knowledges and practices in subtle ways. When local practices threatened their vision for standardized, uniform

[367] NA, NTS Vol. 7412 Ref: 370/327, Cotton Growing in Natal and Zululand 1917-1940, E. Loffler to Minister of Agriculture, 18 November 1920. Loffler's breeding success made him the recipient of numerous awards, including the British Cotton Growing Association's prestigious One Hundred Pounds Cup awarded for superior yields.
[368] Zululand Times Annual, December 1924.
[369] *Official Yearbook of the Union of South Africa* (1925).
[370] *Zululand Times*, 2 April 1925. See also *Zululand Times,* 15 January 1925.

production – as was the case with ratoon cotton – they attacked it as an enemy of rational, scientific cultivation. When local practice reinforced the state's broader goals of cotton cultivation – as was the case with Loffler's breeding of Zululand Hybrid – they embraced it.

Experts used their new elevated status to advance the political aims of the newly consolidated settler state. Experiments supervised by Scherffius identified much of Zululand as ideal for cotton production due to its high temperatures. These northern regions were at once the most remote and least governable. Cotton thus legitimated a deepening of administrative control into the furthest peripheries of the Union. Cotton was favoured because it fit well within the state's ideological priorities: it allowed for an expansion of state power into Zululand and empowered white settler agriculture. The science of cotton cultivation became inextricably interwoven within the exercise of state power.[371]

As historian William Beinart has noted with respect to early South African conservation programs: "technical interventions were not themselves socially neutral".[372] The rational act of agricultural expansion masked the political act of dispossession as Zulu farmers were denied access to hundreds of thousands of acres of land.[373] This enthusiasm for cotton depoliticized the issue of land and its distribution. It thus occluded the reality that

[371] This intertwining of science and the state underpinned many agricultural programs initiated during the late colonial period. See Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* For specific case studies of how this inter-relationship manifested itself in British Columbia see Tina Loo, "Making a Modern Wilderness: Conserving Wildlife in Twentieth-Century Canada," *Canadian Historical Review* 82 (2001): 92-121; Matthew Evenden, *Fish versus Power: An Environmental History of the Fraser River* (Cambridge and New York, 2004); James Murton, *Creating a Modern Countryside: Liberalism and Land Resettlement in British Columbia* (Vancouver, 2007).

[372] William Beinart, "Soil Erosion, Conservationism and Ideas about Development: a Southern African Exploration, 1900-1960," *Journal of Southern African Studies* 11 (1984): 52-83, and Peter Delius and Stefan Schirmer, "Soil Conservation in a Racially Ordered Society, 1930-1970," *Journal of Southern African Studies* 26 (2000): 719-742 also emphasize that conservation programs initiated by the new South African state were more about control than conservation.

[373] James Ferguson, *The Anti-Politics Machine: "Development", Depoliticization, and Bureaucratic Power in Lesotho* (Minneapolis, 1994). See also Mackenzie, Contested Ground: Colonial Narratives and the Kenyan Environment, 1920-1945".

cotton's expansion into Zululand was fundamentally about consolidating white settler production and control.

Chapter 5
Boom and Bust in Zululand, 1924-1930

The South African cotton boom reached its peak in 1924/25. The Union had become a reputable international cotton supplier; purchase orders were being received from as far away as Italy and India.[374] Expectations escalated along with production levels. William Scherffius predicted that output for 1925/26 would increase by more than 200%.[375] Another estimate predicted cotton would soon yield revenues of £10 million a year.[376] Still another forecast that cotton farms would soon overtake gold mines as the nation's leading revenue generator.[377]

Zululand garnered disproportionate benefits from this cotton boom. The acreage under cotton more than doubled every growing season between 1919 and 1924. Cultivators across the province prepared record acreages in 1925: the area under cultivation in Vryheid was 50% greater than in the previous year; Eshowe was up by 117%, Alexandra by 75%, the Midlands by 146%, Ixopo by 100% and Richmond by 50%. Growers in Natal and Zululand put over 30 500 acres under cotton during the 1924/25 growing season, accounting for just under half of the 67 500 acres devoted to cotton cultivation in the Union.[378]

International factors helped stimulate this expansion. English demand had fuelled the early twentieth century boom in Zululand. Lancashire mills suffered a severe supply shortage at the turn of the century. This was blamed mostly on declining American production due to the pernicious boll weevil, whose larvae feeds on the cotton boll, and the

[374] NA, Secretary for Mines and Industries (IMI) Vol. 116 Ref: 1868/2/4/25, Trade Commissioner, Cotton Cultivation in South Africa, Letter from M. Volpi, Italian Cotton Association, to H.S. Roux, Commissioner of the South African Government Office, 6 May 1925.
[375] W.H. Scherffius, "On Union Cotton", *African Sugar and Cotton Planter* 1, no.5 (Feb/March 1925): 9-12. *Zululand Times*, 28 June 1923, expected output to treble.
[376] "The Lure of Cotton", *Natal Sugar and Cotton Planter* (October 1924): 11.
[377] "Cotton", *Natal Sugar and Cotton Planter* (November 1924): 7.
[378] *Zululand Times*, 2 April 1925. See also *Zululand Times*, 15 January 1925.

shortage of cheap, black labour in southern plantations. The 1890s saw the slowest growth in Lancashire's supply since the cotton famine ended in 1865. Imports rose from 1 490 million lbs to 1 750 million lbs, an increase of only 4.2% across the decade. Growth was barely a quarter of that during the previous ten years.[379] Lancashire manufacturers, spinners, and operatives estimated that their revenues fell by approximately £2 million annually as a result of this supply shortage.[380]

The British Cotton Growing Association (BCGA) was formed in 1902 to encourage alternative sources of supply.[381] Created by a conglomerate of employers' associations, large firms connected with the cotton trade, and private individuals, the BCGA held more than £500 000 in capital. The BCGA initially decided to focus its efforts in Sudan, Uganda, Nigeria, Nyasaland, and Tanganyika, where it achieved considerable success in expanding supply.[382] The association invested heavily in training local officials to convince Africans of the merits of cotton cultivation. They distributed seed and machinery, provided cheap and easy transport, and purchased all cotton grown.[383] Upset that South Africa was being excluded from this cotton rush, Scherffius initiated correspondence with the BCGA in 1913, lauding the Union's cotton potential. While the BCGA never considered South Africa's

[379] Between 1881 and 1890 supplies increased from 1 274.6 million lbs to 1 490.3 million lbs, an increase of over 17%. Geoffrey Timmins, *Made in Lancashire: A History of Regional Industrialization* (Manchester and New York, 1998), 179.

[380] Ray Dumett, "Government Assisted Agricultural Development in West Africa: Cotton Growing Experimentation in Ghana in the Early 20th Century," *Agricultural History Review* 23 (1975): 156-172.

[381] *Empire Cotton Growing Corporation* (London, 1952). See also NA, Governor's Office (GOV) Vol. 699 Ref: PS22/04, British Cotton Growing Association: Charter of Incorporation, 1904.

[382] BCGA initiatives succeeded in more than quadrupling African production from 1910-1921. Steve Onyeiwu, "Deceived by African Cotton: The British Cotton Growing Association and the Demise of the Lancashire Textile Industry," *African Economic History* 28 (2000): 89-121. See also: E. Egboh, "The Adventures of the British Cotton Growing Association in southern Nigeria, 1902-1913," *Quarterly Review of Historical Studies* 18 (1978): 71-93, and K. Dike Nkworah, "The West African Operations of the British Cotton Growing Association, 1904-1914," *African Historical Studies* 4 (1971): 315-330.

[383] John Robert Hose, "Britain and the Development of West African Cotton, 1845-1960." (Columbia University, 1970), 207.

production potential to be as promising as that of central and west Africa, they did offer optimistic assessments regarding Zululand's cotton possibilities.[384]

The First World War further constrained international trade. Britain's three main cotton suppliers – the United States, Egypt and India – all curtailed production to grow more foodstuffs. World cotton output dropped from just under 24 million bales in 1914 to 15 million bales in 1921. American exports dipped under 10 million bales in 1923, down from more than 15 million bales before the war.[385] This decline in American supplies produced a surge in prices offered to South African growers [see Table 5.1]. These high prices reinforced the efforts of cotton experts to transform Zululand into a centre of cotton production.

Year	Average price per lb of cotton (pence)
1913	5.0
1914	7.3
1915	6.6
1916	7.5
1917	15.0
1918	18.0
1919	29.0
1920	26.0
1921	19.9
1922	12.4
1923	15.9
1924	18.7
1925	14.8

Table 5.1: Average Price per Pound of Cotton offered to South African Growers. From: F. du Toit, "South Africa Cotton Prospects," *Farming in South Africa* I (1926): 256

[384] As reported in NA, British Blue Books (BBB) Vol. 96 Ref: CD3997, Wyndham Dunstan, Director of the Imperial Institute, British Cotton Cultivation, Reports on the Quality of Cotton Growing in British Possessions, May 1908.
[385] "A Brief Review of the Cotton Situation", *African Sugar and Cotton Planter* 1, no. 5 (Feb/March 1925): 7-8.

Everything changed in 1925. Production levels dipped sharply throughout Zululand. Outputs were temporarily sustained by expanding acreage in 1926 and 1927, but yields plummeted; they fell by more than half in almost every part of the province.[386] Many farmers replanted in 1926 and 1927, but losses continued to escalate. By 1933 Zululand cotton production was reduced to a trickle [Figure 5.1].

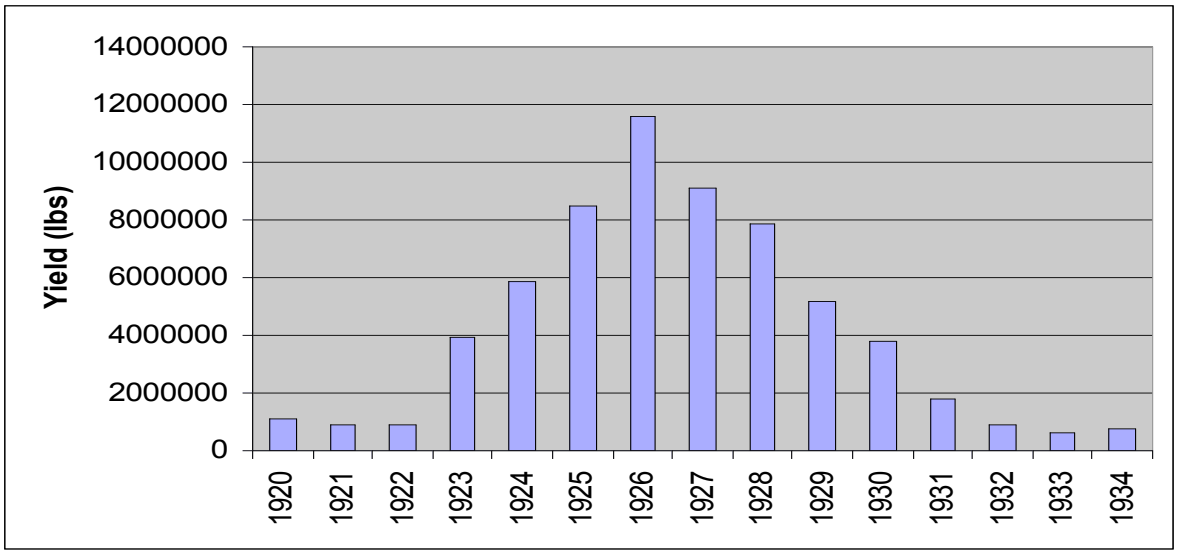

Figure 5.1: Cotton production in Natal and Zululand, 1920-1934. Source: *Yearbook of the Union of South Africa* 17 (1935): page unknown.

The most common explanations for cotton's collapse included labour shortages, inadequate transport, and unfavourable international markets. Certainly each contributed to the debacle; each was an evident, proximate cause of decline. But emphasizing the potency of these factors allowed officials and farmers to avoid the fundamental cause of their difficulties: erratic precipitation (that produced floods and droughts), and the corresponding spikes in insect damage. Denying the incompatibility of their hopes for cotton production and the ecological realities of the territory allowed officials and farmers to portray the crash

[386] *Zululand Times*, 10 September 1925.

as a temporary decline that did not threaten Zululand's long-term prospects as a cotton producer. This chapter contends that ecological obstacles to production were the ultimate cause behind the collapse of the Zululand cotton boom.

Candover Estates

Two of Zululand's most successful cotton ventures exemplify the pattern of boom and bust that characterized production during these years. The first was Zululand's largest private cotton enterprise, Candover Estates, located just west of the uPhongola River near Magut. The idea of establishing cotton production in the far north of Zululand was the vision of Richard Rouillard, a veteran speculator and entrepreneur. Rouillard's varied background had taken him from a successful venture as part-owner of a Mauritian sugar estate, through a decade in the gold mines of the Witwatersrand, to a brief stint overseeing mines east of the uPhongola River, and then another decade managing nearby coalfields. Rouillard prided himself on his reputation as a visionary and trailblazer, capable of finding success at whatever venture caught his eye. He has been described as an: "entrepreneurial visionary… politician…[and] campaigning general".[387]

In 1918 Rouillard began purchasing a number of unoccupied farms in the far north of Zululand [Illustration 5.1]. He assembled over 36 000 acres located in the lowveld west of the uBombo Mountains, between the uPhongola and uMkuze Rivers, and amalgamated them into Candover Cotton Estates.[388] Like Sawer and Scherffius, Rouillard was convinced that the new national scientific apparatus could triumph over the obstacles that had hampered

[387] David Lincoln, "Settlement and Servitude in Zululand, 1918-1948," *The International Journal of African Historical Studies* 28 (1995): 49-67, p. 62.
[388] Rouillard assembled start-up capital from friends in Mauritius and £100 000 raised in London. He ended with initial capital in excess of £400 000.

previous attempts at cotton cultivation, especially a "lack of knowledge as regards suitable climate… [and] the right variety of seed".[389] He praised the high fertility of the soils in Zululand, the dry conditions during the reaping season, the large yields per acre, the ample labour supply and the absence of bollworm. His decades spent in Zululand had convinced him that the area's low rainfall (approximately 18 inches per season) would be insufficient for any crop other than cotton.

[389] KC, R. A. Rouillard, The Growth of the Cotton Industry, In: A Century of Progress in Natal, 1824-1924. Issued by the *Natal Witness*.

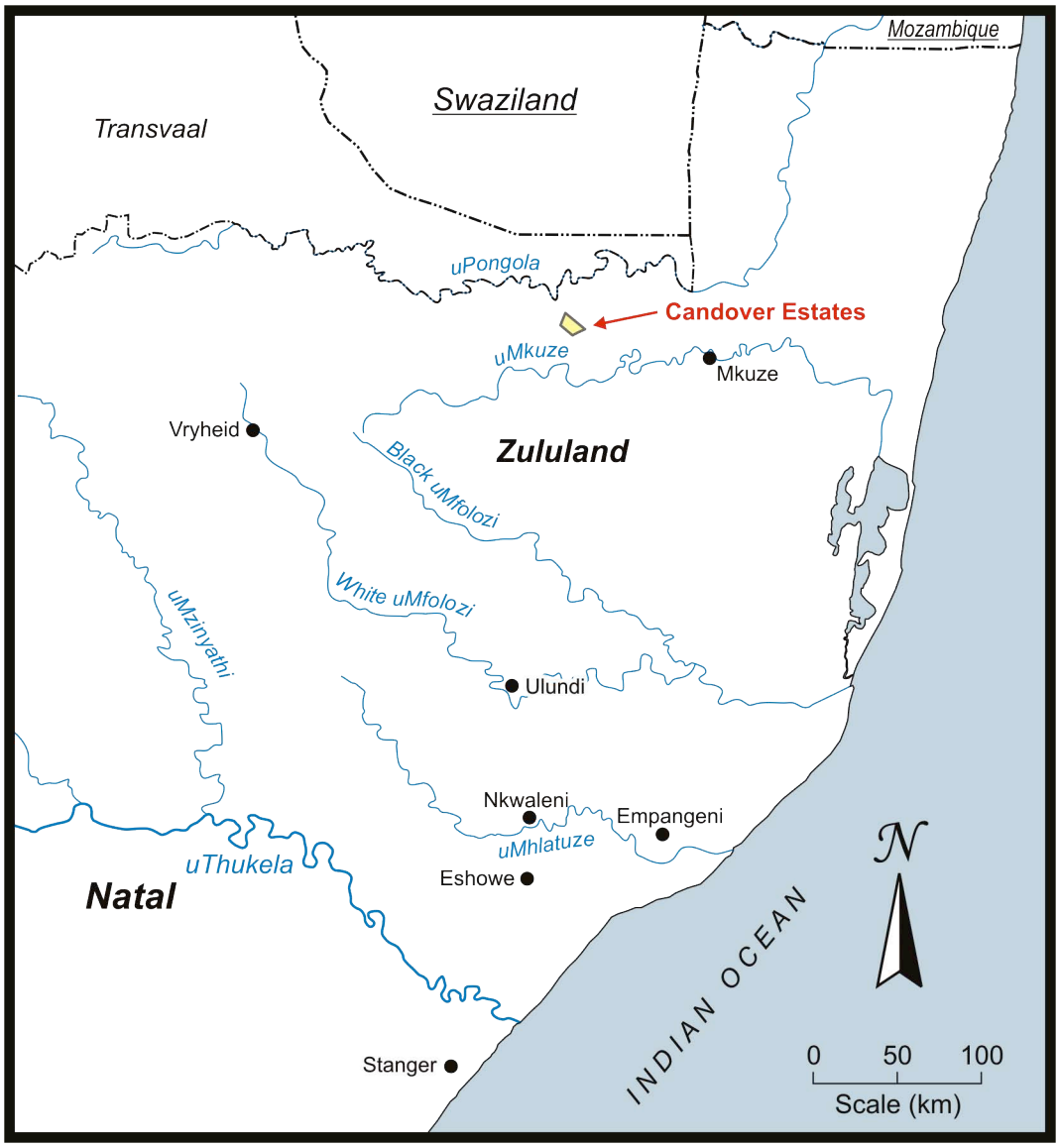

Illustration 5.1: Candover Estates. Source: NA, LDE-N Vol. 586 Ref: 7104/9, Candover: Cotton Ginnery, South African Railways, Proposed Railway: Mtubatuba to Pongola River.

Two major obstacles to production at Candover were transport and labour. Vryheid, the nearest market, was seventy miles, but two days, distant through steep and mountainous country. Most of the Africans who lived on neighbouring Reserves were either content to remain where they were,[390] or already engaged in seasonal migration to the Witwatersrand

[390] The Reserves of coastal Zululand offered their inhabitants relatively prosperous means of subsistence, making them reluctant employees. See David Lincoln, "Plantation Agriculture, Mozambican Workers and

gold mines. Rouillard realized that success in such a remote part of Zululand would require grand plans, and he sought to bring over 40 000 acres under cotton in order to reap economies of scale in both transportation and labour costs.

By 1923 Rouillard had achieved profitably high production levels. Production costs of Candover lint for the 1923/24 growing season amounted to 8d per lb. These included growing, reaping, ginning, transport, freight, and sale in Liverpool, and together they amounted to approximately half the price Rouillard received from English buyers. With yields averaging 300 lbs per acre, this translated into a gross revenues of £15, and net profits of £7 10s. per acre. This, claimed Rouillard, was almost three times greater than the returns secured by the average American producer.[391]

Within a few seasons Candover produced the largest cotton crop ever harvested south of the Zambezi River.[392] In the 1922/23 growing season more than 3 500 bales of cotton, valued at over £40 000, were harvested there.[393] Good rains fell in spring 1923 (7 inches in October and 9 inches in November), which convinced Rouillard to put another 3 000 acres under cotton.[394] Output almost doubled. The following year, the planted area was doubled again, to 16 000 acres, and revenues exceeded £100 000.[395] A visiting journalist surveying Candover's fields remarked that there was "cotton as far as the eye could see".[396] Rouillard

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Employers' Rivalry in Zululand, 1918-1948," in *White Farms, Black Labour: The State and Agrarian Change in southern Africa, 1910-1950*, ed. Alan Jeeves and Jonathan Crush (Pietermaritzburg, 1997), 137-147.

[391] See R. A. Rouillard, "The Development of Northern Natal and Zululand in Relation to Irrigation Farming, Cotton Growing, Coal Mining and the Development of Sodwana Harbour," *South African Geographical Journal* (1925): 21-38.

[392] *Sun and Agricultural Journal of South Africa* (May 1923). In: W. A. Lee, "A Study in Tenacity: The Memoirs of R.A. Rouillard" (B.A. (Hon), University of Natal, 1989), 28.

[393] *Zululand Times*, 21 June 1923.

[394] *Zululand Times*, 10 January 1924.

[395] "Candover Estates", *African Sugar and Cotton Planter* 1, no. 5 (Feb/March 1925): 29/30.

[396] "A Visit to the Candover Estates", *The South African Cotton Growers' Journal* (November 1925): 11.

predicted over 33 000 acres would be under cotton in 1925 yielding revenues in excess of £300 000.

But Candover's fortunes crashed abruptly in 1925. Increases in acreage were offset by a drastic decline in yields, from a high of 300 lbs per acre in 1922/23 to less than 80 lbs per acre in 1924/25. In 1926/27, 10 400 acres were seeded with cotton, but yields declined to 48 lbs per acre.[397]

Candover's diminishing yields spelled declining profitability. Costs ballooned to £16 per lb in 1925/26 and £22 per lb in 1926/27. In 1927 the meager cotton crop was not even picked, as it was "too poor to warrant the expense".[398] The once majestic cotton fields were completely overrun with weeds. The operation's debt reached a staggering £275 000.[399] Only three years after attaining record heights, cotton production at Candover had collapsed. Assets were liquidated: in 1930 all 76 000 acres of land were taken over by the Department of Agriculture.

Ntambanana Soldier-Settlement

Ntambanana was one in a series of settlements carved out of Crown Land set aside for white settlement under the Land Act 1912.[400] Unlike Candover, the epitome of private entrepreneurship, Ntambanana's rise was rooted in state-sponsored communalism. The urgency that had driven framers of the Land Act to engross tribal lands intensified with the

[397] NA, Department of Commerce and Industries (RHN) Vol. 1127 Ref 111/5/2, Board of Trade and Industries, Report on Costs of Production of Cotton in the Union of South Africa, 20 April 1928.
[398] *Zululand Times*, 3 November 1927.
[399] NLSA (National Library of South Africa), Select Committee on Irrigation Matters, Testimony of James Sommerville, Secretary for Lands, 4 May 1932.
[400] For a published account of some aspects of the history of the ill-fated Ntambanana settlers, see Shirley Brooks, "'Ropes of Sand': Soldier-Settlers and Nagana in Zululand," in *White Farms, Black Labor: The State and Agrarian Change in Southern Africa, 1910-1950* ed. Alan Jeeves and Jonathan Crush (Portsmouth, 1997), 243-264.

return of soldiers following World War I. New settlements were established to reward military men for their service overseas. [401] Leaseholds were given for five years, and additional funds were often provided by the Land Bank for the purchase of inputs and implements.[402] Ultimate responsibility for the soldier-settlers lay with the Ministry of Lands, but it was left to Regional Land Boards to recommend both prospective settlements and suitable applicants. Ntambanana, established in 1913, was the first of soldier settlement in Zululand. Soon after came Hluhluwe, Mkuze, Nkwaleni, and Magudu, all of which got caught up in the cotton boom.[403]

Surveys of the Ntambanana Valley Lands by the Natal Land Board began in August 1913.[404] Over 20 000 acres were assessed initially, about six to ten miles northwest of Empangeni, between the uMhlatuze River to the south and the uMfolozi Game Reserve to the north [Illustration 5.2].[405] The land was located at an altitude of about one thousand feet, with rainfall averaging between 26 and 30 inches a year.[406] Most of the land was covered by grass and thorny Acacia trees growing in shallow soils (estimated at 4 to 6 inches deep),

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[401] Soldier-settlements were established in most Commonwealth countries following the First World War. For a comparative study see J.M. Powell, "Debt of Honour: Soldier Settlement in the Dominions, 1915-1940," *Journal of Australian Studies* (1981): 64-87, and Graeme Wynn, "Foreword: Soldiers' Fields," in *Creating a Modern Countryside: Liberalism and Land Resettlement in British Columbia*, ed. James Murton (Vancouver, 2007). For details on soldier-settlements in Australia see Marilyn Lake, *The Limits of Hope: Soldier-Settlement in Victoria, 1915-1938* (Melbourne, 1987); for New Zealand Michael Roche, "Empire, Duty, and Land: Soldier Settlement in New Zealand 1915-1924," in *(Dis)placing Empire: Renegotiating British Colonial Geographies*, ed. Lindsay J. Proudfoot and Michael Roche (Aldershot, England and Burlington VT, 2005), 135-155; for Kenya C. J. Duder, "The Soldier Settlement Scheme of 1919 in Kenya" (Ph.D., University of Aberdeen, 1978); for Canada James Murton, *Creating a Modern Countryside: Liberalism and Land Resettlement in British Columbia* (Vancouver, 2007).

[402] Lincoln, "Settlement and Servitude in Zululand, 1918-1948," 52.

[403] By the end of 1918, approximately 531 soldiers had been settled on 860 000 acres across South Africa. Kent Fedorowich, *Unfit for Heroes: reconstruction and Soldier Settlement in the Empire Between the Wars* (Manchester, 1995), 126.

[404] Lands were surveyed initially for general settlement and later turned into soldier-settlement schemes.

[405] Most of the coastal lands suitable for sugar were already occupied by white settlers in 1912. Crown lands designated as soldier-settlements were clustered more inland. They were deemed some of the finest lands for stock raising and other agricultural pursuits.

[406] NA, Department of Lands (LDE-N) Vol. 5 Ref 3/2/1, Land Board Report, September 1913. See also "Cotton Growing in Zululand", *Journal of the Department of Agriculture* V (1922): 370.

underlain by blue shale. The initial Land Board Report expressed concern about the lack of water, particularly in the western and northern sections where conditions were warmer and the soils were especially shallow; it was expected that wells would have to be dug.[407] In fact, the surveyors noted that the water situation improved as they moved eastwards out of the proposed settlement area into the neighbouring Reserve: "the land was much better and the water supply far more plentiful within the Reserves than is the case with the lands thrown open for settlement by Europeans," they wrote. Still, the survey party was confident that settlement would succeed: "although portions of the land inspected are not too good, as a whole the land is well adapted for settlement by Europeans".[408]

[407] NA, LDE-N Ntambanana Valley Lands (NVL) Vol. 3 Ref 3/2, Inspector of Lands to Secretary of Land Board, 31 May 1918.
[408] NA, LDE-N NVL Vol.1 Ref 3/2, Report upon the Inspection of Lands Lying in and the North of the Ntambanana Valley, Division of Lower Umfolozi, Zululand, 30 September 1913.

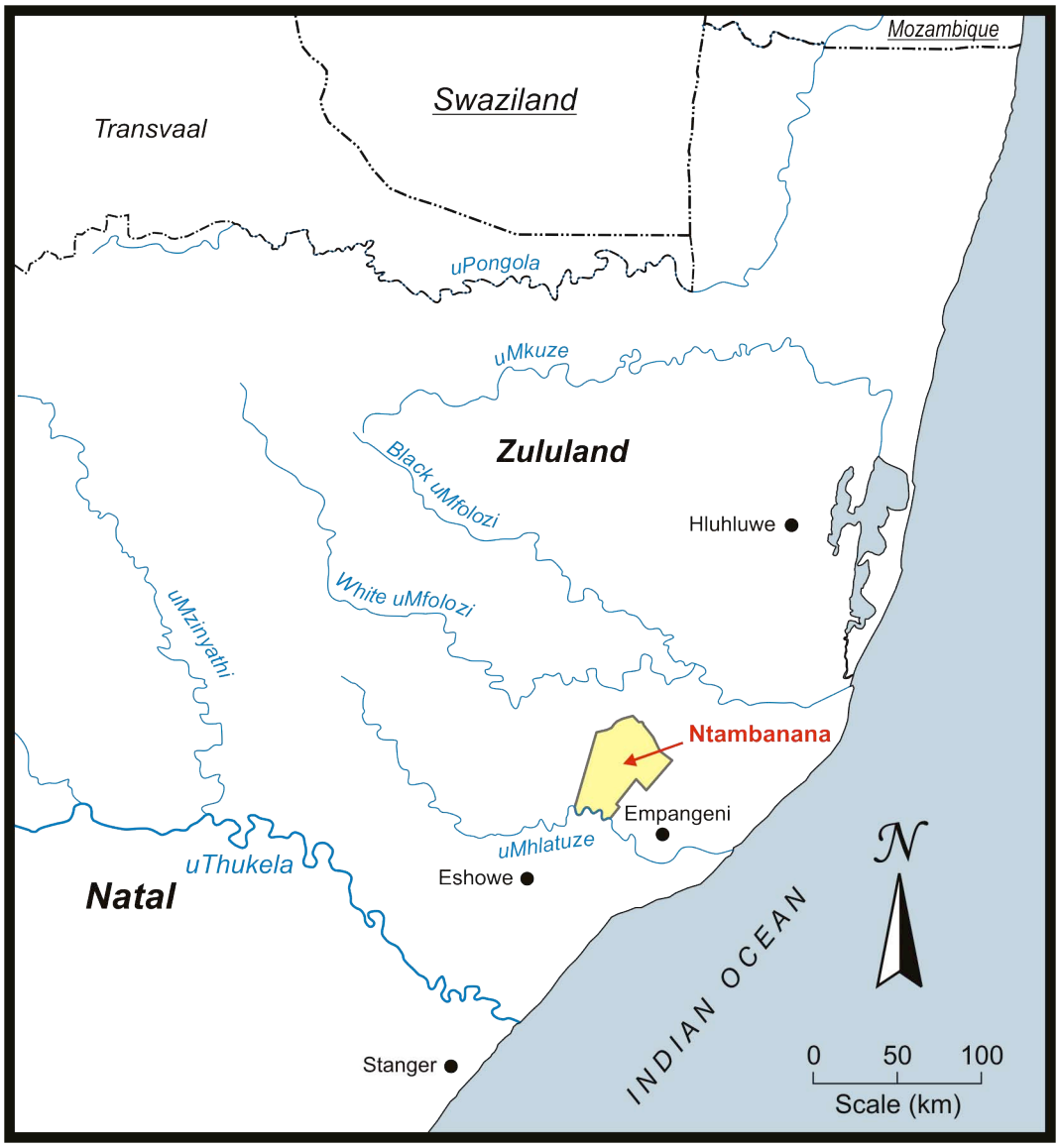

Illustration 5.2: Ntambanana Soldier-Settlement. Adapted from: Shirley Brooks, "Changing Nature: A Critical Historical Geography of the Umfolozi and Hluhluwe Game Reserves, 1887-1947." (Queen's University, 2001): 348.

The allocation of allotments took longer than expected. It was delayed for some years by concerns in the Department of Native Affairs about the implications of white settlement for the two nearby African Reserves.[409] By 1917, however, the Land Board had prevailed and over 80 000 acres were designated for white settlement. Officials were

[409] See for instance NA, LDE-N NVL Vol. 1 Ref 3/2, Ntambanana Valley Secretary for Native Affairs to Secretary for Lands, 24 September 1914.

overwhelmed by over three hundred interested applicants. Sixty-two properties were surveyed and allocated in June 1919, all but one to returning soldiers.[410] Plots averaged between 1 000 and 1 500 acres. These settlers occupied their plots in time for the 1919/1920 growing season, and most focused on mixed farming and grazing with small plots devoted to sugar cane.

The promise offered by cattle rearing and sugar were dulled after only a couple of growing seasons. The risks of nagana, the dreaded cattle sickness spread by tsetse fly, had not been adequately communicated to the new settlers.[411] The disease appeared early in 1920, devastating cattle stocks. One estimate placed stock losses at just over eight hundred in this first growing season. Over 75% of all cattle died between 1920 and 1922.[412] Compounding this loss was the failure of all sugar planted, due to a lack of rain. This initial devastation was a tremendous blow to the settlers' optimism. Public sentiment was overwhelmingly in favour of compensating the soldiers for their hardship.[413] The Commissioner for Returned Soldiers argued vehemently that the returned soldiers should be

[410] NA, LDE-N NVL Vol. 2 Ref 3/2/1, Ntambanana Valley Lands, Secretary for Lands to Secretary, League of Returned Soldiers and Sailors, 9 June 1919. Prices were determined on a sliding scale based on what surveyors determined to be the most significant limitation to cultivation, a lack of water. Farms in the water-rich south and south-east were sold at 17s 6d an acre. Prices decreased for farms further north and west, most sold at 15s 6d an acre, while those furthest north-west were sold at 12s 6d an acre. See NA, LDE-N NVL Vol. 2 Ref 3/2/1, Secretary of Lands to Secretary, Ntambanana Valley Farmer's Association, 14 July 1925.

[411] This shocking omission seems to have been selectively withheld from the national Ministries. There is significant evidence that local magistrates had communicated to the Land Boards the risks that nagana posed to any settlement, but that these warnings had been swept aside in the rush to open the land for settlement. See for instance, NA, LDE-N NVL Vol. 2 Ref: 3/2/1, Ntambanana Valley Lands, Magistrate, Lower Umfolozi to Chief Surveyor, 13 July 1919. See also Shirley Brooks, "Changing Nature: A Critical Historical Geography of the Umfolozi and Hluhluwe Game Reserves, 1887-1947" (PhD, Queen's University, 2001).

[412] NA, LDE-N NVL Vol. 3 Ref 3/2, Ntambanana Farmers' Association to Land Board, n.d.

[413] See for instance editorials in the *Zululand Times* sympathizing with the plight of these settlers: 11 June 1920, 9 July 1920 and 4 September 1920.

provided with mechanical ploughs and motor transport to facilitate growing in coming seasons, and that the soldiers should be excused all rent owed.[414]

Despite their setbacks the Ntambanana settlers persevered. The dry conditions that prevailed during these first few growing seasons convinced most of them that only drought-resistant cotton could succeed.[415] Almost all farmers put between fifty to fifty-five acres under cotton the following growing season. By 1923 over one thousand acres were planted with cotton.[416] At picking time, the *Zululand Times* proclaimed that cotton and Ntambanana were now "synonymous", with yields exceeding those reported from all over the country.[417] The acreage under cotton doubled in the following season, elevating Ntambanana's status to the premier cotton growing centre in Zululand.[418] Estimates suggested that Ntambanana's 1924/25 crop would exceed the total production of Natal during the previous growing season.[419]

But then, in 1925, prospects for cotton at Ntambanana crashed as precipitately as did those at Candover. The losses sustained at Ntambanana over the next few years were staggering. Average yields dropped from 410 lbs per acre in 1923/24 to under 257 lbs per acre in 1927/28.[420] Stock and crop losses amounted to over £38 000 annually.[421] More than

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[414] NA, LDE-N NVLVol. 2 Ref: 3/2/1, Ntambanana Valley Lands, Commissioner for Returned Soldiers to Secretary for Lands, 17 September 1920. See also Ibid., Ntambanana Report, author unknown, 6 October 1920.
[415] NA, LDE-N NVL Vol. 2 Ref: 3/2/1, Ntambanana Report, 6 December 1920.
[416] G.F. Keatinge, "Cotton Growing in South Africa", *Report to the Empire Cotton Growing Corporation on a Tour Undertaken in South Africa*, November 1922 to March 1923 (1923).
[417] *Zululand Times*, 5 April 1923.
[418] *Zululand Times*, 31 April 1924.
[419] "Prosperity on the Ntambanana Cotton Fields", *African Sugar and Cotton Planter* 1 no. 5, (Feb/March 1925): 15.
[420] Ntambanana Agricultural Cooperative Society, Annual Meeting, *Zululand Times*, 11 October 1928. These declining yields at Ntambanana exemplified the trend experienced at the other cotton soldier-settlements scattered throughout Zululand. At Nkwaleni, for instance, yields dropped from 150 lbs per acre in 1925/26 to 121 lbs per acre the following season, while the cost per lb of lint more than tripled. See NA, RHN Vol. 1127 Ref: 111/5/2, Board of Trade and Industries: Report on Costs of Production of Cotton in the Union of SA, 20 April 1928.
[421] NA, LDE-N NVL Vol. 4 Ref 3/2, Ntambanana Lands, Extract from *The Farmer,* n.d.

half of all the Ntambanana plots were abandoned by 1930.[422] Nearly every settler declared bankruptcy, confirming the assertion in the *Natal Mercury* that: "cotton farmers at Ntambanana are faced with ruin".[423] Those who remained reverted to planting cane during the 1930/31 growing season, despite warnings from government officials. Frost destroyed between 20 and 60% of the total crop, estimated to be between 2 000 and 4 000 tons. This proved to be the settlement's final gasp. In 1933 the Union flag that had flown above Ntambanana since its inception in reflection of its origins as a soldier settlement was pulled down and the place was abandoned.[424]

Accounting for the Collapse

The failures at Candover and Ntambanana were both devastating and emblematic of those experienced more widely throughout Zululand. Almost all cotton-growers experienced losses during the 1924/25 growing season. Initial estimates placed these at only 30%, but they eventually spiraled to more than 80% across Natal and Zululand. The following two growing seasons proved little better. Most farmers replanted, but with little success: debts mounted as yields declined. By 1933 nearly every farmer had abandoned cultivation. The suffering experienced by the region's cotton farmers was depicted in biblical terms: according to an editorial published in the *Zululand Times*, "the ten historical plagues of

[422] Other soldier-settlements across the Commonwealth folded due to a similar combination of poor planning, lack of capital, and adverse environmental conditions. See for instance: J.M. Powell, "The Debt of Honour: Soldier Settlement in the Dominions, 1915-1940"; Monica Keneley, "Land of Hope: Soldier Settlement in the Western District of Victoria 1918-1930," Electronic Journal of Australian and New Zealand History November (2000): 1-10.
[423] *Natal Mercury*, 4 September 1931.
[424] NA, LDE-N NVL Vol. 5 Ref 3/2/1, Dismal Story to Minister, *Natal Mercury*, 31 August 1933. The President of the Ntambanana's Cotton Growers' Association painfully acknowledged: "we are beaten".

Egypt pale in significance before the chapter of afflictions this district has been called upon to suffer".[425]

Explanations for this devastating collapse were plentiful. Cotton farmers commonly blamed the downturn on the inadequacies of African labour. The Zululand cotton industry was crucially predicated on the sustained availability of a low-wage seasonal labour force. However, Africans living in nearby Reserves were routinely enticed by higher wages and better working conditions offered by the gold mines at the Witswatersrand.[426] Although Rouillard soon accepted the need to attract transitory migrant workers through networks that extended into the Transkei, Swaziland, and Mozambique, Zululand cotton growers fretted constantly about the intermittent stream of labour to their fields. They became increasingly vocal in their opposition to recruitment firms enticing labourers from the Zululand Reserves into the gold mines, suggesting that such labour should rightfully be theirs.[427]

Desertion was another problem. Growers claimed that labour accounted for more than 85% of their costs during the height of the cotton boom, due primarily to the high proportion of worker abandonment.[428] Many of these cotton growers were relying heavily on recruitment from outside Zululand – primarily Mozambique – at significant cost. Both cotton and sugar growers complained that they lost over 50% of their recruited labour to

[425] *Zululand Times*, 15 March 1928.
[426] Africans testifying before the Native Farm Labour Commission in October 1937 were nearly unanimous in stating that they opted for work in the gold mines because of higher wages and superior work regiments. Lincoln, "Settlement and Servitude in Zululand, 1918-1948". Jeeves estimates that during the 1920s wages at the gold mines were more than double those available in Zululand agriculture. Alan Jeeves, "Sugar and Gold in the Making of the South African Labour System: The Crisis of Supply of the Zululand Sugar Estates," *The South African Journal of Economic History* 7 (1992): 7-33.
[427] "Labour for Picking", *South African Cotton Growers' Journal*, (February 1925): 5; "Native Growing and Labour", *South African Cotton Growers' Journal*, (June 1925): 3; "Labour for the Cotton Industry", *South African Cotton Growers' Journal*, (November 1925): 25; "Meeting of the Pongola Growers' Association", *South African Cotton Growers' Journal,* (January 1926): 11.
[428] *Zululand Times*, 11 November 1926.

desertion.[429] As the President of the Hluhluwe Farmer's Association observed wryly: "the cheap labour is expensive when three-quarters run away".[430] Growers lobbied for heavier fines to curtail this practice.[431]

Many expressed dissatisfaction with the national government's inability, or seeming unwillingness, to secure a reliable Native labour force for the cotton fields.[432] Some growers demanded that the recently enacted Pass Laws be strengthened,[433] to further constrain African movement and force a greater proportion of the local population into the local labour force.[434] Others favoured the establishment of a central recruiting agency modeled on the Native Recruiting Corporation of the Witwatersrand which had been so successful in securing labour for the gold mines.[435] Still others suggested importing Africans en masse from neighbouring Mozambique, or the wholesale recruitment of child-labourers.

Labour concerns were paramount at Candover. Historian David Lincoln has shown that, despite being situated at the confluence of the major migrant labour routes bringing Tsonga workers (in the main) south from Mozambique, and although it was surrounded by Native Reserves, Candover suffered labour shortages from its inception.[436] Richard Rouillard shifted his focus towards importing labour from further afield, however he failed in

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[429] A de V Minaar, "Labour Supply Problems of the Zululand Sugar Planters, 1905-1939," *Journal of Natal and Zulu History* 12 (1989): 53-72.
[430] *Zululand Times*, 6 June 1926.
[431] *Zululand Times*, 19 Feburary 1925.
[432] See for instance editorials in the *Zululand Times,* 19 February 1925, 23 July 1925, 6 August 1925, and 18 February 1926.
[433] The 1923 Native Urban Areas Act sought to control African movement outside of the Reserves by forcing every African to carry a pass. Anyone caught without a pas was arrested and transported back to the Reserves.
[434] Heaton Nicholls, the MP for Zululand, favoured this solution. See *Zululand Times,* 2 July 1925 and 28 February 1929.
[435] "Meeting of the Pongola Growers' Association", *South African Cotton Growers' Journal* (January 1926): 11.
[436] Migrant workers moved freely between the Mozambique and Zululand borders in the 1920s. The Transvaal-Mozambique Agreement of 1909 had sought to restrict the employment of Mozambicans within the gold mines, making all Mozambicans within South Africa prohibited immigrants. This allowed Zululand employers to pay these workers lower wages than those offered to South African labourers. See Lincoln, "Plantation Agriculture, Mozambican Workers and Employers' Rivalry in Zululand, 1918-1948," and Jeeves, "Sugar and Gold in the Making of the South African Labour System: The Crisis of Supply of the Zululand Sugar Estates".

his bid to negotiate a deal with the Native Affairs Commissioner to bring families from the Transkei to work on the cotton fields. This forced Candover to compete directly with better-coordinated and better-funded recruiters from the gold mines and the sugar estates.[437] Healthy males enticed by the superior wages of the mines were recruited there, while the best of the workers too young or too unhealthy for the mines were recruited to the sugar estates. This meant that only "leftovers" – mainly young children – were readily available for cotton farms. Candover won special permission to recruit them in 1925.[438]

For all that, there is evidence that Rouillard had sufficient labour available during the period of Candover's decline. When it was at its worst – 1924-1927 – Rouillard laid off both white and black labour. The number of white men employed as managers was cut from 64 in the 1925 picking season to 50 in 1926 to 37 in 1927. African labour underwent a more precipitous decline: from 1950 in 1925, to 1133 in 1926, and 837 in 1927.[439] These figures suggest that Rouillard exaggerated the impact of labour shortages on Candover's operations.

Explanations for the collapse at Ntambanana focused less on issues of labour; records suggest that farmers' needs were easily met by labourers from the surrounding Reserves. Instead, Ntambanana farmers attributed their collapse to the national government, accusing them of providing inadequate land, misguided planning, and insufficient transportation for successful cotton cultivation.

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[437] Lincoln, "Settlement and Servitude in Zululand, 1918-1948," 60/61. Lincoln suggests this intermittent supply of labour forced Candover to rely on a "cosmopolitan" work force that included workers from Natal, Zululand, Mozambique, Basutoland, Transkei, Transvaal and Swaziland.

[438] Lincoln, "Plantation Agriculture, Mozambican Workers and Employers' Rivalry in Zululand, 1918-1948, " 141. In "Settlement and Servitude in Zululand, 1918-1948," 64, Lincoln offers a vivid portrayal of the wretched conditions these cotton workers faced: limited diet rations that led to widespread scurvy, high death rates due to malaria, and hospitalization facilities that consisted only of a wood and iron building with a cement floor and no beds.

[439] William Himbury, *The Union of South Africa as a Source for Increasing our Cotton Supplies* (Manchester, 1929), 37.

The farmers' complaints were championed by the Member of Parliament for Zululand, George Heaton Nicholls. Nicholls, himself a wealthy sugar farmer, had become convinced of cotton's potential as a driving force for Zululand settlement during a visit with then Prime Minister Jan Smuts in 1922. Nicholls was committed to helping hard-working Zululand farmers and lobbied tirelessly for compensation and rehabilitation that would allow these men to remain on the land.[440] Nicholls blamed the disaster that befell Ntambanana and other soldier-settlements on poor planning by James Hertzog's new National Party government; he reserved his harshest criticism for the Minister of Lands, P.G.W. (Piet) Grobler.[441] He was particularly exercised about the lack of coordination between the four departments responsible for land settlement: Agriculture, Irrigation, Labour and Land. He accused officials of deliberately propagating misinformation, and indicted the government publication *Farming Opportunities in South Africa* (1922) for suggesting returns from Zululand cotton approximated £2 000 per acre, and could exceed £350 per acre even in bad years. These were, indeed, absurdly inflated estimates. Nicholls provided a heart-wrenching account of veterans who sacrificed their savings for Ntambanana land, only to be wiped out.[442] In the end, settlement schemes only exacerbated the poor white problem they were supposed to alleviate, as more than 12 000 settlers were left heavily indebted to the government.

The settlers were adamant that they deserved compensation for their losses, complaining that more was owed them after their service to the Commonwealth. They

[440] Nicholls had a particular empathy for the settlers as he had himself been a sugar pioneer in Zululand before entering politics. See George Heaton Nicholls, *South Africa in my Time* (London, 1961).
[441] The accounts of Nicholls' impassioned pleas to Parliament on behalf of the solider-settlers are found in *Zululand Times*, 17 March 1927. It is important to note the partisan nature of this issue: Nicholls was a member of Smuts' South African Party that was ousted as the Government by a coalition headed by James Hertzog's predominantly Afrikaner National Party in the general election of 1924. The tensions that existed between Nicholls and Grobler were rooted largely in their political opposition.
[442] *Zululand Times*, 17 March 1927.

accused the state of overvaluing the land offered to them: only 50 000 of the 90 000 acres allotted were suitable for stock, due to the prevalence of nagana. Settlers demanded acknowledgement of the mistakes made in allotting them unsuitable land at inflated prices: Their solution:

> Cut out the bad land. Provide fencing and clearing on the re-adjusted boundaries. Control all traffic emerging from fly areas. Systematically sterilize all stock in the settlements. And finally, make some provision whereby the state contributes something towards the cost of the disastrous experiment which has resulted in every settler who took part – walking out a ruined man, or with this prospect in the near future.[443]

The official request from the Ntambanana Farmers' Association to the Minister of Lands articulated their proposal as a three-fold solution: the government should take over the whole settlement, initiate a re-evaluation of the farms with the objective of refunding monies paid, and then provide settlers with preference in the allotment of additional land, preferably further north in Nkwaleni where the land seemed comparably free from pests and nagana.[444] Lobbying on their behalf, Nicholls implored the Minister to absolve these men of their debts.[445]

The National Party coalition government bristled at these requests for intervention. Responding to Nicholls, Grobler seemed indifferent to the settlers' complaints, and categorically refused them compensation or relocation to other more promising allotments. He portrayed the Ntambanana settlers as whiners and complainers, reminding them:

> There are other areas in the Union which are also infected with cattle diseases, and the Government had not at any time considered the question of paying compensation

[443] NA, LDE-N NVL Vol. 4 Ref 3/2, Ntambanana Lands, Mr. F.T. Brighton, Statement from the Settler's Point of View of the Nagana Problem as Affecting the Ntambanana Settlement, Submitted to the Nagana Conference at Pretoria, 24 September 1931.
[444] NA, LDE-N NVL Vol. 4 Ref 3/2, Ntambanana Lands, Ntambanana Farmers' Association to Minister of Lands, 16 August 1933.
[445] Nicholls' recommended a more sustained government commitment to Zululand cotton cultivation. He extolled the virtues of the Sudanese Gezira Scheme, in which the government entered into a contract with a private company to create 300 000 acres of irrigated cotton lands. He argued that this was the type of scheme that could enjoy success in Zululand. See *Zululand Times*, 11 June 1931.

> to settlers or to private farmers…the Ntambanana settlers believe that they alone of the farmers of the Union are suffering from the effects of cattle disease, failure of crops, and poor farming conditions generally.[446]

Despite recommendations from a group of visiting cotton experts who suggested special loans to help offset labour and living expenses, the only commitment the government made to the settlers at Ntambanana was an advance from the Land Bank to cover the cost of tractors.[447] This proposal was regarded with scorn by many in the province, who bemoaned the inaction of the "unsympathetic government" in hastening Ntambanana's decline.[448]

Inadequate transportion was another problem. When Ntambanana was established in 1919, settlers were promised a reliable and efficient means of transportation – a regular lorry service.[449] But this single transport link was not enough to ensure efficient and economic travel between the producers at Ntambanana and their market at Empangeni. Due to a financial dispute between the Department of Lands and the provincial administration over the maintenance costs for the newly paved twenty-mile road, the road quickly fell into disrepair and the settlement lost its only public transport link with its market.

Unreliable transport was a major obstacle throughout Zululand. Wagons were the only means of bringing cotton from the disparate soldier-settlements to the railway terminus at Empangeni. According to the *Natal Sugar and Cotton Planter* there were 30 000 to 40 000 acres suitable for cotton in Hluhluwe, over 50 000 acres near the Pongola River, and

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[446] NA, LDE-N NVL Vol. 4. Ref 3/2, Ntambanana Lands, Mr. Grobler, Minister of Lands, to Heaton Nicholls, 16 March 1931.

[447] For the report by these cotton experts see NA, LDE-N NVL Vol. 2 Ref 3/2/1, Report by Cotton Experts (Beaumont, Scherffius, Milligan, White) on a Visit to Ntambanana, 7 July 1924. The decision to advance funds towards the purchase of the tractors is found in NA, LDE-N NVL Vol. 4 Ref 3/2, Ntambanana Lands, Managing Director, Land Bank to Secretary for Lands, Pretoria, 17 December 1927.

[448] "Ntambanana Settlements", *African Sugar and Cotton Journal* 1 no. 2, (May 1927): 27. Again, anti-government sentiment directed at the Nationalist Party on the part of these predominantly British settlers was a significant factor in fuelling this resentment.

[449] A truck and driver were to be provided courtesy of the Department of Lands. See NA, LDE-N NVL Vol.2 Ref 3/2/1, Ntambanana Valley Lands, Commissioner for Returned Soldiers to Secretary for Lands, 17 September 1920. Animal-based transportation was impossible due to the prevalence of nagana.

over a million in Swaziland that were left uncultivated due to lack of adequate transport.[450] This transportation deficit was felt most keenly by the gin at Empangeni. Built by the Zululand Cooperative Cotton Association at the end of the 1925/26 season to serve soldier-settlements at Ntambanana, Hluhluwe and Mkuze, the gin was constantly hindered by its inadequate transportation links to producers. It posted a loss in each of the eight years of its operation.[451]

Shortcomings in planning and transportation were hallmarks of many soldier-settlement schemes intiated across the British empire during this period. Historian J.M. Powell lists eight factors that hampered the success of Australian schemes, many of which – falling prices, high input costs, heavy debt burdens, improper locational decisions – were important contributors to Ntambanana's downfall. Comparing settlement schemes in Australia, New Zealand and Canada, Powell concludes that policy makers and officials deserve more of the blame for these failures than the soldiers themselves.[452] Powell's conclusions are confirmed by micro studies of soldier-settlement schemes in Victoria and Queensland, which conclude that over-optimistic evaluations of the land, shifting markets, and insufficient agricultural advice from officials stymied settler efforts.[453] The disaster that befell settlers at Ntambanana was emblematic of the poor planning and undercapitalization that characterized soldier-settlements throughout British colonies.

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[450] "The New Zululand Railway", *Natal Sugar and Cotton Planter*, (November 1924): 10. Rouillard also believed that the inadequacy of rail links was the major hindrance towards exploiting the province's northern cotton potential. See "Neglect of North Natal", *African and Sugar Planter* 1 no. 13, (November 1925): 20.

[451] The gin, and the Cooperative Association itself, were both taken over by the Department of Agriculture in 1931/32 for £10 400, the sum of the company's debt. NA, Public Works Department (PWD) Vol. 562 Ref 1304, Empangeni Agricultural Department: Purchase of Zululand Coop Cotton and Agricultural Association, Secretary of Finance to Secretary for Public Works, 26 July 1934.

[452] Powell, "Debt of Honour: Solider Settlement in the Dominions, 1915-1940", 71. See also Wynn, "Foreword: Soldiers' Fields," xviii.

[453] Keneley, "Land of Hope: Soldier Settlement in the Western District of Victoria, 1918-1930". Murray Johnson, ""Promises and Pineapples": Post-First World War Soldier Settlement at Beerburrum, Queensland, 1916-1929 " *Australian Journal of Politics & History* 51 (2005): 496-512. See also Lake, *The Limits of Hope: Soldier-Settlement in Victoria, 1915-1938*, 195-228.

The official report on the Zululand cotton disaster, prepared by the South African Board of Trade, downplayed the limitations posed by labour, planning, and transportation, to focus instead on the vagaries of the international cotton market.[454] America's cotton production never dropped off as Zululand growers had hoped it would; instead, it rebounded swiftly from the devastation wrought by boll weevil in the early 1920s. American cotton acreage increased from 38.7 million acres in 1923 to 42.6 million acres in 1924 and 46.5 million acres in 1925.[455] The US produced 15.6 million bales in 1925, only half a million bales below the highest output on record.[456] A year later the American crop was just under 18 million bales, the largest ever recorded.[457] American production alone exceeded world demand by more than 3 million bales [Figure 5.2].

[454] NA, RHN Vol. 1591 Ref 600/92, Board of Trade and Industries Report #92: The Cotton Growing Industry with a Minority Report on the Proposed Stabilization of Cotton Prices by Mr. F.J. Fahey, 1929. The Board was given a mandate to survey cotton growing conditions in South Africa and account for the massive rise and subsequent decline of cotton production in the 1920s.
[455] *Zululand Times*, 27 August 1925.
[456] "Improvement of the Cotton Crop", *African Sugar and Cotton Planter* 2, no. 1 (Jan 1926): 27.
[457] "American Cotton Crop", *African Sugar and Cotton Planter* 2, no. 12 (Dec 1926): 21.

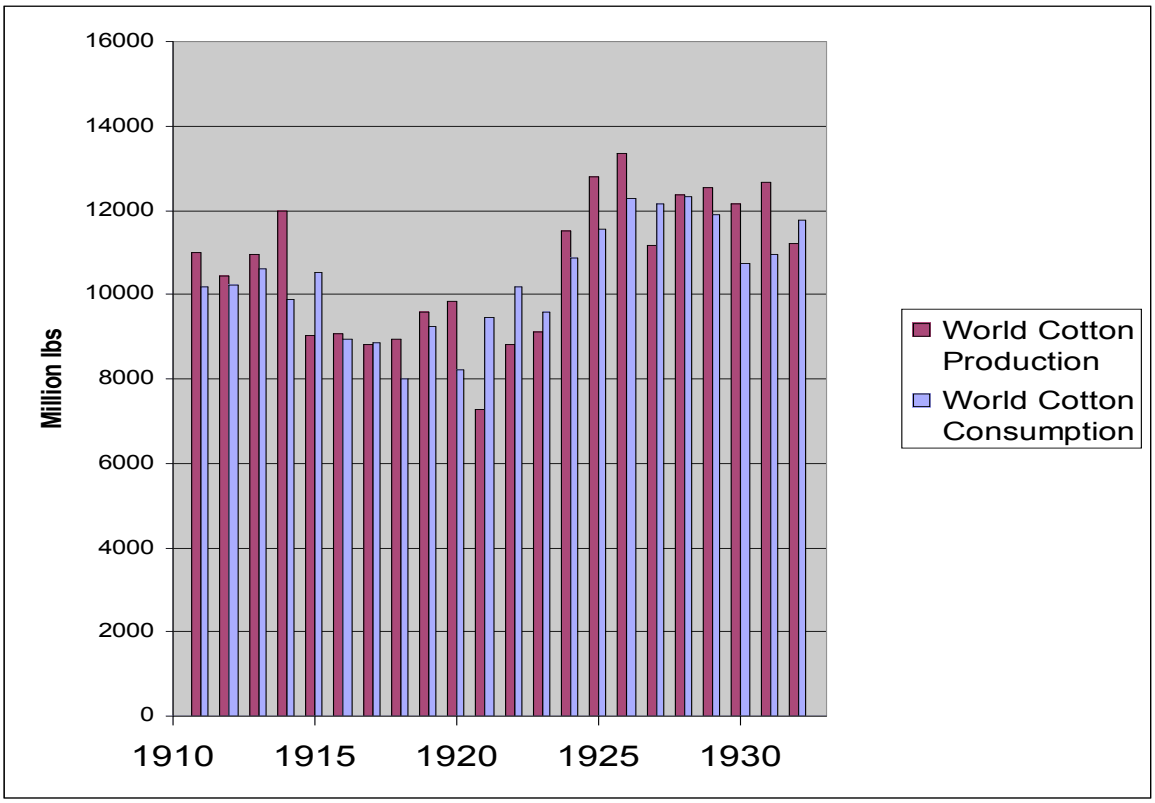

Figure 5.2: World Cotton Production and Consumption, 1911-1932. Source: R. Robson, *The Cotton Industry in Britain* (London, 1957): 354 and Appendix B.

World prices dipped sharply as a result. The price of American middling dropped from 11.8 d. per lb in 1923 to 7.5 d. per lb in 1926.[458] By 1927 prices in Zululand were down to 6d. per lb. Despite a mini-resurgence that lifted prices past 10d. per lb in 1928, they dropped soon after, falling from 9d. per lb in 1929 to 5d. in 1930 and then 3d. in 1931.[459] The government was urged to interfere in order to prevent the total collapse of the South African industry. Interested parties called for the implementation of one of two mechanisms: price stabilization, which would ensure farmers a minimum income regardless of prevailing global trends, or a cotton subsidy, in the form of individual payments to growers made according to their needs.

[458] B. R. Mitchell, *British Historical Statistics* (Cambridge, 1988), 725-726.
[459] J.A. Todd, "Twenty-Five Years of Cotton Prices," *Empire Cotton Growing Review* 15 (October 1938): 278.

The Board of Trade was reluctant to endorse either measure. Despite identifying the drop in international prices as a primary cause of the collapse, the Board recommended greater investment in scientific research (especially entomological), investment in railways, and a review of the labour recruiting system. Its most tangible recommendation called for a reinforcement of the networks by which information was disseminated from the central scientific authority to individual growers. It urged the Department of Agriculture to enter into contracts with individual growers to ensure that these connections were not compromised. Under this centralized and regimented plan, the Department would provide all contracted farmers with seed at a set price. Farmers would agree, in turn, to grow no cotton except that raised from multiplied seed of the same variety originating from the same breeding station, and to carry out all reasonable instructions disseminated from the Department. There would be periodic inspections to ensure that these regulations were adhered to. The Board of Trade reassured growers that the implementation of such measures would enable Zululand to achieve record production levels once again.

Environmental Explanations

Labour shortages, inadequate planning, and disappointing international markets all played a role in stifling Zululand production. But in the end they were less important than environmental obstacles presented by insects and uneven precipitation.

The 1924 to 1927 growing seasons were plagued by difficulties. Rains arrived early in the 1924 growing season, and fell steadily during October and November. Seed was planted soon after and successful germination was widely reported. But expectations were doused in early March. On March 10th, storms brought six inches of rain to parts of

Zululand. A relentless, heavy downpour continued for the next ten days. Precipitation records were set across Natal and Zululand: Eshowe received over 35 inches during these ten days, Stanger just less than 25 inches, Ntambanana 35 inches. Reported levels were even higher further north: Nongoma, Hluhluwe, and Ingwavuma all reported 60 inches or more.

These unprecedented rains caused devastating floods over much of the province. All the northern rivers overflowed their banks. On March 19th, the uThukela Bridge – linking Natal and Zululand – washed away, isolating Zululand settlers. Roads were impassable. All postal communication was interrupted. The local newspaper reported that Zululand was reduced to "one big mud puddle".[460]

The timing of the rains was particularly disastrous for the 1925 cotton crop. Early planting had been encouraged by early rains, so that much of the crop had already matured when the floods hit. Bolls were washed away, dirtied, stained, soiled. Barely any cotton was fit to harvest. The *Zululand Times* summed up the extent of the devastation: "At Nkwaleni, at Ntambanana, on the Hluhluwe and up in the remote parts of Mkuze…men of our race have watched their lands, sodden with water, gradually give up the bright promise of the early season and vanish in a sea of mud".[461]

According to Captain Brown, a cotton planter on the Hluhluwe soldier-settlement, the flood destroyed over five thousand acres of cotton, representing more than 75% of the settlement's crop. The financial devastation was overwhelming; only one or two planters avoided bankruptcy. Brown harvested only twelve bales (less than five percent of what he might have expected) from the hundred and more acres planted to cotton, which should have yielded more than three hundred bales. Near desperation, he wrote: "most of us are ex-

[460] *Zululand Times*, 19 March 1925.
[461] *Zululand Times*, 2 April 1925.

servicemen, and whilst we do not want to plead for charity, yet we do feel that the Government might come forward and make it possible for us to obtain loans from the Land Bank. It is the only thing that can save us now…the alternative is ruin".[462] By the end of the year, seventy settlers had abandoned the settlement.

Estimates of the flood's damage swelled as the extent of the devastation became clear. Initial losses were placed at less than 30% of the total crop, though this was soon revealed as a significant underestimate; within days, losses were said to exceed 40%.[463] The numbers continued to rise as the full extent of secondary losses became known. All roads in northern Zululand were impassable through April and May, preventing farmers from transporting the small amount of cotton that survived the floods to market. Once the territory had dried out, it became clear that almost 90% of the crop had been destroyed by the flood.[464] Final tallies provided by the Zululand Cooperative Cotton Association recorded revenues of £161 for the 1924/25 season, down from an expected £770. That puts the financial loss at just under 80%.[465] An anticipated record cotton crop had been almost completely destroyed by flood.

Despite this setback, hopes remained high for the 1925/26 season. The losses of 1924/25 were dismissed as an anomaly, the result of a fluke variability in rains that could not be repeated. Early in the 1925/26 season there was a prevailing sense that the worst had passed: "the weather has up to present been so favourable that even the most pessimistic of

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[462] "Hluhluwe Cotton Settlement," *African Sugar and Cotton Planter* 1, no. 8 (June 1925): 19. See also "Hluhluwe Cotton Settlement," *African Sugar and Cotton Planter* 1, no.9 (July 1925): 36. Some Hluhluwe planters left with debts exceeding £3 000.

[463] *Zululand Times*, 19 March 1925 and 2 April 1925.

[464] *Zululand Times*, 17 December 1925. These figures were disputed by the *African Sugar and Cotton Planter* who downplayed the extent of the devastation, calling such high figures "guess work" and "ridiculous". "Zululand Cotton Destroyed", *African Sugar and Cotton Planter* 1, no. 6 (April 1925): 17. The estimate of 90% appears most often in assessments of the flood's damage to the Zululand cotton crop.

[465] Zululand Cooperative Cotton Association, Annual Meeting, *Zululand Times*, 10 July 1926.

our agriculturalists brightened up and began to think that better days were ahead".[466] As in 1924, rains were plentiful through the planting season of 1925. But they stopped abruptly in the New Year. A heat wave began in late December 1925 and continued through the summer months. Little rain fell in the first two months of 1926 which are typically the wettest: fewer than 3 inches were recorded in most parts of the province in January; in February, Hluhluwe received only 0.8 inches.[467] When rains finally arrived in mid-March, most of Zululand received less than 3 inches, too little to allow crops to recover.[468] Farmers complained that these untimely rains were stunting the cotton crop. According to the *Zululand Times* in April 1926, "Dry weather is again becoming more serious and rain is badly needed. The weather at times looked promising but nothing came of it and conditions remain dry".[469]

Output was severely affected by the drought. The lack of rain hampered germination (successful germination requires water immediately after planting) leaving a poor, thin stand. The plants that grew matured quite well, revealing plenty of buds; however the lack of good rains in January caused many to fall before they developed bolls. Many of the bolls that grew failed to open properly. One farmer at the Hluhluwe soldier-settlement observed:

> Judging from my own farm the worst effect of the drought was the bad germination of the seed, leaving a poor stand of plant. Once established the plants have come on fairly well and you see now quite presentable cotton fields as the plants are concerned but the yield is poor. The plants are full of buds but when maturing lots of the bolls either drop off or are so damaged by bollworms that they do not open up properly.[470]

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[466] *Zululand Times*, 12 March 1925.
[467] *Zululand Times*, 18 Februray 1926.
[468] *Zululand Times*, 11 March 1926.
[469] *Zululand Times*, 22 April 1926.
[470] Hluhluwe Annual General Meeting, *Zululand Times*, 10 June 1926. See also NA, Department of Entomology (CEN) Vol. 689 Ref E7638, Tobacco and Cotton Expert, Eshowe, Zululand, Powell to C. Haines, Entomologist, 23 March 1926.

Yield and quality suffered accordingly. Growers throughout Zululand reported difficulties in finding buyers for their poor, wilted crop. Most of the cotton that was harvested sold at rock-bottom prices of between and 0.5 d. and 3.75 d. per lb.[471]

Dry conditions persisted through the 1926/27 growing season. Rains were very light in August and September, delaying plowing.[472] When they finally arrived in late October, planting proceeded in hope that the crop would compensate for the past two seasons of disappointment. But again the clouds refused to yield. A grower at Mtubatuba complained: "hot dry winds are the order of the day, and the crops and grass are scorched, despair has taken the place of anxiety. The spruits [small streams] are dry and this in the middle of the wet season".[473] Further north at Hluhluwe cotton prospects were equally bleak: "the terrible drought still continues here, and though the rain which fell at the end of December has improved the veld from its state a month ago, the outlook for crops…is very black indeed".[474] The extreme heat exacerbated the situation, causing plants to wilt and preventing future growth.

When rains arrived late in March they came in short violent bursts just as the cotton crop was at full boll. Eshowe received just over 14 inches of rain and Empangeni 11 inches between 24 and 31 March. Nkwaleni reported over four inches in just one night. Much of the cotton was washed away. Other stands were so dirty and wet they were unpickable. The heavy rains also catalyzed jassid infestations, which were particularly damaging with the cotton at full boll. There were so many insects on the plants that one farmer remarked the

[471] *Zululand Times*, 10 June 1926.
[472] *Zululand Times*, 26 August 1926.
[473] *Zululand Times*, 23 December 1926.
[474] *Zululand Times*, 29 July 1927.

entire colour of his field was changed from a "lovely green colour to a rusty red".[475] The crop was so scarce and scattered that it was hardly worth picking.

Ntambanana was hit particulary hard by this combination of flood and drought. After suffering huge losses from nagana and the repeated failures of the sugar crop, many Ntambanana settlers mortgaged their holdings to plant as much cotton as possible in hope of a bumper crop in 1924/25. When the rivers flooded, dozens of holdings were almost completely wiped out: J. MacMahon, on Lot 236, had expected 150 bales prior to the flood and ended up reaping only 30. R.C. Lyle, on Lot 239, saw his expected yield drop from 98 bales down to eight. W.M. Shepstone on Lot 240 saw his crop plummet from an expected 95 bales to three. C.V. Tustin, on Lot 247, harvested seven bales after investing upwards of £375 in the cultivation of his 75 acres in expectation of harvesting near 100 bales.[476] Only 700 of the 7 000 acres planted during this growing season were ever picked.[477]

Farmers became mired in debt: Of the 46 who remained in 1926, only 13 (28%) were able to pay back even £1 towards their debts. 1927 was slightly better, as 22 of the farmers (48%) made partial debt repayments. Still, 20 of 46 Ntambanana farmers (43%) were unable to make a contribution in either year [Table 5.2].[478] Average debts ballooned from £400 per settler in 1921 to over £2000 per settler in 1931.[479]

[475] *Zululand Times*, 24 March 1927. See also President's Report, Hluhluwe Farmers' Association, Annual General Meeting 1926, *Zululand Times*, 10 June 1926.
[476] NA, LDE-N NVL Vol. 2 Ref 3/2/1, Ntambanana Valley Lands, Report by Cotton Experts upon Visit to Ntambanana to Secretary of Lands, 7 July 1924.
[477] *Zululand Times* 2 May 1929. The most heavily damaged areas were in the low-lying, southern section of the settlement which was flooded when the uMhlatuzi River overflowed its banks.
[478] NA, LDE-N NVL Vol. 3 Ref: 3/2, Ntambanana Valley Lands, Debt Repayment, n.d.
[479] NA, LDE-N NVL Vol. 2 Ref 3/2/1, List of Holdings and Expenditures, n.d.

Lot #	Settler	Acres	Purchase Price (£)	Installments	£ paid in 1926	£ paid in 1927
236	HF Ivory	1292	1237	24	49	49
237	PA Fraser	1323	1194	43	86	86
238	LC Baummann	1584	1833	68	136	Unknown
254	HRC Cadman	1239	1159	29	29	88
255	H Turle	1128	1278	47	0	0
256	J MacMahon	915	1091	27	0	25
257	GWT Roberts	1150	1281	31	0	0
258	CP Stevenson	1462	1825	46	0	22
259	JS Scott	1180	758	27	0	0
260	WT Woods	1184	760	28	28	28
261	A Hamilton	1170	897	33	0	0
262	G Hamilton	1126	1369	34	0	0
263	RW Chandler	1134	728	27	0	0
264	CV Lowe	1112	1039	26	10	12
268	O Norgaard	1249	956	35	0	34
270	TF Pearse	1238	854	17	14	15
271	VV Comins	1132	869	17	0	0
272	WV Phipson	1258	1343	29	0	10
274	AR Moberly	1183	956	35	0	0
275	AJW Tanner	1130	1157	29	0	10
276	C Beviss	1126	722	18	52	0
277	CE Liversage	1198	1193	28	0	0
279	HF Barnes	1107	1505	37	37	0
280	LM Titlestad	1134	1065	27	0	0
281	JL Shenton	1281	1321	33	0	0
282	JN Baring	1175	1705	43	0	99
283	SW Johnson	1459	942	24	0	67
284	TE James	1131	1498	30	0	0
285	WG Moore	1360	1438	30	0	0
286	AD Clark	1199	1109	28	0	25
288	JSF Barratt	1260	984	20	0	0
290	AO Curry	1342	1108	28	0	0
292	JW Harding	1228	1725	43	24	1
293	HHW West	1409	1847	47	0	0
301	RD Gibson	1436	925	23	0	0
303	TM Liver	1460	1400	26	0	0
304	GT Coffey	1520	1033	25	0	48

Lot #	Settler	Acres	Purchase Price (£)	Installments	£ paid in 1926	£ paid in 1927
306	ST Menne	1482	1141	29	0	102
310	AC Whitehead	1279	1189	24	0	0
311	ET Salberg	1151	1835	47	0	10
312	MC Salberg	1220	1093	27	0	107
313	CJ Wilson	1190	917	37	0	64
314	WCN Harris	1264	970	39	37	0
315	G Humphrey	1376	1060	21	42	42
316	M Davies	1240	1207	30	0	0
320	WW de Waal	1429	1092	22	0	0

Table 5.2: Debt Repayment on Ntambanana Settlement 1926 and 1927: Source: NA, LDE-N NVL Vol. 3 Ref: 3/2, Ntambanana Valley Lands, n.d. This is only a partial list, due to damage on the original document.

The fate of one farmer, Harry Farquharson, epitomized the severity of the devastation. Farquharson arrived at Ntambanana with start-up capital of just under £800 in the early 1920s. He lost 80 head of cattle to nagana in the first year. The following season he borrowed heavily and planted both cotton and maize. In 1923/24 he shifted his emphasis to cotton with encouraging results; in 1924/25 he borrowed again to put more land under cotton. The floods washed away between 90 to 95% of his crop, valued at between £3 000 and £4 000. Farquharson managed to recoup only £300. He borrowed more money at even higher interest rates and planted again, only to see drought destroy the 1925/26 crop. He abandoned his farm in 1929, and was granted rehabilitation for insolvency in 1932.[480]

Farquharson's trials with cotton underscore the pernicious timing of these consecutive disasters. Losses due to nagana forced farmers to borrow heavily at high interest rates, creating a debt trap from which many were unable to escape. One official who assessed the settlement at the height of the disaster observed: "today their position is worse than it was

[480] *Natal Mercury*, 27 September 1932. Farquharson's name does not appear in Table 5.2 because of damage to the original document.

before and those of them who tried to do the most have been the heaviest losers".[481] This accumulating debt disheartened the soldier-settlers and dampened the camaraderie that had marked the early years of settlement. Many were fearful of being labeled as deserters if they abandoned their agricultural undertaking.[482]

In an attempt to reduce borrowing, Ntambanana farmers began to rely exclusively on ratoon crops in 1926 and 1927. Many were initially reluctant but conceded that ratoon was the only alternative: "they hoped that in normal times it would not be necessary to continue this method which has now been forced upon them by stress of circumstance".[483] Cotton experts temporarily softened their stance against ratooning and acknowledged it as a viable survival strategy under such adverse climatic conditions.[484] But the ratoon cotton suffered in both yield and quality, and debts continued to accumulate. The combined disasters of the flood and drought were too much for many to bear. More than half of all the Ntambanana plots were abandoned by 1928.[485]

The devastation wrought by flood and drought was compounded by a dramatic increase in insect damage. The incidence of both jassid and cotton bollworm (especially the Sudan and Red varieties) increased significantly in 1925. For about five growing seasons

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[481] NA, LDE-N NVL Vol. 2 Ref 3/2/1, Report from On-Site Inspection from Department of Lands, 5 June 1925.
[482] Murray Johnson argues that Australian soldier-settlers also suffered from the psychological impact of the war which intensified feelings of loss and frustration with the land. See Johnson, ""Promises and Pineapples": Post-First World War Soldier Settlement at Beerburrum, Queensland, 1916-1929". For more on the comraderie that prevailed among Ntambanana settlers see: Shirley Brooks, "Playing the Game: The Struggle for Wildlife Protection in Zululand, 1910-1930" (Queen's University, 1990).
[483] NA, LDE-N Vol. 2 Ref 3/2/1, Report by Cotton Experts on Visit to Ntambanana to Secretary of Lands, 7 July 1924. See also "News from Districts: Ntambanana", *South African Cotton Growers' Journal,* (May 1926): 31.
[484] See for instance the recommendations from the Principal of Cedara Agricultural College in "The Planter and his Problems", *African Sugar and Cotton Planter* 2, no. 6 (June 1926): 2, and "Union Prospects", *South African Cotton Growers' Journal*, (May 1926): 11.
[485] Other soldier-settlements across the Commonwealth folded due to a similar combination of poor planning, lack of capital, and adverse environmental conditions. See for instance: J.M. Powell, "The Debt of Honour: Soldier Settlement in the Dominions, 1915-1940"; Keneley, "Land of Hope: Soldier-Settlement in the Western District of Victoria, 1918-1930".

Zululand growers had noticed a link between wet, cloudy weather, and insect attacks. Few were surprised when jassid attacks spiked following the flood. Jassids began making their appearance immediately after the rains, and serious outbreaks were reported from Swaziland into Natal.[486] Reports of heavy infestations came from all corners of Zululand, including Hluhluwe, Nongoma, and Ntambanana.[487] The Inspector of Lands, who visited Ntambanana immediately after the floods, conveyed the scale of the disaster: jassids had overrun all the fields he visited and were present at every stage of growth.[488] He estimated that one-third of the crop had been destroyed by pests.

Cotton bollworm also caused heavy losses. Growers at the Mkuze soldier-settlement reported losses of up to 75% due to bollworm; those further north at Ndumu complained of losses exceeding 80%.[489] Similar numbers were reported further west among cotton growers in the Transvaal. The Tobacco and Cotton Division estimated that 60% of crop losses in the 1924/25 season were due to jassid and bollworm.[490] Without some sort of control measure the entire enterprise of South African cotton was threatened.

The sharp increase in pest attacks caught the centralized entomological authority off-balance and ill-prepared. The Chief Entomologist, C. Haines, was overwhelmed with desperate requests to help alleviate jassid and bollworm damage as lowveld farmers clamored for on-site inspections and expert recommendations.[491]

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[486] *Zululand Times*, 16 July 1925.
[487] NA, CEN Vol. 689 Ref E7638, Tobacco and Cotton Expert, Eshowe, Zululand, General, Powell to C. Haines, Entomologist, Pretoria, 23 March 1926.
[488] NA, Secretary for Agriculture (LBD) Vol. 4044 Ref QC15, F.F. Beaumont, Inspector of Lands to Secretary to the Land Board, 15 March 1925.
[489] NA, RHN Vol. 1591 Ref 600/92, Board of Trade and Industries Report #92, The Cotton Growing Industry with a Minority Report on the Proposed Stabilization of Cotton Prices by Mr. FJ Fahey, 1929.
[490] NA, LBD Vol. 4044 Ref QC15, The Role of Government Entomologists, Memo to the Director of the Field and Animal Husbandry from the Department of Agriculture, Tobacco and Cotton Division, 18 August 1925.
[491] See for instance the request from the Secretary of the Ngotshe and PongolaPoort Cotton Growers' Association, which is indicative of these requests, in NA, LBD Vol. 4044 Ref QC15, Secretary, Ngotshe and

Existing methods of jassid control were woefully inadequate. Experiments using Bordeaux mixture (diluted copper sulfate and hydrated lime) were a failure.[492] Other trials with spraying dusts and copper solutions were more promising, but high costs made widespread dissemination impractical. Haines believed that the only real hope lay in breeding jassid-resistant cotton varieties, a process that would take years and require significant capital investment.

Efforts to control bollworm were even less effective. Spraying and dusting with arsenic and other poisons such as sodium fluosilicate and calcium arsenate yielded "very disappointing" results.[493] Trap crops of maize and sorghum intended to lure insects away from cotton were attempted but failed to reduce damage. Ongoing experiments with biological control – focusing on the search for egg parasites and larval predators – had produced few results.[494] With none of his experiments yielding successful control measures, Haines was left with only preventative, proactive advice to offer South African growers. He advised them to plow fields after picking, to prevent the larva from stowing away on previous growth, to dig up soil around new plants, and to diversify crops.[495] The only tangible aid Haines could offer was to appoint two new government entomologists to widen the scope of his research program.

PongolaPoort Cotton Growers' Association to Secretary for Agriculture, 27 November 1924, and the request from the Ntambanana Growers' Association in NA, LBD Vol. 4044 Ref QC15, Chief Entomologist to Secretary of Agriculture, 14 April 1925. Both these requests were refused. Richard Rouillard also sent numerous request for aid in combating insects pests at Candover, most of which were similarly refused. See for example NA, CEN Vol. 666 Ref E5904, General Correspondence: R. A. Rouillard, Rouillard to Chief, Division of Entomology, 2 November 1924, and Ibid., 25 November 1924 and 6 February 1925.

[492] "The Battle Against the Boll", *African Sugar and Cotton Planter* 2, no. 2 (Feb 1926): page unknown.

[493] C. Haines, "Controlling Cotton Bollworm", *Journal of the Department of Agriculture* IX, (1924): 311-312.

[494] G. C. Ullyett, "The Life-History, Bionomics and Control of Cotton Stainers (Dysdercus spp.) in South Africa," (Pretoria, 1930), 9. See also J. S. Taylor, "Notes on the American Bollworm *(Heliothis Obsoleta)* on Cotton, and Its Parasite *Microbracon Brevicornis*," (Pretoria, 1932); "Enemies of the Cotton Crop," *Farming in South Africa* I (1926): 21; "Bollworm Parasites and Predators," *Farming in South Africa* III (1928): 856.

[495] NA, LBD Vol. 4044 Ref: QC15, Chief Entomologist to Secretary of Agriculture, 14 April 1925, and NA, LBD Vol. 4044 Ref: QC15, Chief, Division of Entomology to Mr. Evans, 13 April 1925. See also: Excerpt from Agricultural Journal, Mr. C Haines, Government Entomologist, *Zululand Times*, 15 October 1925.

Growers were increasingly impatient with the inability of cotton experts to alleviate devastating pest damage. Ostensibly infallible scientific experts were being exposed as anything but, and they began to turn on themselves in frustration. The Tobacco and Cotton Division began to criticize the inadequacies of the Division of Entomology. The Assistant Chief of the Tobacco and Cotton Division blamed the entomologists directly, arguing that their inability to mitigate the devastation caused by insects pests put national production in jeopardy: "this matter is most serious and unless much more is done in this direction, cotton growing will not make anything like the progress it was anticipated".[496] He was joined in his outrage by William Scherffius, the patriarch of South African cotton cultivation, who scolded the Division of Entomology for not paying enough attention to farmers experiencing rising losses due to insect damage.[497]

These criticisms were reinforced by the Tobacco and Cotton Division's attempt to quantify the role played by different ecological variables in causing cotton's collapse. Insects were deemed responsible for 60% of total losses (£225 000), with 30% (£112 500) due to unfavourable weather and 10% (£37 000) to washaways.[498] This ecological compartmentalization allowed officials to focus on the problem of insect pests in isolation from climatic conditions. The message from the Department of Agriculture was unequivocal: insects alone were the main impediment to successful cotton cultivation in South Africa.

[496] NA, LBD Vol. 4044 Ref: QC15, Recommendation from Pieter Koch, Assistant Chief, Tobacco and Cotton Division, 25 July 1925. See also NA, LBD Vol. 4044 Ref QC15, Director of Field and Animal Husbandry to Secretary for Agriculture, 28 July 1925.
[497] NA, LBD Vol. 4044 Ref: QC15, W.H. Scherffius to Secretary for Agriculture, 18 August 1918.
[498] NA, LBD Vol. 4044 Ref QC 15, Insect Pests in Cotton Bolls: Miscellaneous Correspondence, Memo to the Director of Field and Animal Husbandry from the Department of Agriculture, Tobacco and Cotton Division, 18 August 1925.

In the short term, such claims deflected complaints away from the Department of Agriculture, whose authority rested on its ability to solve the pressing problems that confronted Union cotton growers. In the longer term, however, this shift-the-blame-game served to isolate the ecological constraints confronting cotton farmers and hid the broader, more integrated ecological obstacles to production behind the immediate inadequacies of insect control. Focusing on the inability of the Division of Entomology to solve insect pests in the laboratory diverted attention away from the more pressing and less-controllable problem of erratic precipitation levels. Insect pests were conceived of as a bounded, unitary obstacle that need not threaten cotton's long-term prospects in South Africa. Insects were, it seemed, a challenge that could be defeated or a problem that could be fixed : thus they became the main focus of attention among scientific experts.

Chief Entomologist Haines reacted to criticisms of his unit's inability to solve the insect problem with predictable defensiveness and surprising vigour, arguing that losses due to insect pests had been exaggerated, and insisting that the disaster was primarily a consequence of uneven rains.[499] He rejected the notion that insect pests could be studied as an isolated problem: deficiencies in the entomological research program stemmed from the belief that insects were considered separate from broader issues of ecological incompatibility. He pointed to recent observations that confirmed the link between wet weather and increased incidence of jassid in Zululand.[500]

Haines dismissed the notion that such complex interactions could be reduced to entomological problems. He noted sarcastically that this reductionism would allow entomologists alone to determine how and where cotton cultivation would take place: "I

[499] C. Haines, "Enemies of the Cotton Crop", *Farming in South Africa* I (1926): 21.
[500] *Zululand Times*, 16 July 1925.

cannot support the implication that entomologists should endeavour to ascertain where it will be comparatively safe to continue to advocate the growing of this crop".[501] He called instead for a more integrated research agenda that would study the problem of insect pests alongside other climatic variables. He rejected his colleagues' ecological compartmentalization as pure fantasy: "the observations of the past few years seem to indicate that if cotton could be grown under ideal conditions as to soil, soil-management, rainfall, and temperature, it is very improbable that any of the one hundred and fifty odd insects and troubles that afflict it would do serious damage".[502]

Uneven Precipitation

Haines emphasized what no scientific expert wanted to acknowledge: it was uneven precipitation, in conjunction with insect pests, which accounted for the collapse of the Zululand cotton boom. Agricultural officials dismissed the 1924/25, 1925/26, and 1926/27 growing seasons as temporary, fleeting and aberrant. The disasters were regarded as a series of flukes: "It is not the cotton, but the drought, which is responsible for this [immediate] setback" argued one editorial writer[503]; elsewhere, others insisted that "only in exceptional years will the crop be a complete failure".[504]

Notions of abnormality were encouraged by the lack of evidence about 'normal' precipitation levels in Zululand. No long-term record of annual rainfall, and thus of means

[501] NA, LBD Vol. 4044 Ref QC15, Chief, Division of Entomology to the Department of Agriculture, 18 August 1925.
[502] NA, LBD Vol. 4044 Ref: QC15, Chief, Division of Entomology to the Department of Agriculture, 25 August 1925.
[503] "A Stressful Season", *African Sugar and Cotton Planter* 2, no. 3 March 1926): 21.
[504] "Cotton", *African Sugar and Cotton Journal* 1, no. 2 (May 1927): 1; "Wealth in Cotton", African Sugar and Cotton Journal 1, no. 4 (July 1927): 19. See also *Zululand Times*, 28 May 1925, 10 June 1926, 17 June 1926, 8 July 1926, 17 June 1926 and 2 May 1929 and NA, NVL LDE-N Vol. 2 Ref 3/2/1, Secretary for Lands to Secretary Ntambanana Valley Farmers' Association, 14 July 1925.

and standard deviations, existed. One cotton researcher compared rainfall from 1925 to 1928 with the average for 1918 and 1925, and concluded that these three seasons were "unusual".[505] The *Yearbook of the Union of South Africa* first published values for 'normal' annual rainfall in 1924 based on between ten and twenty years of accumulated data gathered intermittently since 1896; the normality or otherwise of subsequent years was measured in terms of their deviation from this 'standard'.[506] The 'normal' value for Zululand precipitation was estimated at somewhere between 20 and 35 inches annually, depending on location.[507] Explanations couched in terms of normality offered a soothing reassurance that seasons of precipitation that were either too heavy or too light were exceptional and would not soon be repeated.

Two British cotton experts who visited Zululand soon after the crash confirmed the fallacy of accounting for failure by invoking abnormality. William Himbury, the Managing Director of the British Cotton Growing Association, visited South Africa in 1927 to provide a first-hand account of the Union's viability as a raw cotton supplier. Himbury was Britain's leading cotton expert, having spent much of his career touring Britain's tropical possessions and assessing each colony's viability for cotton.[508] His was the empire's most respected voice on cotton.

Himbury advanced two primary explanations for the collapse of the cotton boom. The proximate cause was not the drop in international prices, as had been suggested by the Board of Trade, but rather the erroneous judgment exercised by farmers, based on poor advice received from agricultural officials. Himbury listed a multitude of such mistakes:

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[505] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1926/27* (London: 1926).
[506] *Official Yearbook of the Union* 7 (1924).
[507] "Cotton Growing in the Union", *Journal of the Department of Agriculture*, VI (1923).
[508] "Obituary: William Himbury," *The Geographical Journal* 122 (1956): 140.

planting on marginal soil, planting at too high an altitude, planting late as a gamble that was ruined by frost. The prevailing policy seemed to be to get as much seed in the ground as possible instead of endeavouring to obtain a large crop from a well-cultivated small area.[509] Himbury observed that many of Zululand's ecological obstacles, especially the increasing incidence of pestilence, were exacerbated by plantation farming. Large-scale monocropping – such as that undertaken by Candover Estates – was untenable within these erratic ecological realities: cotton's only chance for success was as part of peasant farming that embraced a wider range of crops.[510]

Himbury further suggested that the ultimate cause of the collapse was the unsuitability of the Zululand climate for cotton: "there is little doubt the chief cause of failure has been adverse climatic conditions".[511] Himbury doubted the data on which estimates of 'normal' rainfall were based: "there are rainfall records taken over a number of years, but they are not a reliable guide, as the variation within a few miles is at times very great, not only between places but from season to season".[512] He understood that uneven precipitation was in fact the norm for Zululand and for cotton to thrive it would have to develop within a planting system that accepted this reality rather than ignored it: "these seasons have been described as abnormal, but if one studies the crop results from year to year and in different districts, it is an open question whether those so-called abnormal years are not normal ones".[513] He questioned whether dryland cotton farming could succeed within such variable rainfall, and recommended irrigated cotton as a means to overcome this barrier.

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[509] Himbury, *The Union of South Africa as a Source for Increasing our Cotton Supplies*, 31.
[510] "Cotton Growing Prospects", *African Sugar and Cotton Planter* 3, no. 1 (Jan 1927): 28.
[511] Himbury, *The Union of South Africa as a Source for Increasing our Cotton Supplies*, 21.
[512] Ibid. 21.
[513] Ibid. 14. E.N.T. Powell, a local agricultural official, also complained about the 'futility' of monocropping in Zululand and recommended planting cotton alongside maize, tobacco, beans, peanuts, in addition to ventures in cream, butter, and dairying to help lessen the risk of agricultural failure. *Zululand Times*, 22 May 1930.

G.E. Keatinge, who visited Zululand as representative of the Empire Cotton Growing Corporation (ECGC) in 1922 and then again in 1925 after the devastation of the floods, corroborated Himbury's conclusions.[514] He agreed that the national scientific infrastructure had been ineffective in aiding local farmers achieve success with cotton. He was convinced that the government had misled settlers about the region's potential for cotton production: "most of the new settlers started with too great expectations from cotton and far too little knowledge and experience of farming principles".[515] In the rush to maximize acreage, land that was recently cleared was put immediately under cotton, leaving the soil unproductive. Cotton was grown repeatedly on the same soil for five or six years which most likely led to an increase in insect pests. Unsuitable soil was chosen; often on sloping land, or too near a river, which was vulnerable to flooding. Keatinge, like Himbury, further admonished those who tied up all their capital in one crop.

Keatinge was convinced that a poor understanding of the natural constraints of cotton production underlay the disastrous outcome of Zululand ventures in the 1920s. He pored over the existing rainfall statistics to prove that so-called 'abnormal' precipitation levels were anything but:

> A study of these records [rainfall statistics] appeared to indicate that given a fairly retentive soil and good tillage two of the twelve years would have given good cotton crops, five would have given fair cotton crops, three moderate and two poor. There were three years in which drought would have done damage and four in which excessive rains would have done damage.[516]

Keatinge emphasized the poor decisions made by farmers that contributed to their difficulties. Drought damage was compounded by the cultivation of marginal soils. Insect pests increased as cotton was planted on the same land year after year without reprieve.

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[514] Keatinge's first report was printed as a pamphlet: G.F. Keatinge, "Cotton Growing in South Africa," 193.
[515] *Zululand Times*, 9 September 1926.
[516] Keatinge, "Cotton Growing in South Africa,", 194.

Damage due to excessive rains could have been mitigated by planting cotton alongside other crops, a strategy that had been ignored in the hype of the cotton boom. Keatinge concluded that single-crop farming was an untenable agricultural system within Zululand: "owing to the uncertainty of the climate, the cotton-planter, pure and simple, cannot exist here except in rare cases. He must be more of a general sub-tropical farmer, skilled in the knowledge of raising a variety of other crops".[517]

More recent historical climatic reconstructions support Himbury's and Keatinge's contention that the high variability of precipitation between 1924 and 1927 was 'normal' for Zululand. Peter Tyson of the Climatological Research Group at the University of the Witswatersrand has emphasized the cyclical nature of Zululand's precipitation variability and identified an 18-20 year oscillation. South-eastern Africa is greatly affected by these periodicities which can account for as much as 20 to 30% of the variance in summer rainfall.[518] The 1924/25 growing season has been identified as the final year of a wet period which lasted from 1916/17. 1925/26 marked the beginning of a dry period that lasted until 1932/33. This remains one of the driest period on record in South Africa in the 20th century [Figure 5.3].[519]

[517] Zululand Times, 9 September 1926.
[518] R.A. Preston-Whyte and P.D. Tyson, *The Atmosphere and Weather of Southern Africa* (Cape Town, 1988) 260. See also P.D. Tyson, T.G.J. Dyer, and M.N. Mametse, "Secular Changes in South African Rainfall: 1880-1972," *Quarterly Journal of the Royal Meteorological Society* 101 (1975): 817-833.
[519] Preston-Whyte and Tyson, *The Atmosphere and Weather of Southern Africa*, 260.

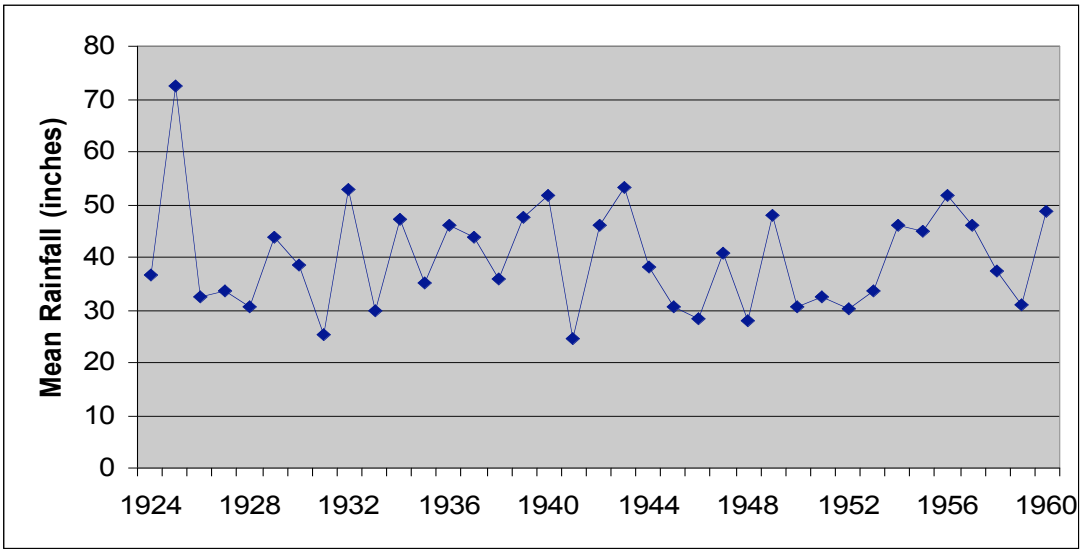

Figure 5.3: Mean Rainfall for Eleven Zululand Centres, 1924-1960. Source: B.E. Beater, *Soils of the Sugar Belt, Part 3 Zululand. Natal Regional Survey #5*. (London and New York, 1962): 7. These data are averaged from the following stations (Amatikulu, Gingindlovu, Umhlatuzi, Eshowe, Nkwaleni, Empangeni (x2), Heatonville, Mposa, Eteza, Hluhluwe), all located within coastal Zululand, which received heavier rainfall than the interior.

The precipitation regime of south-eastern Africa is also closely correlated with ENSO (El Nino Southern Oscillation) events. High phase (cold) events typically produce heavy rainfall in this part of the continent as the Intertropical Convergence Zone (ITCZ) – the convergence of the South and North tropical circulations – shifts north and east towards the equator, producing wet conditions over much of southern Africa. During low-phase (warm) events, when the ITCZ shifts south and west, spring and summer rainfall is typically sparse.

Recent research has charted a linear relationship between ENSO events and rainfall variability in south-eastern Africa.[520] This relationship has been tracked historically and been found to hold 80% of the time between 1875 and 1983: 12 of the 15 high phase SO years during this period had above average rainfall, while 17 out of 22 low phase SO years

[520] C.F. Repelewsi and M.S. Halpert, "Precipitation Patterns Associated with the High Indices Phase of the Southern Oscillation," *Journal of Climate* 2 (1989): 268-284.

were periods of below average rainfalls.[521] Specifically, 1924 (the worst flood year) has been identified as a cold episode year, and 1925 (the worst drought year) as a warm event year.[522]

Historical studies of the Zululand environment confirm the persistence of this pattern of uneven precipitation over the past two hundred years. Dendrochronological evidence supports Tyson's theory that rainfall alternated between periods of heavy and light rainfall within an 18-20 year cycle.[523] Documentary records also corroborate this variability: heavy rainfall caused extensive flooding in 1855/56, 1873/74 and 1892/93, with periods of intense drought in-between.[524] Floods were experienced as recently as 1913 and 1917.[525] Alternating heavy rainfall and prolonged periods of drought have been recorded in northern Natal and Zululand since climatological record keeping began in the mid-19th century.

The norms used by experts to explain cotton's collapse were compiled over a period too narrow to reveal these cyclical oscillations. These scientific estimates were then assimilated as truth by officials, and became the foundation for further misconception regarding Zululand's growing conditions. These norms reassured growers that Zululand's climate was predictable and regular; extreme weather events in the form of flood and droughts were dismissed as aberrations. Reports from imperial cotton experts, backed up by

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[521] Recent research estimates that SO events accounted for 20% of summer rainfall variance (Nov-Apr) during these growing seasons. See S.J. Mason, "El Nino, Climate Change, and the Southern African Climate," Environmetrics 12 (2001): 327-345; J.A. Lindesay and C.H. Vogel, "Historical Evidence for Southern Oscillation-Southern African Rainfall Relationships," *International Journal of Climatology* 10 (1990): 679-689; T. G. J. Dyer, "Rainfall along the East Coast of Southern Africa, the Southern Oscillation, and the Latitude of the Subtropical High Pressure Belt," *Quarterly Journal of the Royal Meteorological Society* 105 (1979): 445-451

[522] Repelewsi and Halper, "Precipitation Patterns Associated with the High Indices Phase of the Southern Oscillation". See also Mike Davis, *Late Victorian Holocausts: El Nino Famines and the Making of the Third World* (London and New York, 2001), 271.

[523] Martin Hall, "Dendroclimatology, Rainfall and Human Adaptation in the Later Iron Age of Natal and Zululand," *Annals of the Natal Museum* 22 (1976): 693-703.

[524] E Nelville, "Rainfall in Natal," *Natal Agricultural Journal* 11 (1909): 1531-33;W. B. Tripp, "Rainfall of South Africa 1842-86," *Quarterly Journal of the Royal Meteorological Society* 14 (1888): 108-123; P. Barnes, "The Great Flood of 1856," *Natalia* 14 (1984): 33-41

[525] *Zululand Times*, 30 November 1917.

more recent historical ecological reconstruction, reject the labeling of these seasons as abnormal. They emphasize that a high variability in annual precipitation levels has been a hallmark of Natal and Zululand since climatological record keeping began in the late-19th century. If cotton was to succeed in the lowveld, growers would have to find a way to succeed within these erratic precipitation levels, and not deny the possibility of their recurrence.

Conclusion

Cotton's rise to prominence in the 1920s was buoyed by declining American supply, rising prices, and a devotion to science that instilled in growers a confidence that nearly all of south-eastern Africa was well-suited for the crop. Cotton spread rapidly throughout Zululand, monocropped on hundreds, sometimes thousands, of acres on end. By 1924 Natal and Zululand together accounted for more than half of the Union's total output.

The Zululand cotton crash deflated these lofty expectations. The flood of 1925, which dropped more than sixty inches of rain in some regions, destroyed nearly 80% of expected output. A combination of drought and insect damage hampered replanting efforts in 1926 and 1927. This series of poor growing seasons destroyed livelihoods along with expectations. Candover, Zululand's largest producer which at its zenith put more than 11 000 acres under cotton, was bankrupted within five years. Ntambanana settlers – already weakened by losses due to nagana – were helpless to offset the steady decline in yields, abandoning the soldier-settlement in 1933.

Labour, planning, and market considerations all affected the success or otherwise of cotton cultivation in southern Africa during this period. But focusing exclusively upon them

distracts attention from the underlying lesson of the Zululand cotton crash. By emphasizing more manageable solutions and dismissing adverse growing seasons as 'abnormal', officials and farmers were able to ignore the possibility that they feared most: cotton was unable to succeed in Zululand due to erratic precipitation levels and the recurrent likelihood of heavy insect damage.

The well-informed, well-argued reports of British cotton authorities Himbury and Keatinge provided the most comprehensive and insightful contemporary verdict on the Zululand cotton crash. These experts argued that rainfall variability, and the increased insect damage that followed, represented the two limiting factors to Zululand cotton production. The Zululand cotton crash exposed the reality that ecological obstacles to production were the primary hindrance to widespread cotton cultivation. As one leading cotton expert conceded: "nature is the obstacle".[526]

Both Himbury and Keatinge recommended greater expenditures on scientific experimentation to mitigate the effects of rainfall and insects. These calls coalesced into a vision for an experiment station that would focus exclusively on the ecological constraints faced by lowveld cotton growers.[527] A station was subsequently established at Barberton in the eastern Transvaal, with a breeding program intended to overcome the major ecological obstacles to cotton production in this region by developing insect- and drought-resistant strains of seed.

[526] D.F. Miller, "General Possibilities", *The South African Cotton Growers' Journal* 1, no. 6 (April 1925): 19.
[527] *Zululand Times*, 18 February 1926 and 25 March 1926.

Chapter 6
Scientific Advance and Practical Failure: The Empire Cotton Growing Corporation's Attempts at Breeding for Insect-Resistance, 1924-1948.

The cotton crash of the 1920s revealed the limits of the Department of Agriculture's capacity to overcome the ecological obstacles to production faced by South African cotton growers. The Division of Entomology had exhausted all known measures to combat insect invasions, including biological parasites, dusting with poisons and soil preparation methods; none had been effective in combating the devastation. Officials concluded that breeding insect-resistant strains offered the most promising means of moving beyond the disappointment of the 1920s and ensuring cotton's success in the South African lowveld. But it would be a hit-and-miss undertaking requiring significant capital investment, a steady transit of imported specimens, and a scattering of trained research officers to test the viability of newly-bred strains throughout the cotton producing areas. Implementing such an ambitious, wide-spread and comprehensive breeding program was an intimidating challenge.

Agricultural officials also recognized that a single national breeding program could not address the varied needs of growers in different parts of South Africa. Ecological constraints in the lowveld differed from those in other major cotton growing regions.[528] The cotton crash of the 1920s had convinced officials that south-eastern Africa's most pressing obstacles to production were uneven rains and insect damage. Jassid, the most pernicious lowveld pest, was absent from other cotton-growing areas in the Union, making it impossible for the Division of Entomology, based in Rustenburg in the middleveld, to implement an appropriate anti-jassid breeding program. In response to the geographical variations in cotton production conditions, the Department of Agriculture decentralized its operations and

[528] "Cotton Breeding in the Lowveld", *Journal of the Department of Agriculture* XI (1925): 153-158.

integrated place-specific research programs that reflected each region's particular set of challenges. Separate research centres were established in the three main cotton growing areas: at Tzaneen in the Cape, Rustenburg in the middleveld, and Barberton in the lowveld.

The Department could not widen its research program alone. It needed experience in designing a comprehensive insect-resistance breeding program. It needed a global reach, to import promising experimental strains of cotton from beyond southern Africa. The Department of Agriculture contracted out their lowveld breeding and experimentation program to the only organization that could fulfill all of these requirements: the Empire Cotton Growing Corporation (ECGC).[529]

This chapter chronicles the ECGC breeding program at Barberton in the eastern Transvaal between 1924 and 1948. It is fundamentally concerned with the politics and circulation of knowledge production. First, it focuses on the contested formulation of the Barberton station's research program, which coincided with the most tumultuous period in cotton production in south-eastern Africa. The idea for an experimental centre that focused exclusively on the needs of lowveld farmers arose in the early 1920s, during the lofty heights of the Zululand cotton boom. It was envisaged as an outpost of the centralized, state-driven experimentation network underpinned by cotton experts (discussed in Chapter 4). Barberton was imagined as a 'one stop shop' for all matters relating to planting, plowing, harvesting, and picking that could help expand lowveld production.

But this original vision for Barberton was hijacked by the dramatic cotton crash of 1925, 1926, and 1927. Its mission was reoriented to focus exclusively on mitigating damage wrought by jassid, which farmers regarded as the region's most pernicious constraint to

[529] NA, GG Vol. 1943 Ref 62/1747, Extract from Board of Trade Journal No. 1232, Empire Cotton for Government Grant, 8 July 1920.

successful production. This chapter argues, first, that Barberton's research agenda was shaped significantly by local factors. The Corporation's research goals were not imposed monolithically by imperial scientific experts; rather, Barberton's breeding program was intimately tied to regional priorities and concerns.[530] In emphasizing the local character of this cotton breeding program, and attempting to 'place' science – to reveal the ways in which the landscape of south-eastern Africa informed the research agenda of Barberton scientists – this chapter echoes David Livingstone's contention that "the 'where' of scientific activity matters a great deal".[531] The cotton breeding program at Barberton is a story of expert knowledge that incorporated rather than undermined ecological specificity.

Second, this chapter focuses on how the ECGC made use of its global networks to achieve success with breeding for insect-resistance. Specimens were imported from the ECGC breeding station in Trinidad, knowledge was assimilated from previous experimental work in India, and ultimately successes achieved at Barberton were used as the foundation of a new Africa-wide research station in Uganda. These transnational scientific networks were crucial to the Corporations' breeding successes, and to the prospects for successful cotton production on the South African lowveld.

This emphasis on the interconnectedness of the Corporation's breeding program fits well within Alan Lester's recent call for "networked accounts" of imperial history.[532] Lester

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[530] Two studies which emphasize imperial science being imposed upon the African landscape rather than reacting to it are: Helge Kjekshus, *Ecology Control and Economic Development in East African History : The Case of Tanganyika, 1850-1950* (London, 1977) and Neal Sobania, "Pastoralist Migration and Colonial Policy: A Case Study from Northern Kenya," in *The Ecology of Survival: Case Studies from Northeast African History*, ed. Douglas H. Johnson and David M. Anderson (London, 1988), 219-240.

[531] David Livingstone, *Putting Science in its Place : Geographies of Scientific Knowledge* (Chicago and London, 2003), 3. See also Suzanne Moon, "Empirical Knowledge, Scientific Authority, and Native Development: The Controversy over Sugar/Rice Ecology in the Netherlands East Indies, 1905-1914," *Environment and History* 10 (2004): 59-81.

[532] Alan Lester, "Introduction: Historical Geographies of Southern Africa," *Journal of Southern African Studies* 29 (2003): 595-613.

has argued eloquently for a 'new' imperial history that moves beyond the static categories of 'core' and 'periphery', which constrain the spatial imagination of empire as unidirectional and linear.[533] Instead, he proposes that relationships between Britain and its colonies – and between the colonies themselves – are more usefully conceived of as networks, which allow multiple sites of scientific knowledge to be considered within the same analytical frame, without privileging one over the other.[534] This chapter builds upon this call for a new spatial imagination of empire by tracing the flow of experts, specimens, and knowledge across these imperial networks.

A Vision for a Lowveld Cotton Research Station

The Empire Cotton Growing Corporation was formed in 1917 as an offshoot of the British Cotton Growing Association (BCGA), itself established in 1904 by a conglomerate of British cotton interests to "promote and extend the growing and cultivation of cotton in the colonies".[535] After more than a decade of efforts to maintain a steady supply to British mills, the BCGA was overwhelmed by the magnitude of that task. Originally envisioned as a marketing and promotion venture, it was being inundated with requests for research and experimentation, an area in which it sorely lacked expertise.

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[533] Two of the most influential works within this tradition are George Basalla, "The Spread of Western Science," *Science* 156 (1967): 611-622, and Ronald Robinson and John Gallagher, *Africa and the Victorians: The Official Mind of Imperialism* (London and Basingstoke, 1961).

[534] Alan Lester, "Imperial Circuits and Networks: Geographies of the British Empire," *History Compass* 4 (2006): 124-141. See similar calls in Alan Lester, *Imperial Networks: Creating Identities in Nineteenth-Century South Africa and Britain* (London and New York, 2001), and David Lambert and Alan Lester, eds., *Colonial Lives Across the British Empire: Imperial Careering in the Long Nineteenth Century* (Cambridge, 2006). Other studies that exemplify this 'new' imperial history include Tony Ballantyne, *Orientalism and Race: Aryanism in the British Empire* (Basingstoke, 2002), and Carl Bridge and Kent Fedorowich, eds., *The British World: Diaspora, Culture and Identity* (London, 2003)

[535] NA, GOV Vol. 699 Ref PS22/04, British Cotton Growing Association: Charter of Incorporation, 1904.

In 1917 the BCGA requested that a special committee of the Board of Trade consider the problem of supply expansion. The committee recognized the limits of the BCGA's mandate, applauded its achievements, and recommended the establishment of a separate, non-profit, body to conduct scientific research into cotton growing. From these recommendations the Empire Cotton Growing Corporation emerged. Mandated to conduct research and experimentation, it was intended to complement the BCGA's emphasis on commercial expansion. The ECGC's Royal Charter charged it with "extending and promoting in the interests of our Empire the growing and cultivation of cotton in our Dominions, Colonies, Protectorates, Protected States and in any country or place over which we have or may have mandate or control".[536]

The British Government provided £1 000 000 as start-up capital. Continuing operating costs were to come from the industry itself. The Cotton Industry Act, passed by the British Parliament in 1923, imposed a levy of 6d. per standard bale on all cotton purchased by British spinners.[537] This levy, and interest on the initial capital, provided the ECGC with an annual income of approximately £130 000 during its first decade of operation.

The work of the Corporation was centred at the Imperial College of Tropical Agriculture in Trinidad, where it opened a cotton research station in 1926. Established to investigate "the cotton plant in all phases of its growth and under rigorously controlled conditions, so that it may be possible to ascertain and to estimate the importance of the several factors which contribute to the final result", the station was never intended to disseminate varieties of pure-strain seed to different cotton-growing corners of empire: the

[536] *Empire Cotton Growing Corporation*, (London, 1952). See also John Robert Hose, "Britain and the Development of West African Cotton, 1845-1960." (Columbia University, 1970), 273-313.
[537] NA, RHN Vol. 1127 Ref 111/5/2, *The Economist* No. 4392, 29 October 1927. See also G. B. Masfield, *A Short History of Agriculture in the British Colonies* (Oxford, 1950), 88.

intensive breeding work was to be carried out at satellite stations in the cotton-growing countries.[538] The Corporation's emphasis was thus not on acclimatization but rather on place-specific breeding programs to ensure success under local growing conditions. Members of the ECGC's scientific staff were trained at Cambridge University for a year and then in Trinidad, where they completed courses in agriculture, chemistry, soil science, botany, genetics, entomology, mycology and bacteriology.[539] Between 1921 and 1952 over one hundred Corporation research officers received their training at Trinidad before dispersing to direct cotton-growing efforts throughout the empire.

In 1924 the South African Department of Agriculture approached the ECGC about contracting out their lowveld experimental work. South Africa was not a major component of the Corporation's vision for African production; the BCGA focused its operations further north in tropical African nations such as Nigeria, Uganda, and Tanganyika. But Corporation decision-makers were excited by the South African government's "full and hearty" commitment to cotton operations, as well as the established, centralized networks of experimentation and information dissemination that existed there.[540] They agreed to conduct a lowveld breeding program under the patronage of the Department of Agriculture. The Department provided a start-up grant of £900, and offered an operational and transportation allowance to all ECGC officers based in South Africa.[541] For their part, the Corporation committed to providing two supervisors and three South African assistants who had recently

[538] "Cotton Research", *African Sugar and Cotton Planter* 1, no. 12 (October 1925): 20.
[539] A. Aspinall, "The Imperial College of Tropical Agriculture, Trinidad", *Empire Cotton Growing Review* 10, no. 3 (1933): 165-172.
[540] Agricultural Research Council – Institute for Industrial Crops (ARC-IIC), ECGC Files, Report of the Executive Committee, to be submitted at the Meeting of the Administrative Council on 13 January 1927.
[541] NA, Department of Irrigation (LPS) Vol. 3 Ref BHE35, P.A. Bowmaker, General Correspondence, Chief, Division of Plant Industry to Secretary for Agriculture, 11 March 1930.

finished their year's special training at the Imperial College at Trinidad.[542] They also promised to fund the bulk of the annual operating expenses, predicted to be just under £4 000 per year.

The ECGC and the Department of Agriculture shared a common vision for this cotton research station: it was to respond to the diverse priorities of lowveld farmers located in both the eastern Transvaal and Zululand. It was intended, first and foremost, to "improve the varieties of cotton grown in the Union".[543] More broadly, though, the station was expected to increase farmers' general knowledge about cotton across a broad spectrum of topics including, but not limited to, seed selection, plowing, planting, trimming, crop rotation, and spacing.[544] After some brief deliberation, the ECGC decided to establish its headquarters at Barberton in the eastern Transvaal [Illustration 6.1].[545]

[542] ARC-IIC, ECGC Files, Report of the Executive Committee, to be Submitted at the Meeting of the Administrative Council on 19 October 1927.
[543] F. Parnell, "Report on Cotton Breeding in the Lowveld", *Journal of the Department of Agriculture* XI (1925): 154.
[544] NA, GG Vol. 941 Ref/17 1018, A Cotton Research Station for the British Empire: Summary of a Report to the Empire Cotton Growing Corporation by Professor J.B. Farmer and Mr. LG Killby, n.d.
[545] NA, Division of Agricultural Education and Extension (LON) Cotton Experiment Station, General, Vol. 358 Ref.A290 1924-1943, Proposal for the Barberton Cotton Breeding Station, 15 October 1924. Barberton was selected because of the ginnery established there, the large number of cotton growers nearby, and the fact that land was immediately and cheaply available from the local jail authority.

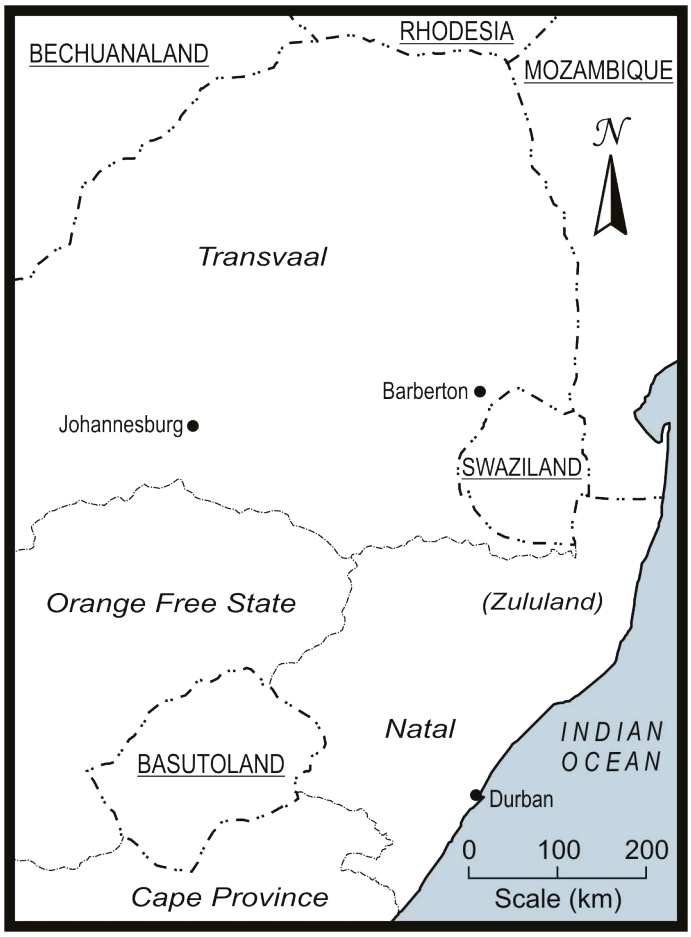

Illustration 6.1: Barberton, in the eastern Transvaal.

The combination of flood, drought and insect pests that decimated cotton yields on the South African lowveld in 1925, 1926, and 1927 forced Corporation scientists to rethink this original vision. Lowveld growers were particularly frantic about the devastation caused by jassid, a pest unique to their region. Corporation scientists realized they were ideally suited to tackle this obstacle due to their breeding expertise and international networks. In consultation with the Department of Agriculture, they decided to focus most of their efforts on breeding jassid-resistant strains; other research projects investigating the rotation of crops

and the best time for planting became secondary.[546] The breeding of new insect-resistant strains was championed as the most effective way to revitalize the cotton industry after the slump that had hampered production in recent years. "Once this difficulty [insect pests] is overcome," wrote one ECGC official, "there will hardly be a limit to the development of cotton growing in South Africa".[547]

After the devastation they suffered during the cotton crash Zululanders resented the decision to locate the cotton research station outside their territory. They protested that Zululand had been the heartland of the cotton boom of the 1920s, and that growers there had been hardest hit by the demoralizing combination of flood, drought and insects.[548] Broadsheets complained that Zululanders were "desperate for want of expert guidance".[549] Experiments, they reasoned, ought to be located within the most promising growing areas. Officials from the Department of Agriculture assured Zululand growers that Barberton's research agenda would address issues that affected growers throughout the lowveld; cotton growing conditions in the eastern Transvaal were, they argued (somewhat hopefully), nearly identical to those in Zululand. Zululanders were not so easily convinced: they maintained that atmospheric and soil conditions varied greatly between the two areas, and that the high humidity near the coast set much of Zululand apart from the rest of the so-called lowveld cotton region. Not wanting to alienate such a large proportion of cotton growers, the Corporation decided on a compromise: they established a satellite experimental station on

[546] F.R. Parnell, "The Cotton Breeding Station, Barberton", *Empire Cotton Growing Review* V, no.4 (1929): 314-322 and F.R. Parnell, "The Breeding of Jassid-Resistant Cottons: Report for the Season 1924/25", *Empire Cotton Growing Review* II, no. 4 (1925): 7.
[547] "Annual Report for 1925/26", *Farming in South Africa* I (1926): 325. See also E.H.T. Powell, "Cotton Growing in Natal and Zululand", *Farming in South Africa* I (1926): 185.
[548] See editorials "Natal's Claim Thwarted", *Zululand Times*, 25 March 1926 and "An Experiment Station", *African Sugar and Cotton Planter* 2, no. 4 (April 1926): 23.
[549] *Zululand Times*, 25 March 1926.

the property of the recently-defunct Candover Estates, at Magut.[550] This would ensure that specimens developed at Barberton would benefit from extensive testing in Zululand growing conditions.

The Barberton Cotton Experiment Station was inaugurated as the nexus of a wider network of experimentation that would improve cotton varieties for lowveld growing conditions for the 1926/27 growing season. It consisted of 20 fields of 2.5 acres each on level land with a deep, rich soil, and another 8 acres for buildings. A further 30 acres was expected to be put under cotton each year for experimental purposes.

The Experimental Program at Barberton

The ECGC's efforts in South Africa were coordinated by Sean Milligan, a Scot who had spent thirty years farming and studying agriculture in Britain before joining the Indian Agricultural Department in 1905. During his tenure as Deputy Director of Agriculture in the Punjab Region, Milligan oversaw the widespread dissemination of American Upland cotton and the expansion of irrigation projects. He was subsequently appointed Bengal's Director of Agriculture, before being recruited by the ECGC in 1924 to head their South African operations.[551] In South Africa, Milligan occupied himself primarily with outreach, leaving the task of formulating and directing Barberton's research agenda in the hands of F. R. Parnell. Parnell was a veteran cotton breeder who had also made his reputation as a first-class cotton breeder with the Indian Agricultural Department before he took charge of Barberton in 1924.

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[550] ARC-IIC, ECGC Files, Report of the Executive Committee, to be submitted at the Meeting of the Administrative Council on 13 January 1927. Satellite stations were also established at Ingwavuma and Bremersdorp in Swaziland.

[551] For more on Milligan's background see *The South African Cotton Growers' Journal* (February 1925): 13.

The scattered record of observation and experimentation compiled by the Division of Entomology during the 1920s had yielded some useful observations on jassid behaviour: first, that jassid incidence was usually correlated with higher precipitation levels; and second, that the leaf-hoppers bred on the underside of the leaf and wrought their deadly sap-sucking damage from there. Parnell integrated these observations with knowledge from his Indian cotton breeding experience. There, breeding efforts aimed at jassid-resistance had focused on the link between a cotton plant's hairiness – the length and density of hairs on the underside of the leaf – and its resistance to jassid. Experiments in the Punjab had revealed a close inverse correlation between the degree of hairiness and the number of eggs laid.[552] Parnell hypothesized that the hairs tickled the ovipositor of the female, causing her to shy away from laying her eggs on the leaf vein. His first series of trials at Barberton set out to compare the density and length of hairs on the underside of the leaf with jassid incidence. Weekly tests measured jassid counts on sections of thirty leaves of different varieties. By the end of the first season, Parnell had confirmed that both hair density and length affected the plant's susceptibility to jassid attacks.[553]

Parnell then searched for existing hairy varieties to assess their level of jassid resistance. His Corporation colleagues sent seed with varying degrees of hairiness from all over the empire, from Tanganyika, Nyasaland, India, Australia, America, Rhodesia.[554] Varieties with smooth undersides imported from America, including Acala, Delfos, and Express, were all wiped out by jassid, which was absent in the United States [Illustration 6.2]. As demonstrated in Table 6.1, hairier varieties – such as the Ugandan – proved most

[552] E. O. Pearson, *The Insect Pests of Cotton in Tropical Africa* (London, 1958).
[553] Parnell, "The Breeding of Jassid-Resistant Cottons: Report for the Season 1924/25". See also F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1926/27* (London: 1927).
[554] NA, CEN Vol. 683 Ref: E7005, F.R. Parnell, Cotton Plant Breeder, Barberton, General, 1924.

resistant. These initial trials confirmed Parnell's hypothesis that cotton plants with smooth, non-hairy leaves were especially vulnerable to jassid destruction.

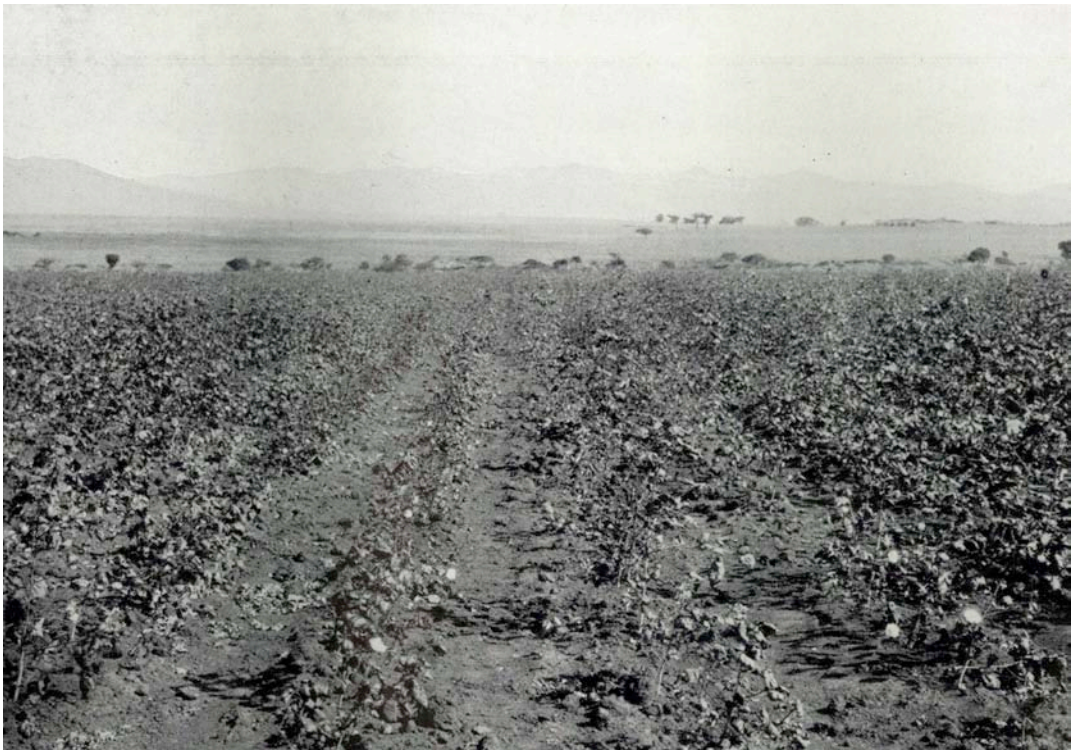

Illustration 6.2: Field of Improved Bancroft Destroyed by Jassid, 1926. Source: F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1926/27* (London: 1927): Plate VII.

	Degree of Attack				
Variety	Nil	Slight	Moderate	Rather Bad	Bad
Cambodia	100	-	-	-	-
Uganda	3	8	27	32	30
Improved Bancroft	-	3	12	38	47
Zululand Hybrid	-	2	14	38	46
Griffin	-	-	2	27	71
Watt's Long Staple	-	-	-	-	100

Table 6.1: Jassid-Resistance Trials of Varieties at Barberton, 1925. Source: F.R. Parnell, "Cotton-breeding in the Lowveld", *Journal of the Department of Agriculture* XI (1925): 157.

The most resistant imported variety was a selection known as Cambodia, sent by an ECGC scientist in Madras. Parnell had encountered Cambodia during his Indian breeding

work: it produced large bolls with good quality lint – over 1.125 inch in staple – and its jassid-resistance had been established unequivocally. But it was a very large plant, as much as eight or nine feet high, and almost as wide across with stems that were quite delicate. Parnell worried that this would make it very susceptible to the violent storms that occurred regularly across the lowveld. Experiments conducted in the 1928/29 growing season confirmed just that, as all the Cambodia planted at Magut and Barberton was destroyed by hailstorms. Trials with Cambodia were abandoned the next year due to its weakness in resisting these adverse weather conditions. This failure convinced Parnell that any jassid-resistant strain would also have to be resilient to the lowveld's other ecological variables, especially high winds and erratic precipitation levels, if it were to achieve wide-scale success. He decided to re-orient breeding efforts away from acclimatization of foreign varieties: the breeding of jassid-resistance would begin with strains that were already well-adapted to these harsh lowveld growing conditions.

Parnell launched a two-pronged breeding program to find a reliable, consistent, high-yielding jassid-resistant strain that would provide long-term stability for lowveld growers. He sought to accomplish this via single-plant selection (known also as pure line selection), in which a large population was planted and the best performers for the desired trait – in this case jassid resistance – were retained, while the rest were discarded. The progeny of these selected plants were then re-grown in isolation and screened again for the desired trait. This process was repeated until a uniform plant population was obtained that demonstrated consistent performance. In 1928 he initiated several single-plant selections using Zululand Hybrid. He also initiated trials using imported strains such as Improved Bancroft from

America and Uganda, hardy varieties with sturdy stalks that had proved resilient during the previous season's violent storms.

Successful single-plant selection would take a number of growing seasons, and Parnell was committed to making an immediate impact among lowveld growers already disheartened by the succession of poor growing seasons. Growers were languishing under seemingly constant setbacks: first floods, then pests, then drought. Parnell wanted to give them a psychological boost to rekindle their faith in Zululand's cotton-growing capacity. He was also facing immense pressure from his superiors to produce some sort of encouraging measure that would convince both growers and government that their investment in ECGC research efforts was worthwhile. So he decided to embark upon a simultaneous program of mass selections – in which plants are selected based on their phenotypic performance, and bulk seed is used to produce the next generation – as a means of providing an immediate, stop-gap solution to the cotton crisis. To this end, Parnell planted a wide spectrum of strains from the USA, India, Uganda, and about fifty selections of Zululand Hybrid provided by local growers searching for any sign of jassid resistance among strains that had already demonstrated some success within Zululand's erratic growing conditions.

Parnell's investment in mass selection yielded immediate results. In a field of Zululand Hybrid he identified a group of plants that retained their colour better than the rest, and remained healthy until picking in early May. These plants were quite uniform, strong-growing, big bolled, with a staple of well over 1 and 1.25 inches. Despite a low average number of bolls per plant, yields were consistently high. Parnell dubbed this superior performer Z.1 and set about distributing this seed to farmers. While he recognized that Z.1 was not a consistent-enough performer to ward off jassids for years on end, he was confident

that such a stop-gap solution would keep enthusiasm high while he searched for a longer-term solution: "it is easier to revive a waning industry than to resurrect it after it is once dead, and, for this reason, every effort has been made to multiply seed as rapidly as possible".[555]

The discovery of Z.1 created a whirlwind of optimism around the ECGC breeding program. Hopes for future prosperity based on cotton production in the South African lowfeld centred on the new jassid-resistant strain. Growers lauded the ECGC breeders for rescuing cotton cultivation from obscurity. Editorials in local broadsheets extolled Z.1 as a crucial development that would overcome the disappointment of previous growing seasons and usher in a new era of sustained cultivation.[556] ECGC scientists reinforced this pervasive sense of optimism: "there is every reason for hoping that the jassid problem will be solved satisfactorily in the very near future, thus removing one of the most serious obstacles to the successful development of cotton-growing in the lowveld area".[557] Efforts were turned to widespread multiplication: Parnell wanted to provide all lowveld farmers with Z.1 as soon as possible.

Dissemination began in 1926/27. Re-selections of the strongest Z.1 performers were undertaken on a separate block of land to reduce contamination from outside strains. Half of the seed reaped was replanted; the rest was disseminated to farmers in the Barberton area.

While Z.1 boosted the morale of lowveld growers (although the low incidence of jassid owed something at least to the prevailing drought), Parnell's investment in single-plant selections also began to show encouraging results. By the end of the 1926/27 season, two

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[555] F.R. Parnell, "The Cotton Breeding Station, Barberton", 315-322.
[556] See editorials in the *Zululand Times*,15 July 1926, 2 June 1927, and 14 July 1928. See also A.R. Pullen, "Improved Cotton Seed", *Farming in South Africa* II (May 1927): 93 and "Confidence Well Based", *African Sugar and Cotton* Planter II, no. 6 (June 1926): 19.
[557] F.R. Parnell, "The Cotton Breeding Station, Barberton", 315-322.

strains had emerged as the most promising. The first, A.12, was a selection of Z.1 made by a local grower, a strong, tough type, very hairy with lots of bolls. The second, U.4, was the progeny of a single plant selected at Barberton by Parnell in early 1925 from Ugandan cotton. U.4 was a small compact variety that gave heavy yields despite its small stature: its boll size averaged only 4.3 grams per boll compared with Zululand Hybrid at 5.5 grams and Improved Bancroft at 6.6 grams, but its overall yield per plant was higher than both.[558] Both A.12 and U.4 thrived in the 1926/27 growing season, the second of the severe drought years. Both yielded an average of 750 lbs per acre each, and suffered little or no jassid damage.

In 1927/28, U.4 yields surpassed those of A.12 and it emerged as the lowveld's most promising jassid-resistant variety. Yield tests at Barberton and the satellite stations recorded an average yield 50% better than that of Z.1, and 100% better than non-resistant varieties of Improved Bancroft, Zululand Hybrid, and Uganda (the U.4 parent).[559] Moreover, U.4 out-yielded A.12 across a range of different soil and climatic conditions by an average of 40%. In spite of late rains and prevailing drought conditions, the 1 200 acres planted with U.4 yielded returns of between 1 000 and 1 500 lbs per acre, with yields of up to 2 000 lbs per acre reported in a few places with favourable growing conditions. The U.4 variety also outperformed A.12 in jassid-resistance, drought resistance, prolific flowering capacity, quickness in forming buds and setting fruit, freedom from shedding, and ginning percentage.[560]

In the eyes of ECGC personnel, one more growing season was needed to confirm U.4's supremacy. Yields in 1928/29 stayed between 1 400 and 1 750 lbs per acre of seed

[558] F.R. Parnell, "The Origin and Development of U.4", *Empire Cotton Growing Review* 7, no. 3 (1930): 177-182.
[559] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1927/28* (London: 1928).
[560] Ginning percentage is the proportion of lint relative to seed.

cotton, compared with only 711 lbs for A.12 and 303 lbs for Improved Bancroft. The most encouraging news came from farmers off the station who planted about 1 000 acres of U.4 and reported favourable returns and strong jassid resistance. They further reported that U.4's small bolls seemed better able to withstand dry conditions and were more resistant to bollworm attacks than the larger bolls produced by other strains. The season's experiments convinced Parnell that U.4 was the jassid-resistant variety that he had been searching for: "In no single instance, whether in good or bad conditions, on the station or in the district, has [U.4] failed to show up well. Further work, therefore, will be concentrated almost entirely on U.4 and its substrains".[561]

Parnell's most pressing task became the dissemination of U.4 to farmers. He had been disappointed by the previous seasons' efforts at multiplication. Only farmers in the immediate vicinity of Barberton had received U.4; farmers in Zululand had to rely on Z.1 or A.12. Parnell hoped to produce enough U.4 to supply all lowveld growers in 1929. Efforts shifted towards intensive multiplication. By the end of that year Parnell had nearly three hundred tons of seed available, enough to plant over 30 000 acres. This was distributed to growers at a price of 3d. per lb.

The timing of U.4's emergence was particularly fortuitous. Widely disseminated during the 1929/30 season, when cotton prices dipped by almost 20%, U.4 buoyed the hopes of farmers mired in financial downturn.[562] They were eager to believe the cotton enthusiasts who claimed that U.4 had completely changed cotton's profitability. From the board room of the ECGC, Milligan boasted that U.4 yields were high enough to sustain cultivation during

[561] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1928/29* (London: 1929).
[562] *Zululand Times*, 18 December 1930. Prices fell to 5d. per lb by the end of 1930 (they had been almost twice this only twelve months earlier)

price lulls and periods of agricultural depression.[563] The President of the Central Cotton Cooperative Exchange, who planted one of the largest crops of U.4 in 1928, assured his members:

> There is no need for despondency. It seems to me that the advent of the new U.4 strain, which ensures a bigger yield per acre, has come about at a most opportune time, and will prove the salvation of many cotton growing friends. The yields to be expected this season promise to be very full ones, and with this greater production per acre the drop in prices will not be felt as severely as would otherwise have been the case.[564]

Echoing this enthusiasm, growers and newspapermen heralded U.4 as the pivotal find that would help Zululand turn the tide after consecutive disappointing growing seasons. One *Zululand Times* editorial heaped praise upon the Corporation's "expert knowledge" for "the discovery and development of means whereby [jassids] might be effectively combated".[565] Another recounted how U.4 had single-handedly allowed Barberton growers to recover from the devastation of the late 1920s.[566] U.4 was lauded as the technological savior that would rescue cotton cultivation in Zululand from obscurity:

> The optimism of today, however, stands in a very different light as compared with the optimism that obtained with regards to cotton eight or ten years ago. In the latter period the optimism was based largely on hope and expectation. Today it is based on scientific knowledge and something that is actual.[567]

By 1931 U.4 was being exported to Northern Rhodesia, Nyasaland, Tanganyika, Uganda, and Sudan. The success U.4 had achieved solidified Barberton's reputation as the premier cotton breeding station in all of Africa. The Corporation decided to boost these efforts by

[563] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1929/30* (London: 1930).
[564] Address from G.M. Robinson, President of the Central Cooperative Exchange, *Zululand Times*, 8 May 1930.
[565] *Zululand Times*, 2 May 1929.
[566] "Editorial: A Hopeful Outlook", *Zululand Times*, 21 March 1929.
[567] "Editorial: Forging Ahead", *Zululand Times*, 15 May 1930.

further expanding the staff: one more entomologist and three more junior agricultural officers were added in 1932.[568]

Safeness

ECGC officials were so confident in the suitability of U.4 to lowveld conditions that some breeders hoped for a particularly heavy jassid infestation that would test U.4's resilience under extreme conditions.[569] To their delight, widespread jassid attacks were reported throughout 1929/30. All non-jassid resistant strains planted at Barberton, including Watts' Long Staple, Improved Bancroft, and Acala were completely destroyed, leaving only a few inches of dried stick. U.4 exceeded expectations under these challenging conditions: Barberton growers obtained an average yield of 690lbs per acre, including losses due to washouts and poor cultivation. Well-treated crops managed yields of between 800 and 1 000 lbs per acre. By 1930, there was enough U.4 to supply all lowveld growers.

But efforts to capitalize on U.4's success stalled almost immediately. Rains arrived late in the spring in both 1930/31 and 1931/32 and were followed by severe droughts. Losses to jassid were relatively slight during these seasons, but cotton bollworm damage increased. Together, drought and bollworm caused the complete failure of many crops. Late in the 1932 season, a employee of the Magut Experiment Station wrote:

> It is very difficult indeed to say much about the crop at the moment. A lot of it which looked very promising a few weeks ago has gone off badly owing to bollworm and drought, and on the whole a very mediocre return is to be expected. All the plant cotton was put in late, and bad stands were obtained. If we had had a better tail to the

[568] ARC-IIC, ECGC Files, ECGC Annual Meetings, 11th AGM, 26 May 1932. Barberton's reputation was further enhanced by the 1931 visit of Dr. Harland, Head of the Genetics Department at the central breeding stat at Trinidad. He lauded Parnell's work, and came away so impressed with U.4's performance that he brought a number of samples back with him to Trinidad, in the hopes of crossing U.4. with the most promising Trinidadian strains. See ARC-IIC, ECGC Files, ECGC Annual Meetings, 10th AGM, 20 May 1931.
[569] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1929/30* (London: 1930).

> season some very good crops would have been obtained, but one feels pessimistic at the moment.[570]

In 1930/31, 400 single-plant re-selections of U.4 were undertaken at Barberton and only a handful survived the drought. A year later December dust storms destroyed virtually all the cotton at the station, while the season's rains remained "short, badly distributed, and irregular".[571] In South Africa as a whole, poor growing seasons and a 43% dip in the international price of cotton drove output down from 16 000 bales in 1930/31, to 9 000 bales in 1931/32, and 2 801 bales in 1932/33.[572]

The losses attributed to drought and bollworm forced Parnell to rethink the Corporation's narrow focus on jassid resistance. The variable precipitation and the increased incidence of bollworm convinced him that success in lowveld cotton cultivation would require adaptation to fluctuating environmental conditions.[573] He adjusted his research priorities to integrate these place-specific ecological realities. Abandoning his initial, almost exclusive, focus on developing jassid-resistance, he began to pursue a more holistic concept of 'safeness', which he defined as the ability of the cotton plant to adapt to extreme growing conditions, whether dry or wet, whether insect damage was heavy or light.

Through the devastation of the 1930/31 and 1931/32 growing seasons, Parnell's detailed observations revealed that bollworm damage differed within the U.4 population according to two traits: damage was less pronounced on U.4 plants with a higher number of

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[570] NA, Trade Commissioner (HLK) Report on the 1932 Cotton Crop from P.A. Bowmaker at the Experiment Station, Magut, to the Senior Cotton Grader, Durban, 12 April 1932.
[571] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1930/31* (London: 1931).
[572] ARC-IIC, ECGC Files, ECGC Annual General Meetings, 12th AGM, 26 May 1933, and B. R. Mitchell, *British Historical Statistics* (Cambridge, 1988).
[573] Parnell examined the precipitation records that began at Barberton in 1889 and concluded that high variability was the norm: "the figures are erratic, both for yearly and distribution, and it is not possible to speak of a normal season". F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1932/33* (London: 1933).

bolls, and on those plants that fruited earlier in the growing season. Parnell attributed this to the timing of infestations by the lowveld's two primary insect pests. For the most part, bollworms attacked the crop early in the growing season, depleting it of bolls; jassids set in later and prevented any further setting. Plants with a large number of small bolls had a better chance of rebounding from the initial bollworm attacks. As evidence of this, Parnell pointed to one, hundred-acre U.4 crop with a large number of bolls, that was badly damaged by bollworm early in the 1931 season, then rebounded strongly to yield over 1000 lbs per acre.[574] Early fruiting further increased the chances of rebounding later in the season.[575] Both traits became crucial to Parnell's emphasis on 'safeness'.

Re-selections of U.4 sought both early fruiting and higher boll numbers. In 1932/33, three re-selections, U.4/2, U.4/4 and U.4/4/2, achieved a 10-15% yield increase over the original U.4. Intra-breeding among this first generation progeny led to the development of O.52 in 1934/35, an early, heavy fruiting type with plenty of strength that retained its flowers better than other U.4 progeny. In its first full growing season, stands of O.52 achieved yields of between 800 and 1000lbs per acre.[576] Parnell enthused that O.52 combined all the necessary traits to overcome the ecological constraints to cotton production in the South African lowveld.

But a fault quickly emerged: O.52 had a lower ginning percentage than other early fruiting strains. In 1935/36 Parnell began selecting against his trait, and developed a new strain of O.52 with considerably higher ginning percentages that maintained the original

[574] ARC-IIC, ECGC Files, ECGC Annual General Meetings, 10th AGM, 20 May 1931.See also "Cotton Bollworm", *Farming in South Africa* 2 (1927): 224, ARC-IIC, ECGC Files, ECGC Annual General Meetings, 13th AGM, 14 June 1934.
[575] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1935/36* (London: 1936).
[576] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1965/37* (London: 1937).

plant's early fruiting and high boll numbers.[577] Two of these re-selections, 5143 and 5149, were deemed the most promising; their yields surpassed those of O.52 by 27% and 25%, respectively, and they had higher ginning percentages. Both strains seemed to respond to heavy or light rainfall seasons with considerable success, and they resisted heavy bollworm attacks.

In 1937/38, both 5143 and 5149 outyielded their O.52 parent by more than 20%, and had slightly higher ginning percentages (35.8% for 5143 and 36.9% for 5149 compared to 35% for O.52).[578] Lint was sent to the government cotton grader, who reported that 5143's lint was of a much better quality than that of O.52. Further reselections of 5143 yielded a new generation of substrains (known as 6130) that retained the toughness of the original 5143 with added resistance to both drought and Alternaira disease, which caused premature leaf-fall and had become increasingly prevalent across the lowveld. The yields of these reselections, expressed as percentages of O.52 were: 129% for 5143, 128% for 6130, and 108% for 5149.[579] 5143 and its substrains emerged as the most suited to Parnell's emphasis on safeness: they were able to withstand periods of both heavy and light rainfall, and seemed resistant to both bollworm and jassid attacks.

The outbreak of World War II crippled ECGC experimental efforts.[580] The Corporation lost five scientists to wartime service in the fall of 1939. Parnell decided to

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[577] Ibid. 11.
[578] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1937/38* (London: 1938).
[579] Ibid., 16.
[580] By the 1940s cultivation effort in Swaziland had taken on a very different character from its parent research program in Barberton. Throughout the 1930s both Swazi stations at Bremersdorp and Ingwavuma had served the same role as the station at Magut; satellite stations testing strains developed at Barberton under different lowveld growing conditions. During the 1940s efforts shifted to encouraging native cultivation. An intensive propaganda campaign was launched to convince Swazi growers of the merits of cotton based on its drought resistance, value as a rotation crop for maize, immunity from attack by witchweed, cash return, and importance of lint as material for war supplies. One hundred and twenty growers took part in the first season, and totaling

consolidate all experiments at Barberton and closed the station at Magut. With his single remaining assistant, he continued with selections as best he could; 5143 continued to perform well, with a mean yield of 476 lbs per acre, and was widely disseminated to farmers across the lowveld in 1940. Trials continued to show higher yields, but these slight increases were not sufficient to stem the declining enthusiasm for breeding work. Despite all the advances that Corporation scientists had achieved in their fifteen-year breeding program, the output of the Zululand lowveld had declined steadily during the 1930s [see Figure 6.1].

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over 21 941 lbs of seed cotton. But this figure dropped to 11 215 lbs in the second growing season, with average yields dropping from 186 lbs per acre to 118 lbs per acre due to adverse climatic conditions and heavy labour demands. By 1943 this scheme was completely abandoned. For more see J.V. Lochnie, "Cotton Growing in Swaziland", *Empire Cotton Growing Review* 7, no. 3 (1930): 183-192; F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1943/44* (London: 1944); Alan H. Jeeves and Jonathan Crush, "Introduction," in *White Farms and Black Labour: The State and Agrarian Change in Southern Africa, 1910-1950*, ed. Alan H. Jeeves and Jonathan Crush (Portsmouth, 1997); Bonginkosi Azariah Bhutana Sikhondze, "The Development of Swazi Cotton Cultivation, 1904-85" (PhD, School of Oriental and African Studies, 1989).

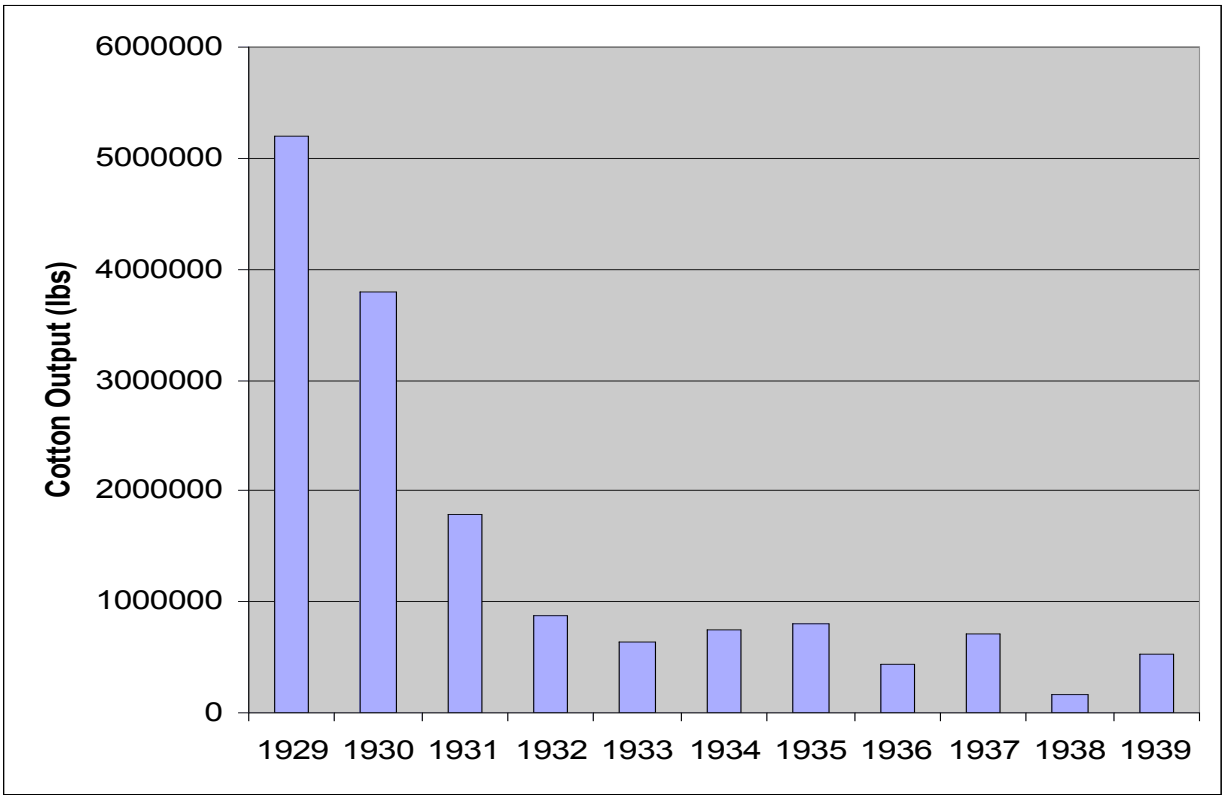

Figure 6.1: Cotton Output for Natal and Zululand, 1929-1939. Source: *Official Yearbook of South Africa* (1934): 473 and Ibid., (1941): 733.

The war spelled the end of Barberton's single-plant selection program, and left 5143 and its substrains as its legacy [Table 6.2]. By 1940, however, ECGC breeders had hit a ceiling with single-plant selections. Even 5143 was increasingly vulnerable to jassid attacks. ECGC personnel were convinced that a substantial improvement within the U.4 lineage, either in terms of yield or quality, depended upon increasing hairiness to solidify jassid resistance.

Strain	Yield (lb per acre)	% Bulk	Date put into general cultivation
U.4 Bulk	385	100	1929/30
U./4	454	118	
U.4/4	478	124	1935/36
O.52	562	146	1939/40
5143	566	147	
6130	569	148	

Table 6.2: Progress of U.4 Variety Trials. Source: F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1939/40* (London: 1940): 13.

Hybridization

After 1940, ECGC scientists shifted their focus towards hybridization – the crossing of two plants to produce progeny exhibiting the positive characteristics of each parent – in hope of producing a plant that would resist jassid attacks and yield higher quality lint than U.4 family cottons.[581]

Efforts at hybridization necessitated a renewed focus on imported varieties. Breeders at the Cotton Research Station in Trinidad sent a number of hairy varieties to cross with 5143. The first experiments were with Cambodia, the large trunk variety susceptible to wind damage that Parnell had discarded years earlier. The early Cambodia x 5143 crosses were reduced in size, and resembled the 5143 parent in habit and growth, but they did not fruit as well as the best 5143 selections. More promising was the MU.8A strain, an Indian Upland type that was among the hairiest varieties in existence. This was crossed with 5143 for the first time in 1939/40. ECGC breeders hoped to combine MU.8A's hairiness and lint quality with 5143's suitability for lowveld growing conditions.

[581] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1937/38* (London: 1938): 18.

Results were disappointing. The 5143 x MU.8A crosses gave high-yielding plants with significant hairiness, but ginning percentages were quite low. This reflected the larger problem ECGC breeders had encountered in their earlier attempts at breeding for hairiness: this characteristic tended to be associated with plants that produced short, harsh lint. To overcome this, Parnell took a more nuanced look at the link between hairiness and jassid resistance. Hairiness, he decided, was a simplification that masked the complexity of a characteristic that varied with the length, thickness, and density of the leaf hairs on cotton plants.[582] He set about developing a standardized grading system to distinguish and evaluate different types of hairiness. His trials confirmed that jassid susceptibility and infestation were correlated with both the density and length of hair on the underside of the leaf lamina, but that length, rather than density or thickness, was the prime determinant of jassid resistance [Illustration 6.3]. These trials revealed a very high inverse correlation (greater than 95%) between infestation or susceptibility and hairiness when hair length was greater than 0.3mm, and even greater resistance when length exceeded 0.5mm.[583]

[582] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1941/42* (London: 1942): 44.
[583] F.R. Parnell, H.E. King and D.F. Ruston, "Jassid Resistance and Hairiness of the Cotton Plant", *Bulletin of Entomological Research* (1949): 539-575.

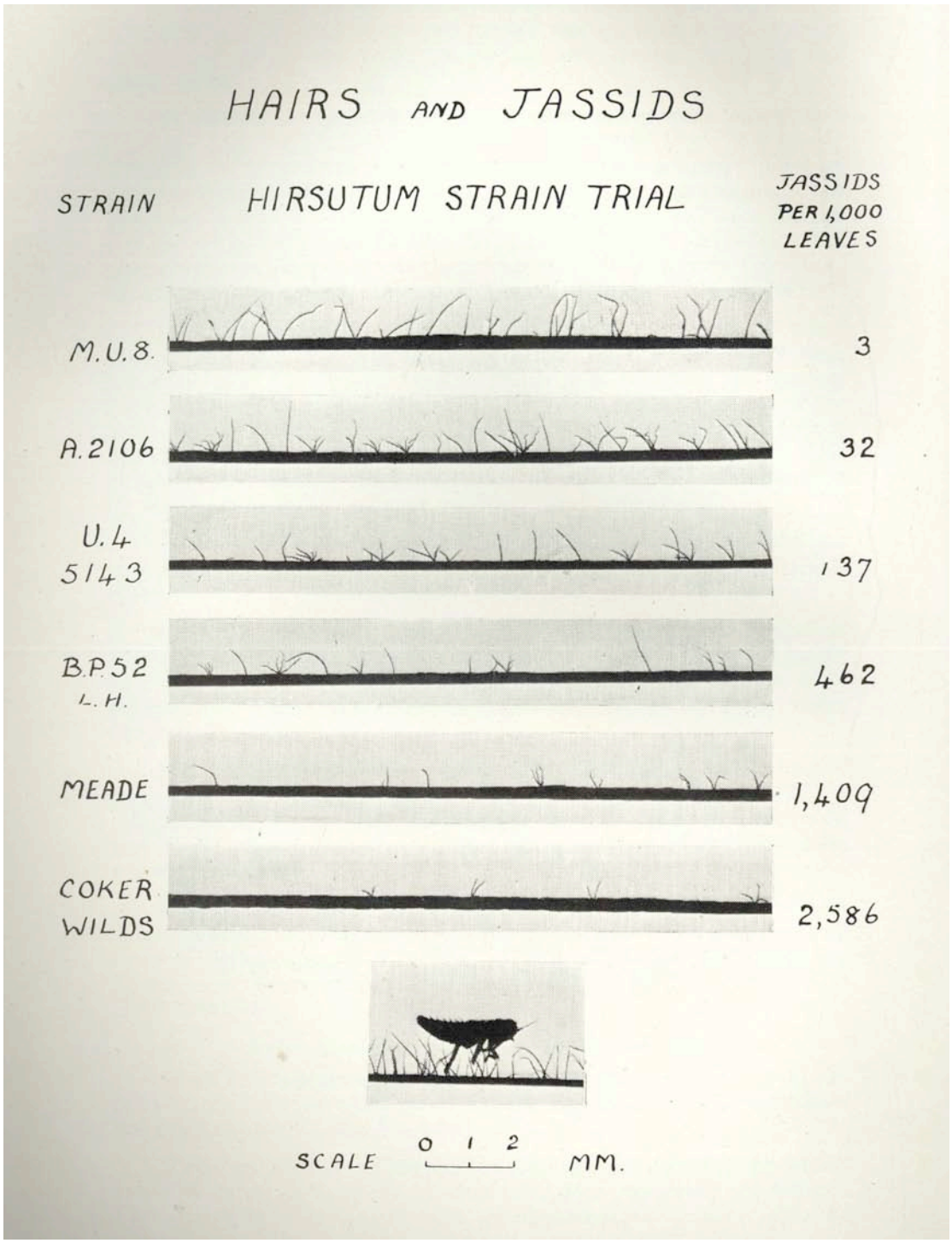

Illustration 6.3: Experimental Trials Showing the Link between Hairiness and Incidence of Jassid. Source: F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1943/44* (London: 1943): 28.

Parnell therefore set about breeding for leaf hair length while maintaining long, fine lint. By 1942/43 the 5143 x Cambodia crosses began to show some promise: for the third successive season progeny demonstrated a combination of ginning percentage and hairiness far superior to either parent.[584] The mean average for the best performers of the 5143 x Cambodia crosses were 575 lbs per acre compared with 450 lbs per acre for the best 5143 performers.[585] These hybridized varieties also demonstrated heavier seed weight and longer lint length.

Among the 5143 x Cambodia hybrids, A.2106 emerged as the strain best suited to Zululand. It achieved the highest yield during both the 1943/44 and 1944/45 growing seasons, surpassing 5143 by as much as 46%. Efforts quickly shifted to multiplication: Parnell hoped to have seven tons of A.2106 seed ready for dissemination by 1946, enough to replace 5143 in general cultivation. But samples sent off to the British Cotton Industry Research Association were poorly received. Testing there confirmed the spinning quality of this hybrid was about the same as the original U.4, a judgment that disappointed Corporation breeders whose own observations had estimated A.2106's lint to be consistently longer than that of the U.4 strains.

Barberton researchers turned to improving the lint quality of the hybridized varieties. Efforts shifted to the 5143 x MU.8A crosses, which underperformed U.4 x Cambodia crosses in yield, but not by much (599 lbs per acre compared with 622 lbs per acre in 1946/47). Commenting on the samples sent to them, the British Cotton Industry Research Association reported that the 5143 x M.U.8 hybrids were consistently good in strength and appearance,

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[584] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1942/43* (London: 1943): 20.
[585] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1943/44* (London: 1944).

while the 5143 x Cambodia hybrids were on the whole weaker and poorer in appearance. In addition to poor lint quality, another concern about A.2106 and other U.4 x Cambodia progeny was that these heavier-yielding but late-developing types suffered disproportionately from late bollworm infestation.[586]

The hybridization trials peaked when BP.52, a Ugandan variety, was crossed with MU.8A. The result yielded 676 lbs per acre, and produced a longer and finer fibre than had ever been achieved in the lowveld. The best progeny, A.618, was favoured over A.2106 for a number of reasons: its earliness made it less susceptible to bollworm, it had slightly longer hairs and therefore more jassid resistance, its lint was judged in spinning tests results as being superior to A.2106.[587]

The Abandonment of Barberton

Despite the advances made by hybridization, by the early 1940s Parnell and his fellow breeders were resigned to the failure of cotton production in south-eastern Africa. The Corporation's investment in breeding technology had produced higher-yielding strains with good jassid resistance, but they were unable to make cotton growing a viable proposition on the South African lowveld. As Parnell reflected in 1942:

> For some years before the war started, it was becoming more and more clear that South Africa could not possibly develop into an important producing country with cotton prices at their then low-level. We know that considerable areas are suitable for the crop and that good yields of good quality cotton can be obtained: unfortunately other economic factors intervene, making the costs of production high in comparison with those of some larger producing countries.[588]

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[586] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1947/48* (London: 1948).
[587] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1948/49* (London: 1949).
[588] NA, LON Vol. 358 Ref A290, Barberton Cotton Experiment Station, General, 1924-1943, Parnell to Pieter Koch, 31 January 1942.

The wartime price of cotton rose from 3d. per lb in 1937/38 to 8.d per lb in 1944/45, an increase of 60%. But rising American output (estimated at between eleven and twelve million bales), which flooded the market, stifled larger price increases.[589] By contrast with the sluggish increase in cotton prices, the price of maize increased by 106% between 1938 and 1945; citrus increased by 65% during the same period, and field crops such as potatoes and beans rose by 138%.[590] Parnell recognized that the economic outlook offered "no hope of the present type of cotton being produced on a large scale".[591]

Output during the 1940s confirmed Parnell's pessimism. Seed cotton production in Natal and Zululand declined steadily throughout the 1940s. Output dipped from 773 000 lbs in 1939/40, to under 500 000 lbs in 1940/41, 130 000 lbs in 1941/42, and 90 000 lbs in 1942/43. There was a brief upsurge to 130 000 lbs in the following year,, and but in 1944/45 seed cotton output was a mere 36 000 lbs.[592] There seemed to be little prospect of production values returning to levels attained during the height of the cotton boom.

Breeding technologies could not offset the economics constraining lowveld cotton cultivation. Stagnating prices, compounded by steady losses from bollworm and uneven precipitation, ate into growers' profit margins. Experimental costs were also rising: during the 1949/50 growing season, ECGC expenditures for experimental work at Barberton had ballooned to £4 321, with an additional £2 556 going to salaries. This total was over 30% higher than that predicted when Barberton was established.[593] Faced with escalating experimental costs, the Corporation decided that it could not justify such high expenditures

[589] F.M. de Toit, "Cotton Culture", *Farming in South Africa* XV, no. 166 (January 1940): 4.
[590] J. M. Tinley, *South African Food and Agriculture in World War II* (Stanford, 1954), 89-100.
[591] F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1942/43* (London: 1943): 17.
[592] *Official Yearbook of the Union* (1941/42): 381.
[593] NA, HLK Vol. 67 Ref 51/2, Empire Cotton Growing Corporation and British Cotton Growing Corporation, 25 January 1950.

while domestic production levels stagnated, and reassessed its commitment to cotton growing in southern Africa.

The combination of environmental and economic constraints to production persuaded Corporation officials in London to abandon South African breeding efforts in 1948. At the same time, the Corporation closed down the Cotton Research Station in Trinidad, to combine its laboratory-based research program into cotton's genetic constitution and physiological behaviour with Barberton's more practical, applied cotton breeding programs in a single research station at Namulonge, Uganda, that would address problems of cotton-growing in Africa from the largest cotton-producing country in the continent.[594]

By 1950 the Corporation had consolidated all of its African operations at Namulonge, with 13 professional scientists and a total staff of more than 250. Corporation scientists, who had previously been scattered across the cotton-producing regions of empire, were now deployed entirely within eight countries (all but two of them in Africa): Uganda, Kenya, Tanganyika, Nyasaland, Northern Nigeria, Sudan, Aden, and the West Indies [Table 6.3].[595] At Namulonge, research focused on refining profitable growing techniques rather than the controlled, precise experimentation that had dominated Barberton's agenda. Corporation scientists devoted themselves to developing a high productivity farming system based around cotton.

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[594] ARC-IIC, ECGC Files, ECGC Annual General Meetings, 24th Annual General Meeting, 5 June 1945. All of the Corporation's holdings in Trinidad were purchased and taken over by the Trinidadian Government. See also M.H. Arnold, ed., *Agricultural Research for Development: The Namulonge Contribution* (Cambridge, 1976). Total capital for the station was approximately £205 500: £100 000 was provided by the Colonial Development and Welfare Fund, £78 000 from the Corporations' invested resources and £25 000 from the Cotton Industry War Memorial Trust. See also Joseph Hutchinson and D.F. Ruston, "The Empire Cotton Growing Corporation and the Organization of Research on Raw Cotton," in *The Organization of Research Establishments*, ed. John Cockcroft (Cambridge, 1965), 114-129. All of the Corporation's experimental work in Africa was to be coordinated through this station, under Parnell's direction Parnell retired soon after his appointment in 1951 due to ill health and received an O.B.E. that same year.

[595] *Empire Cotton Growing Corporation* (London: 1951).

Location	1928	1933	1938	1948	1953	1958	1962
Fiji	1	1					
N. Rhodesia	2	1	1				
S. Rhodesia	3	4	4				
Swaziland	1	1	2				
South Africa	8	11	11	4			
Nyasaland	5	3	4	2	3	1	1
West Indies	4	6	5	1	2	1	1
Sudan	4	3	3	6	6	5	9
Nigeria	2	2	1	0	4	5	7
Tanganyika				3	6	6	7
Uganda				6	13	14	16
Aden						3	2
Thailand							1

Table 6.3: The Distribution of ECGC Scientific Officers, 1928-1962. Source: Joseph Hutchinson and D.F. Ruston, "The Empire Cotton Growing Corporation and the Organization of Research on Raw Cotton," *The Organization of Research Establishments*, ed. John Cockcroft (Cambridge, 1965), 114-129, p. 142.

The Corporation's retreat from South Africa reflected a broader shift in imperial scientific priorities. As Joseph Hodge has shown, science during the period of late colonialism took on a more humble and restrained character, due both to the decline of Britain's global influence and the proliferation of failed colonial ventures.[596] The ECGC abandoned its vision of extending its influence throughout Africa, and restricted itself to the continent's most productive cotton region, east Africa.

Control over the Barberton research station reverted back to the South African Department of Agriculture, under the supervision of Professor A.R. Pullen. Pullen continued some breeding work with the promising A.618 strain, but budget restrictions forced him to scale back operations to focus to primarily on insect control. The insect-resistance breeding program, begun with so much fanfare in 1926, was abandoned, as the Department of Agriculture shifted responsibility for breeding pure cotton strains back to the individual

[596] Joseph Morgan Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Athens, 2007), 16.

farmer.[597] Pullen's limited research program focused instead on insecticides: he experimented with different quantities of the most popular insecticides (DDT, BHC, Toxaphene) to find the optimum combinations for each lowveld pest.[598]

Conclusion

The Empire Cotton Growing Corporation's abandonment of Barberton spelled the end of state-led cotton breeding efforts in South Africa. Foreign-trained scientists had imported specimens, knowledge, and expertise to overcome the obstacles that had precipitated the Zululand cotton crash, but still failed to achieve sustained cultivation. The technologies of mass selection, single-plant selection, and hybridization had proven insufficient to overcome the ecological and economic barriers to lowveld production. This latest attempt by experts to impose cotton within Natal and Zululand ended in ignominy.

The Corporation's greatest success, U.4, was a product of Parnell's efforts to integrate this place-specific knowledge within global networks of exchange. The emergence of U.4 was underpinned by Parnell's investigations of hairiness, which were informed significantly by his previous breeding experience in India and experiments comparing specimens imported from Trinidad and the United States. The Corporation's achievements in breeding for jassid-resistance owed much to these imperial networks.

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[597] See for instance "Better Seed for Larger Yield", *Farming in South Africa* XXI, no.248 (1946): 720, which called for farmers to become more "seed conscious" regarding the quality, viability, purity and yielding capacity of the cotton seed they were planting.

[598] Division of Entomology, "Cotton Insects, Recommendations for the 1951/52 Season", *Farming in South Africa* XXVI, (August 1951): 278/279. See also Pieter Koch, "Cotton Culture", *Farming in South Africa*, XXIV, no. 282 (1949): 387 and T.J. Naude, "Cotton Insect Problems", Farming in South Africa XXV, no. 296 (1950): 349. This coincided with larger trends in world agriculture that embraced the wide-scale use of pestcides and insecticides following WWII. For more see: Thomas D. Dunlap, *DDT: Scientist, Citizens, and Public Policy* (Princeton, 1981).

The Corporation's foray into breeding for insect-resistance also offers important insights into the relations between imperial scientific experts and local environments. Although Barberton was envisaged as a sub-tropical experimental station that would address a wide variety of research needs, Corporation researchers there quickly reoriented their focus towards the development of jassid resistance after the Zululand cotton crash revealed them to be the lowveld's most pernicious cotton pest. During his twenty years as head of Barberton's research program, Parnell proved adept at adjusting his research agenda to integrate place-specific observations, exemplified by his widened focus on 'safeness', and his commitment to improving varieties that had proven hardy enough to withstand the region's violent storms and erratic precipitation. Barberton's breeding program was intimately tied to local priorities and concerns, and serves as a caution to histories that unduly emphasize the hegemonic attitudes of imperial experts towards African environments.

The ECGC's efforts to breed jassid-resistant cotton represent a continuation of the dominant scientific paradigm that sustained cultivation efforts through the early 20th century. In the wake of the devastating crash of the 1920s, cotton experts approached environmental constraints to production – in the form of marginal soils, uneven rainfall, insect damage – in isolation rather than as an interaction. Insect pests were conceived of as a bounded, unitary obstacle that need not threaten cotton's long-term prospects in South Africa. Insects were, it seemed, a challenge that could be defeated or a problem that could be fixed: thus they became the main focus of attention among scientific experts.

This ecological compartmentalization hid the broader, more integrated ecological obstacles to production behind the immediate inadequacies of insect control. While Corporation breeders were largely successful in mitigating jassid attacks, other variables –

namely bollworm and erratic precipitation – reemerged as major constraints to successful production. Parnell's new emphasis on 'safeness' represented a shift towards a research paradigm that appreciated these interactions. But he was unable to develop a new variety that satisfied all growing requirements. The Empire Cotton Growing Corporation was the latest in a long series of scientific failures to integrate cotton in the South African lowveld.

Chapter 7
Conclusion: One Hundred Years of Disappointment

Touted as a commodity crop capable of remaking land and life in southern Africa in the 1850s, the 1860s, at the turn of the century, and again in the 1930s, cotton never became the elixir of transformation that its proponents envisaged it to be in Natal and Zululand. In the century-long trajectory of endeavours to establish cotton as a major crop traced in this dissertation, disappointment succeeded enthusiasm as regularly as reports of large prospective cotton yields were swept aside by harrowing tales of crop failure and despair. Successive chapters of this study have identified the historically specific political, racial, and economic factors that thwarted these repeated efforts to capture for southern Africa some of the returns that flowed from the establishment of 'King Cotton' in other parts of the globe. But even more crucially, I argue, this story of agricultural failure was rooted in the environment and in human interactions with it. Four ecological constraints were of particular significance to the disappointing performance of cotton cultivation in south-eastern Africa:[599]

Temperature

Cotton is a heat-loving plant that requires high growing-season temperatures to thrive. Temperature influences cotton production in several ways: it determines the earliest date for sowing, time of flowering, fibre quality, and growth rate throughout the life of the plant. Optimum temperatures for growth are between 24 and 32^0C;[600] temperatures below 20^0C

[599] What follows is an assessment of the most important growing conditions for successful cultivation in Upland varieties (*Gossypium hirsutum),* which make up approximately 90% of the world's cultivated cotton. This was the chosen variety for most of the ventures surveyed in the dissertation, with the exception of the Natal Cotton Company scheme which focused on the Sea Island variety (*Gossypium barbadense*), and the Empire Cotton Growing Corporation which imported a number of non-Upland varieties for experimentation.

[600] J.L. Hatfield, J.R. Mahan, and J.J. Burke, "Crop-Specific Thermal Kinetic Windows in Relation to Wheat and Cotton Biomass Production," *Agronomy Journal* 80 (1988): 553-556. V.R. Reddy, K.R. Reddy, and D.N. Baker, "Agroclimatology and Modeling," *Agronomy Journal* 83 (1991): 211-217. Extremely high temperatures

inhibit germination rates, shoot elongation, and primary root development.[601] Cotton is vulnerable to frost: growth and development cease when temperatures fall below 10^0C. Consistently warm temperatures assist morphological development, through the accumulation of sunlight hours, which is calculated in heat units.[602] In southern Africa, cotton requires between 2100 and 2700 heat units during the October to March growing season.

Two other factors influence heat availability. The first is the rate of photosynthesis, which is the crucial limiting factor to cotton growth in the African tropics.[603] Situated south of 29^0S in the mid-latitudinal zone, this was not a major issue for South African growers, whose rates of potential photosynthesis – estimated at 29 g/m^2/day over the 6 month growing period – proved sufficient for cotton yields in excess of 400kg/ha.[604] The second factor is cloudiness: reduced light caused by cloudy weather lowers rate of vegetative growth and leads to smaller bolls. Areas recording more than 60% cloudiness annually are generally considered to be unsuitable for cotton.[605] Interviews with contemporary agricultural officials

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(above 35^0C) can also hinder development by increasing rates of transpiration (water lost through leaf evaporation), which exacerbates water loss. Such extreme high temperatures are also associated with higher shedding rates and decreases in boll size. See Harry Bates Brown and Jacob Osborn Ware, *Cotton* (New York, 1958), 243. Generally speaking this was not a major issue within Natal and Zululand, though there were some sporadic observations of crop damage due to scorching heat made by Loffler at his farm at Nongoma and by some Ntambanana settlers. High temperatures presented a more significant constraint to cotton cultivation further north in Zimbabwe, Malawi and Mozambique.

[601] G.A. Constable, "Temperature Effects on the Early Field Development of Cotton," *Australian Journal of Experimental Agriculture and Animal Husbandry* 16 (1976): 705-710.

[602] A.B. Hearn and G.A. Constable, "Cotton," in *The Physiology of Tropical Food Crops*, ed. P.R. Goldsworthy and N.M. Fisher (Chichester, 1984), 495-427. Monthly heat units values are obtained by subtracting the base temperature (the temperature under which the crop will not grow; in cotton's case the base temperature is 10^0C) from the mean temperature and multiplying this figure by the number of days in that month.

[603] Philip W. Porter, "Notes on Cotton and Climate: A Colonial Conundrum," in *Cotton, Colonialism, and Social History in Sub-Saharan Africa*, ed. Allen Isaacman and Richard Roberts (Portsmouth, 1995), 43-49.

[604] Jen-Hu Chang, "Potential Photosynthesis and Crop Productivity," *Annals of the Association of American Geographers* 60 (1970): 92-101.

[605] Brown and Ware, *Cotton*, 251.

suggest that this could have been a significant limiting factor to cotton production in the far north of Zululand.[606]

In the 19th century, cotton cultivation efforts focused on inland areas with high elevations, frequent frosts, and violent storms. The lands that Joseph Byrne assembled for his settlers, for instance, were located predominantly at elevations above 1000m which left cotton exposed to strong winds and frigid temperatures.[607] Modern-day estimates of Byrne's sites along the Illovo River reveal average temperatures during the October-March growing season of between 18.3 and 20.7^{0}C, and the accumulation of only 1514 to 1937 heat units during this period.[608] Byrne settlers allocated plots closer to Pietermaritzburg faced similar constraints, with average temperatures of 19.6^{0}C translating into a maximum heat unit value of 1742. Byrne chose plots that were too high, too far inland, and too cold for cotton to succeed.

The critical role of temperature in the growing regime of cotton helps explain the northern migration of these repeated efforts in southern Africa. Following the disappointment of 19th century cotton schemes, scientists in the Union's Department of Agriculture identified the link between warmer temperatures and the morphological development of cotton. Subsequent attempts to integrate cotton at Ntambanana and Candover sought to take advantage of Zululand's higher overall temperatures.[609] The region's cotton prospects shifted increasingly to the north and to the east as officials sought lands with lower elevations and warmer temperatures.

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[606] Interview with Uri Stein, Cotton Research Officer, Makhathini Research Centre, 25 January 2005.
[607] The Natal Cotton Company Lands along the coast being the only exception.
[608] K. Camp, "The Bioresource Groups of KwaZulu-Natal," (1999).
[609] Contemporary estimates put Candover's availability of heat units at 2509 and Ntambanana's at 2317. The rise in mean temperatures from south to north is a different of approximately 1.7^{0}C from a mean annual temperature of 20.0^{0}C near Port Shepstone to 21.7^{0}C at Pongola in northern Zululand. B.E. Beater, "Soils of the Sugar Belt," in *Natal Regional Survey Vol. 5* (Cape Town, 1962).

Soils

Soils were another significant constraint on cotton cultivation. Cotton develops a larger and deeper root system than most other crops. It has a primary tap root that penetrates almost straight down (as much as three metres), and lateral roots that spread out more or less horizontally. It is not unusual for well-spaced Upland varieties to fill a soil volume of more than 2.5 metres in diameter and one metre thick. Cotton thrives on deep, alluvial soils that allow its root system to extend its reach: one study indicates that good soil depth allows the plant to flower earlier and longer, and produce more than three times as many bolls as cotton planted on shallow soils.[610]

Most soils in Natal and Zululand limited the expansion of cotton's massive root system.[611] Cotton planted within thirty kilometers of the coast – for instance by the Natal Cotton Company and Henry Francis Fynn at Inyangwimi – suffered from sandy, rocky, shallow soils. Much of the cotton planted elsewhere was limited by heavy clay content, common in the Vertisols that predominate in south-eastern Africa. Cotton grown on loam soils generally fruits earlier and more rapidly than that grown on clay soils.[612] This effect is linked with higher soil temperatures and better aeration provided by the coarser texture of loams.[613] Heavy clay soils are also prone to waterlogging, which can reduce yields by as much as 20%.[614] This was a major complaint voiced by Byrne settlers allocated plots along

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[610] Brown and Ware, *Cotton*, 253.
[611] South African Sugar Association Experiment Station, "Identification and Management of the Soils of the South African Sugar Industry," (Mount Edgecombe, 1999).
[612] J.L. Ping et al., "Identification of Relationships Between Cotton Yield, Quality, and Soil Properties," *Agronomy Journal* 96 (2004): 1588-1597.
[613] Brown and Ware, *Cotton*, 253.
[614] A.S. Hodgson, "The Effects of Duration, Timing, and Chemical Amelioration of Short-Term Waterlogging during Furrow Irrigation of Cotton in Cracking Grey Clay," *Australian Journal of Agricultural Research* 33 (1982): 1019-1028.

the Illovo River.[615] Further north, Zululand soils such as those on Candover Estates also suffered from poor drainage.[616]

Agricultural decisions exacerbated the consequences of reliance on marginal soils. Byrne settlers anxious to establish their homesteads often put their land under cotton immediately, without first breaking up the soil, which limited root expansion. Most Zulu growers lacked plows, leaving only their bare hands and digging sticks for seedbed preparation. The fervor which characterized the Zululand cotton boom led growers to plant cotton on the same soil year after year which depleted the soil of nutrients. These farming practices compounded the already severe limitations of clayish soils.

Uneven precipitation

Despite its reputation as a drought-tolerant crop, cotton is quite fickle in its water requirements. Dryland cotton requires an initial burst of rain for germination: cotton seeds will not germinate until they have absorbed approximately half their weight in water.[617] A minimum of 90 to 120 mm is then required for seedling development; vegetative growth is correlated with water availability during the first three months of the growing season.[618] Early water shortages stunt all subsequent growth in upland cotton. The most sensitive period for water stress is during peak flowering, which occurs 90 to 120 days after

[615] Contemporary assessments of Byrne sites along the Illovo River estimate that shallow soils occupy more than 50% of arable land available, while poor drainage is present in over 30% of soils.
[616] Contemporary estimates at Candover suggest that sandy soils make up 31.5% of the area, shallow soils occupy 52.4%, and poor drainage affects almost half of all soils.
[617] Brown and Ware, *Cotton* 247.
[618] D.W. Grimes, H. Yamada, and W.L. Dickens, "Functions for Cotton (Gossypium hirsutum L.) production from irrigation and nitrogen fertilization variables," *Agronomy Journal* 61 (1969): 773-776. One study found that a water shortage of 33% during the first two months of the growing season reduced plant height by 18%, leaf number and area by 60%, and significant hindered boll development in upland cotton. A.J. Stegger, J.C. Silvertooth, and P.W. Brown, "Upland Cotton Growth and Yield Response to Timing the Initial Postplant Irrigation," *Agronomy Journal* 90 (1998): 455-461.

planting.[619] Steady, even rains are required: too little inhibits boll formation; too much soaks the roots and damages cotton already on the bolls.[620] A mature plant with cotton on the bolls is particularly vulnerable to heavy rains that will spoil or stain the lint, and cause bolls to fall off prematurely. In south-eastern Africa successful cotton cultivation needs, in sum, between 700 and 1100mm of rainfall, evenly distributed through the growing season.

The cotton cultivation episodes examined in this dissertation have revealed how the uneven annual precipitation in south-eastern African hampered cotton's success. Precipitation in the region comes primarily in short, sharp afternoon storms. Byrne settlers along the Illovo noticed that while overall rainfall was sufficient for cotton, it was delivered in the form of heavy, intense thunderstorms. White settlers who planted along the uMkhomanzi River in the 1870s saw their cotton efforts similarly stifled by violent afternoon storms. The great flood of March 1925 virtually wiped out Zululand growers, with overall losses of more than 90% reported throughout Zululand.

Inter-annual variation further constrained cotton growing efforts within the region. In south-eastern African rainfall incidence is determined primarily by two oscillation patterns – an 18-20 year fluctuation underpinned by shifts in the Intertropical Convergence Zone, and the less predictable Southern Oscillation Events – which together account for 50% of annual variability.[621] This high variation year from year complicated planning and farming decisions. Crops planted on severe slopes at Candover were washed away by heavy

[619] J. Kock, L.P de Bryun, and J.J. Human, "The Relative Sensitivity to Plant Water Stress during the Reproductive Phase of Upland Cotton," *Irrigation Science* 11 (1990): 239-244.
[620] P.O. Cull, A.B. Hearn, and R.C. Smith, "Irrigation for Crops in a Subhumid Environment," *Irrigation Science* 3 (1981): 17-20. Grimes *et al.* estimate that water stress during this crucial period of peak blooming causes overall yields losses of 32%. See Grimes, Yamada, and Dickens, "Functions for Cotton (Gossypium hirsutum L.) Production from Irrigation and Nitrogen Fertilization Variables".
[621] R.A. Preston-Whyte and P.D. Tyson, *The Atmosphere and Weather of Southern Africa* (Cape Town, 1988).

flooding. Ntambanana farmers who monocropped their land under cotton were more vulnerable to these dramatic swings in precipitation.

Insect Pests

Southern Africa's two major cotton insect pests – jassid and bollworm – also presented significant, costly barriers to development. Both commonly fed on other southern African crops, the bollworm on maize, sorghum, tobacco and tomato, and the jassid on sweet potato, beans, and cowpea, but were especially devastating for cotton.

Both bollworm and jassid wrought havoc on cotton stands devastated by flood and drought in the 1920s. Cotton stands across Zululand – primarily monocrops sown in hopes of great profit anticipated in consequence of the lofty expectations propagated by scientific experts – provided enormous food sources for both insects. They flourished, causing unprecedented levels of damage. The Division of Entomology exhausted all known measures including trap crops, spraying, and dusting. They had nothing to recommend to farmers.

The Empire Cotton Growing Corporation's jassid-resistant breeding program highlights the interconnectedness of these ecological constraints to production. Having achieved successful jassid-resistance with hairy varieties Z.1 and U.4, Corporation breeders were confident they had solved the region's most significant obstacle to successful cotton cultivation. However, they underestimated the interactions between the biological and climatic obstacles to production. Drought in the early 1930s, for instance, stunted yields, and led to a resurgence of cotton bollworm. Breeders then complained of uneven rainfall between 1940 and 1945, which exacerbated insect damage and accelerated the Corporation's

departure.[622] Scientists in both the Corporation and the Department of Agriculture were unwilling or unable to acknowledge that unsuitable growing conditions such as heavy precipitation and waterlogged soils increased the plants' vulnerability to insect attacks.[623] They approached these ecological constraints in isolation rather than as an interaction.

This dissertation sheds further light on how inappropriate growing conditions hinder commodity crop production. It has chronicled the historically specific conditions in which capitalist agriculture attempted to overcome constraints to cotton production in Natal and Zululand, in the form of temperature, soils, precipitation and insect pests. Settlers and scientists tried to surmount these obstacles through a variety of technological inputs: importation of foreign varieties, intercropping, breeding for insect-resistant strains. But they always came up short. This dissertation stresses the limitations of commodity agriculture when confronted with unsuitable growing conditions. Cotton failed in part because colonists lacked the appropriate technology to overcome ecological constraints to production.

Agriculture, Experts and the State

Ecological obstacles were compounded by ill-advised agricultural policies disseminated by 'experts' with little knowledge of the land and its suitability for cotton. Joseph Byrne was a self-proclaimed expert whose search for profits drove him to allocate farms that were too small, on lands that were too far inland, and too cold for cotton to succeed. Theophilus Shepstone was the preeminent expert on Native Affairs within Natal,

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[622] Corporation breeders complained that "despite the improvement in prices, the acreage under cotton in the Barberton district was only double that of the previous season, due largely to the face that little effective rain fell in the area between March and early November 1946, thus limiting the amount of dry land that could be prepared for planting". F.R. Parnell, *Report on the Work of the Cotton Breeding Station, Barberton, Transvaal, for the Season 1946/47* (London: 1947).

[623] E. O. Pearson, *The Insect Pests of Cotton in Tropical Africa* (London, 1958), 223.

but provided few tools for growers in his cotton scheme and attempted to encourage cotton cultivation in Native Locations where soils were marginal. Enthusiasm for cotton during the Zululand cotton boom was underpinned by the Union's new agricultural experts – men like Sawer and Scherffius – who favoured monocropping cotton: this exhausted the soil and made farmers more vulnerable to variations in precipitation and insect pests. Scientists working for the Empire Cotton Growing Corporation sought to overcome ecological obstacles to production by developing jassid-resistant cotton strains; their efforts were undermined by the limitations imposed by other ecological constraints on cotton production in this part of the world.

In each of these cases, 'expert' knowledge promised improvement through new technologies or policies to overcome ecological limitations to production. In each instance, optimism was confounded by growing conditions. The ways in which these experts represented the agricultural potential of Natal and Zululand (whether they depended on travel writings, experiments, visits, or the endorsements of other experts) did not match the reality farmers encountered on the ground. Ventures developed to capitalize on these optimistic assessments were doomed to failure.

This dissertation has focused on the outcomes of these cotton schemes and argued that, despite its repeated failure, cotton facilitated important structural changes to the region's political and economic landscape. Three significant political outcomes emerged out of these failures. First, cotton was an agent of imperial power. The representation of Natal as a 'cotton colony' was crucial to attracting white colonists to Natal under the Byrne scheme. From small beginnings, settler numbers doubled in less than two years, primarily as a result of Byrne's efforts and the anticipation of success that he cultivated on the prospects of

successful cotton cultivation. Although none of Byrne's boatloads of emigrants succeeded in producing cotton for export, most settled in the colony and many of their descendents remained there for generations to follow, buttressing Natal's position as a white outpost colony.

Shepstone's scheme to encourage cotton as a Zulu crop in the 1860s produced a second important political outcome. Cotton emerged as the hinge upon which competing visions for African-settler relations within the colony turned, segregation – supported by Theophilus Shepstone – and assimilation, favoured by the majority of European settlers. With his favoured Location System under attack, Shepstone searched for some means of solidifying Zulu peasant production which would insulate the Locations from those who campaigned to cut their size. These Locations became the blueprint for the delineation of space between Natal's African and settler population for the next hundred years.[624] Despite its failure, cotton succeeded in cementing the spatial divide between African and settler agriculture.

Finally, cotton expanded the influence of the newly-consolidated white South African state during the Zululand cotton boom. Experiments conducted by the Union's new Department of Agriculture identified much of Zululand as ideal for cotton production due to its high temperatures. These northern regions were at once the most remote and least governable. Cotton thus legitimated a deepening of administrative control into the furthest peripheries of the Union. Cotton was favoured because it fit well within the state's ideological priorities: it allowed for an expansion of state power into Zululand and

[624] Shepstone's vision of spatial segregation and 'indirect rule' through African power structures was an important influence behind the Union of South Africa's policies of institutional segregation which prevailed between 1910 and 1948. Scholars have also debated the historical continuity between Shepstone's original policies and the apartheid regime's creation of Bantustans (black homelands). See William Beinart, *Twentieth-Century South Africa*, 2nd ed. (Oxford, 2001).

empowered white settler agriculture. Simultaneously, this enthusiasm for cotton depoliticized the issue of land and its distribution. The technical, rational act of agricultural expansion masked the political act of dispossession as Zulu farmers were denied access to hundreds and thousands of acres of land.[625] Cotton served as the legitimating factor for an intensification of administrative control into Zululand.

Other studies have emphasized cotton's role in extending and entrenching colonial state power elsewhere in Africa. Victoria Bernal has argued that irrigated cotton production was actually a secondary part of the Gezira cotton scheme in Sudan, which she insists was first and foremost about disciplining rural peasants to accept British authority.[626] Richard Roberts likewise emphasized the political aspirations embedded in efforts to promote cotton in the French Soudan: "cotton colonialism was not merely an effort to promote commodity production; it was simultaneously an effort to see, to master, and to control the colonial territory and the lives of natives within it".[627]

As James Ferguson summarized in *The Anti-Politics Machine*: "planned interventions may produce unintended outcomes that end up, all the same, incorporated into anonymous constellations of control… that turn out in the end to have a kind of political intelligibility".[628] The political outcomes achieved through cotton were at times intentional (as in the case of Byrne and Shepstone), and at others incidental (as in the case of the

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[625] James Ferguson, *The Anti-Politics Machine: "Development", Depoliticization, and Bureaucratic Power in Lesotho* (Minneapolis, 1994). See also A. Fiona D. Mackenzie, "Contested Ground: Colonial Narratives and the Kenyan Environment, 1920-1945," *Journal of Southern African Studies* 26 (2000): 697-718.

[626] Victoria Bernal, "Cotton and Colonial Order in Sudan: A Social History with emphasis on the Gezira Scheme," in *Cotton, Colonialism and Social History in Sub-Saharan Africa* ed. Allen Isaacman and Richard Roberts (Portsmouth, 1995), 96-118. Contributions by M. Anne Pitcher, Allen Isaacman and Arlindo Chilundo, and Osumaka Likaka within this same volume also examine how the state mobilized cotton to extend its control over colonized lands and populations.

[627] R. L. Roberts, *Two Worlds of Cotton: Colonialism and the Regional Economy in the French Soudan 1800-1946* (Stanford, 1996), 16.

[628] Ferguson, *The Anti-Politics Machine: "Development", Depoliticization, and Bureaucratic Power in Lesotho*, 20.

Zululand cotton boom). But they were consistent in reinforcing the ideals of the white settler state. Cotton may have failed agriculturally, but experts succeeded in boosting settler numbers, cementing the divide between settler and African agricultural space, and expanding state control into rural areas. Cotton was an agricultural failure, but a political success.

Legacies of Colonial Failure for Agricultural Development

The struggles, disappointments, contradictions, failures and incidental successes associated with efforts to cultivate cotton in south-eastern Africa recounted in these pages have implications for more recent development initiatives in this region. Scholars have begun to emphasize the continuities between ideologies and practices articulated by colonial management paradigms and newly emergent development ones.[629] This work has centered on unraveling the intellectual traditions embedded within development thinking.[630] Inspired by Foucault, these researchers are asking questions about the ideological origins of development, or, in Foucault's terms, the genealogy of development; that is, tracing the recurrence of the idea and understandings of development across a range of 19th century and 20th century contexts. Emphasizing the legacies of colonial attempts to manage the non-human environment serves to critically interrogate what 'counts' as development.[631]

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[629] See for instance the special issue of the *Journal of African History* 41(1) entitled Lessons Learned? Development Experiences in the Late Colonial Period. See also Grace Carswell, "Continuities in Environmental Narratives: The Case of Kabale, Uganda, 1930-2000," *Environment and History* 9 (2003): 3-29, and Christophe Bonneuil, "Development as Experiment: Science and State Building in Late Colonial and Postcolonial Africa," *Osiris* 15 (2000): 258-281.

[630] Frederick Cooper and Randall Packard, "Introduction," in *International Development and the Social Sciences: Essays on the History and Politics of Knowledge*, ed. Frederick Cooper and Randall Packard (Berkeley, 1997); Michael Cowen and Robert Shenton, *Doctrines of Development* (London and New York, 1996); Gilbert Rist, *The History of Development: From Western Origins to Global Faith* (London and New York, 1997).

[631] One major criticism of this literature has been that it elevates development discourse to the point where bureaucracies appear monolithic and undifferentiated. See for instance R.D. Grillo, "Discourses of

This has been an explicitly political project. A crucial component of historicizing development has been to underline how "political and social problems were recast as technical ones that could be fixed by rational planning and expert knowledge".[632] The rise of the so-called development era in the twentieth century (marked by polarization of the First and Third World, the supremacy of multi-national lending institutions, and large-scale, technocratic projects initiated by experts with little experience in the countries themselves), coincided with a depoliticization of power and politics, which obscured the degree to which management paradigms were fundamentally concerned with "control, power, and self-determination".[633] Connecting development's present with its colonial past places the issue of power front and centre. It also serves to disrupt what Jonathan Crush has identified as the "presentist" bias which underpins current development thinking.[634]

Agriculture has emerged as one of the most fruitful areas for research of this sort. One prolific area of inquiry has been in soil management. Scholars have investigated how assumptions, practices, and policies inaugurated by colonial managers were upheld after decolonization and independence.[635] In one particularly insightful study, Kate Showers emphasizes that the dominant ideology governing soil conservation in the colonial state of

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Development: The View from Anthropology," in *Discourses of Development: Anthropological Perspectives*, ed. R.D. Grillo and R.L. Stirrat (Oxford and New York, 1997), 1-34, and K. Sivaramakrishan and A. Agrawal, "Articulating Regions: Globalization, Modernity, and Locality in Stories of Development," in *Ford Foundation Crossing Borders Initiative* (New Haven, 1998). This study has sought to avoid this by focusing on the individuals who shaped colonial power (especially experts in positions of scientific authority) and how these management decisions were determined by the particularities of place. The micro-focus of this study – examining the individuals, policies and schemes that tried to integrate cotton in Natal and Zululand – reveals how agricultural outcomes are the product of specific historical circumstances.

[632] Joseph Morgan Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Athens, 2007), 19.

[633] William Adams, *Green Development: Environment and Sustainability in the Third World*, 2nd ed. (London, 2001), xiii

[634] Jonathan Crush, "Imagining Development," in *Power of Development*, ed. Jonathan Crush (London and New York, 1995).

[635] See for instance Carswell, "Continuities in Environmental Narratives: The Case of Kabale, Uganda, 1930-2000," and William Beinart, "Soil Erosion, Conservationism and Ideas about Development: a Southern African Exploration, 1900-1960," *Journal of Southern African Studies* 11 (1984): 52-83.

Basutoland – based largely on knowledge and practices transplanted from America and South Africa – remained largely unchanged after decolonization and the reconstitution of the territory as Lesotho. She concludes that soil management programs served as "an ideological bridge between Basutoland and Lesotho".[636]

Joseph Hodge has undertaken the most comprehensive and convincing analysis of the transformation of colonial agricultural systems into "agricultural development" on the African continent. He reveals how the relationship between imported experts and unfamiliar landscapes was shaped by colonial experience. Much of the lexicon, as well as several of the philosophical assumptions of agricultural development, have their roots in pre-WWII encounters between colonizers and foreign environments far from their homelands. Hodge concludes: "development as a framework of ideas and practices emerged out of efforts to manage the social, economic, and ecological crisis of the late colonial world".[637]

Historian Allen Isaacman has done more than anyone to underline the connections between the past and present of cotton cultivation in Africa. He provides an eloquent and convincing argument for why "the past matters":

> In the search for a viable future, historical analysis is often absent and the past simply treated as a backdrop. This presentist bias leaves insufficient analytical space to explore critically ways in which current crises are the product of previous policies and practices. Such a shortsighted perspective also precludes a discussion of how history can provide valuable insights about the contradictions, negotiations, tensions, and struggles which must necessarily be at the centre of any discussion of sustainability writ large.[638]

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[636] Kate Showers, *Imperial Gullies: Soil Erosion and Conservation in Lesotho* (Athens, 2005). Showers investigates a number of recent development initiatives, including the Thaba Bosiu Rural Development Project (1973-1977), the Senqu River Agricultural Extension Project (1972-1977), the Leribe Project/Khomokaoana Project (1970-1980), showing how each is underpinned by knowledge, ideas and/or practices developed during the colonial era.

[637] Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, 2.

[638] Allen Isaacman, "Historical Amnesia, or, the Logic of Capital Accumulation: Cotton Production in Colonial and Postcolonial Mozambique," *Environment and Planning D: Society and Space* 15 (1997): 757-790, p. 758.

Isaacman connects the experiences of cotton ventures in 19th and 20th century Mozambique with recent efforts at cotton cultivation there, arguing that cotton production – both in the present and in the past – is and has been more about power and control than it is about environmental or ecological considerations. Further, he insists – echoing the American philosopher and poet George Santayana who observed that "those who cannot remember the past are condemned to repeat it" – that development experts and planners who ignore the story of cotton's past in Africa are destined to repeat mistakes made by their colonial predecessors.[639]

This dissertation illuminates "how the past makes itself felt in the present".[640] The cycles of failure that marked the history of cotton in south-eastern Africa did not end when the Empire Cotton Growing Corporation abandoned their Barberton breeding program in 1948. Despite the Corporation's pessimistic accounts of the region's potential for cotton production, local politicians and enthusiastic farmers continued to promote the prospects of irrigated cotton cultivation through the 1940s and 1950s. Many remained convinced that uneven, unreliable rainfall was the primary constraint on cotton production in the region and believed that better irrigation technologies could overcome this obstacle.

Surveys to assess the potential for irrigated cotton production were initiated in 1931. These concluded that more than 500 000 acres could be brought under cultivation, and that yields of between two and two-and-a-half times greater than those for dryland cotton could be expected.[641] Agricultural entrepreneurs proposed a massive irrigation scheme that would

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[639] George Santayana, *Life of Reason; Or, Phases of Human Progress* (New York, 1953), 284.
[640] Anthony Giddens, *Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis* (London, 1979), 70.
[641] NA, Department of Lands II (ACT) Vol. 287 Ref 10785, Pongola River – Natal – Irrigation Upper Scheme Land West of Rooirand, Grobler, Minister of Lands to Secretary of the Natal Land Board, 7 October 1931. See also See also NA, LON Vol. 268 Ref A157/10, Pongola Irrigation Settlements, Memorandum on State Irrigation Schemes, with Particular Reference to the PIS by A.M. Bosman, Chief, Division of Agricultural Education and Extension, and Dr. H.W. Turpin, Assistant Chief, Division of Agricultural Education and

divert water from the Pongola River just south of the border with Mozambique. Dubbed the Pongola Irrigation Scheme (PIS), this massive undertaking was completed in 1934, with an eleven kilometre canal providing water to an estimated 13 500 acres.[642] As had been the case in Zululand during the cotton boom, the PIS attracted support for political as well as agricultural reasons: in 1930 this region, known as Maputaland, lay largely beyond effective state authority. According to one preliminary assessment on the Scheme's viability, there was "no part of the Union which is as isolated, so remote and neglected as Maputaland. Parts of it are rarely visited by European officials and the Natives are left to pursue their customary avocations with little guidance or advice from the government".[643] The PIS was hampered by a series of obstacles: including a lack of coordination among administering departments, a lukewarm reception by white settlers, market isolation, heavy jassid infestations, and inadequate irrigation during drought years.[644] By the end of World War Two, the Pongola Irrigation Scheme was, according to one of its founders, a "white elephant" in the region.[645] More than £2 million were spent without any cotton ever having been grown.[646]

In the late 1930s hopes of white settlement were abandoned, as government officials shifted their efforts towards converting existing irrigation infrastructure into an African

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Extension, n.d, and NA, LDE-N Vol. 586 Ref 7104/0, Candover: Cotton Ginnery, Secretary for Lands to Provincial Representative, 2 March 1940.

[642] NA, ACT Vol. 287 Ref: 10785, Pongola River – Natal – Irrigation Upper Scheme Land West of Rooirand, Pongola Soil Survey, prepared by T. Arthur Warner, Chairman, Local Land Board, 12 March 1934. More than 7 000 African workers, primarily amaTsonga, worked on its construction.

[643] NA, NTS Vol. 7983 ref 260/337, Pongola Irrigation Scheme, Report on Tour Undertaken by Chief Native Commissioner of Natal, Mr. Lugg, and appointed members of the Native Affairs Commission through Zululand, 9 October 1939.

[644] NA, LON Vol. 268 Ref A157/10, Pongola Irrigation Settlements, Report on Visit to Pongola Settlement from Mr. B.W. Sutton, Senior Dairy Officer for Natal, 13 November 1939

[645] NA, LBD Vol. 1967 Ref 3365/27, Economic Survey of the Land Settlements of the Pongola Irrigation Scheme, R.A. Rouillard to Dr. Jansen, former Minister of Lands, no. 308, 11 November 1949.

[646] *Natal Mercury*, 7 September 1933.

agricultural project.[647] These efforts stuttered, and plans for using irrigation as a means of encouraging the region's white settlement were re-energized with the election of the 'reunited' National Party and its policies of apartheid in 1948.[648] Enthusiasm for a new, expanded Pongola Irrigation Scheme was buoyed largely by the prospect of settling destitute, marginalized whites onto these state-subsidized plots: the PIS was envisioned as a scheme for the rehabilitation of poor families.

Between 1950 and 1955 the Department of Water Affairs invested over £1.1 million to update existing infrastructure and increase delivery capacity.[649] White settlers were offered just over 50 acres of land each; by 1953 over 155 plots were occupied. Farmers invested heavily in mechanization, spending an average of more than R7 000 on machinery.[650] Average holding size increased accordingly. By 1959 white settler farms along the Pongola River averaged just under 4 000 acres in size, and their average capital investment was R11 000.[651] Acreage under cotton in Natal and Zululand remained relatively steady: approximately 15 000 acres were put under cotton each year in the 1950s, though yields varied widely, due primarily to fluctuations in precipitation. Only three farmers in all of Zululand managed to squeeze profits from cotton; the rest operated at a loss.[652]

As in the case studies examined in the dissertation, cotton remained important to the state's broader political and ideological priorities after 1948. As sociologist Tessa Marcus

[647] NA, NTS Vol. 7983 Ref: 260/337, Pongola Irrigation Scheme, Follow-up Report by the Commission on Northern Zululand, by Heaton Nicholls and W.R. Collins, 24 January 1937.
[648] NA, NTS Vol. 7983 Ref: 260/337, Pongola Irrigation Scheme, Memorandum on the Future of the Pongola Irrigation Scheme, n.d.
[649] NA, NTS Vol. 7983 Ref: 260/337, Report on the Proposed Pongolapoort-Makatini Flats Government Water Scheme 1960/61, n.d.
[650] This emphasis on mechanized agriculture was evident throughout the Union. The periodical *Farming in South Africa* reported that the number of tractors in South Africa increased from 6 019 in 1937 to 22 292 in 1946 to 48 423 in 1950. S.J. de Swardt, "The Revolution in Our Agriculture", *Farming in South Africa* XXIX, no. 336 (1954): 163.
[651] Kassier and Graham, *Survey of the Cost of Production in the Pongola Extension Area*, (1968).
[652] Yields fluctuated from an average of 264 lbs per acre in 1957/58 to 454 lbs per acre in 1958/59. Kassier and Graham, *Survey of the Cost of Production in the Pongola Extension Area*, 21.

has shown, brilliantly, agriculture during the apartheid period rode a wave of technological advancement that improved the productivity and profitability of the white agricultural sector, while simultaneously marginalizing African labour. This reinforced the state's broader aspirations by spatially containing the African population within the homeland territories, known as Bantustans.[653]

In the 1960s and 70s the apartheid government tried again, implementing a plan to dam the Pongola River to provide a reliable source of water for unemployed white farmers who were to be settled on twenty hectare plots. The Pongolapoort dam was opened in 1974, but the influx of white farmers never materialized, due to protracted negotiations with Swaziland over the location of water catchments, and the rapid economic growth in the 1960s which mopped up much of the surplus 'poor white' labour, and deflected the expected mass white migration into urban centres.

Unable to attract white growers to the region, the state sought to recruit black farmers to cultivate cotton on lands watered by the Pongolapoort dam Beginning in 1985, five thousand farmers – most of them Zulu and Tsonga – were resettled along the floodplains of the Pongola River (known also as the Makhathini Flats) and encouraged to cultivate irrigated cotton. The crop was expected to be the 'growth engine' of the region, but an ever-changing framework of control (no fewer than eight government agencies were involved in agricultural management between 1984 and 1992), coupled with high levels of institutional mistrust and crippling levels of indebtedness, hampered production. Household surveys undertaken in the late 1980s recorded average yields of approximately 1 400 kg per hectare, well below the

[653] Tessa Marcus, *Modernising Super-Exploitation: Restructuring South African Agriculture* (London and New Jersey, 1989).

'break even' level of 2 000 kg per hectare.[654] Over 65% of farmers reported operating at a loss.

The most recent bout of enthusiasm for cotton cultivation on the Makhathini Flats began in 1997, when the Republic of South Africa passed the Genetically Modified Organism Act and became the first African nation to legalize the dissemination of Genetically Modified (GM) Crops. One year later, the American biotechnology giant Monsanto completed its government-regulated trials, and began promoting its patented Bt cotton (genetically engineered to be resistant to one of the region's most pernicious insect pests, the cotton bollworm) to Zulu farmers. After only two growing seasons all smallholder cotton farmers in the Makhathini Flats were growing the Bt variety exclusively. This was trumpeted by Monsanto as a huge endorsement of its Bt technology, and of its potential to help improve the lot of smallholder farmers throughout Africa.

In the 2000/01 season, a group of British researchers published a series of articles, based on a single survey, which incorporated responses from one hundred cotton farmers at Makhathini. They reported two significant reasons for the sky-high adoption rates: increased cotton yields of 58% and drastic reductions in pesticide exposure. In answer to the rhetorical question that titled their more important academic article – 'Can GM cotton help the poor?' – these researchers replied with a resounding 'yes'.[655]

Early in 2004, I visited the Makhathini area with Dr. Harald Witt and Dr. Raj Patel, two colleagues from the University of KwaZulu-Natal, to interview local farmers and

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[654] T.J. Bembridge, "Farmer Characteristics, Innovativeness, and Cotton Production at Makhathini Irrigation Scheme, KwaZulu," *Development Southern Africa* 8 (1991). Only 17% of respondents had achieved yields that exceeded that 2 000 kg per hectare minimum. Bembridge concludes that the main factors behind these low yields were the inadequate application of irrigation technology and insufficient water access.

[655] Colin Thirtle et al., "Can GM Technologies Help the Poor? The Impact of Bt Technology in Makthathini Flats, South Africa," *World Development* 31 (2003): 717-732.

contextualize the claims for successful cultivation of Bt cotton.[656] Drawing on surveys, focus groups, and over thirty in-depth interviews with local cotton farmers, our research revealed a number of issues that previous assessments had overlooked, particularly the significance of access to markets, seeds, and credit as reasons farmers chose to adopt Bt cotton.[657] We were led to conclude that rather than forming a rousing endorsement of Bt cotton, the extremely high rate at which GM cotton was adopted reflected the profound lack of choices facing farmers in the region.

By situating these recent attempts to introduce GM cotton to KwaZulu-Natal within a longer history of agricultural failure, this dissertation complicates and casts some doubt on claims by proponents of Genetic Modified cotton that this crop offers a revolutionary break from the past that will irrevocably alter the livelihoods of Africa's poor, smallholder farmers. Viewed against the backdrop of endeavours examined in the preceding pages, Bt cotton appears as the latest in a long series of technological interventions that have consistently failed to transform south-eastern African into a hotbed of cotton production. Efforts to promote GM cotton on the Makathini Flats remain steeped in the legacies of earlier failures: the bias in favour of large-scale agricultural interventions, the recasting of social and political problems as technical ones that can be fixed by rational planning and expert knowledge, the propensity for scientific research that studies ecological variables in isolation rather than as an interaction.

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[656] Harald Witt, Rajeev Patel and Matthew Schnurr, "Can the Poor Help GM Crops? Technology, Representation and Cotton in the Makhathini Flats, South Africa," *Review of African Political Economy* 108 (2006): 147-163.

[657] Water supply was another issue raised by local cotton farmers: these well-publicized stories of success occurred between 1999 and 2001, during which water supply was steady. Our research, undertaken in 2004, coincided with a dry period when yields were lower. There was also anecdotal evidence that jassid attacks were on the rise among Bt cotton stands, due to it being a smooth rather than a hairy variety. Interview with Eugene Eulitz, Cotton Agricultural Officer, ARC-IIT, Rustenburg, 19 March 2005.

The history of cotton in Natal and Zululand is the history of a crop in the wrong climate. Cotton cultivation was tried repeatedly by European settlers and scientists desperate to transform south-eastern Africa into a landscape dominated by commodity production. Cotton was attempted first as a white settler crop, then a Zulu crop; it was monocropped on thousands of acres during the Zululand cotton boom; new strains were developed to make it resistant to jassid. Still it failed. During the latter half of the twentieth century irrigation, fertilizers, and mechanization were attempted, but they too failed. Monsanto's Genetically Modified Bt cotton is but the latest technological intervention designed to overcome the region's ecological obstacles to production. The history of cotton in Natal and Zululand is a story of historical amnesia: cotton was tried time and time again, but settlers and scientists were unable to introduce and produce this commodity crop under the particular political, economic, social, and above all ecological circumstances that jointly constituted the environment of south-eastern Africa.

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Fynn Papers (FP)
Government Gazette (GG)
Government House (GH)
Moreland Papers (MP)
Natal Almanac (NA)
Natal Blue Books (BB)
Secretary of Native Affairs (SNA)
Selected Documents Presented to the Legislative Council (LC)
Sessional Papers of the Legislative Assembly (SPLA)
Shepstone Papers (SP)
Surveyor General's Office (SGO)
Zululand Archive (ZA)
Zululand Government House (ZGH)

Killie Campbell Africana Library (KC), Durban

Diary of John Cardnell Blamey
Diary of William Todd
Henry Francis Fynn Letters
James Eckroyd Letters
Jane Arbuthnot Reminiscences
Reports of Natal Farmers Club

South African National Archives (NA), Tshwane

British Blue Books (BBB)
Department of Commerce and Industries (RHN)
Department of Entomology (CEN)
Department of Lands (LDE-N)
Department of Lands II (ACT)
Department of Irrigation (LPS)
Division of Agricultural Education and Extension (LON)
Governor's Office (GOV)
Native Affairs Department (NTS)
Ntambanana Valley Lands (NVL)
Office of the Governor General of South Africa (GG)
Prime Minister's Office (PM)
Public Works Department (PWD)
Secretary for Agriculture (LBD)
Secretary for Mines and Industries (IMI)
Tobacco and Cotton Division (TAD)
Trade Commissioner (HLK)
Uitvoerende Raad (URU)

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Soil Series of the Natal Sugar Belt

Agricultural Research Council, Institute for Industrial Crops (ARC-IIC), Rustenburg
ECGC Miscellaneous Files
ECGC Annual Meetings
ECGC Reports Received from Experiment Stations

Periodicals:
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African Sugar and Cotton Planter
Agricultural Journal and Mining Record
Agricultural Journal of South Africa
Bulletin of the Imperial Institute
Empire Cotton Growing Review
Farming in South Africa
Journal of the Department of Agriculture
Natal Agricultural Journal
Natal Mercury
Natal Sugar and Cotton Planter

Natal Times
Natal Witness
Official Yearbook of the Union of South Africa
South African Cotton Growers' Journal
South African Sugar Yearbook and General Directory
Zululand Times

Interviews

These interviews were conducted primarily by the author. Those interviews affixed with an asterix were conducted jointly with Dr. Raj Patel.

*Uri Stein, Manager of Makhathini Research Station – 28 January 2005
*Barry van Rinsberg, Operations Manager, Makhathini Cotton Company – 3 February 2005
Mr. Nkosi, Municipal Manager, Jozini Municipality – 4 February 2005
Ron Bennett, Department of Natural Resources – 28 February 2005
*T.J. Buthelezi, Makhathini Cotton Farmer – 31 January 2005
Eugen Eulik, Entomologist, ARC-IIC, Rustenburg – 15 March 2005

Focus Groups

Focus groups were undertaken in collaboration with Dr. Raj Patel and Dr. Harald Witt. These were conducted primarily in isiZulu and facilitated by Nonhlanhla Dlamini, Thulani Ndlaiz and Dumisani Nyathi.

uNdumo I – 26 January 2005
uNdumo II – 27 January 2005
uMboza – 1 February and 2 February 2005

Names of Participants:

M. P. Mkuabela	P. Nkanini	Z. Nkhabela	Mr. Madimane
P. Dlamini	T. Ndlozi	M. Zikhali	J. Mabika
S. Khoza	M. Gumede	N. Gumede	Mr. Khoza
G. Ndlovu	M. Mhlongo	M. Mkhamuka	Mrs. Mlambo
V. Gumede	M. Gumede	K. Khumalo	J. Mthembu
T. Tembe	N. Mthali	M. Mantengu	J. Tembe
H. Mthembu	N. Mponjane	M. Manukuza	Z. Ndlaza
N. Njokweni	J. Gumede	E. Tembe	
T. Khumalo	G. Manukuza	T. Ngubane	

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Certificate of Approval

PRINCIPAL INVESTIGATOR	DEPARTMENT	NUMBER
Wynn, C.G.	Geography	**B04-0629**

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT

CO-INVESTIGATORS:

Schnurr, Matthew, Geography

SPONSORING AGENCIES

TITLE :

Green is the Colour of Hope: A Political Ecology of Maize and Cotton in KwaZulu-Natal, 1850-2004

APPROVAL DATE	TERM (YEARS)	DOCUMENTS INCLUDED IN THIS APPROVAL:
SEP 23 2004	1	Sept. 23, 2004, Consent form / Sept. 20, 2004, Contact letter / July 30, 2004, Questionnaire

CERTIFICATION:

The protocol describing the above-named project has been reviewed by the Committee and the experimental procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval of the Behavioural Research Ethics Board by one of the following:
Dr. James Frankish, Chair,
Dr. Cay Holbrook, Associate Chair,
Dr. Susan Rowley, Associate Chair
Dr. Anita Hubley, Associate Chair

This Certificate of Approval is valid for the above term provided there is no change in the experimental procedures