

# THE ROLE OF DROUGHT IN AGRARIAN CRISIS AND SOCIAL CHANGE: THE FAMINE OF THE 1890s IN SOUTH-EASTERN AFRICA

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## ABSTRACT

During the second half of the 1890s, south-eastern Africa was hit by a drought-driven ecological crisis. Using records previously unexploited for climate and climate impact research, and which cover the area from modern-day Zimbabwe and Botswana to eastern South Africa, this study explores the complexity of this crisis through an analysis of the spatial extent, duration and severity of the regional drought, and its associated socio-economic and environmental repercussions. This interdisciplinary study stands at the nexus of environmental, economic and social history. The records used include (i) British administrative sources, (ii) reports and letters by members of various Protestant missionary societies from diverse environments across the study area, together with (iii) local newspapers. Analysis of these materials reveals that generally the period was marked by a sequence of considerably delayed rainy seasons, which in turn negatively impacted upon the rain-fed agriculture. Below average levels of summer rainfall also adversely affected the development of young crops. The drought was more severe and continuous in the interior of the region than towards the Indian Ocean coast. The prolonged dry conditions were accompanied by, and likely exacerbated, locust outbreaks and the spread of cattle plague (Rinderpest). We demonstrate in this paper that drought, as the original driver of the crisis, triggered a cascade of responses from harvest failure to famine and ultimately led to profound socio-economic change.

**Keywords:** historical climatology, agriculture, El Niño, colonial history, economic history, epizootic, nineteenth century

**Manuscript length:** 8577 words plus three figures

## 1. Introduction

The year 1896 was catastrophic for large parts of south-eastern Africa. A drought-driven agricultural crisis triggered massive harvest failures. Swarms of locusts compounded the problem, devouring the few maize and sorghum crops that the drought had spared. To add to this apocalyptic scenario, Rinderpest was sweeping southwards through the region and when it met with an already drought-weakened cattle population it destroyed this pillar of traditional African life and the mainstay of the colonial agrarian economy. This environmental crisis raised the pressure substantially on a region that was already under stress and subject to rapid socio-economic change. The environmental crisis affected a significantly larger population than previous subsistence crises; the African population of the former Colony of Natal is estimated to have increased by almost 30% from c. 1880 to the mid-1890s.<sup>1</sup> In general, population growth likely exceeded the rise in agricultural production (Wilson, 1971). In Natal and at least some regions of the South African Republic (SAR; known as Transvaal) and Bechuanaland the area of cultivated land had expanded (Schapera 1970; Schapera and Comaroff 1991); however, access of African people to the land was reduced in the colonial system (de Kiewiet 1965; Lambert 2003). As a result of the natural calamities in the mid-1890s, famine held the region in its grip. The situation was especially problematic in the interior and in semi-arid regions bordering the Kalahari, where the drought was more pronounced and persisted over several years.

Pre-industrial societies generally possess coping strategies to endure one failed harvest, but a sequence of years of dramatically reduced agricultural output will spell disaster (Roumasset 2003). Famine, however, is an ecologically and socially modulated process, and the political, social and economic situation has to be taken into consideration (Sen 1981). In late-nineteenth century southern Africa, pressure was growing for Africans to be integrated into the capitalist economy; hut tax and rent needed to be paid in cash which in turn often had to be gained by wage labour, often in the mining sector. Political power was almost exclusively in the hands of people of European descent (Thompson 2001).

In this study, hitherto largely unexplored data are used to achieve a comparative analysis of the severity and impacts of the mid-1890s drought across south-eastern Africa, and to understand the role of drought in the developing agrarian crisis. Supplement 1 (S1) gives details on the wide variety of primary sources used, and also describes the mission network and the British administration in the region which supplied most of this information.<sup>1</sup> As a major event in a time marked by rapid political, economic and social change, the most disastrous famine year 1896 has attracted attention before, primarily in the narrow geographical setting of the colony of Natal and northern Transvaal

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<sup>1</sup> All original source references are given in endnotes in S5.

(Ballard 1983; Dreier 2005; Lambert 1995; Ramdhani 1989), as has the cattle plague in southern Africa (Ballard 1986; Lambert 1995; Phoofolo 1993; Phoofolo 1999; Phoofolo 2003; Spinage 2003; Spinage 2012; van Onselen 1972). Unlike previous investigations, however, this study is regional in scale, focusing not only on the former British colonies of Natal and Zululand, and the SAR, but also on the British territories of Matabeleland (southern Rhodesia) and Bechuanaland, which was divided into the Crown Colony of British Bechuanaland (CCBL), formerly part of the Cape Colony, and Bechuanaland Protectorate (BLP) (Fig. 1).

Studies of this type can yield important insights into the differential vulnerability of historical societies to climate variability (cf. Pfister 2010). This paper provides a broader conceptualisation of historical droughts –not only the direct impacts of the failure of seasonal rains, but also the implications of drought for the wider ecology of the region are considered. In mid-1890s south-eastern Africa, drought appears to have triggered crop failures and water shortages, but, as will be argued, also increased the prevalence of pests and heightened the vulnerability of the drought-stressed livestock to disease. Such wider assessments of drought-affected ecosystems are essential if historical analyses are to provide an accurate baseline against which the impacts of future droughts can be assessed (Niang et al. 2014).

## **2. Drought conditions over southern Africa during the mid- to late 1890s**

Most of the study area is situated in the southern African summer rainfall zone and has a strongly seasonal precipitation regime with high interannual variability (Nash 2017). More than 66% of mean annual precipitation is concentrated into the austral summer months of October to March, with the dominant rain-generating weather systems including ridging anticyclones, tropical-extratropical cloudbands, cut-off lows and mesoscale convective complexes (Tyson 1986). Much of the remainder of the year is dry due to the dominance of stable subtropical high-pressure systems over the interior of the subcontinent. Only in the coastal regions of former Zululand and Natal is rainfall perennial, albeit with a markedly wetter summer season. Precipitation decreases away from the coastal areas. Annual rainfall totals along the coast of former Zululand exceed 1300 mm, declining to 735 mm over the Lesotho lowlands and ~500-600 mm in former Bechuanaland (Schulze 2001; Hydén 2002; Nash 2017). Substantial fluctuations in summer rainfall totals are common (Knox 1911; van Heerden and Taljaard 1998). Rainfall totals are closely associated with sea surface temperature anomalies in the southwest Indian Ocean (e.g. Mason 1995; Reason and Mulenga 1999), with warmer sea surface temperatures generally correlating with wetter summers. Summer rainfall is also modulated as a

result of El Niño-Southern Oscillation teleconnections, with droughts frequently occurring during the summer following an El Niño event (e.g. Lindesay et al. 1986; Nicholson and Entekhabi 1986).

Instrumental rainfall observations for much of South Africa began in the late nineteenth century (Nicholson et al. 2012), therefore climate conditions prior to c.1900 are best assessed by rainfall indices constructed from weather references in documentary sources. Reconstructions using such sources show clearly that the drought conditions of the mid- and late-1890s affected large areas of the summer rainfall zone from Natal and Zululand (Nash et al. 2016), across Lesotho (Nash and Grab 2010), the Orange Free State (OFS) (Nicholson et al. 2012), and the northern Cape Colony (Vogel 1989) to the Kalahari (Nash and Endfield 2008) and German South-West Africa (modern day Namibia) (Grab and Zumthurm 2018) and even extended to winter rainfall areas of Namaqualand (Kelso and Vogel 2007). Drought conditions also prevailed in Transvaal, where descriptions correspond to the instrumental observations from Joubert Park (Johannesburg), and in Rhodesia<sup>2</sup> (Selous 1896). In the last decades of the nineteenth century, meteorological stations were established across the region, but many early instrumental series are incomplete. Missing values are more frequent in these series during the drought years and may indicate a breakdown in administrative reporting. The complete series used in this paper are: Durban (Natal), Joubert Park in Johannesburg (SAR), Campbell (Cape Colony) and Newlands (Cape Colony). Data for Barkly West (Cape Colony) are missing between August 1896 and May 1898, but are available for the early and late part of the crisis. These series were obtained from the Global Historical Climatology Network dataset (GHCN) version 3 (Lawrimore et al. 2011).

The drought of 1895-96 was the climax of a sequence of dry years stretching over the mid- to late 1890s. Even though the 1894-95 rainy season in Natal started relatively wet in September 1894, the following two months were very dry, so that midland and highland areas experienced drought-related problems; these do not appear to have occurred along the coast. In Natal, the rainy season from December onwards compensated for this shortage (Nash et al. 2016), while rainfall in Transvaal was normal. However, precipitation totals for 1894-95 in CCBL and BLP were below average in the semi-arid zones bordering the Kalahari Desert<sup>ii</sup> causing, in some regions, an early onset of drought-related dearth.<sup>iii</sup> This lack of rainfall is reflected in rainfall totals for Newlands, which dropped well below average in the early part of the rainy season and did not recover during the remainder of the summer. Barkly West shows a similar pattern in the months September to November, but rainfall

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<sup>2</sup> This paper focuses on the land south of the Zambezi River, on Matabeleland and to a lesser degree Mashonaland. However, the land north of the Zambezi also formed part of what was from 1895 onwards referred to as 'Rhodesia'. These territories were part of the British Empire, but the administration lay in the hands of the British South Africa Company. Matabeleland and Mashonaland formed 'Southern Rhodesia' in 1898, which in the twentieth century became a British colony. In this paper we refer to the area as Rhodesia, as this was the official name during most of the study period.

was high in December 1894 and January 1895; in Campbell the situation was normal. As Barkly West lies only c. 30km from Newlands and c. 80km from Campbell, this suggests spatially discontinuous rainfall, probably of a convective nature.

This generally dry but variable rainy season was followed by a long dry winter. The period from early winter to spring (May to October) 1895 was the driest in the Johannesburg station record (1893 to 1986), the drought from August to October was unique. It was also very dry in Durban. In early September, the Natal coast experienced unusually late frost and dry weather;<sup>iv</sup> in the Natal Midlands, winter conditions prevailed into the first week of October.<sup>v</sup>

Instrumental data for Durban show a severe drop in precipitation during the 1895-96 rainy season, due primarily to a lack of rain in the early part of the season. Further inland in Natal and Zululand, the situation deteriorated considerably. After the dry winter, people were so eagerly awaiting the spring rains that the newspaper *Natal Witness* recorded almost every single rainfall event over the interior of the colony, starting with a short period of drizzly showers in the third week of September<sup>vi</sup> and continuing with rare thunderstorms during the second half of October.<sup>vii</sup> Nonetheless the precipitation totals were frequently insufficient to allow planting.<sup>viii</sup> Complaints about north winds, which indicate high pressure over the southern African interior, were still common in September and November 1895 and occurred even in January 1896.<sup>ix</sup> Although the rainy season started around mid-November over most of Natal and Zululand, and December 1895 was wet, the rains failed again in January and February 1896.<sup>x</sup> Rainfall remained generally below average for the following years (Nash et al. 2016).

This basic pattern of a delayed onset of the rains in 1895 and a shortfall of precipitation in January and February 1896 was also observed over the inner regions of south-eastern Africa<sup>xi</sup> including Matabeleland (Selous 1896), although the dry conditions were even more pronounced and prolonged. The Limpopo, then still a perennial river albeit with weak flow, dried up unseasonably (Molosiwa 2013) and, by January 1896, Johannesburg could only be supplied with water by cart.<sup>xii</sup> The Johannesburg rainfall series shows the magnitude of the 1895-96 drought to be on par with 1932-33, 1935-36, 1962-63, 1965-66, 1968-69; only 1982-83 was considerably drier. The delayed onset of the rainy season contributed to the rainfall deficit from central Transvaal to the eastern edge of the Kalahari and beyond into German South-West Africa. During four subsequent years, until 1898, the spring and early summer months – September to November – were extremely dry, hindering the then largely rain-fed agricultural production. Even the severe drought around Johannesburg in the mid-1930s did not exceed three subsequent years of dry springs and early summers.

Rainfall totals for the summer of 1896-97 were average for Johannesburg, but wide areas of Transvaal and Bechuanaland experienced a delay in the onset of rains until mid-December 1896 or even early January 1897, a month that then was very wet.<sup>xiii</sup> Instrumental records at Johannesburg show the summers of 1897-98 and 1898-99 to be periods of below average rainfall; reports from BLP, CCBL and Transvaal suggest extreme drought in spring 1897 and early summer 1897/98, when water levels dropped so low that streams or wells dried up, and normally reliable sources of drinking water dwindled.<sup>xiv</sup> These low water levels and the following bad harvest in western Transvaal and Bechuanaland in 1898 were again due to severely delayed rains.<sup>xv</sup> Further south at Campbell and Newlands, the spring and early summer months of 1897 were also very dry, but conditions ameliorated during the remainder of the rainy season. Drought conditions persisted in some areas (e.g. Johannesburg and southern BLP) until late 1898, contributing to yet another harvest failure in 1899<sup>xvi</sup>. However, the drought and famine cycle was broken in the Limpopo area, and parts of CCBL and Transvaal.<sup>xvii</sup> This pattern is confirmed by rainfall observations at Campbell, Newlands, and Barkly West, which show normal to good rains for the whole 1898-99 rainy season, including early summer.

### **3. The Locust Plague**

The severe drought was not the only factor contributing to harvest failures. From Bechuanaland to Natal, grain crops that escaped the drought – in river valleys, due to localised thunderstorms or as a product of a third or more sowing – were devoured by countless Brown and Red locust swarms (Fig. 2). Locust plagues were a recurrent danger to southern African agriculture. The Brown locust outbreak that accompanied the drought of the mid- to late 1890s can be traced back to 1891, when small swarms of most likely Brown Locusts were present at Mafeking (CCBL) close to the Transvaal border (Spinage 2012). Emmaus, a mission station in western Transvaal south of the Magaliesberg Range was subject to severe but localised crop losses due to locusts in April 1891.<sup>xviii</sup> Subsequently the locusts spread; in late 1892 they were reported in Heidelberg (SAR).<sup>xix</sup> The Cape Colony was affected in 1892-93 (Spinage 2012) and in that season locust swarms destroyed harvests at Emmaus and also north of the Magaliesberg Range in Transvaal.<sup>xx</sup> The maximum distribution of the Brown locust can include most areas of non-coastal southern Africa (Spinage 2012), and in late 1892 and early 1893 swarms even appeared in the northern districts of Natal.<sup>xxi</sup> In 1894 the more destructive Red locust appeared in western Transvaal,<sup>xxii</sup> which was unusual for the southern African interior. Red locusts tended to invade the eastern part of southern Africa including the coastal lowlands; in 1894 they also reached the OFS (Spinage 2012). They were probably the main species affecting Zululand and caused major damage to the sugar plantations in the Natal coastal belt from 1894-95

onwards (Ballard 1983).<sup>xxiii</sup> It was not until the onset of severe drought in 1895-96, however, that locusts had a widespread detrimental effect upon grain crops.

Locust development, and the change from solitary grasshoppers to the gregarious swarm phase, is connected to ecological and climatological factors. Whereas the Brown locust tends to form swarms towards the end of bad droughts (Spinage 2012), the gregarious phase of the Red locust is more directly linked to dry conditions, which can contribute to the development of migratory swarms of Red locusts in the outbreak areas of southern Malawi and Zimbabwe. Some contemporaries assumed the locust plague of 1895-96 originated about two years earlier in the area of 'the lakes', presumably the Lake Malawi region (Spinage 2012). A lack of precipitation in the outbreak areas reduces the habitat of the Red Locust; the higher locust density can then cause the locusts to enter the gregarious phase, in which they form swarms and migrate, often wreaking havoc to the grain and grass vegetation in their path (Steedman 1990). The coastal regions of Natal and Zululand attract Red locust swarms; in October and November 1895 the locusts arrived en masse in those colonies and in the eastern Transvaal<sup>xxiv</sup> and persisted throughout the following summer. Red locusts cannot normally breed successfully in these regions, where it is too moist (Spinage 2012; Steedman 1990). However, the 1895-96 drought allowed the Red locust to become enzootic in Natal and Zululand (Spinage 2012). Reports of locusts depositing eggs in the last quarter of 1895 are numerous.<sup>xxv</sup> Several localities did not suffer severely during the first visit of the locusts. However, although the Locust Extermination Bill of 1895 stipulated the digging up of locust eggs (Ballard 1983; Lambert 1995), sufficient numbers remained in the ground to ensure that the subsequently hatched insects would devour any remaining grain crops.<sup>xxvi</sup> The infestation of 1895-96 was, in some places, so severe that the insects stripped trees of their bark.<sup>xxvii</sup> By April 1896, large numbers of locusts succumbed to a fungus; it is likely that the insects' vulnerability to the pathogen was raised by the average precipitation levels that prevailed from March 1896 onwards in the coastal regions (Nash et al. 2016). As a result, the situation was much improved by 1896-97; locusts were present, but damage was localised and primarily occurred in Zululand.<sup>xxviii</sup> However, in the following season the locust plague was more widespread and high numbers of insects caused problems, especially in late 1897 and early 1898,<sup>xxix</sup> a pattern that repeated itself in 1898-99 with more serious consequences.<sup>xxx</sup> Locust plagues would recur in Natal and Zululand during the first decade of the twentieth century (Ramdhani 1989; Spinage 2012).

The impact of the locust plague was more severe in Transvaal and Bechuanaland. These areas were infested with locusts throughout the drought years until at least 1899, with a devastating effect on grain crops in both 1895-96<sup>xxxi</sup> and 1897-98.<sup>xxxii</sup> The summer of 1896-97 did not offer much relief

either,<sup>xxxiii</sup> and southern BLP was still not free of the pest by 1898-99;<sup>xxxiv</sup> however, the situation in the eastern Limpopo region, in south-eastern Transvaal<sup>xxxv</sup> and in CCBL had by then improved.

Overall, it seems that locust infestations not only accompanied drought, but were enhanced by it, especially during the dry springs and early summers of the mid- to late 1890s. In Natal and Zululand, complaints about locusts were reduced once the summer rainfall, even if below average, had arrived. That heavy rains could destroy locust eggs was already known to local observers.<sup>xxxvi</sup>

#### **4. The Cattle Plague**

The outbreak of Rinderpest in southern Africa in 1896-98 would have had a devastating effect upon cattle numbers in any year. However, the outbreak occurred at the worst possible time, when, due to drought conditions, cattle were already weakened and more susceptible to disease. Furthermore, the measures taken to constrain the spread of the cattle plague and minimise the loss of livestock appear to have raised the vulnerability of local populations to both drought and locust impacts (Fig. 2).

Cattle plague had been advancing southwards through the African continent since 1889 until it stopped at the Zambezi River in 1893. In February 1896, the Zambezi was crossed and southern Rhodesia infected. The cattle plague spread rapidly along major transport routes, with draught oxen serving as the main vector. By late March, the disease had already reached the southern BLP (Spinage 2012); in March or April it entered CCBL and Transvaal, where it raged until 1897; in September 1896 it reached the Cape Colony and in winter 1897 finally crossed into Natal and Zululand (Phoofolo 1993; Spinage 2012; Unterhalter 1978). From this description, it is evident that expansion of the disease-affected area coincided with, or followed quickly after, the dry summers of 1895-96 and 1896-97. Southern Rhodesia and Bechuanaland, experienced severe drought in spring 1895 and January-March 1896, during which time the plague crossed the Zambezi; Transvaal was similarly in drought in 1896-97 when Rinderpest ravaged the country.

Cattle populations in south-eastern Africa were in a vulnerable position at the outbreak of the Rinderpest panzootic, in part due to overstocking but also due to the establishment of colonial regulations concerning land access (Marquardt 2005). Drought-induced starvation of livestock is under-reported in comparison to crop failure in contemporary accounts and studies of the 1896 famine. However, since malnourishment played a role in the following devastations of the cattle plague, it is imperative to outline its severity and prevalence. Reports of poor pastures and famished cattle come from all over the study region. In Bechuanaland, oral traditions describe debilitated cattle starving and dying of thirst, as well as very low milk yields due to the drought (Molosiwa



2013). Missionaries from western Transvaal and CCBL observed cattle dying of hunger in large numbers during the last quarter of 1896, just when or shortly before Rinderpest arrived in these areas.<sup>xxxvii</sup> In both regions, the situation was so bad that even the few cattle that survived the onset of the plague were threatened by a lack of pasture and death in the drought of late 1897.<sup>xxxviii</sup> Cattle in Zululand and northern Natal, especially in the mid- and upland districts, met with a similar fate in spring 1895 and winter 1896.<sup>xxxix</sup> The prolonged and widespread lack of pasture and fodder resulted in price rises of 44% for oathay and 20% for oats in 1896. That year the import of forage and oats became economically viable, which had not happened previously.<sup>xl</sup> These imports of animal feed, probably primarily for the more valuable horses, were valued at £14017. To put this into context, the fencing of Natal as a protection against Rinderpest would have cost £60000. Even though the worst of the drought in Natal was concentrated in 1895-96, allowing livestock to recover, the winter and spring of 1897, when Rinderpest arrived, were again marked by low precipitation levels and consequently poor pastures.<sup>xli</sup> In some areas, such as Kuruman (CCBL) and south-eastern Transvaal, cattle were in such bad condition that substantial numbers succumbed to pleuro-pneumonia – including around half the livestock on farms in the Vryheid district (SAR) (Macnab 1897).<sup>xlii</sup> This was not the first – or indeed last – time in southern Africa that drought had contributed to the loss of cattle due to starvation and ensuing disease; substantial livestock losses followed the drought episodes in the late 1870s (de Kiewiet 1941; Lambert 1989) and the 1930s (Beinart 2003).

Marquardt (2005) and Spinage (2012) consider drought to be a factor in the spread of Rinderpest through the reduction of watering points and feeding grounds, which would have raised the potential for infective contacts between livestock and also with susceptible wild species. In eastern Africa, where the disease wrought havoc on the cattle stock between 1887 and 1892, its march was often also accompanied by dry conditions (Hamilton Johnson 1988, Nicholson 2012, Serels 2018, Spinage 2003, Spinage 2012). In the mid- to late 1890s in southern Africa, fencing, quarantining and the killing of infected cattle herds were practised by the colonial authorities to counteract the spread of disease, but to little effect.

Weakened cattle were easy prey for the newly arrived Rinderpest, and mortality was extremely high. An almost total loss of cattle was observed in Rhodesia (Spinage 2012); in BLP, a conservative estimate ranges from 90-97%;<sup>xliii</sup> in CCBL, 97% of cattle were destroyed (Marquardt 2005); and Boers and Africans in western Transvaal probably lost 95% or more of their cattle.<sup>xliiv</sup> In an attempt to 'stamp out the disease', herds under British control outside native reserves were shot when some animals had become infected until late 1896 (Gilfoyle 2003; Saker and Aldridge 1971). A similar policy and timeframe seems to have applied in Transvaal,<sup>xliiv</sup> but here experimental inoculation was used much earlier (winter 1896) (Spinage 2003). Natal had the advantage of facing the disease about

a year later than other areas. This not only gave cattle a chance of recuperation from the withered pastures, but crucially, by then effective inoculation methods had been developed (Gilfoyle 2003; Spinage 2003). As a result, the death rate of cattle owned by people of European descent was only c. 38%. However, some 75% of African cattle, often grazing communally in drier areas and less protected by preventive colonial measures, were killed in the panzootic (Fig. 3.C).<sup>xlvi</sup> In the Cape Colony, inoculation was a successful tool to save herds, with only 40% of the cattle dying. In the middle of 1898, however, the inoculation campaign ground to a halt when the panzootic came to an unexplained 'natural death' (Gilfoyle 2003). This coincided with the end of the extreme phase of the drought, so it can be assumed that the combined effect of the inoculation campaign and improved water and grass supplies had diminished the pool of disease-prone cattle. This suggestion is supported by the lower mortality rates or even total absence of Rinderpest from Cape Colony districts within the winter- and perennial-rainfall areas, where the drought of the mid-1890s was less developed.

The consequences of such dramatic losses of cattle have received ample attention in South African historiography (Ballard 1986; Phoofolo 1993; Phoofolo 1999; Phoofolo 2003; van Onselen 1972). In broad terms, the Rinderpest vastly impoverished the African communities; about a decade after the Rinderpest, in 1905, Africans in Natal (where cattle mortality had been comparatively light) still only owned about half as much cattle as before the panzootic. With regard to the drought and famine conditions that were still continuing in Transvaal and Bechuanaland after the cattle plague, and which returned to Natal and Zululand within a few years, the Rinderpest heightened the vulnerability of the African population. In regions such as Bechuanaland, where cattle farming dominated the agricultural sector, the cattle plague itself was a major factor in the famine (Molosiwa 2013; van Onselen 1972).<sup>xlvii</sup> However, even areas with more diverse agricultural production were susceptible to the effects of the disease. The widespread death of cattle depleted supplies of draught oxen, shattering the transport system, and also led to a severe shortage of plough oxen. The former contributed to steep rises in prices for foodstuffs, especially under famine conditions; foodstuff had to be carried by people or by horses and mules, which Africans in general did not own (Schapera and Comaroff 1991).<sup>xlviii</sup> The latter – combined with a lack of manure and consequent decreased soil fertility<sup>xlix</sup> – would lead to a lower level of agricultural productivity.<sup>i</sup> Cattle could no longer be sold for food in famine years, due to quarantining measures, fencing and the drop in livestock prices preceding the cattle plague.<sup>ii</sup> In Transvaal, the quarantining of the sub-districts coincided with the climax of the drought and famine in 1896 and aggravated the situation by interrupting the trade network.<sup>iii</sup>

The closing of the border between SAR and BLP in 1896 severed the BLP from Transvaal grain supplies, and contributed to a major spike in prices prior to the construction of the Mafeking-Palapye-Bulawayo railway in 1896-97 (Fig. 1).<sup>liii</sup> Africans in Bechuanaland survived this period of acute dearth by consuming the meat of doomed or diseased cattle,<sup>liv</sup> a measure that was later taken up in other regions.<sup>lv</sup> Once this short-lived glut was finished, the loss of cattle resulted in a collapse in the supply of meat and milk for Africans and European farmers alike;<sup>lvi</sup> as a consequence, African diets became generally low in protein and fat (Turner 1909a). The lack of (sour) milk particularly affected children, causing malnourishment and raising susceptibility to gastro-intestinal infections (Lambert 1995; van Onselen 1972).

## 5. Agriculture in Crisis

The triad of drought, locusts and cattle plague ruined the agricultural and pastoral sector in south-eastern Africa and constituted a massive shock to food supplies (Fig. 2). Agriculture was vulnerable to drought; irrigation was uncommon and, where it existed, was only small in scale. The bulk of agricultural production was in the hands of Africans; in many areas farmers of European descent focused on pastoral farming. Due to a variety of factors, African agriculture was particularly at risk to drought-induced crop failure. Native reserves were frequently situated in arid areas (de Kiewiet 1965; Humby 1904). The crop-range was limited, and even in Natal peripheral locations were badly integrated into the colonial market. The agricultural system was based on the supply of surplus land that could be sown when necessary; however by the early 1890s, population pressure and the developing social and legal framework in Natal hindered the access of Africans to the land. Maize and sorghum were the main food crops grown, although maize was not well adapted to the recurrent droughts of the region and more prominent in the areas of higher rainfall. Towards the north of the study area, sorghum was still preferred over the relative newcomer maize (Dreier 2005; Schapera and Comaroff 1991). Both crops were among the favoured foodstuffs of the granivorous locusts, but when the locust plague relented in Natal in 1896-97, sorghum proved more resilient to the pest.<sup>lvii</sup> In normal years, the varied geography and rainfall patterns in south-eastern Africa would permit the balancing out of local or regional harvest failures via trade. The severity of the drought cycle in the mid-1890s, especially 1895-96, however, and the ubiquity of locusts wrought havoc on this system. Transvaal and Bechuanaland experienced more problems, because the most significant drought-induced harvest failure of the period, 1896, coincided with the Rinderpest and its impact on the transport system and nutrition. The danger of a transport breakdown during a supply crisis was obvious; the resident magistrate of the starving Ixopo district of Natal expressed concern about grain

transport a full year before the arrival of the cattle plague and urged the central government to stockpile supplies of grain in the stores (Ballard 1983).

Planting and sowing of the traditional African crops were dependent on the arrival of the spring rains. The first showers after the dry winter season triggered the onset of ploughing. In Natal, people would begin looking out for signs of spring by August, with the *Natal Witness* reporting every potential rain shower or storm; if the rains had not arrived by October the situation became precarious. In 1895 the rains reached south-eastern Africa in November and late rainy seasons remained a recurrent problem until the end of the century. When sowing was delayed too long, harvest success was endangered by autumn frosts, especially in upland areas. Throughout Natal, Zululand and the south-eastern districts of Transvaal, frosts did not affect harvests in 1896,<sup>lvi</sup> but most crops had already withered during the drought from January to March or had been devoured by the locusts.<sup>lvii</sup> Frost damage remained a risk in the following years, but was rare.<sup>lviii</sup> Whereas coastal colonies experienced a respite from drought and locusts in 1896-97, the situation further inland remained strained; the harvest was patchy in Transvaal and failed in BLP.<sup>lix</sup> For BLP and CCBL this was the third harvest failure in successive years, since crops had already failed there and in south-eastern Transvaal and parts of Zululand in 1895.<sup>lx</sup> Harvest failures occurred in western Transvaal and Bechuanaland in 1898, though the harvest was sufficient towards the Indian Ocean coast.<sup>lxi</sup> The problems continued for parts of BLP and Transvaal in 1899,<sup>lxii</sup> but the build-up to the South African War (1899-1902) overshadowed all other developments.

Agricultural coping strategies were employed to reduce the impact of the environmental crisis. As long as there were draught oxen available, extra ploughs could be laid on to break-up the hardened soil and accelerate ploughing and sowing when the late rains finally arrived.<sup>lxiii</sup> Once the Rinderpest had killed the oxen, Africans had to resort to tilling the land with hoes, a much more time intensive process; this contributed to a decrease in sown acreage. Some farmers and Africans on mission stations used mules for ploughing and the price of mules rose.<sup>lxiv</sup> In certain years, drought and locusts destroyed the seedlings and so made repeated sowing necessary; in northern Natal during 1895 maize was sown thrice by some farmers.<sup>lxv</sup> Africans also employed repeat sowings, but this cost extra seed and delayed the harvest, thereby extending the period during which people depended on wild herbs, roots etc., which during famine constituted a larger share of the consumed calories.<sup>lxvi</sup> However, the necessary resources to endure times of crisis could not even be provided by all rural Whites (de Kiewiet 1941); and in Transvaal, ruined farmers were unable to plant in 1896-97<sup>lxvii</sup> and were in need of financial aid from the government (Cripps 2012). Such assistance was unavailable for Africans. In the more affected regions, people had to resort to consuming seed corn; Britain attempted to avert the inevitable ensuing harvest failure through the donation of seed corn

to the BLP.<sup>lxx</sup> Those Africans who could still plant, favoured the more drought resistant sorghum over maize. In many parts of Natal, the acreage of sorghum reaped by Africans increased relative to maize after 1895 (Fig. 3.A, S2).<sup>lxxi</sup>

In regard to the locust plague, measures for raising resilience were also taken on a local level or by the colonies or states: they included a raised input of work as well as legal and scientific approaches. In Natal, where possible, Africans increased the acreages dedicated to sweet potatoes to escape the ravages of locusts (S3).

Nevertheless, the combined impact of drought and locusts proved a catastrophe for agricultural output; in the Natal midlands districts south of Pietermaritzburg the harvest failed almost entirely on land cultivated by Africans. The coast and the districts north of the capital fared somewhat better. The pastoral sector also suffered from drought and whereas the cattle numbers in African ownership decreased, the cattle owned by farmers increased (Fig. 3.A-C, S2).

With even the relatively wet Natal facing such a severe harvest failure, prices for maize and sorghum soared during 1896. Geographically, prices were not only determined by the magnitude of the harvest failure, but also by the distance to the recently constructed railways (Fig. 1); these were the lifelines through which maize imported from the USA and Argentina was supplied.<sup>lxxii</sup> Remote areas suffered most and were also vulnerable to the profiteering of traders and speculators. Prior to the construction of the railway in BLP, the protectorate had to be supplied by mules. As a result, in the southern Protectorate, a 200lb. bag of flour fetched £3 10 shillings,<sup>lxxiii</sup> while in the northern region it reached an exorbitant £10 at the time of greatest dearth.<sup>lxxiv</sup> Once the railway opened, the price for imported bags of maize stood at £1 10 shillings.<sup>lxxv</sup> In Zululand, the average price was £1 7 shillings to £1 15 shillings.<sup>lxxvi</sup> The SAR government imported mules alongside maize to ensure the transport of grain into the hinterland.<sup>lxxvii</sup> Prices for the cheaper sorghum rose to £1-2 per sack on the Highveld by winter 1896.<sup>lxxviii</sup> Before the American maize arrived, the situation was tense in Johannesburg, prices oscillated between £1 5 shillings and £2 10 shillings (Cripps 2012). In general, urban centres along the railways were the best supplied places during the famine. In Natal, Durban and Pietermaritzburg saw the lowest prices of the colony, but even here the average price for a muid of maize doubled to 19 shillings 10 pence in 1896. Improvement in the agricultural sector, accompanied by falling prices, occurred in coastal colonies during 1896-97. Further inland the situation did not relax due to lack of seed corn and discouraged cultivators reducing the sown acreage. By 1898, conditions in Natal had worsened again, resulting in a return to famine prices which were maintained over most of south-eastern Africa until at least the harvest of 1899.

## 6. Reduction of vulnerability to famine

The persistent environmental crisis of the mid- to late 1890s, culminating in the famine of 1896, occurred at a watershed moment. The precolonial strategies for managing dearth – extensive use of wild plant and animal resources, food sharing amongst communities, change in settlement patterns and occasionally the recourse to social conflict – were largely coming to an end, but colonial famine management was not yet fully developed. Once the administrations in the urban centres realised that the combined impacts of drought, locusts and cattle plague exceeded the potential of normal coping strategies, regional governments resorted to the international grain market. Imports of maize from the Americas were organised by the British dominions and SAR and were distributed via the railway network. Around New Year 1896, Transvaal opted for imports and the lowering of import tolls; Natal began to investigate the need for imports in late January.<sup>lxxxix</sup> In the following year, c. 62000t of maize were imported at Durban and c. 38500t into the Cape Colony, a trade that had essentially not existed previously (Fig. 3.D). The imported grain was to be sold at market price, but, with the speculation involved, many rural Africans were priced out of the market.

Government-level famine management focused on this provision of imported maize at market price. In the context of ongoing efforts to increase the reservoir of African wage labour in the farming and mining sectors, the subsistence crisis was considered an opportunity to separate African populations from traditional subsistence livelihoods and integrate them into the labour market (Ballard 1983; Unterhalter 1978).<sup>lxxx</sup> In Natal, the farming sector also aimed to reduce African agricultural competition (Lambert 1989; 2003). Even though resident magistrates, missionaries and chiefs had urged central governments to prepare for famine,<sup>lxxxi</sup> the administrations only rarely provided maize as relief or at cost price, conceded credit to Africans for the purchase of maize, or relinquished taxes or 'squatters rent' (Ballard 1983; Lambert 1995; Ramdhani 1989). Thus, food relief in Natal and Zululand came late and was of limited extent; credit was rarely conceded and grain was mostly sold at market price (Ballard 1983; Lambert 1995; Ramdhani 1989).<sup>lxxxii</sup> In BLP, authorities embarked on relief on a larger scale and supplied grain at cost price, but the distribution of free food was largely avoided.<sup>lxxxiii</sup> After President Krüger inspected the famine-ridden districts of northern Transvaal in 1896, efforts were made to supply grain to starving Africans in northern and south-eastern regions (Cripps 2012; Wylie 2001).<sup>lxxxiv</sup>

Faced with severe shortages, coping strategies were developed by some of the mission stations in affected areas. The response of individual missions was much dependent on the financial situation and transport links of the station, the potential of the 'home' mission society to accrue famine donations, and the personality of individual missionaries. There is evidence that mission stations remitted the church tax, and of missionaries using their purchasing power and the mission networks

to provide grain for their communities and for passing refugees.<sup>lxxxv</sup> In northern Transvaal, the Berlin and Swiss Missions organised large scale food provision and partly also medical treatment (Dreier 2005). Early in 1896, the London Missionary Society encouraged donations for BLP in Britain; this effort merged with the work of the London Relief Committee to supply primarily seed corn but also free food for mission stations.<sup>lxxxvi</sup> In British colonies, English-speaking missionaries used their influence to convince the government and public to increase food relief;<sup>lxxxvii</sup> in Transvaal this duty fell to German and Swiss mission societies (Dreier 2005).

With speculative maize prices and a lack of food relief, Africans resorted to a mixture of old and new adaptive social mechanisms. Where market integration was still functional, and resources sufficient, Africans exchanged cash reserves and cattle for maize.<sup>lxxxviii</sup> The migration of whole tribes or villages to less vulnerable areas was no longer possible, but families or individuals, using traditional support networks, moved to friends or relatives; missionaries frequently reported people fleeing hunger. By 1896, selling labour for food or money was a well-established crisis management technique. Throughout southern Africa, primarily young men left their homes for the Transvaal mines or urban employment to raise cash for food and taxes, and to avoid further stress on dwindling local food supplies, thereby, however, weakening the community and family ties.<sup>lxxxix</sup> This sudden supply of labour, increased also by the defeat of the Gaza kingdom in modern day Mozambique, however, enabled the Chamber of Mines to reduce African wages by 30% in late 1896 while increasing daily work hours (Marks 2011; Phoofolo 1993). To deflect growing tensions, the SAR government informed the workers that the responsibility for this decision lay with the 'uitlanders' dominating the mining industry.<sup>xc</sup> Other Africans found work on farms or mission stations. Vulnerable members of African society had to stay behind without support; they compensated for harvest shortfalls by increasing hunting activities where possible, and by gathering wild roots, herbs and fruits, locusts and other insects. Energy was preserved by reducing activity.<sup>xc<sup>i</sup></sup> In parts of rural Transvaal and in Bechuanaland, 1896 represented the second year of harvest failure and was not the last.<sup>xc<sup>ii</sup></sup> The duration of the drought and the parallel occurrence of Rinderpest resulted in widespread mass migration – even the abandonment of villages – and in hunger and famine-related disease,<sup>xc<sup>iii</sup></sup> afflictions that did not occur to such an extent in the coastal colonies. Whereas in Natal and Zululand, the tradition of food sharing was still practised to some degree, in these semi-arid regions such traditions appear to have collapsed, suggesting a breakdown of social cohesion (Dreier 2005; Molosiwa 2013).<sup>xc<sup>iv</sup></sup>

## 7. Demographic, social and political developments in the wake of the crisis

The pressures of the environmental and socio-economic stress and the adaptations to overcome the crisis had ramifications on a wide array of aspects of the life of Africans including: decreasing health, increased mortality, a change in religious attitudes and a contribution to political upheaval. Peoples' health suffered most in areas of prolonged severe food shortages, as in the so-affected Transvaal and Bechuanaland. Malnutrition was widespread, and starvation also occurred.<sup>xcv</sup> As noted above, the loss of meat and dairy due to the Rinderpest removed a major source of fat and protein from the African and poor White's diet (Turner 1909a); with children suffering especially from a lack of vitamins and minerals (van Onselen 1972). The imported American maize was animal fodder, dried or roasted, and was nutritionally inferior to fresh local maize. The imported grain was generally disliked by Africans and in BLP was referred to as 'Black Coals'.<sup>xcvi</sup> In the prolonged drought, wild and cultivated vegetables were lost and sorghum harvests were severely affected. Since sorghum was also used for brewing, beer consumption in interior southern Africa dropped dramatically during these years.<sup>xcvii</sup> As beer, greens and milk were major sources of vitamin C for African populations (Turner 1909b) it is not coincidental that scurvy was widespread in BLP in 1896-97<sup>xcviii</sup> and that many Natal hospitals diagnosed the disease regularly after 1898, when the cattle plague had struck and the dry conditions were renewed.<sup>xcix</sup> It was troublesome in 1897 and 1898 (Hickley and Bronte Stewart 1952). Scurvy became a serious health problem in the mines, where workers tended to fall ill within a few weeks of arrival. Mining companies recognised that workers arrived in a pre-scorbutic state, but did not adapt their food provisions, which at this point consisted only of porridge made from dried import maize (Wylie 2001).

The post-1896 years saw a rise in famine disease due to the lack of food, and of disease due to the consumption of unhealthy food such as decomposing cattle carcasses; this was particularly widespread in Bechuanaland, where the Rinderpest coincided with the drought.<sup>c</sup> In Transvaal, dead cattle were partly burnt,<sup>ci</sup> but water sources contaminated during the drought or by dead cattle caused gastro-intestinal diseases and fever. Malnutrition and the associated social hardships and migration could increase vulnerability to infectious disease. Early in 1897, typhoid fever and malaria spread through low lying areas of Bechuanaland and Transvaal. Whereas typhoid fever was most likely linked to the displacement of people and low living standards, the increase in malaria, which was endemic in the Lowveld (de Kiewiet 1941), can probably be attributed directly to the weather conditions. When the water flow in rivers ceased and left only scattered pools, these would provide the ideal breeding ground for mosquitoes – the vectors for malaria – in the warm summer months. Many Africans, as well as people of European descent, fell victim to these disease outbreaks.<sup>cii</sup> Mortality was high on some German Hermannsburg mission stations, and five missionaries (of a total of c. 10) as well as eight family members died during the first half of 1897.<sup>ciii</sup> Northern Transvaal



did not escape (Malunga 2003). Smallpox, which had been prevalent in Johannesburg and Transvaal in 1893, took hold at least in south-eastern Transvaal in 1897 and west of Pretoria early in 1898, with villages being quarantined.<sup>civ</sup> In autumn 1898, malaria returned.<sup>cv</sup> In Berseba, Transvaal, the mortality rate for African people was 10%, while estimates for Kuruman (CCBL) reached 25%;<sup>cvi</sup> recurrent fever epidemics marked the following autumn and winter.<sup>cvi</sup> In accordance with the loss of life in Transvaal, a mortality rate of 20% is assumed for the badly hit areas of eastern Bechuanaland for the years of recurrent crisis between the mid-1890s and c. 1905.

With the catalysing effect of the famine and Rinderpest, African societies experienced profound social and religious change. Africans took refuge at the mission stations, sometimes as 'bread-Christians', since missions were striving to feed their congregations and refugees.<sup>cvi</sup> However, the erosion of the basis of traditional African life brought with it the spread of millenarian fears and, in areas of prolonged or close contact with European settlers, this contributed to a real religious shift and a rise in conversions to Christianity, especially amongst the Tswana people.<sup>cix</sup> Rain-making rituals were in decline among the Tswana (Schapera 1970), as attested by the missionaries in Transvaal,<sup>cx</sup> although these rites used to be carried out annually in the arid regions of the west (Schapera 1937). In Natal, mission records are entirely mute upon this contentious issue, giving the impression that no rain-making took place. However, even though expanding, the subsistence crisis accelerated the profound change that African Christianity was undergoing. The 'Ethiopian' Church, a movement for an independent African Christian community, widened its influence, new churches were founded, and the congregations of some mission societies sought increasing independence (Chidester 1992; Houle 2011; Klein et al. 2018). Revival movements swept through Protestant communities in Natal and Transvaal (Dreier 2005; Houle 2011).

In areas where colonial influence was limited, or where African-White relations were strained, Africans frequently associated the blights devastating the land with colonial expansion (van Onselen 1972). The recently colonised Matabele in Rhodesia, for example, blamed drought, locusts and cattle plague on the establishment of the rule of the British South Africa Company (Baden-Powell 1897; Selous 1896). The requisition of Matabele cattle by the company before and during the drought in late 1895<sup>cx</sup> further enraged the tribe, and by March 1896 rebellion spread. During this rebellion, the British strategically destroyed local grain stores after the failed harvest of 1896, when a bag of grain was already valued at c. £10 (Baden-Powell 1897; Selous 1896),<sup>cxii</sup> and when the railway to Rhodesia was still more than a year off completion. The Africans of the Langeberg region (CCBL), famished and without hope for the forthcoming harvest period,<sup>cxiii</sup> were confronted with hut-tax demands and the 'stamping out' approach towards Rinderpest, and so rebelled in summer 1896-97 (Cleall 2012; Saker and Aldridge 1971). In 1898, the Venda, the last 'independent' tribe on SAR territory, were

vanquished (Braun 2013). Rumours of rebellion and uprising were prevalent in many regions including Zululand, Natal and Basutoland. With cattle holding such a central place in traditional African life (Phoofolo 1993; Unterhalter 1978), these tensions were linked to the looming Rinderpest, but in Natal and Basutoland, unrest preceded the cattle plague and coincided with the climax of the 1896 famine.

Ultimately, the environmental crisis of the mid-1890s left a more profound impact on the African population than the doomed rebellions. When the main shock of the 1896 famine had subsided, and the economic and social disruption it caused could be accommodated, the cattle plague, which equalled a massive wealth destruction, prevented any recovery. Agricultural data from Natal show that the acreage cultivated by Africans shrank.<sup>cxiv</sup> Further, swathes of land that had been grazed by African cattle were now empty and could easily be absorbed into White farms (Marks 2011). In 1905 in Natal African cattle stood only at about 50% of the pre-plague level, while the cattle owned by white farmers slightly exceeded pre-plague numbers<sup>3</sup> (the recovery rates for both groups may also appear higher than they actually were due to the cattle raiding in the South African War).<sup>cxv</sup> Since cattle constituted wealth, their loss greatly reduced the potential for Africans to investment in agriculture, let alone purchase additional land where still legally possible. Unsurprisingly, the agricultural boost in Natal created by the South African War could not reverse the long term trend of farmers of European descent coming to dominate the agricultural and pastoral sector (Ballard 1986). When mining profits began to revive South African agriculture and help to start 'scientific' farming, this growth totally bypassed the African population and only raised the speed with which 'squatters' or tenants on unprofitable terms were removed from the land (Guest 1989; Lambert 1995). This development was greatly facilitated by the impact of the environmental crisis of the mid-1890s that impoverished African populations.<sup>cxvi</sup> The result of the crisis was aptly summed up in the words of Africans near Kuruman (CCBL): 'We are no longer a people, we are a remnant society'.<sup>cxvii</sup> Africans lost economic standing and, increasingly, room for political manoeuvre. Impoverished Africans and landless White people swelled the ranks of the urban proletariat (de Kiewiet 1941; Marks 2011).

## 8. Conclusion

In the mid- to late 1890s, prolonged drought took hold of the summer rainfall regions of south-eastern Africa. During a series of extremely dry springs and early summers, locusts thrived and destroyed the young and late-sown crops. Pastures and watering holes were reduced by the

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<sup>3</sup> These numbers apply to Natal within the borders of 1896. In 1903 the districts Utrecht, Vryheid and Paulpietersburg were transferred to the Colony of Natal, cattle in these districts is excluded for the comparison.

drought, and this contributed to the spread and mortality of the cattle plague. In effect, rather than simply reducing crop yields and degrading water supplies, prolonged drought triggered changes to natural ecosystems and agricultural systems. The resulting environmental and agrarian crisis was particularly devastating in the interior of south-eastern Africa. As a natural phenomenon, the environmental crisis and famine impacted on all sectors of south-eastern African society, but the vulnerability of various social groups, and their resilience to and recovery from this crisis, were determined by pre-existing socio-economic and political structures. Groups and individuals of low socio-economic status, effectively barred from political influence, found it difficult to adapt successful short- or long-term coping strategies. In south-eastern Africa in the 1890s, this put both African populations and poorer people of European descent at risk. Crisis management saved many lives, but the necessary coping strategies drew increasing numbers of Africans into the capitalist system (Marks 2011). The crisis accelerated existing trends and heralded the arrival of the twentieth century, where ultimately South African society would be segregated culturally, socially and economically along racial lines.

### **Acknowledgements**

This research was funded by Leverhulme Trust Research Project Grant number F/00 504/D. We extend our thanks to the ELM archive that holds the records of the Hermannsburg mission.

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Figure captions

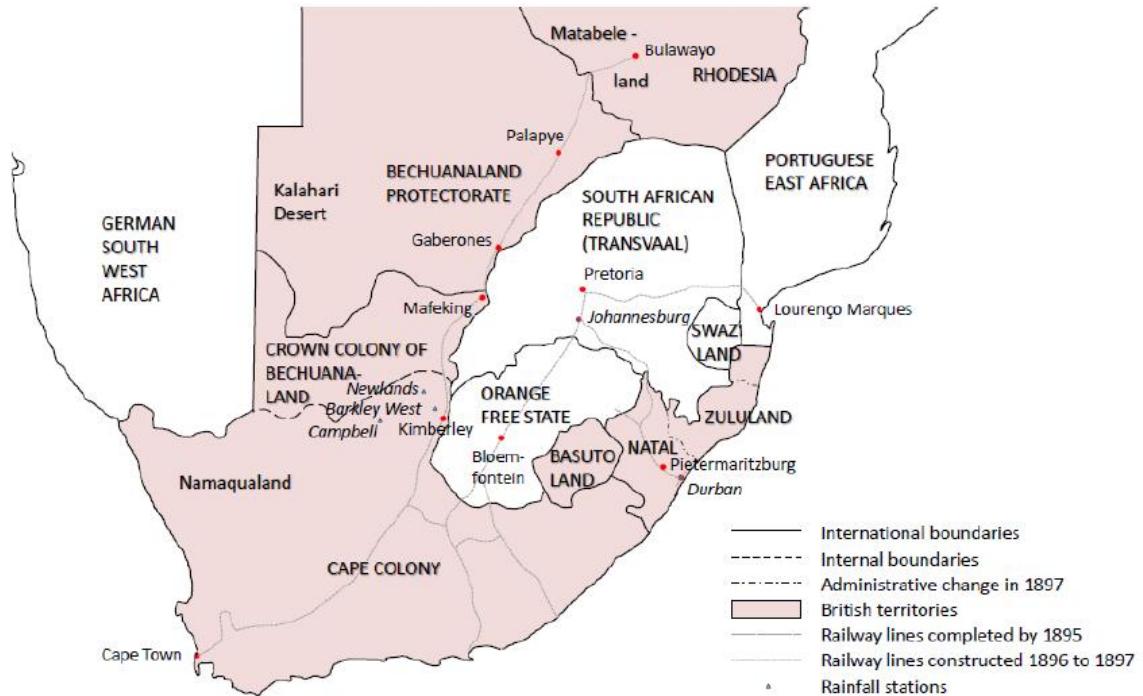


Fig. 1: Administrative boundaries and railway lines in southern Africa, 1895-98. Rainfall stations marked in Italics with the locations indicated by triangles. Place names given as in use during the study period.

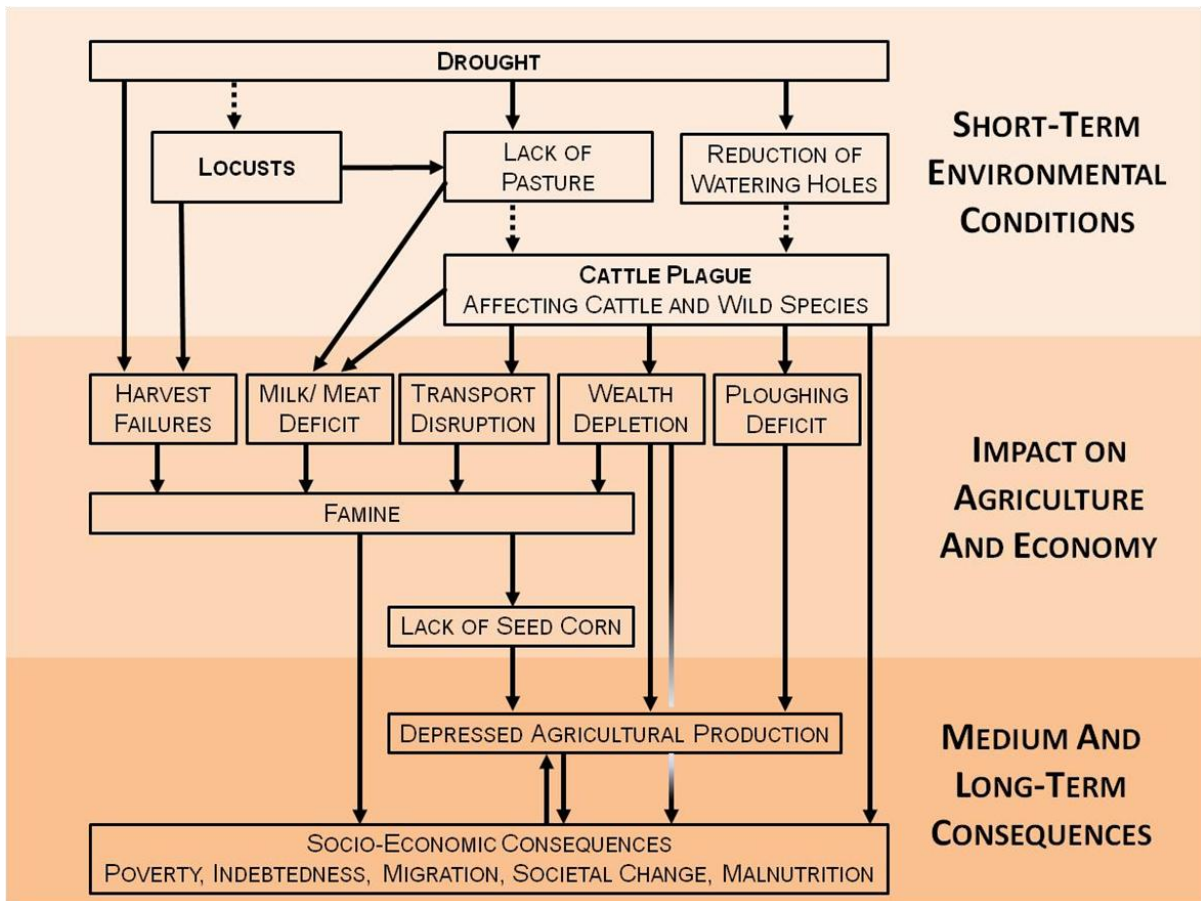


Fig. 2: Environmental aspects of the agrarian crisis and its consequences in the 1890s.

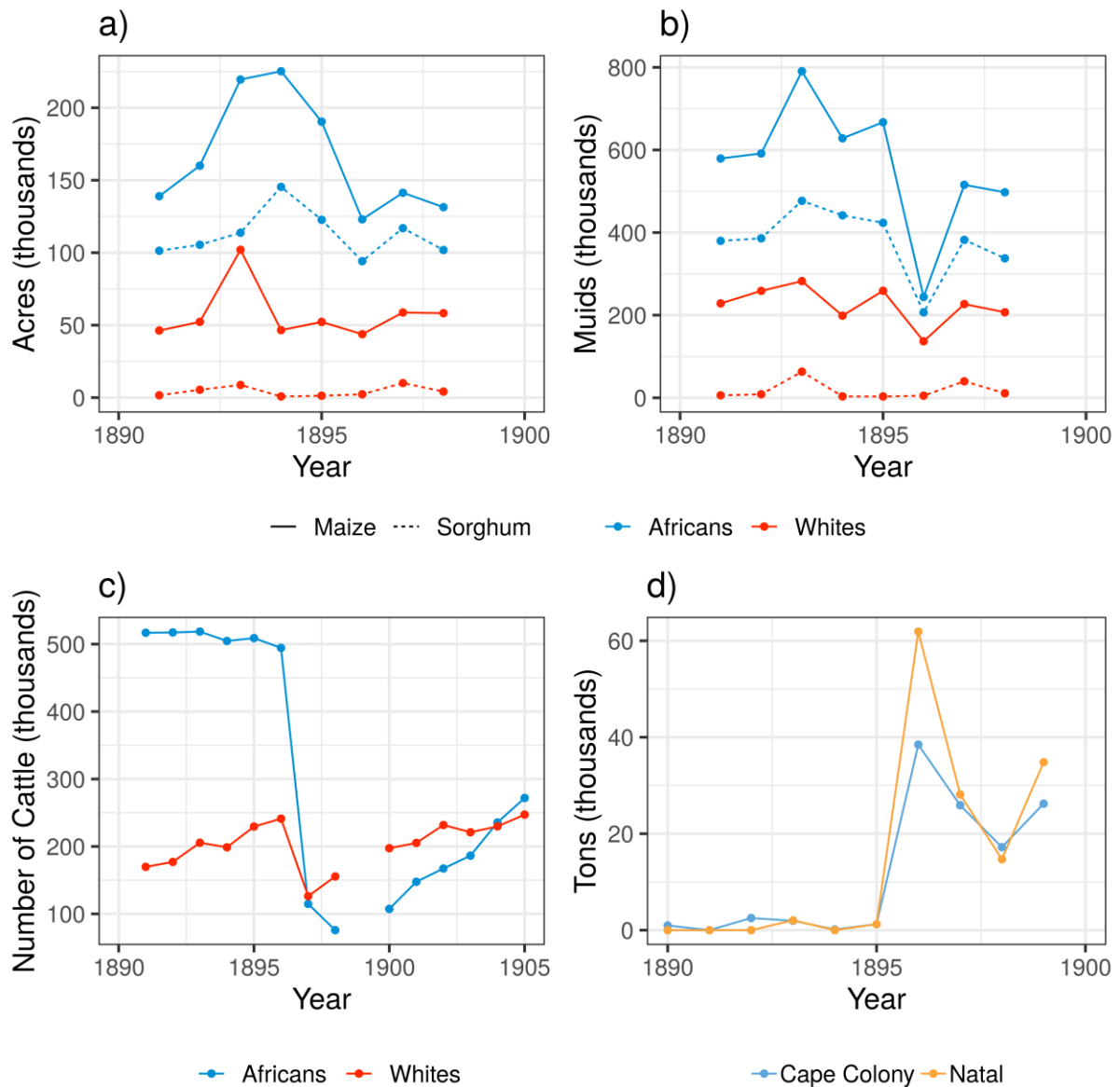


Fig 3: Impact of the ecological crisis of the 1890s in southern Africa. A: Natal, acres reaped with maize and sorghum 1891-1900, B: Natal, harvest quantity of maize and sorghum 1891-99, C: Natal, cattle 1891-1905. D: Cape Colony and Natal, maize imports 1890-99. Data for A-C for Africans and Whites and referring to Natal in the borders of 1896, before Zululand in 1897 and Paulpietersburg, Vryheid and Utrecht came under the administration of the Colony of Natal.

# **THE ROLE OF DROUGHT IN AGRARIAN CRISIS AND SOCIAL CHANGE: THE FAMINE OF THE 1890s IN SOUTH-EASTERN AFRICA**

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## **SUPPLEMENTARY INFORMATION**

### **S1 Data sources and region of interest**

Apart from the literature dedicated to the drought driven crisis and the cattle plague given in the main text of the paper, histories of southern African people and states also include information on the subject (de Kiewiet 1941; Molosiwa 2013; Ramsay et al. 1996), but a coherent analysis over wider south-eastern Africa is lacking. The utilisation of new information sources – in particular a plethora of letters and reports by various protestant mission societies – allows for a detailed study of the drought-driven environmental crisis and its impacts.

The colony of Natal possessed one of the densest networks of mission stations worldwide (Etherington 1989): material from the Anglican Society for the Propagation of the Gospel, the Lutheran German Hermannsburg mission and the Norwegian mission, and the American Board of Commissioners of Foreign Missions has been included in the study. The Hermannsburg and Norwegian mission stations were concentrated in northern Natal and in British and SAR Zululand (south-eastern SAR); the American stations clustered in coastal Natal. A second Hermannsburg mission province was located mainly in western Transvaal, although this Tswana mission extended also into south-eastern BLP. In the northern districts of SAR, the Berlin and Swiss missions were active; their crisis records have been studied by Dreier (2005). The Tswana mission of the London Missionary Society was located in the semi-arid region east of the Kalahari from CCBL to northern BLP. The natural world was of interest to many missionaries working in the rural hinterland. However, this interest was more pronounced in mission societies with a lower economic resource base, as missionaries were forced to integrate into their new environment. In this respect, particularly the Hermannsburg missionaries who had a background in agriculture and were members of a comparatively poor mission society that obliged them to also farm for sustenance and trade, and to a lesser degree the Norwegian missionaries, were exceptionally sensitive to climatic, environmental and agricultural fluctuations.

Across the former British dominions, the mission records are supplemented with information from colonial Blue Books. These are collections of statistical data by the British administrations on a wide

variety of sectors perceived to be essential for the territory, such as economic activities, customs, public works, military and meteorology. The statistical information provided for agriculture is usually precise for the population of European descent but is estimated for the African population, and does not encompass Africans outside of 'native reserves' in the case of Natal. For Natal, the *Natal Witness* newspaper provides additional temporally highly resolved data.

All original source references are given in endnotes in the Supplement 8 (S8).

## **S2 Agricultural statistics for the Colony of Natal for 1896**

Natal is the only part of the study area where administrative systems were sufficiently advanced to supply comparatively robust agricultural estimates through which the subsistence crisis can be quantified; in 1895 the maize acreage had exceeded sorghum by c. 36%, which was also the average for the years 1891-95. In 1896 then, there were only 23% more maize acres, and until 1903 the quota would oscillate between 11% and 22% (Fig. S6.A).<sup>cxviii</sup>

That sorghum withstood the environmental pressures of the agricultural crisis in the second half of the 1890s better than maize is also demonstrated by the agricultural statistics for the summer season 1895-96 in Natal. Acres reaped and harvest quantity of both maize and sorghum collapsed in 1896, but maize suffered even worse than sorghum (Fig. S6.A-B).<sup>cxix</sup> The midland districts south of Pietermaritzburg (Fig. S4) formed the epicentre of the harvest failure. From 1895 to 1896, maize yields amongst the predominantly African population here dropped by 86-98%; for sorghum the reduction was 78-98%. Reaped acres for the main crops also dropped dramatically: 67-98% for maize and 72-88% for sorghum. In this region, there was almost no harvest in 1896.

At the coast, the acreage reaped by Africans was generally maintained or dropped by only up to 40%; harvest losses did not exceed 66%. The sorghum harvest varied widely. However, these values may be overly optimistic since locusts had already affected the coastal belt during the summer of 1894-95, resulting in a below average harvest. In 1896, the maize harvest amongst farmers failed completely: north of Durban the acreage reaped collapsed almost entirely. Given that the sugar cane acreage was maintained from 1895 to 1896, it can be assumed that the cash crop was prioritised in the fight against locusts.<sup>cxx</sup>

In the midlands north of Pietermaritzburg and in north-west Natal, the acreage of maize and sorghum sown by Africans was generally maintained or even increased, whereas productivity was low. In about half of the districts the yield remained stable, in the other half the decrease did not exceed 50-60%. Farmers also enlarged their area sown with maize and sorghum, and this extension

resulted in a harvest quantity that was generally on par with 1895. By the time the drought had broken in late 1895 it must have been obvious that maize would fetch high prices in 1896, so Africans and farmers alike would have tried to avoid depending on the market and hoped to produce a marketable surplus.

The pastoral sector of Natal also came under pressure due to the 1895-96 drought and long before the arrival of the Rinderpest in 1897. Estimates of African-owned cattle declined sharply in some mid- and highland districts. Numbers of White-owned cattle increased colony-wide, but such increases appear to have been restricted to areas close to railways. It seems likely that in these districts, farmers acquired cattle that were sold by Africans to raise money for foodstuffs and tax or rent obligations. Colony-wide, cattle numbers remained stable (Fig. S6.C). The low quality of pasture is also demonstrated by the drop in sheep numbers in north-western Natal.<sup>cxxi</sup>

### **S3 Measures against the locust plague**

As locusts had already damaged the sugar cane and grain crops in the coastal belt of Natal, the Natal Locust Extermination Bill was passed in 1895 (Ballard 1983; Lambert 1995). According to the Bill, locust eggs were to be dug up for cash. Manifold are the descriptions of the fight against the pest, African communities expended days and weeks in the generally futile activity of chasing locusts off fields using fumes, noise, sticks or controlled burning. Ditches were also dug to collect and kill the young hoppers.<sup>cxxii</sup> The Bill enabled magistrates to enlist unpaid African labour to fight the pest, a measure taken frequently in the coastal districts to protect the sugar cane (Ballard 1983; Lambert 1995; Ramdhani 1989). Conscription often required so much effort that Africans were forced to neglect their own crops. Effective locust control was developed by a sugar farmer in the form of an arsenic and treacle based insecticide; this could only be used where the risk of poisoning stock was minimal.<sup>cxxiii</sup> No attempt was made to provide Africans with the insecticide (Ballard 1983; Lambert 1995); however, due to the risk locust-poison posed to cattle it was still viewed with suspicion by Africans decades later (Beinart 2003). Fungi were also used experimentally against the pest.<sup>cxxiv</sup> To adapt to the constant threat of locust swarms, Africans increased the acreage dedicated to root vegetables, and land planted with sweet potatoes doubled in the years after 1895, albeit remaining overall on a low level. Sweet potatoes were almost exclusively grown along the coast, but, faced with food shortages, the people of Upper Umkomanzi in the Natal midlands increased the area of cultivation by more than five times in 1896 compared to the 1891-95 average.<sup>cxxv</sup>

#### **S4 Abbreviations**

BL RH	Bodleian Library at Rhodes House, University of Oxford, UK
BLP	Bechuanaland Protectorate (British)
CCBL	Crown Colony of Bechuanaland (British)
CUL	Cambridge University Library
DCCU UI	Digital Content Creation Unit, University of Illinois, USA
ELM	Evangelisch-lutherisches Missionswerk, Hermannsburg, Germany
HHL	Harvard University, Houghton Library, USA
HMB	Hermannsburger Missionsblatt
JHB	Johannesburg
KCAL	Killie Campbell Africana Library, University of KwaZulu-Natal, Durban, South Africa
LMS	London Missionary Society
MB	Missionsblad
MHS	Misjonshøgskolen
N	Natal (British)
NMT	Norsk Missionstidende
OFS	Orange Free State
SOAS	School of Oriental and African Studies, London, UK
TNA	The National Archives, London, UK
USPG	United Society for the Propagation of the Gospel
WBM	Woman's Board of Missions
SAR	South African Republic (Transvaal)
ZL	Zululand (British)

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- <sup>iv</sup> KCM 98/75/7/1-3 Groom, T., File 7. Diaries 1895, 3. – 7.9.1895, Verulam N.
- <sup>v</sup> Natal Witness 1895: 9.10. Bulwer N, Dargle N.
- <sup>vi</sup> Natal Witness 1895: 20.9. Newcastle N, Nottingham Road N, Estcourt N, 24.9. Tugela River N, 26.9. Pietermaritzburg N, 27.9. Colenso N, Newcastle N, Estcourt N, Umzinto N, Barberton SAR, Pretoria SAR, Johannesburg SAR.
- <sup>vii</sup> Natal Witness 1895: 16.10. Nottingham Road N, 18.10. Pietermaritzburg N, 21.10. Pietermaritzburg N, 25.10. Nottingham Road N, Estcourt N, Pietermaritzburg N, York N, 26.10., Newcastle N, 31.10. Colenso N, Vryheid SAR, Dargle N, Pietermaritzburg N.
- <sup>viii</sup> Natal Witness, 1895: 18.10. Pietermaritzburg N, 31.10. Pietermaritzburg N, 5.12. Pietermaritzburg N.
- <sup>ix</sup> Natal Witness 1895: 4.10. Pietermaritzburg N, 1896: 17.1. Pietermaritzburg N; KCM 98/75/7/1-3 Groom, T., File 7. Diaries 1895, 12.11.1895, Verulam N.
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BLP; SOAS, LMS C 55-2-D, Brown, J.T., 29.11.1898, Kuruman CCBL; SOAS, LMS C 56-1-C, Price, R., 9.5.1899, Kuruman CCBL.

<sup>xvii</sup> E.g. SOAS, LMS C 56-1-A, Partridge., 19.1.1899, Molepolole BLP; SOAS, LMS C 56-1-A, Young, 18.3.1899, Palapye BLP; SOAS, LMS C 56-1-C, Wookey, A.J., 26.4.1899, Molepolole BLP; SOAS, LMS C 56-1-C, Hargreave, 13.5.1899, Palapye BLP; SOAS, LMS C 56-2-B, Williams, H., 21.7.1899, Palapye BLP; SOAS, LMS C 56-1-A, Brown, J., 8.2.1899, Taung CCBL; SOAS, LMS C 56-1-C, Brown, J.T., 2.5.1899, Kuruman CCBL; SOAS, LMS C 56-1-C, Price, R., 9.5.1899, Kuruman CCBL. For Molepolole BLP and Kuruman CCBL there rains arrived too late in 1898 to ensure a good harvest the following year.

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<sup>xix</sup> Natal Witness 1892: 21.12. Heidelberg SAR.

<sup>xx</sup> ELM, Südliches Afrika, Chronik der Station Emmaus, District Rustenburg, Transvaal, August Lohann, Anno 1893, p. 26-7; HMB 41/2, 1894, 20-22, Wenhold, H., July 1893, Kana SAR; HMB 41/9, 1894, 159, Kaiser, H., July 1893, Hebron SAR; HMB 41/1, 1894, 4-5, Jordt, H.P., July 1893, Eben-Ezer SAR.

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<sup>xxvii</sup> HMB 44/3, 1897, 48-9, Dedekind, Ch.W., c. July 1896, Nazareth N, HMB 43/12, 1896, 231-4, Schumann, F.B., c. July 1896, Umlalazi ZL.

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<sup>xxxii</sup> HMB 46/1, 1899, 23-4, [Müller, E. Chr.], c. Jan. 1898, Limao BLP; HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 45/5, 1898, 74-5, Behrens, W., c. Jan. 1898, Bethanie SAR; HMB 45/9, 1898, 186-7, Schepmann, H., early 1898, Berseba SAR; HMB 46/2, 1899, 33-4, [Schepmann, H.], c. July 1898, Berseba SAR; HMB 46/1, 1899, 21-2, [Behrens], c. July 1898, Bethanie SAR; HMB 45/12, 1898, 243-6, Grotherr, C., c. July 1898, Polonia SAR; SOAS, LMS R Box 2, Partridge, report, 21.1.1898, Molepolole BLP; SOAS, LMS C 55-1-B, Willoughby, W.C., 22.4.1898, Palapye BLP; SOAS, WMMS South Africa Correspondence Fiche Box 27, Fiche 1067 Transvaal 1891, Box 330, Rogers, A., 19.5.1898, Mafeking CCBL.

<sup>xxxiii</sup> HMB 44/2, 1897, 28, Meyer, H., 4.12.1896, Bethanie SAR; HMB 44/4, 1897, 76-9, Behrens, A.H., 27.1.1897, Bethanie SAR; HMB 44/6, 1897, 121-2, [Jordt, H.P.], early 1897, Eben-Ezer SAR; HMB 48/2, 1901, 20, [Schindler, K.G.], c. July 1899, Pella SAR; SOAS, LMS C 54-1-B, Williams, H., 10.3.1897, Molepolole BLP; SOAS, LMS R Box 2, Ashton, W., 28.12.1896, Barkly CCBL; SOAS, LMS C 54-1-A, Ashton, W., 18.1.1897, Barkly CCBL.

<sup>xxxiv</sup> HMB 46/9, 1899, 224-5, Behrens, G., early 1899, Ramotswa BLP; HMB 48/1, 1901, 7-8, Jordt, H.P., c. July 1899, Eben-Ezer SAR; SOAS, LMS R Box 3, Good, J., report, 1898, Kanye BLP; SOAS, LMS R Box 3, Williams, H., report, 1898, Palapye BLP; SOAS, LMS R Box 3, Brown, J., report, 1898, Taung CCBP.

<sup>xxxv</sup> HMB 48/1, 1901, 7-8, Jordt, H.P., c. July 1899, Eben-Ezer SAR.

<sup>xxxvi</sup> Natal Witness 1895: 21.12.

<sup>xxxvii</sup> HMB 44/6, 1897, 121-2, [Jordt, H.P.], early 1897, Eben-Ezer SAR; HMB 44/9, 1897, 222-4, Lohann, K.A., July 1897, Emmaus SAR; SOAS, LMS R Box 2, Price, R., report, 12.12.1896, Kuruman CCBL.

<sup>xxxviii</sup> HMB 45/5, 1898, 74-5, Behrens, W., c. Jan. 1898, Bethanie SAR; HMB 45/9, 1898, 186-7, Schepmann, H., early 1898, Berseba SAR.

<sup>xxxix</sup> CUL, Statistical Year Book of the Colony of Natal 1896, Report for the half-year ending December 31 1895 for Kranzkop, Stock and Agriculture, Boast, H.W., 18.1.1896, Pietermaritzburg 1895; HMB 43/6, 1896, 91-2, Kohrs, W., Jan. 1896, Etembeni N; Natal Witness 1895: 2.11. Newcastle N; Natal Witness 1896: 31.7. Richmond N, 21.8. Umkomanzi N, Ixopo N; NMT, vol. 51, March 1896, Steenberg, O., 8.1.1896, Mahlabatini ZL.

<sup>xl</sup> TNA, Blue Book for the Colony of Natal 1880 – 1892-3, General imports and Agriculture, Pietermaritzburg 1881-93; TNA, Statistical Year Book of the Colony of Natal 1894-1896, General imports and Agriculture, Pietermaritzburg 1894-1897.

<sup>xli</sup> Natal Witness 1897: 26.8., 2.9., 14.9. Ipolela N, 2.10. Impendhle N, 18.11. Harrismith OFS.

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<sup>xliiv</sup> HMB 44/11, 1897, 258, Schulenburg, H., early 1897, Ramaliane [Ramadiane] SAR.

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- <sup>xlvi</sup> TNA, Statistical Year Book of the Colony of Natal 1896-1898, Agriculture, Pietermaritzburg 1897-9.
- <sup>xlvii</sup> DCCU UI, Annual reports BLP 1896-7, Bechuanaland Protectorate, 4, London 1898; HMB 43/11, 1896, 223-6, [Müller, Chr.], July 1896, Limao BLP; HMB 44/11, 1897, 258, Schulenburg, H., early 1897, Ramaliane [Ramadiane] SAR.
- <sup>xlviii</sup> Colenso, H.E., Famine-making in Matabeleland, Social Democrat, March 1897, 67-70; HMB 44/5, 1897, 97-8, [Stallbom, H.C.F.], early 1897, Bethel SAR; HMB 44/11, 1897, 258, Schulenburg, H., early 1897, Ramaliane [Ramadiane] SAR; BL RH, USPG E52b, Samuelson, S.M., 31.12.1897, St Paul's KwaMagwaza ZL.
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- <sup>liii</sup> DCCU UI, Annual reports BLP 1896-7, Bechuanaland Protectorate, 4-5; *ibid.*, Northern Protectorate, 14-5, London 1898; HMB 45/2, 1898, 24-5, Müller, Chr., Jan. 1897, Limao BLP.
- <sup>liv</sup> DCCU UI, Annual reports BLP 1896-7, Bechuanaland Protectorate, 4; *ibid.*, Southern Protectorate, 10, London 1898; HMB 45/2, 1898, 24-5 Müller, Chr., Jan. 1897, Limao BLP.
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- <sup>lvi</sup> HMB 44/11, 1897, 258, Schulenburg, H., early 1897, Ramaliane [Ramadiane] SAR; HMB 43/10, 1896, 205-7, Jensen, F., July 1896, Linakona [Dinokana] SAR; HMB 46/2, 1899, 31, Deppe, F.H., c. Jan. 1898, Marburg N; HMB 46/3, 1899, 48, Dedekind, C.W., c. July 1898, Nazareth, N.
- <sup>lvii</sup> HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Mellen, L.M., report, 13.6.1897, Esidumbini N; HHL, ABC 15.6.2, vol. 1. Zulu, East Africa, WBM 1886-1899, Mellen, L.M., 13.10.1897, Esidumbini N; HMB 45/1, 1898, 4-5, Rößler, J.K., 12.7.1897, Elim N; HMB 45/1, 1898, 6, Deppe, F.H., 26.7.1897, Marburg N; BL RH, USPG E52b, Samuelson, S.M., 30.6.1897, St Paul's KwaMagwaza ZL.
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Zululand the harvest failure 1895 was due to locust infestation: BL RH, USPG E50d, Samuelson, S.M., 30.6.1895, St Paul's KwaMagwaza ZL.

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<sup>lxv</sup> HMB 45/5, 1897, 70-2, Kück, H., early 1898, Empangweni N; HMB 44/5, 1897, 97-8, [Stallbom, H.C.F.], early 1897, Bethel SAR; HMB 44/9, 1897, 222-4, Lohann, K.A., July 1897, Emmaus SAR; HMB 45/5, 1898, 74-5, Behrens, H.W., early 1898, Bethanie SAR; SOAS, LMS R Box 2, Partridge, report, 21.1.1898, Molepolole BLP; Natal Witness 1895: 28.11. Greytown N.

<sup>lxvi</sup> HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Phelps, F., report, July 1898, Inanda N; HMB 45/5, 1897, 70-2, Kück, H., early 1898, Empangweni N; HMB 43/10, 1896, 205-7, Jensen, F., July 1896, Linakona [Dinokana] SAR; HMB 44/4, 1897, 76-9, Behrens, A.H., 27.1.1897, Bethanie SAR; BL RH, USPG D122c, Johnson, C., 14.10.1897, St Augustine's Rorke's Drift N.

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<sup>lxix</sup> HMB 43/10, 1896, 205-7, Jensen, F., July 1896, Linakona [Dinokana] SAR; HMB 44/4, 1897, 76-9, Behrens, A.H., 27.1.1897, Bethanie SAR; HMB 46/1, 1899, 21-2, [Behrens], c. July 1898, Bethanie SAR.

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<sup>lxxi</sup> TNA, Blue Book for the Colony of Natal 1890-1 – 1892-3, Agriculture, Pietermaritzburg 1891-3; TNA, Statistical Year Book of the Colony of Natal 1894-1903, Agriculture, Pietermaritzburg 1894-1904.

<sup>lxxii</sup> For Bechuanaland: DCCU UI, Annual reports BLP 1896-7, Bechuanaland Protectorate, 4-5, *ibid.*, Northern Protectorate, 14, London 1898. The effect of the high transport rates for ox-wagon in the post-cattle plague Natal are described in: HMB 48/2, 1901, 17-8, Kohrs, W., c. July 1898, Etembeni N.

<sup>lxxiii</sup> HMB 43/11, 1896, 223-6, [Müller, Chr.], July 1896, Limao BLP.

<sup>lxxiv</sup> DCCU UI, Annual reports BLP 1896-7, Northern Protectorate, 14.

<sup>lxxv</sup> HMB 45/2, 1898, 24-5, Müller, Chr., Jan. 1897, Limao BLP.

<sup>lxxvi</sup> In coastal ZL the price was about 27s per bag in winter 1896, HMB 43/12, 1896, 231-4, Schumann, F.B., c. July 1896, Umlalazi ZL. Further inland the prices per bag averaged at 30s (£1 10s) over the year (normal c. 5-6s per bag), MB 21/7, 1897, Astrup, T., early 1897, Entumeni ZL. This is confirmed by MB 21/5, 1897, Astrup, N., 10.9.1896, Untunjambeli N, which also puts the average price per bag in ZL to 30s (£1 10s). It was the American import maize that kept the prices comparatively low, without imports the prices were expected to have climbed to c. 128s (£6 8s). A climax was reached in spring 1896 before the new harvest was ripe, when around Eshowe a bag maize commanded 35s (£1 15s), Natal Witness 1896: 10.12. Eshowe ZL.

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- <sup>lxxix</sup> Natal Witness 1896: 29.1. N; "The Transvaal Uitlander." *Times* [London, England] 4 Jan. 1896: 8. *The Times Digital Archive*. Web. 5 June 2015.
- <sup>lxxx</sup> DCCU UI, Annual reports BLP 1896-7, Bechuanaland Protectorate, 4-5.
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- <sup>lxxxiv</sup> Colenso, H.E., *Famine-making in Matabeleland*, *Social Democrat*, March 1897, 67-70.
- <sup>lxxxv</sup> HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 44/3, 1897, 48-9, Dedekind, Ch.W., c. July 1896, Nazareth N; HMB 44/6, 1897, 118-20, [Rößler, J.K.], early 1897, Elim N; HMB 44/1, 1897, 6, Engelbrecht, J.D., c. July 1896, Ekombela SAR; HMB 44/11, 1897, 258, Schulenburg, H., early 1897, Ramaliane [Ramadiane] SAR; HMB 44/9, 1897, 222-4, Lohann, K.A., July 1897, Emmaus SAR; SOAS, LMS C 54-1-B, Williams, H., 10.3.1897, Molepolole BLP; BL RH, USPG E52b, Samuelson, S.M., 31.3.1897, St Paul's KwaMagwaza ZL.
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- <sup>lxxxvii</sup> E.g. HHL, ABC 15.4, vol. 14, Southern Africa, Zulu Mission 1890-99, Goodenough, H.D., 5.2.1896, Inanda N; BL RH, USPG E51b, Samuelson, S.M., 30.9.1896, Polela N; BL RH, USPG E51b, Samuelson, S.M., 31.12.1896, Polela N; BL RH, USPG E52b, Samuelson, S.M., 31.3.1897, St Paul's KwaMagwaza ZL.
- <sup>lxxxviii</sup> DCCU UI, Annual reports BLP 1896-7, Northern Protectorate, 14, London 1898; HMB 44/4, 1897, 76-9, Behrens, A.H., 27.1.1897, Bethanie SAR; HMB 44/5, 1897, 97-8, [Stallbom, H.C.F.], early 1897, Bethel SAR; HMB 44/11, 1897, 256, Peters, J.H., c. July 1897, Jericho SAR; HMB 43/6, 1896, 58-61, Wolff, D., early 1896, Ekuhlengeni ZL; HMB 43/12, 1896, 231-4, Schumann, F.B., c. July 1896, Umlalazi ZL; MB 21/5, 1897, Astrup, N., 10.9.1896, Untunjambeli N; MHS, Mission Archives, A1045-140b-10, Borgen, M., 23.3.1897, Inhlasatye SAR; MHS, Mission Archives, A1045-140b-8, Steenberg, O., 15.8.1896, Mahlabatini ZL.
- <sup>lxxxix</sup> DCCU UI, Annual reports BLP 1896-7, Southern Protectorate, 10, London 1898; HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Ransom C.N., report, c. July 1896, Amanzimtoti N; HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Mellen, L.M., report, 13.6.1897, Esidumbini N; HMB 46/1, 1899, 23-4, [Müller, E. Chr.], c. Jan. 1898, Limao BLP; HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 44/4, 1897, 72-4, Kück, J., c. July 1896, Empangweni N; HMB 44/6, 1897, 118-20, [Rößler, J.K.], early 1897, Elim N; HMB 45/1, 1898, 4-5, Rößler, J.K., 12.7.1897, Elim N; HMB 44/1, 1897, 6, Engelbrecht, J.D., c. July 1896, Ekombela SAR; HMB 45/1, 1898, 8, Wolff, D., 1.7.1897, Ekuhlengeni SAR; HMB 44/11, 1897, 257, Peters, J.H., c. July 1897, Jericho SAR; HMB 46/1, 1899, 21-2, [Behrens], c. July 1898, Bethanie SAR; HMB 46/4, 1899, 68, Jordt, H.P., c. July 1898, Eben/Ezer SAR; HMB 46/8, 1899, 161-3, [Haccius, G.], July 1898, Hermannsburg DE for SAR; HMB 48/1, 1901, 7-8, Jordt, H.P., c. July 1899, Eben-Ezer SAR; HMB 43/12, 1896, 231-4, Schumann, F.B., c. July 1896, Umlalazi ZL; MB 20/9, 1896, Astrup, H., 21.8.1896, Entumeni ZL; MHS, Mission Archives, A1045-140b-8, Stavem, O., 13.10.1896, Durban N; MHS, Mission Archives, A1045-140b-10, Borgen, M., 23.3.1897, Inhlasatye SAR; MHS, Mission Archives, A1045-140b-8, Steenberg, O., 15.8.1896, Mahlabatini ZL; MHS, Mission Archives, A1045-140b-7, Braatvedt, N., 8.12.1896, Ongoye ZL; BL RH, USPG E51b, Samuelson, S.M., 31.3.1896, Polela N; BL RH, USPG E51b, Samuelson, S.M., 30.6.1896, Polela N; BL RH, USPG E51b, Markham, B., 31.12.1896, Polela N; BL RH, USPG E50d, Samuelson, S.M., 30.6.1895, St Paul's KwaMagwaza ZL.
- <sup>xc</sup> "South Africa. The Native question in the Transvaal." *Otago Witness* [Dunedin, New Zealand] 31 Dec. 1896, 49. *National Library of New Zealand – Papers Past*. Web. 5 November 2014.
- <sup>xci</sup> HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 43/12, 1896, 231-4, Schumann, F.B., c. July 1896, Umlalazi ZL; SOAS, LMS C 53-1-B, Brown, J.T., 27.2.1896, Kuruman CCBL; SOAS, LMS C 55-2-A, Brown, J.T., 9.8.1898, Kuruman CCBL; MHS, Mission Archives, A1045-140b-8, Stavem, O., 13.10.1896, Durban N; MHS, Mission Archives, A1045-140b-10, Borgen, M., 23.3.1897, Inhlasatye SAR; BL RH, USPG E50d, Samuelson, S.M., 31.12.1895, St Paul's KwaMagwaza ZL.
- <sup>xcii</sup> HMB 43/11, 1896, 223-6, [Müller, Chr.], July 1896, Limao BLP; HMB 45/2, 1898, 24-5, Müller, Chr., Jan. 1897, Limao BLP; HMB 46/9, 1899, 224-5, Behrens, G., early 1899, Ramotswa BLP.

<sup>xciii</sup> DCCU UI, Annual reports BLP 1896-7, Southern Protectorate, 10, London 1898; HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; SOAS, LMS C 54-1-B, Williams, H., 10.3.1897, Molepolole BLP; SOAS, LMS C 54-2-B, Willoughby, W.C., 14.8.1897, Palapye BLP; SOAS, LMS C 54-2-B, Lloyd, E., 17.9.1897, Kanye BLP; SOAS, LMS R Box 2, Williams, H., report, 1897, Molepolole BLP.

<sup>xciv</sup> Food was shared along kinship networks, particularly women and children moved to relatives, HMB 44/4, 1897, 72-4, Kück, J., c. July 1896, Empangweni N; BL RH, USPG E51b, Samuelson, S.M., 30.6.1896, Polela. Where the resources existed, mission stations tried to give food to refugees or encouraged sharing, HMB 44/1, 1897, 6, Engelbrecht, J.D., c. July 1896, Ekombela SAR. Even though the coastal lowlands of Zululand were badly affected by locusts, upland Zulus joined family in the lowlands, because sweet potatoes which were generally not attacked by locusts, were grown in the lowlands, MHS, Mission Archives, A1045-140b-7, Braatvedt, N., 8.12.1896, Ongoye ZL. In Bechuanaland and Transvaal references to migration to relatives for food sharing appear again after the travel restrictions due to the *rinderpest* were lifted in 1897: HMB 46/1, 1899, 23-4, [Müller, E. Chr.], c. Jan. 1898, Limao BLP; HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 46/1, 1899, 21-2, [Behrens], c. July 1898, Bethanie SAR.

<sup>xcv</sup> HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 44/5, 1897, 68-70, Hörmann, H.W., early 1897, Emtombeni N; SOAS, LMS C 54-1-B, Williams, H., 10.3.1897, Molepolole BLP; SOAS, LMS C 54-2-B, Willoughby, W.C., 14.8.1897, Palapye BLP; SOAS, LMS C 54-2-B, Lloyd, E., 17.9.1897, Kanye BLP; SOAS, LMS R Box 2, Williams, H., report, 1897, Molepolole BLP; SOAS, LMS C 55-2-A, Wookey, A.J., H., 21.7.1898, Molepolole BLP; SOAS, LMS C 55-2-B, Lloyd, E., 22.9.1898, Kanye BLP; SOAS, LMS C 55-2-C, Wookey, A.J., H., 29.9.1898, Molepolole BLP; SOAS, LMS R Box 3, Williams, H., report, 1898, Palapye BLP; SOAS, LMS C 55-2-A, Brown, J.T., 9.8.1898, Kuruman CCBL; SOAS, LMS R Box 3, Price, R., report, 6.1.1898, Kuruman CCBL; SOAS, LMS R Box 3, Brown, J.T., report, 1898, Kuruman CCBL; MB 20/7, 1896, Astrup, N., 16.5.1896, Untunjambeli N; MHS, Mission Archives, A1045-140b-8, Stavem, O., 13.10.1896, Durban N; MHS, Mission Archives, A1045-140b-10, Borgen, M., 23.3.1897, Inhlasatye SAR; MHS, Mission Archives, A1045-140b-10, Borgen, M., 18.6.1897, Inhlasatye SAR; MHS, Mission Archives, A1045-140b-8, Steenberg, O., 15.8.1896, Mahlabatini ZL; NMT, vol. 51/12, June 1896, Borgen, M., 13.4.1896, Inhlasatye SAR; BL RH, USPG E51b, Samuelson, S.M., 31.12.1896, Polela N; BL RH, USPG E52b, Samuelson, S.M., 31.3.1897, St Paul's KwaMagwaza ZL.

<sup>xcvi</sup> HMB 45/2, 1898, 24-5, Müller, Chr., Jan. 1897, Limao BLP; HMB 44/5, 1897, 97-8, [Stallbom, H.C.F.], early 1897, Bethel SAR; HMB 45/2, 1898, 21-2, Engelbrecht, W., c. July 1897, Ekombela SAR.

<sup>xcvii</sup> HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 46/9, 1899, 224-5, Behrens, G., early 1899, Ramotswa BLP; HMB 43/10, 1896, 205-7, Jensen, F., July 1896, Linakona [Dinokana] SAR; HMB 44/10, 1897, 243-4, Schepmann, H., Jan. 1897, Berseba SAR; HMB 44/9, 1897, 222-4, Lohann, K.A., July 1897, Emmaus SAR; HMB 45/9, 1898, 186-7, Schepmann, H., early 1898, Berseba SAR; HMB 45/5, 1898, 74-5, Behrens, H.W., early 1898, Bethanie SAR; HMB 46/8, 1899, 161-3, Schindler, K.G, early 1898, Pella SAR; HMB 46/2, 1899, 33-4, [Schepmann, H.], c. July 1898, Berseba SAR; HMB 46/1, 1899, 21-2, [Behrens], c. July 1898, Bethanie SAR; HMB 48/1, 1901, 7-8, Jordt, H.P., c. July 1899, Eben-Ezer SAR; SOAS, LMS C 53-1-C, Williams, H., 27.3.1896, Molepolole BLP; SOAS, LMS C 54-1-C, Williams, H., 25.5.1897, Molepolole BLP; SOAS, LMS C 54-1-D, Willoughby, W.C., 9.6.1897, Palapye BLP; SOAS, LMS R Box 2, Lloyd, E., report, 17.2.1897, Kanye BLP; SOAS, LMS R Box 2, Williams, H., report, 1897, Molepolole BLP.

<sup>xcviii</sup> DCCU UI, Annual reports BLP 1896-7, Southern Protectorate, 10; *ibid*, Northern Protectorate, 25, London 1898.

<sup>xcix</sup> TNA, Statistical Year Book of the Colony of Natal 1898-1904, Hospitals and asylum, Pietermaritzburg 1899-1905.

<sup>c</sup> DCCU UI, Annual reports BLP 1896-7, Southern Protectorate, 10, London 1898; HMB 43/11, 1896, 223-6, [Müller, Chr.], July 1896, Limao BLP; HMB 45/2, 1898, 24-5, Müller, Chr., Jan. 1897, Limao BLP.

<sup>ci</sup> HMB 44/4, 1897, 76-9, Behrens, A.H., 27.1.1897, Bethanie SAR.

<sup>cii</sup> DCCU UI, Annual reports BLP 1896-7, Southern Protectorate, 10; *ibid*, Mounted Police, 25, London 1898; HMB 44/9, 1897, 226, [Wolff, D.], early 1897, Ekuhlengeni SAR; HMB 44/11, 1897, 256, Peters, J.H., c. July 1897, Jericho SAR; HMB 44/9, 1897, 216, [Haccius, G.], August 1897, Hermannsburg DE for BLP, SAR; HMB 45/9, 1898, 186-7, Schepmann, H., early 1898, Berseba SAR; HMB 45/12, 1898, 242-3, Peters, J.H., early 1898, Jericho SAR; HMB 46/2, 1899, 33-4, [Schepmann, H.], c. July 1898, Berseba SAR; SOAS, LMS R Box 2, Williams, H., report, 1897, Molepolole BLP; MHS, Mission Archives, A1045-140b-10, Borgen, M., 18.6.1897, Inhlasatye SAR.

<sup>ciii</sup> HMB 44/9, 1897, 216, [Haccius, G.], August 1897, Hermannsburg DE for BLP, SAR; HMB 46/8, 1899, 161-3, [Haccius, G.], July 1898, Hermannsburg DE for SAR.

<sup>civ</sup> HMB 45/1, 1898, 12, Stallbom, H.C.F., 7.7.1897, Bethel SAR; HMB 46/8, 1899, 161-3, [Haccius, G.], July 1898, Hermannsburg DE for SAR.

- <sup>cv</sup> HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BLP; HMB 45/9, 1898, 178, [Behrens], c. July 1898, Ramotswa BLP; HMB 46/9, 1899, 224-5, Behrens, G., early 1899, Ramotswa BLP; HMB 46/2, 1899, 33-4, [Schepmann, H.], c. July 1898, Berseba SAR; HMB 46/1, 1899, 21-2, [Behrens], c. July 1898, Bethanie SAR; HMB 46/4, 1899, 68, Jordt, H.P., c. July 1898, Eben/Ezer SAR; HMB 45/12, 1898, 243-6, Grotherr, C., c. July 1898, Polonia SAR; HMB 46/3, 1899, 51, Penzhorn, J.C.E., c. July 1898, Saron SAR; HMB 46/8, 1899, 161-3, [Haccius, G.], July 1898, Hermannsburg DE for SAR; SOAS, LMS C 55-1-B, Willoughby, W.C., 22.4.1898, Palapye BLP; SOAS, LMS C 55-2-A, Brown, J.T., 9.8.1898, Kuruman CCBL.
- <sup>cvi</sup> HMB 46/2, 1899, 33-4, [Schepmann, H.], c. July 1898, Berseba SAR; SOAS, LMS C 55-2-A, Brown, J.T., 9.8.1898, Kuruman CCBL.
- <sup>cvi</sup> HMB 48/5, 1901, 72, Schepmann, H., 21.1.1901, Pretoria SAR; ELM, Südliches Afrika, Chronik der Station Emmaus, District Rustenburg, Transvaal, Claus Hansen, 1900, p. 30.
- <sup>cvi</sup> HMB 46/1, 1899, 23-4, [Müller, E. Chr.], c. Jan. 1898, Limao BLP; HMB 44/6, 1897, 118-20, [Rößler, J.K.], early 1897, Elim N; HMB 44/1, 1897, 6, Engelbrecht, J.D., c. July 1896, Ekombela SAR; SOAS, LMS C 54-1-B, Williams, H., 10.3.1897, Molepolole BLP; MB 20/4, 1896, Astrup, H., c. Febr. 1896, Entumeni ZL; MB 20/9, 1896, Astrup, H., 21.8.1896, Entumeni ZL; MHS, Mission Archives, A1045-140b-8, Steenberg, O., 15.8.1896, Mahlabatini ZL; BL RH, USPG E52b, Samuelson, S.M., 31.3.1897, St Paul's KwaMagwaza ZL.
- <sup>cix</sup> HMB 43/11, 1896, 223-6, [Müller, Chr.], July 1896, Limao BLP; HMB 46/6, 1899, 113-5, Jensen, F., c. July 1898, Limao BL; HMB 45/9, 1898, 186-7, Schepmann, H., early 1898, Berseba SAR; HMB 45/12, 1898, 239-41, Kaiser, H.L., early 1898, Hebron SAR; HMB 45/12, 1898, 242-3, Peters, J.H., early 1898, Jericho SAR; HMB 45/12, 1898, 236-7, Wenhold P.C.H., early 1898, Kana SAR; HMB 45/12, 1898, 239-41, Jensen, F., early 1898, Linakona [Dinokana] SAR; HMB 45/12, 1898, 243-6, Grotherr, C., c. July 1898, Polonia SAR; HMB 45/11, 1898, 221, Schulenburg, H.W., c. July 1898, Ramaliane [Ramadiane] SAR; HMB 46/8, 1899, 161-3, [Haccius, G.], July 1898, Hermannsburg DE for SAR. Amongst the Zulus interest in Christianity did not or only very hesitantly rise: HMB 45/10, 1898, 208-10, Bostelmann, T., early 1898, Ehlohlomo ZL; HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Ransom, c. July 1898, Ifafa N; NMT, vol. 53/7, April 1898, Steenberg, O., 31.12.1897, Mahlabatini ZL.
- <sup>cx</sup> HMB 44/6, 1897, 125, [Jensen, F.], early 1897, Linakona [Dinokana] SAR; HMB 46/8, 1899, 161-3, [Haccius, G.], July 1898, Hermannsburg DE for SAR.
- <sup>cx</sup> Colenso, H.E., Famine-making in Matabeleland, Social Democrat, March 1897, 67-70.
- <sup>cxii</sup> "The Rising in Rhodesia." *Times* [London, England] 20 July 1896, 7+. *The Times Digital Archive*. Web. 19 Mar. 2015; the mentioned expedition in the environs of Bulawayo alone destroyed c. 1020 bags of grain which due to the scarcity of food was valued at £12500.
- <sup>cxiii</sup> SOAS, LMS R Box 2, Price, R., report, 12.12.1896, Kuruman CCBL.
- <sup>cxiv</sup> TNA, Statistical Year Book of the Colony of Natal 1895-1905, Agriculture, Pietermaritzburg 1895-1905.
- <sup>cxv</sup> TNA, Statistical Year Book of the Colony of Natal 1895-1905, Agriculture, Pietermaritzburg 1895-1905.
- <sup>cxvi</sup> HMB 43/11, 1896, 223-6, [Müller, Chr.], July 1896, Limao BLP; HMB 45/2, 1898, 24-5, Müller, Chr., Jan. 1897, Limao BLP; HMB 43/10, 1896, 205-7, Jensen, F., July 1896, Linakona [Dinokana] SAR; HMB 44/7, 1897, 148-50, Hansen, C., early 1897, Polfontein SAR; HMB 44/11, 1897, 258, Schulenburg, H., early 1897, Ramaliane [Ramadiane] SAR; HMB 45/9, 1898, 186-7, Schepmann, H., early 1898, Berseba SAR; HMB 46/6, 1899, 106, Engelbrecht, W.H.D., early 1898, Ekombela SAR; HMB 46/4, 1899, 74-5, [Behrens, H.], early 1899, Moseitla and Potuane SAR; HMB 46/1, 1899, 14-6, Schuhmann, F.B., c. July 1898, Emlalazi ZL; HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Wilcox, 2.7.1899, general letter, Natal N; BL RH, USPG E53b, Troughton, A., 31.3.1898, Ladysmith N.
- <sup>cxvii</sup> SOAS, LMS C 55-2-A, Brown, J.T., 9.8.1898, Kuruman CCBL.
- <sup>cxviii</sup> TNA, Blue Book for the Colony of Natal 1890-1 – 1892-3, Agriculture, Pietermaritzburg 1891-3; TNA, Statistical Year Book of the Colony of Natal 1894-1903, Agriculture, Pietermaritzburg 1894-1904.
- <sup>cxix</sup> All agricultural estimates for Natal come from: TNA, Blue Book for the Colony of Natal 1890-1 – 1892-3, Agriculture, Pietermaritzburg 1891-3; TNA, Statistical Year Book of the Colony of Natal 1894-1905, Agriculture, Pietermaritzburg 1894-1906.
- <sup>cx</sup> TNA, Statistical Year Book of the Colony of Natal 1894-1896, Agriculture, Pietermaritzburg 1895-7.
- <sup>cx</sup> Sheep were also scarce in the Cape Colony due to drought, scab and other causes: "Famine in Capetown." *Evening Post* [Wellington, New Zealand] 23 Dec. 1896, 2. *National Library of New Zealand – Papers Past*. Web. 5 November 2014.
- <sup>cxii</sup> HHL, ABC 15.6.2, vol. 2. Zulu, East Africa, WMB 1886-1899, Price, M.E., 22.1.1896, Inanda N; HMB 42/10, 1895, 190, Hörmann, H.W., early 1895, Entombeni N; HMB 42/6, 1895, 82-3, Deppe, F.H., early 1895, Marburg N; HMB 43/10, 1896, 202-3, Rößler, J.K., c. July 1896, Elim N; HMB 43/10, 1896, 205-7, Jensen, F., July 1896, Linakona [Dinokana] SAR; HMB 44/4, 1897, 76-9, Behrens, A.H., 27.1.1897, Bethanie SAR; HMB 48/1, 1901, 7-

8, Jordt, H.P., c. July 1899, Eben-Ezer SAR; HMB 42/6, 1895, 85-6, Schumann, F.B., early 1895, Umlalazi ZL; HMB 43/6, 1896, 58-61, Wolff, D., early 1896, Ekuhlengeni ZL; HMB 43/12, 1896, 231-4, Schumann, F.B., c. July 1896, Umlalazi ZL; MHS, Mission Archives, A1045-140b-1, Eriksen, S., 15.4.1895, Umbonambi ZL; NMT, vol. 51/12, June 1896, Borgen, M., 13.4.1896, Inhlasatye SAR; NMT, vol. 50/21, Nov. 1895, Braatvedt, N., 16.8.1895, Ongoye ZL; NMT, vol. 51/7, April 1896, Berge, L., 28.1.1896, Umpumulo ZL; BL RH, USPG E51b, Samuelson, S.M., 31.3.1896, Polela N; BL RH, USPG E51b, Johnson, C., 31.12.1896, Rorke's Drift N.

<sup>cxiii</sup> Natal Witness 1898: 22. 1.

<sup>cxiv</sup> Natal Witness 1899: 11.1.

<sup>cxv</sup> HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Mellen, L.M., report, 13.6.1897, Esidumbini N; HHL, ABC 15.4, vol. 13, Southern Africa, Zulu Mission 1890-99, Phelps, F., report, July 1898, Inanda N; HMB 44/6, 1897, 118-20, [Rößler, J.K.], early 1897, Elim N; TNA, Blue Book for the Colony of Natal 1890-1 – 1892-3, Agriculture, Pietermaritzburg 1891-3; TNA, Statistical Year Book of the Colony of Natal 1894-1905, Agriculture, Pietermaritzburg 1894-1906.