

**Water as agent for social change, 1900–1939:
Two case studies of developmental state approaches
in establishing irrigation schemes**

*Wessel Visser**

Abstract

The advent of the Union of South Africa in 1910, and especially the creation of the Union's Irrigation Department in 1912, signalled the beginning of large-scale state investment in water storage infrastructure and the start of South Africa's first dam-construction boom on a national scale. At the same time the Union government also began to tackle its increasing social problems such as white poverty by combining poor relief with irrigation and dam-building projects. The Hartebeespoort Dam and irrigation scheme near Pretoria was the first Union project of its kind. Apart from harnessing water for agricultural development, the aim of these state projects was twofold: to provide temporary relief employment for poor and destitute whites through job creation during the construction phases of dams and canals, as well as establishing white irrigation settlement schemes. This article examines aspects of the South African state's irrigation and poor relief projects with a special focus on the Kamanassie irrigation scheme (1919–1925) in the Western Cape and the Buchberg irrigation scheme (1929–1934) on the Orange River in the Northern Cape. The successes and failures of these projects as examples of socio-economic upliftment are discussed briefly.

Keywords: Irrigation settlement schemes; poor whites; drought; Pact government; Hartebeespoort Dam; Kamanassie Dam; Great Depression; Buchberg Dam.

Opsomming

Die koms van die Unie van Suid-Afrika in 1910, en veral die skepping van 'n uniale Besproeiingsdepartement in 1912, het die begin van grootskaalse staatsinvesterings in waterbewaringsinfrastruktuur en die blomtydperk van die land se eerste damkonstruksieperiode op 'n nasionale skaal ingelui. Terselfdertyd het die Unie-regering groter wordende sosiale probleme soos blanke armoede begin takel deur armoedeverligting en dambouprojekte te kombineer. Die Hartebeespoortdam- en besproeiingskema naby Pretoria was die eerste Unie-projek van sodanige aard. Afgesien van die benutting van water vir landbou-ontwikkeling was die doel van

* Wessel Visser is an associate professor in History at Stellenbosch University and is vice-chairperson of the history commission of the South African Academy for Science and Arts. His book, *A History of the South African Mine Workers' Union, 1902–2014*, was published by Edwin Mellen Press in 2016. Research for this article was made possible by a National Research Foundation grant. I am indebted to Prof. Janus van der Westhuizen who provided illuminating insights to this study.

sodanige staatsprojekte tweevoudig: om tydelike armoedeverligting aan armblankes deur werkverskaffing tydens die konstruksiefases van damme en kanale te bied en deur blanke besproeiingsnedersettings te vestig. Hierdie artikel ondersoek aspekte van die staat se besproeiings- en armoedeverligtingsprojekte met 'n spesifieke fokus op die Kamanassie-besproeiingskema (1919–1925) in die Wes-Kaap en die Boegoeberg-besproeiingskema (1929–1934) op die Oranje-rivier in die Noord-Kaap. Die suksesse en mislukkings van hierdie projekte as voorbeelde van sosio-ekonomiese opheffing word ook kortliks bespreek.

Sleutelwoorde: Besproeiingvestigingskemas; armblankes; droogtes; Pakt-regering; Hartebeespoortdam; Kamanassiedam; Groot Depressie; Boegoebergdam.

Introduction

South Africa, it can be said, is a country defined by water, or rather the lack of an abundant supply of water. Historically its interior landscape is marred by periods of severe drought, interspersed sometimes by violent and destructive floods. Despite being a water-scarce country, the national psyche is imbued with the notion of the availability of water and water security since historical times. South Africa has close to the lowest conversion of rainfall to usable runoff from rivers of all countries in the world. It has a surface area of 1.22 million km², of which about one-sixth has no significant surface runoff. Swatuk states correctly that water is at the heart of all human development,¹ and Adams and Anderson assert that irrigation ranked high in the concerns of agriculturalists of the colonial period.²

Emerging irrigation initiatives in the colonial state

Freund argues that in order to initiate developments such as large-scale irrigation projects a purposive state is necessary, one that is relatively incorrupt with a strong cadre of dedicated bureaucrats and institutions or agencies such as irrigation departments. Over time, such institutions have thus been able to modify or moderate and also direct investment, and with it, development.³ The modern era of state-directed irrigation legislation and projects was ushered in from the mid-1870s and coincided with the age of British imperialism in southern Africa. The Cape Colony paved the way for water legislation in South Africa. At the heart of water law development under British rule was a desire to extend the reach of the colonial state, to advance white settlement into the interior of South Africa and to turn the region's resources to the development of the British Empire. Swatuk describes the motives behind colonial irrigation policy as, *inter alia*, to encourage agricultural settlement;

-
1. L. A. Swatuk, "The State and Water Resources Development through the Lens of History: A South African Case Study", *Water Alternatives*, 3 (2010), p 526.
 2. W.M. Adams and D.M. Anderson, "Irrigation before Development: Indigenous and Induced Change in Agricultural Water Management in East Africa", *African Affairs*, 87, 349 (October 1988), p 519.
 3. B. Freund, "'A Ghost from the Past': The South African Developmental State of the 1940s", *Transformation*, 81/82 (2013), pp 86–87.

enhance (pro-British) political stability; increase food production and to build state revenues. It was servants and supporters of the British Empire who strongly promoted the notion in South Africa of establishing white settlement schemes that were linked to irrigation. Swatuk explains that according to the developmental state approach, the socio-political goals of water management led to the increasing interference of state-makers in irrigation schemes in what became a narrative of the colonial state undertaking a “hydraulic mission”.⁴

Freund elaborates on this, stating that together, capitalists and top government officials formed an elite, probably moulded through social associations, common educational background and personal ties. The members of such an elite were embedded in a concrete set of social ties that bound the state to society and provided institutional channels for the continued negotiation and renegotiation of goals and policies.⁵ In the case of colonial South Africa the enthusiasm for irrigation and improved water provision emanated from politicians and officials as well as farmers. As early as the 1880s the British mining magnate Cecil Rhodes envisioned the damming of the Harts River as an opportunity to increase both food supplies to the diamond fields of Kimberley and local employment, although his scheme never materialised.⁶ It was upon notions regarding irrigation such as those suggested by Rhodes, that Sir Alfred Milner, the British high commissioner for South Africa and governor of the Cape, Transvaal and Orange River colonies between 1897 and 1905, built his imperial vision in southern Africa. White agricultural and irrigation settlements formed an important part of this vision. Milner promoted the idea of “self-governing white communities” on the sub-continent of southern Africa under British rule. He also played a significant role in the run-up to the Anglo-Boer War (1899–1902); in the construction of a post-war new South African colonial state; and in drafting an imperial blueprint for the region as a whole. Together with his administrative coterie of young Oxford graduates, he laid the foundation of a new developmental state.⁷

Hydrological experts such as Sir William Willcocks, who served in India and then in Egypt (where he played a major role in the construction of the Aswan Dam) were summoned by Milner in 1901 to serve on commissions to investigate the settlement of British immigrants and the idea of linking this to irrigation schemes; they were asked to recommend an overarching strategy. South African irrigation prospects were beginning to be considered in the context of recent spectacular achievements in the control of water in the Punjab, in Egypt and the American West.⁸

4. Swatuk, “The State and Water Resources Development”, pp 527–528.

5. Freund, “A Ghost from the Past”, p 87.

6. W. Beinart, *The Rise of Conservation in South Africa: Settlers, Livestock and the Environment 1770–1950* (Oxford University Press, Oxford, 2003), pp 161, 175.

7. S. Marks and S. Trapido, “Lord Milner and the South African State”, *History Workshop*, 8 (Autumn 1979), pp 52, 54. See also M. Streak, *Lord Milner’s Immigration Policy of the Transvaal 1897–1905* (Rand Afrikaans University, Johannesburg, 1969), pp 12, 21, 67.

8. J.P.R. Wallis, *Fitz: The Story of Sir Percy Fitzpatrick* (Macmillan, London, 1955), p 92; V. Halpérin, *Lord Milner and the Empire: The Evolution of British Imperialism* (Odhams Press, London, 1952), pp 126,134; Streak, *Lord Milner’s Immigration Policy*, p 19; G.B.

For Milner, such irrigation schemes could serve the further purpose of providing employment for indigent whites.⁹

The duties of the Lands Settlement Commission, appointed under the chairmanship of H.O. Arnold-Forster, were to enquire, *inter alia*, whether suitable land for settlement was available in terms of being “well-watered”, or could alternatively be rendered suitable by means of irrigation.¹⁰ These initiatives were undertaken because irrigation promised high increases in the value of land and production. In the first decade of the twentieth century there was even concern that the country’s mineral wealth might run out, and that the Transvaal Colony would be thrown back on its agricultural resources. In this context, water conservation for agriculture was a national issue.¹¹ The commissioners were quite confident that much of the land could be improved by irrigation.¹² In his turn, Willcocks wrote a comprehensive report for Milner on dam building and irrigation possibilities in the Cape, Orange River and Transvaal colonies which echoed the sentiments of the *Lands Settlement Report*. He concluded by maintaining that the only possible means of development in South Africa lay in the storage of water and its utilisation by irrigation when it was needed. Therefore, storage reservoirs were a “necessary and indispensable adjunct to irrigation development”. He was convinced that the permanent development of agriculture in the country would depend entirely “on irrigation and irrigation alone” and that in large parts of the Cape and Orange River colonies no crops could be grown without irrigation. Willcocks advocated fuller state control of, and investment in, water resources.¹³

Two prominent politicians of the time, both of whom later served in the Union parliament, Sir Percy Fitzpatrick and Sir Thomas Smartt, also helped to set policies for later irrigation developments, based on their own experiences, and shaped the debate about how the interdisciplinary problems of irrigation settlements might be best addressed by the different government departments involved. Both Smartt and Fitzpatrick ventured into private irrigation and land settlement schemes advanced as tributes to two of Cecil Rhodes’s passions – irrigation development and the settlement of Britons on the land. In 1895 Sir Thomas Smartt formed the Smartt Syndicate as an irrigation and settlement project in the semi-arid Karoo in the

Pyrah, *Imperial Policy and South Africa, 1902–10* (Clarendon Press, Oxford, 1955), p 186; Beinart, *The Rise of Conservation*, p 176.

9. T. Keegan, *Rural Transformations in Industrialising South Africa: The Southern Highveld to 1914* (Macmillan Press, London, 1987), p 111.
10. South African Colonial Blue Books (hereafter Cd.) 626, *Report of the Lands Settlement Commission, South Africa* (Wyman & Sons, London, 1901), p 4.
11. Beinart, *The Rise of Conservation*, p 177.
12. Cd. 626, *Report of the Lands Settlement Commission*, pp 12–13, 23; Cd. 627, *Report of the Lands Settlement Committee, Part II. Documents, Evidence, etc.* (Wyman & Sons, London, 1901), p 3. See also W.B. Worsfold, *Reconstruction of the New Colonies under Lord Milner, Volume 2* (Kegan Paul, Trench, Trübner & Co., London, 1913), pp 96–97, 309.
13. W. Willcocks, *Irrigation in South Africa* (Private publication, Johannesburg, 1901), pp 6, 8, 51.

hinterland of the Cape Colony, and in 1913 Sir Percy Fitzpatrick launched the Cape Sundays River Settlements Company in the Eastern Cape.¹⁴ Smartt, who became South Africa's Minister of Agriculture from 1921 to 1924, and who according to Lavin was "the father of irrigation", influenced the course of state policy directly as the author of the Cape Irrigation Act of 1906.¹⁵

Milner's constructionist policies in the period after the Anglo-Boer War, supported enthusiastically by other influential servants of the Empire, created an imperial mind-set and a strong connection with British immigration, land settlement and agricultural development and irrigation schemes for the future South African state.

Using water as an agent for social change

Therefore, with the commencement of the Union of South Africa on 31 May 1910, the state became a well-established agency, in terms of water infrastructure and irrigation, to initiate and advance developmental projects. Economic and agricultural development through state-aided irrigation schemes and storage dams had to be enhanced. In 1912 Francis Kanthack, the former director of irrigation in the Cape Colony, became the first director of the new national Department of Irrigation and the most influential official in his sphere. Previously, he had also worked in the Public Works Department in the Punjab on one of the most ambitious irrigation projects in the British Empire.

Kanthack brought with him a conviction about the role of the state in terms of irrigation development. Kanthack was convinced that agriculture in South Africa would be impossible without water conservation. The new department was led in its activities by the Union Irrigation and Conservation of Water Act of 1912 and Kanthack was the main drafter of this Act. It confirmed government's almost exclusive focus on water for agricultural use and also opened the door for the development of South Africa's first large water storage projects. Thus the year 1912 signalled the beginning of massive state investment in water storage infrastructure and the beginning of South Africa's first dam-construction boom, or as Van Vuuren refers to it, "the first golden era of dam building" in the country.¹⁶

14. See J.M. Meiring, *Sundays River Valley, its History and Settlement* (A.A. Balkema, Cape Town and Amsterdam, 1959); D. Lavin, "Irrigation Development in South Africa: The Smartt Syndicate and the Cape Sundays River Settlement Co.", in J.W.N. Tempelhoff (ed.), *African Water Histories: Transdisciplinary Discourses* (North-West University, Vaal Triangle, Vanderbijlpark, 2005), pp 133–149; M. Harper and S. Constantine, *Migration and Empire: Oxford History of the British Empire Companion Series* (Oxford University Press, Oxford, 2010), p 133.

15. Lavin, "Irrigation Development in South Africa", pp 133–135.

16. Beinart, *The Rise of Conservation*, pp 177–78, 185–86; L. van Vuuren, *In the Footsteps of Giants: Exploring the History of South Africa's Large Dams* (Water Research Commission of South Africa, Gezina, 2012), pp 65–67, 70.

Citizenship in the Union was becoming increasingly racialized and advantaged towards those recognised as white. Therefore, a salient feature of development initiatives, one that demanded attention from successive Union governments almost until the Second World War, was increasing white indigence, particularly among Afrikaners, after the Anglo-Boer War. This became the white state's political burden, an issue which demanded state solutions and initiatives such as the construction of water infrastructure and irrigation settlement schemes. The period of Union government was an opportunity for the creation of an infrastructural platform, therefore water, as a natural resource, coupled with agriculture, came to be seen by those in power as a form of poverty relief and as an agent for social change. Against the background of a segregationist South Africa, these state-driven relief measures were aimed at white indigents only.¹⁷

The Botha government was acutely aware of public expectations that the state would provide solutions to the pressing problem of growing white indigence. In a public speech he gave at Heidelberg, Transvaal, in 1916, the then prime minister, General Louis Botha, admitted that his government was frequently accused of doing far too little to improve the fate of the poor whites. According to Botha the sum of £250 000 was spent on purchasing land for irrigation settlements.¹⁸ In March 1919, the Minister of the Interior, General J.C. Smuts, issued a memo to all heads of government departments, encouraging them to adopt, as far as possible, the all-white labour policy enunciated for irrigation. The hope was that by the provision of employment, fore example dam-building and irrigation development, the state would alleviate the plight of many poor whites.¹⁹ Developmental initiatives that gave rise to white irrigation settlement schemes went hand in hand with the notion of a “back to the land” policy espoused, *inter alia*, by influential members of the Dutch Reformed Church (DRC) and Afrikaner political leaders such as D.F. Malan. Until the 1930s this policy was regarded as part of the solution to the poor white problem and would also keep white people within the agricultural sector.²⁰ According to Du Plessis, rural

-
17. Keegan, *Rural Transformations*, p 109; Freund, “A Ghost from the Past”, p 89.
18. S.P. Jordaan, “J. D. Kestell: Sy Lewe en Werk”, PhD thesis, Universiteit van die Oranje Vrystaat, 1979, pp 213–214; R.A. Lewis, “A Study of Some Aspects of the Poor White Problem in South Africa”, MA dissertation, Rhodes University, 1973, p 10.
19. D. Berger, “White Poverty and Government Policy in South Africa: 1892–1934”, PhD thesis, Temple University, 1982, p 217.
20. See Keegan, *Rural Transformations*, pp 10–11; 26–27; Lewis, “A Study of Some Aspects of the Poor White Problem”, pp 5, 20, 28, 73; Berger, “White Poverty”, p 17; Jordaan, “J. D. Kestell”, pp 213–214, 255; Beinart, *The Rise of Conservation*, p 188; I. Abedian and B. Standish, “Poor Whites and the Role of the State: The Evidence”, *South African Journal of Economics*, 53, 98 (June 1985), pp 96–97; J.W.N. Tempelhoff, “Omgewingslagoffers of Armblanke? Water en Welvaartskepping in die Era van Hertzog, 1914–1939”, Ongepubliseerde referaat, gelewer tydens die jaarlikse Hertzog-gedenklesing van die Suid-Afrikaanse Akademie vir Wetenskap en Kuns, Pretoria, 21 September 2006, p 10; L. Koorts, *DF Malan en die Opkoms van Afrikanernasionalisme* (Tafelberg, Kaapstad, 2014), p 166; L.A. Mackenzie, “Irrigation in South Africa”, Unpublished type-written manuscript of departmental bulletin issued by the director of Irrigation, Pretoria, c. 1946–1948, p 2.

resettlement was also a plan to curb the proletarianisation and urbanisation of all poor whites.²¹ A 1922 interim report of the Drought Investigation Commission recommended “that the State should take these people [poor whites] in hand and by some system place them back on the land”.²²

The Union government’s first major project which involved white labour and the settlement of poor whites on irrigated lands, was the construction of the Hartebeespoort Dam and irrigation scheme near Pretoria between 1916 and 1925. This scheme was an important marker of increased state intervention in terms of white indigence. Authors such as Du Plessis, Clynick and Middelmann suggest that in addition to easing the prevailing socio-economic conditions of white indigence the state also had ulterior political motives for the resettlement of poor whites on the Hartebeespoort Dam irrigation scheme. They maintain that the government’s waning popularity among the white working class, due largely to its quelling of the industrial unrest in 1913 and 1914, would be neutralised to some degree if the Hartebeespoort Dam irrigation scheme was seen as a solution to white poverty and a gesture of goodwill from the government. They emphasise, among other issues, that the economic failure of the scheme as a developmental state project was because socio-political considerations to alleviate white poverty had overruled the economic viability of the project. On the other hand, resettlement schemes such as these also contributed to crystallise residential and spatial segregation policies in rural labour projects, specifically the exclusion of Africans and Coloureds from the rural agricultural economy.²³

In his book, *The Rise of Conservation*, Beinart dedicates a chapter to the initial, privately sponsored irrigation and dam development projects developed by early farmers in the Cape Colony at a time when the state maintained a *laissez faire* attitude towards hydro-development for agricultural capital,²⁴ while Shillington has published an article on the unsuccessful nineteenth-century irrigation schemes in the Harts Valley before heavy capital investment and direct state intervention took place with the initiation of the Vaal-Harts irrigation settlement scheme in the 1930s.²⁵ J.C. Kotzé,

21. A.S. du Plessis, “Die Hartebeespoortdambesproeiingskema; ’n Evaluering van ’n staatsbeheerde hervestigingsprogram, 1914--1952”, MA dissertation, Randse Afrikaanse Universiteit, 1988, p 138.

22. Union of South Africa, (hereafter UG) 1920–22, *Interim Report of the Drought Investigation Commission, April 1922* (Cape Times, Cape Town, 1922), p 29.

23. See, respectively, Du Plessis, “Die Hartebeespoortdambesproeiingskema”, pp 1, 15, 28–31, 137–140; T. Clynick, “White South Africa’s ‘weak sons’: Poor Whites and the Hartbeespoort Dam”, in P. Bonner, A. Esterhuysen and T. Jenkins (eds), *A Search for Origins. Science, History and South Africa’s “Cradle of Humankind”* (Wits University Press, Johannesburg, 2007), pp 248–273; T.J.D. Middelmann, “The Hartebeestpoort Irrigation Scheme: A Project of Modernisation, Segregation and White Poverty Alleviation, 1912–1926”, *South African Historical Journal*, 67, 2 (2015), pp 158–179.

24. Beinart, *The Rise of Conservation*, “Water, Irrigation, and the State, 1880–1930”, pp 158–194.

25. K. Shillington, “Irrigation, Agriculture and the State: The Harts Valley in Historical Perspective”, in W. Beinart, *et al* (eds), *Putting a Plough to the Ground: Accumulation*

on the other hand, discusses the successes of state intervention and white settlement on the Vaal-Harts irrigation scheme.²⁶ Authors such as Keegan, Morrell, Lewis, Berger, Abedian and Standish touch briefly on irrigation and the poor white problem but do not offer detailed studies on irrigation schemes and their implementation as a tool for poverty alleviation.²⁷

This article concurs with the findings of the studies mentioned above, namely that the political motives of state intervention in the implementation of irrigation schemes inevitably had a negative impact on the socio-economic success of such schemes. Yet, despite certain shortcomings and failures, from the point of view of irrigation per se, the Hartebeespoort and Vaal-Harts schemes were indeed viable projects. However, not all white poverty relief irrigation settlement schemes developed in the period from 1900 to 1939 were necessarily sustainable. The article investigates the mixed success of two lesser-known state-sponsored irrigation settlement schemes to alleviate white indigence: the Kamanassie and Buchberg Dam irrigation projects. It will be argued that due to severe socio-political pressures, these projects of state-intervention were conceived before proper investigation and planning was undertaken in terms of sustainability – which may perhaps have influenced the government’s decision to commission the projects. The narrative on irrigation that follows has been compiled from government reports, memoirs, reminiscences and the personal experiences of hydraulic engineers and pioneer irrigation settlers, as well as the relevant published literature.

The Kamanassie Dam and irrigation project

Financing irrigation projects in various places throughout the Union formed part of the state’s poverty alleviation project. In the case of the Kamanassie scheme, agricultural development and economic recovery were the motives behind this state-sponsored white irrigation resettlement project.²⁸ The arid region of Oudtshoorn in the Little Karoo is characterised by river valleys with rich alluvial soils; tobacco, vegetables, fruit and wine have been produced here since the nineteenth century. However, the region is also known for intermitted rainfall patterns and long, recurring droughts. Ostriches are

and Dispossession in Rural South Africa, 1850–1930 (Ravan Press, Johannesburg, 1986), pp 311–335.

26. J.C. Kotzé, “Die Vaalhartsbesproeiingskema: ‘n Ekonomiese en Sosiaal-geografiese Studie”, MA dissertation, Stellenbosch University, 1961.
27. See, respectively, Keegan, *Rural Transformations*; R. Morrell (ed.), *White but Poor: Essays on the History of Poor Whites in Southern Africa, 1880–1940* (Unisa Press, Pretoria, 1992); Lewis, “A Study of Some Aspects of the Poor White Problem”; Berger, “White Poverty”; Abedian and Standish, “Poor Whites and the Role of the State”, pp 93–108.
28. UG, 29-17, *Reports on Various Irrigation Projects*, 31 March 1918, p 13; UG, 30–32, *Report of the Unemployment Investigation Committee*, 1932, pp 15–19; F.J. van Biljon, *State Interference in the Economy of South Africa* (P.S. King & Son, London, 1939), p 115.

particularly well-adapted to these arid conditions²⁹ and according to Beinart, the key economic factor stimulating irrigation in the Cape Colony was the burgeoning trade in ostrich feathers. Ostrich numbers increased from 22 000 in 1875 to 726 000 in 1911.³⁰ Van Vuuren argues that the majority of the irrigation districts established in the period 1912 to 1913 were based on the success of the ostrich feather industry.³¹ Farmers soon realised that the most efficient means of ostrich farming was to enclose the ostriches in paddocks and provide them with suitable fodder, primarily lucerne. Using lucerne as fodder in turn necessitated irrigation and gave a higher yield, but the “miracle crop for the Cape”, as Beinart refers to it, required a great deal of water. This was a major reason why Oudtshoorn, well-watered from streams running down from the Swartberg mountains, became the major centre of ostrich production. By 1911, at the height of the ostrich boom, Oudtshoorn comprised 20 561 ha or 8.5 per cent of the total irrigated land in the country.³²

But economic disaster struck the “ostrich barons” of Oudtshoorn in 1914 when the ostrich feather industry collapsed. Their financial woes were exacerbated by the serious droughts of 1914–1916, 1919, 1924 and 1927. So severe was the 1914–16 drought, that in the opinion of J.H. Schoeman, Oudtshoorn’s member of the legislative assembly (MLA), drought outstripped the collapse of the feather industry as the main cause of the widespread distress suffered by farmers in 1916. Even prior to the feather industry crash, there had been a large-scale switch of farming practices from wheat, tobacco and vine cultivation – all of which required a great deal of labour – to lucerne and ostrich farming, making scores of *bywoners* (poor white share croppers) redundant on these farms. Now with lucerne cultivation and ostrich farming becoming less profitable, their labour was no longer required. All this meant that a growing poor white class of former *bywoners* was emerging in the Oudtshoorn area comprising people who had lost their access to land.

The outbreak of World War One brought economic depression and a fashion change in the northern hemisphere; luxury goods such as clothes trimmed with ostrich feathers were no longer fashionable. Other reasons for the collapse of the market for feathers included overproduction; inadequate marketing; an unwise focus by some farmers on ostriches as their sole agricultural product; and reckless speculation on farm land. By 1917 the market value of ostrich feathers was only 27 per cent of that of 1913. Numerous bankrupt farmers began to join the ranks of pre-war poor *bywoners* who had already been driven from the land of wealthier farmers. In Oudtshoorn the labour market shrunk and building operations stopped almost completely. The scourge of the Spanish Influenza of 1918 also contributed to the destitute condition of rural dwellers. By the end of the war the socio-economic position for many families in the magisterial district of Oudtshoorn was indeed dire

29. See A. le Roux, “’n Historiese Ondersoek na die Ontwikkeling van Landbou in Oudtshoorn en sy Distrik, 1914–1980”, MA dissertation, Stellenbosch University, 2013, pp 1–2, 11, 19, 25–31.

30. Beinart, *The Rise of Conservation*, p 161.

31. Van Vuuren, *In the Footsteps of Giants*, pp 69, 84.

32. Beinart, *The Rise of Conservation*, pp 161–162, 173–174, 185.

and calls for relief lent urgency to new approaches from the Irrigation Department. Flood irrigation had proved adequate for lucerne, but more complex systems, capable of irrigating a wider range of high-value crops, were now essential.³³

The construction of dams in this period was also seen as a solution to the problem of water shortages. It was the Irrigation Department's aim to stabilise water provision in dry seasons and to use stored flood water supplies to bridge longer periods of drought. Equally important, construction work on dams and irrigation works provided quite a few job opportunities for unemployed whites. Many of these poor whites cherished the idea of eventually being able to farm on irrigated land.³⁴ The slump in the market for ostrich feathers caused a general recession in the prosperity of local farmers, and led to increased competition for water supplies in order to step up lucerne production in the face of falling incomes. Farmers who had pulled out their tobacco crops and orange orchards to make room for ostriches now had to return to their former crops.

Work on the Kamanassie Dam at Oudtshoorn in the south-western Cape commenced under these trying conditions. E.T.L. Edmeades, owner of the farm Kamanassie, proposed an irrigation dam to be constructed on the Kamanassie River, a tributary of the Olifants River. Due to the collapse of the feather market and the resultant economic recession the government declared the region indigent. A deputation of Oudtshoorn residents and farmers requested the Minister of Lands, Sir Thomas Smartt, to declare an irrigation district, which was granted in 1917. F.T. Patterson was appointed resident engineer to carry out the work with a loan granted by parliament. According to Patterson, it was decided that the white contingent of the labour force "should be recruited, as far as possible, from Oudtshoorn District".³⁵

Construction of the Kamanassie Dam only began in June 1919 because the First World War hampered the acquisition of the necessary machinery and building supplies and placed significant strain on the Irrigation Department's financial resources. According to Burman, 1919 also brought the worst drought in 50 years to the district. Work on canals commenced in January 1920. The design called for a mass concrete gravity section dam with a crest height of 44 m above the deepest foundation and 35 m above the riverbed. The dam wall was 386 m long and the main spillway on the right flank was 91 m wide with a waste weir wall of 183 m. An emergency spillway was 91 m long and was to discharge into a channel 46 m wide. By

33. Le Roux, "n Historiese Ondersoek na die Ontwikkeling van Landbou", pp 42–49, 159; G.R. Backeberg, "Die Politieke Ekonomie van Besproeiingsbeleid in Suid-Afrika", PhD thesis, Pretoria University, 1994, p 102; P. Buirsky, "Aspects of Material Life in Oudtshoorn 1860–1927, with Particular Reference to the Labouring Poor", BA Honours, University of Cape Town, 1983, pp 38–41, 55, 59, 75–77, 105–106; Beinart, *The Rise of Conservation*, p 187.

34. Backeberg, "Die Politieke Ekonomie", p 107; Tempelhoff, "Omgewingslagoffers of Armblankes?", pp 21, 23.

35. Union of South Africa, WPD – '59, "Director of Water Affairs: Report on the Proposed Olifants River (Oudtshoorn) Government Water Scheme, 1959/1960, p 5; F.T. Patterson, "Kamanassie Irrigation Works", *S.A. Irrigation Magazine*, 1 (1922), p 8.

the end of November 1919 43 580 m³ of concrete had been placed in the dam and earthworks of 48 km had been completed. The dam brought more than 9 400 ha under irrigation. Despite the good start, the rate of construction was impeded severely by the curtailment of funds and the project was only completed towards the end of 1925. Excavation for the foundations was done entirely by hand. A steam excavator for the construction of the canals and furrows was ineffective, necessitating pick and shovel manual labour. All materials were transported by wagons and donkeys were hired from local farmers and *bywoners*. The construction of the dam and irrigation works thus provided relief to the indigent and unemployed in a period of economic hardship.³⁶



Canteen for white workers at the Kamanassie construction site (Source: O.J.P. Stander Private Collection)

In line with the prevailing segregationist policies of the time, black and white workers were kept separate socially and good facilities were provided, particularly for white workers.³⁷ A white labour camp was constructed on one side of the Kamanassie River and a black labour camp on the other side. Housing was provided for 30 single men and there were also dwellings for 30 families. The white labour camp featured a school with three classrooms, a school principal's house, a combined

36. Patterson, "Kamanassie Irrigation Works", pp 8–9, 11; Mackenzie, "Irrigation in South Africa", pp 14–15; F.A. Venter, *Water* (Afrikaanse Pers-Boekhandel, Johannesburg, 1970), pp 315–316, 388; Van Vuuren, *In the Footsteps of Giants*, pp 84–85; Anon., "Kamanassie Dam", *The Water Wheel*, (November/December 2010), pp 21, 23; J. Burman, *The Little Karoo* (Human & Rousseau, Cape Town, 1981), pp 106, 108, 110; Tempelhoff, "Omgewingslagoffers of Armblankes?", p 20; Le Roux, "'n Historiese Ondersoek na die Ontwikkeling van Landbou", p 20; O.P.J. Stander, "Die Voorkoms van Wit Armoede in Oudtshoorn 1914–1937", PhD thesis, Stellenbosch, 2017, pp 164–165.

37. Tempelhoff, "Omgewingslagoffers of Armblankes?", p 22.

café, mess hall and recreation room and sports facilities, such as a tennis court, a nine-hole golf links and a rifle range. On the other hand, the black labour camp comprised 24 thatched round huts and black workers were fed from a kitchen in the compound. Black labourers were rarely allowed to bring their families with them to the construction site. Unskilled (black) labour was recruited from the Eastern Cape.

At the height of construction there were 1 800 men working on the scheme, some 600 on the dam and about 1 200 on the canals, which feed an area of some 12 000 ha and cover a total length of 112 km.³⁸ The cost of the scheme of about £800 000 had to be carried by the irrigators themselves, but as a result of the feather industry collapse and the drought of 1927, which was deemed to be the most severe in 100 years, they were unable to keep up with payments. By 1932 the debt burden incurred amounted to almost £1 250 000 and was eventually written off by the government.³⁹

The influence of the Pact government and the Great Depression on irrigation development and poor relief: Prelude to the Buchberg irrigation scheme

In the mid-1920s and the late 1930s the political and economic landscape of South Africa was altered again and this affected state policies on irrigation development and poor relief projects. Abedian and Standish explain that from about 1920 there was an unprecedented increase in unemployment due to factors such as the closing down of a number of low-grade gold mines; an economic depression; the restriction of diamond mining; and the inability of returned soldiers from the First World War to find work.⁴⁰ A DRC deputation on the indigent and unemployed to the then prime minister, General J.C. Smuts, was informed that the government was no longer prepared to establish poor white settlements. It transpired that the authorities doubted whether such settlements were indeed the answer to poor relief. The costs of resettlement were too high and many indigents were not seen as suitable candidates for settlement schemes.⁴¹

However, in the 1924 general election the South African Party led by General Smuts was defeated by a coalition of General J.B.M. Hertzog's National Party and Col. F.H.P. Creswell's Labour Party, which formed the so-called Pact government. The change of government altered the policy towards white indigence, although there was a degree of continuity in white poverty alleviation policies between the Smuts and Hertzog governments. Instead of establishing new rural settlements to alleviate the poverty problem it was now expected of indigents to rehabilitate themselves, albeit with some government assistance. The introduction of the Pact government's "civilised labour"

38. Patterson, "Kamanassie Irrigation Works, pp 11–12, 14; Venter, *Water*, pp 315, 388; Van Vuuren, *In the Footsteps of Giants*, pp 69, 85; Anon., "Kamanassie Dam", *The Water Wheel* (Nov/Dec 2010), p 23; Burman, *The Little Karoo*, p 110.

39. Venter, *Water*, p 389.

40. Abedian and Standish, "Poor Whites and the Role of the State", p 97.

41. Jordaan, "J. D. Kestell", p 226; B. Freund, "The Poor Whites: A Social Force and a Social Problem in South African History", in Morrell, *White but Poor*, p xviii.

policy in 1924 marked the beginning of greater state intervention and an intensification of the drive to eradicate the poor white problem. “Civilised labour” offered preferential treatment to white workers; certain work was to be done only by people who measured up to the standards of being “civilised” as perceived from a white perspective. In practice this meant that in government departments and municipalities, preference was given to the employment of whites over blacks. The new government aimed at driving an efficient irrigation administration. Under Act No. 33 of 1926, a permanent Irrigation Commission was formed.⁴² Its establishment was to a great extent the work of A.D. Lewis, who succeeded Kanthack as director of Irrigation in 1921. Lewis believed that the full implementation of irrigation schemes in settlement areas would alleviate the anticipated unemployment. The permanent Irrigation Commission took control of a number of existing irrigation schemes and as a result of this policy, thousands of workers throughout South Africa found employment.⁴³

However, preferential treatment of white labour could not stave off the disastrous consequences of the collapse of the New York stock exchange in October 1929, which heralded the Great Depression of 1929–1934. In South Africa the depression was preceded by a drop in the prices of agricultural products in 1925–1926 because of surpluses; a foot-and-mouth epidemic; the closing of some diamond mines leading to job losses; and another crippling drought in the years 1925 to 1928. Prices were so poor in these years that many farmers, even those who were progressive, were ruined. To make matters worse, a drought of considerable proportions took hold in large parts of South Africa during the last phase of the depression, leading to increased unemployment and exacerbating the poor white problem. From 1906 to 1932 the number of poor whites increased from 10 000 to 300 000.⁴⁴

It was the Great Depression with all its increased hardships which saw the introduction of effective steps to absorb much of the poverty by means of state employment. By 1934 government would change its emphasis from providing mostly temporary piece-work employment, to the creation of jobs that were also of a more permanent nature, such as irrigation works. By the 1930s, therefore, irrigation works provided notable employment opportunities for unskilled labourers. Workers recruited by the Department of Labour for this work were required to pass a medical test of fitness prior to engagement.⁴⁵ In this period of acute crisis the development of a large-scale irrigation network was, for Hertzog’s National Party government, with its strong rural Afrikaner support base, a means of keeping whites productive in the

42. J.P. Brits, “The Pact and South African Society”, in B.J. Liebenberg and S.B. Spies (eds.), *South Africa in the 20th Century* (Van Schaik Pretoria, 1993), pp 174, 180, 182; Tempelhoff, “Omgewingslagoffers of Armlankes?”, p 24; Abedian and Standish, “Poor Whites and the Role of the State”, p 98; Mackenzie, “Irrigation in South Africa”, p 17.

43. Van Vuuren, *In the Footsteps of Giants*, p 111.

44. Brits, “The Pact and South African Society”, pp 183, 185–86, 242–244; Abedian and Standish, “Poor Whites and the Role of the State”, p 103; Lewis, “A Study of Some Aspects of the Poor White Problem”, pp 6, 8; L. van Zyl, *Boegoeberg se Mense: ‘n Flukse Draai van die Wiel* (Private publication, Groblershoop, 2007) p 17.

45. Abedian and Standish, “Poor Whites and the Role of the State”, pp 98–100.

rural areas who would probably otherwise have drifted to the towns and aggravated the already chronic unemployment problem in the urban areas as well.⁴⁶ Dam construction in the early 1930s can therefore also be regarded as “depression dams”⁴⁷ of which the Buchberg dam serves as poignant example.

The Great Depression and the Buchberg Dam and canal works: An example of emergency poor relief

According to Billington and Jackson, putting people to work became a goal unto itself in America’s dam-building history. At times, construction on the so-called New Deal dam projects actually began even before engineers had completed detailed planning and design.⁴⁸ Critical social and environmental conditions in South Africa necessitated similar initiatives. The outbreak of the Great Depression and the desperate drought-ridden conditions in the North-west Cape expedited the Buchberg project in the lower reaches of the Orange River. In March 1929 the government decided to initiate this project as a drought and poor relief scheme. The Buchberg Dam is situated in the Northern Cape, not far from Groblershoop, a small town named after J.C.H. Grobler, the minister of Lands in the Pact cabinet, who launched various initiatives such as agricultural settlements to relieve the increasing problem of white unemployment.⁴⁹ A.D. Lewis, the director of Irrigation, was told to “start construction as soon as possible to provide employment for white people who were suffering from the effects of drought”. The urgency of the Buchberg initiative as a poor relief project is illustrated by the fact that the engineers and workers arrived on site even before there was any specific scheme in mind, and it was only once preliminary work had begun that a decision was made to build a storage dam. The design for the dam and irrigation scheme was finalised only in 1930.⁵⁰

Funds for the project were provided by the Department of Labour which was also responsible for employing labour, while the construction was led by the Department of Irrigation. The Buchberg Dam and canal were tackled as two separate construction projects. Resident engineer D.F. Kokot oversaw works at the dam, and A. Aslackson was the resident engineer in charge of work on the canal. Work on the dam and on the construction camp was “hurriedly commenced” concurrently in May 1929. Only white men were employed on the project, as was the case with many government infrastructure projects at the time. People came from far and wide seeking relief from unemployment. Many were farmers who had been forced to abandon their farms; some were former prospectors from the diamond diggings in

46. Shillington, “Irrigation, Agriculture and the State”, p 328.

47. Other dam construction and irrigation schemes initiated during the Great Depression include the Loskop Dam, the Vaal-Harts irrigation scheme, the Vaal Dam, and the Clanwilliam Dam. See Van Vuuren, *In the Footsteps of Giants*, pp. 119–123, 125–141.

48. D.P. Billington and D.C. Jackson, *Big Dams of the New Deal Era: A Confluence of Engineering and Politics* (University of Oklahoma Press, Norman, 2006), p 8.

49. Van Zyl, *Boegoeberg se Mense*, pp 13, 40.

50. Van Vuuren, *In the Footsteps of Giants*, pp 113–114; Anon., “Buchberg: Built on the Backs of Men”, *The Water Wheel* (March/April 2009), p 27.

Lichtenburg and Alexander Bay and others came from cities as far afield as Johannesburg, Pretoria and Bloemfontein to earn a meagre 7s 6d a day. Some were so desperate that they were prepared to work for food alone. Others arrived on site towards the end of 1928, months ahead of time, in the vain hope of finding employment the next year when the project was due to begin. The terrain was harsh and described as a “wasteland” and the work was physically exhausting and backbreaking. Level areas had to be chiselled from the mountain to create space for the stone crusher. All the work was done by hand, with pick, shovel and wheelbarrow, and with the assistance of donkeys and mules. Even the holes for the explosives were drilled by hand. The coffer dams were built on sand-bags which the workers carried back and forth on their backs. Temperatures by day often reached 40°C and work continued at night by oil lamp. Most labour was done on the basis of piece-work.



Indigent white workers at the Buchberg construction site (Source: K. Visser, Private Collection)

Although some sources concur that an average of 350 men worked on the construction of the dam,⁵¹ the 1932 annual report compiled by the director of Irrigation states that some were unable to keep up with non-stop hard physical labour. Only rarely did more than 250 workers report daily for work on site.⁵² In fact, Van Zyl claims that quite a number of workers gave up and deserted to the nearest railway station.⁵³ In this regard Kokot, the chief engineer, made some interesting social observations. According to him, white labourers responded better to the incentive of increased earnings by means of piece-work. He was also of the opinion that the situation could have been improved had it been possible to “freely discharge unsuitable men”. Workers were engaged by the Department of Labour and although they were subjected to a medical examination before being taken on, many were unable to cope with the extremely hard work. Because the work was primarily for the relief of unemployment, only those who were utterly unfit were discharged. This meant that a fair number of “passengers” were carried. Had sentiment not entered into the question “weaklings and malingerers would gradually have been worked out”, with the result that the general efficiency would have been raised considerably.⁵⁴

At the height of construction, there were over 3 000 people living on site. Everything, from labourers to equipment, was initially transported piece by piece using donkey carts, from the nearest train station more than 60 km away. Private individuals could also receive an income by transporting cement, iron and equipment on their wagons. Initially, children as young as nine worked for a sixpence hauling stone in an effort to help their families put food on the table. At one time there were apparently as many as 30 children between the ages of nine and fourteen working on the dam site. However, by June 1930 a school was opened. The camp later boasted a hospital with a medical officer who was paid by the Department of Labour. All the buildings, living units and facilities which appeared in due course, such as the resident engineer’s dwelling, single quarters for unmarried teachers and technical assistants, housing for the school principal and water supply works, were provided by the Department of Irrigation.⁵⁵ These observations concur with those expressed in research carried out by Tempelhoff and the reports issued by the director of Irrigation that when state assistance to indigents and the unemployed improved over time, the physical and material conditions of construction workers improved as well.⁵⁶

-
51. D.F. Kokot, “Buchuberg Dam”, *Civil Engineering*, 30 January 1932, pp 168–170, 176–177; Mackenzie, “Irrigation in South Africa”, p 10; Anon., “Buchuberg: Built on the Backs of Men”, pp 27–28; Van Vuuren, *In the Footsteps of Giants*, p 115; Van Zyl, *Boegoeberg se Mense*, pp 17, 19, 23, 27, 38, 46–47, 61; Venter, *Water*, p 319.
52. UG, 10–1932, *Report of the Director of Irrigation, 1 April 1930 to 31 March 1931* (Government Printer, Pretoria, 1937), p 19.
53. Van Zyl, *Boegoeberg se Mense*, p 27.
54. Kokot, “Buchuberg Dam”, pp 175–176.
55. Anon., “Buchuberg: Built on the Backs of Men”, p 28; Van Vuuren, *In the Footsteps of Giants*, pp 115–116; Van Zyl, *Boegoeberg se Mense*, pp 18–19, 23–24, 38, 44–45, 47, 53, 61; Kokot, “Buchuberg Dam”, pp 173, 176–177; Venter, *Water*, p 319.
56. UG, 3–1938, *Report of the Director of Irrigation, 1 April 1936 to 31 March 1937*, p 31; Tempelhoff, “Omgewingslagoffers of Armblankes?”, pp 22–23.

By 1932 construction of the dam had advanced enough for water to flow into the canal for the first time. The 121 km canal was completed in 1934. Initially it was an earthen canal which led to siltation from time to time and had to be cleansed manually. In 1952 the canal was lengthened to 172 km and its walls lined with cement. It had an irrigation capacity of 3 400 ha. The dam wall, built in the nature of a barrage or weir, was constructed to a final height of 10.7 m and is 622 m long. The dam had an initial storage capacity of 40 million m³ and was originally equipped with 68 sluices designed to allow sediment to pass through the structure.⁵⁷ The whole scheme was handed over to the Lands Department for operation and maintenance in 1934 and in 1945 the Irrigation Department resumed control of the canal.⁵⁸

Apart from providing temporary employment in the construction phase of the project, it was also the state's intention to provide some permanent measure of relief by settling poor whites on irrigation land. Farmers with draught animals working on the construction had the first choice to apply for "proof hire" of land. Individual irrigation plots ranged between 4.9 and 6.8 ha and initially there were 943 plot holders under the Buchuberg irrigation scheme. Once a settler's application for land was approved he could work the plot for two years to prove that he could farm effectively. Originally all land belonged to the state and had to be leased. It was only in the late 1940s that irrigators obtained the right to purchase land from the government. Plots were sold for about £600 to be redeemed over 60 years at a rate of one per cent interest per year. In the early years many irrigators suffered poverty because of the small economic units demarcated and they also lacked agricultural experience and skills. In the formative years of the settlement irrigators suffered low prices because there was no market for their agricultural products. But after the outbreak of the Second World War a new demand for food arose and conditions improved.⁵⁹

Conclusion

The Kamanassie and Buchuberg projects provide a clear illustration of the nexus between state-sponsored white settlement irrigation schemes and white poverty alleviation. Dam-building and irrigation settlement projects were important in addressing the looming white unemployment and indigence problem in an effort to change a social environment in degradation. Opportunities were created for white South Africans to ensure their existence in a rural environment, and the National Party government under General J.B.M. Hertzog adhered to the demands of its Afrikaner constituency to alleviate the plight of the poor through state employment.⁶⁰

57. Anon., "Buchuberg: Built on the Backs of Men", pp 28–29; Van Vuuren, *In the Footsteps of Giants*, p 16; Van Zyl, *Boegoeberg se Mense*, pp 10, 19, 21, 23–25, 28, 44, 53–54; Venter, *Water*, p 319; Mackenzie, "Irrigation in South Africa", p 11.

58. Mackenzie, "Irrigation in South Africa", p 11.

59. Van Zyl, *Boegoeberg se Mense*, pp 27, 31–35; Kokot, "Buchuberg Dam", p 174.

60. Shillington, "Irrigation, Agriculture and State", p 328; Tempelhoff, "Omgewingslagoffers of Armblankes?", p 29.

Despite limited resources the South African state was able to utilise water as an agent for social change and create infrastructure for water conservation, agricultural development and food security as well as address the pressing need for poor relief. The promotion of the farming industry and welfare creation drew on irrigation as the main focus of water legislation until the Water Act, No. 54 of 1956, was promulgated and the state's water conservation and infrastructure strategy shifted towards supporting South Africa's industrial and economic development.⁶¹ But white irrigation settlements such as Hartebeespoort, Kamanassie, and Buchuberg illustrate that the state did not intervene simply for altruistic reasons. Irrigation development also revealed the Union governments' ulterior motive to manipulate irrigation settlement and poverty alleviation for political expediency. This corroborates Freund's third argument that successful developmental states are able to achieve broad general, if passive, support from their populations because they can deliver the material goods and raise living standards.⁶² On the other hand, these pro-white policies contributed to the crystallisation of rural residential and spatial segregation, because African and Coloured farmers were excluded from the rural agricultural economy and irrigation settlement schemes.

Both the Kamanassie and Buchuberg irrigation schemes, as many others in South Africa's irrigation history, were established to combat ecological stress (severe drought) and concomitant economic and social duress (depression and white indigence). However, despite concerted efforts, poor relief through irrigation schemes can at best be regarded as having mixed success and the state's political expedience to appease an expectant poor white electorate sometimes led to rash irrigation planning. For instance, the Kamanassie irrigation scheme was only partially successful and its immediate benefits were overestimated. Although poverty relief was achieved through temporary labour opportunities for white indigents, on completion of the scheme it transpired that the land was unsuitable for permanent irrigation. The district's average annual rainfall between 1914 and 1937 was only 243.56 mm.⁶³ Because of recurring droughts and an intermittent river flow, the surface runoff in the catchment area diminished. It appears that the project was doomed to fail. Only rarely was the dam filled to capacity which rendered irrigators vulnerable to economic disaster due to an unpredictable water supply for their crops. Primitive practices of flood irrigation and earthen furrows involved an excessive waste of water. Furthermore, many irrigators lacked the ability to repay their loans and therefore could not develop the irrigable land to its full potential.⁶⁴

61. J.W.N. Tempelhoff, *An Introduction to the History of Water in South Africa* (North-West University, Vaal Triangle Campus, Vanderbijlpark, 2012), p 12.

62. Freund, "A Ghost from the Past", p 87.

63. Stander, "Die Voorkoms van Wit Armoede", p 88.

64. Backeberg, "Die Politieke Ekonomie", pp 108, 111; Venter, *Water*, p 389; P. Buirsky, "Second Carnegie Inquiry into Poverty and Development in Southern Africa", Unpublished paper (No. 37) presented at the Carnegie Conference, Cape Town, 13–19 April 1984, p 3.

There was a similar outcome at the Buchberg Dam project. Emergency poverty relief was provided in the form of jobs on the construction site and farming opportunities were available on the irrigation settlement scheme. But soon after the completion of the dam the sediment sluices were closed permanently when siltation halved its storage capacity.⁶⁵ In 2002, a dam safety inspection report indicated that 29 of the dam's 68 gates had been sealed off to reduce operational problems.⁶⁶

Using the examples of the Kamanassie and Buchberg projects it is clear that the developmental state approach of utilising water as a natural resource to alleviate a social problem such as white indigence was not always an outright success. Both schemes were initiated in response to substantial political and social pressure on the state to provide poverty relief. Climatological data research and analysis of the sustainability of these projects was not undertaken prior to the construction of the Kamanassie Dam, nor did engineers apply proper hydraulic design principles in planning the Buchberg weir. Further, under the trying circumstances, no proper selection criteria were used to select workers who were suited for the physical demands of the job.

The 1934 report of the Carnegie Commission to investigate the poor white issue pointed out that many aspirant settlers lacked irrigation experience. Furthermore, it recommended that only candidates who showed the necessary perseverance to overcome the trying conditions on pioneer projects, be selected as settlers.⁶⁷ These recommendations concur with Kokot's observations that not all poor white candidates recruited by the Department of Labour for irrigation relief projects such as the Buchberg scheme were physically and mentally fit to meet the harsh and strenuous working conditions required. However, conditions improved for those settlers who persevered because the market for their agricultural products improved after the outbreak of the Second World War. Furthermore, in his seminal study on hegemonic state planning and state-initiated social engineering to solve human problems, James C. Scott, a professor of political science and anthropology at Yale University, argues that radically simplified designs for social organisation seem to court the same risks of failure that befall radical simplified designs for natural environments.⁶⁸

65. Van Vuuren, *In the Footsteps of Giants*, p 117; Venter, *Water*, p 319; J.H. Moolman, "The Orange River, South Africa", *Geographical Review*, 36 (October 1946), p 672.

66. DWAF, "Boegoeberg Dam: Safety Inspection Report", December 2002, pp iv, 1, 11.

67. See UG, 7-1929, *Jaarverslag van die Besproeiingskommissie vir die Tydperk tot 31 Maart 1928* (Cape Times, Kaapstad, 1929), p 28; UG, 9-1932, *Jaarverslag van die Besproeiingskommissie, 31 Maart 1931* (Staatsdrukker, Pretoria, 1932), pp 8-10; UG, 25 - 1935, *Report of the Settlers' Relief Commission, 1934* (Government Printer, Pretoria, 1935), pp 33-37; Tempelhoff, "Omgewingslagoffers of Armblankes?", p 25.

68. J.C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed* (Yale University Press, New Haven and London, 1998), p 7.

REFERENCES

- Abedian, I. and Standish B., "Poor Whites and the Role of the State: The Evidence", *South African Journal of Economics*, 53, 98 (June 1985).
- Adams, W.M. and Anderson, D.M., "Irrigation before Development: Indigenous and Induced Change in Agricultural Water Management in East Africa", *African Affairs*, 87, 349 (October 1988).
- Anon., "Buchuberg: Built on the Backs of Men", *The Water Wheel* (March/April 2009).
- Anon., "Kamanassie Dam", *The Water Wheel* (November/December 2010).
- Backeberg, G.R., "Die Politieke Ekonomie van Besproeiingsbeleid in Suid-Afrika", PhD thesis, Pretoria University, 1994.
- Beinart, W., *The Rise of Conservation in South Africa: Settlers, Livestock and the Environment, 1770–1950* (Oxford University Press, Oxford, 2003).
- Berger, D., "White Poverty and Government Policy in South Africa: 1892–1934", PhD thesis, Temple University, 1982.
- Billington, D.P. and Jackson, D.C., *Big Dams of the New Deal Era: A Confluence of Engineering and Politics* (University of Oklahoma Press, Norman, 2006).
- Brits, J.P., "The Pact and South African Society", in Liebenberg, B.J. and Spies, S.B. (eds), *South Africa in the 20th Century* (Van Schaik, Pretoria, 1993).
- Buirsky, P., "Aspects of Material Life in Oudtshoorn, 1860–1927 with Particular Reference to the Labouring Poor", BA Honours, University of Cape Town, 1983.
- Buirsky, P., "Second Carnegie Inquiry into Poverty and Development in Southern Africa", Unpublished paper (No. 37) presented at the Carnegie Conference, Cape Town, 13–19 April 1984.
- Burman, J., *The Little Karoo* (Human & Rousseau, Cape Town, 1981).
- Clynick, T., "White South Africa's 'weak sons': Poor Whites and the Hartbeespoort Dam", in Bonner, P., Esterhuysen, A. and Jenkins, T. (eds), *A Search for Origins. Science, History and South Africa's "Cradle of Humankind"* (Wits University Press, Johannesburg, 2007).
- Du Plessis, A.S., "Die Hartebeespoortdambesproeiingskema. 'n Evaluering van 'n staatsbeheerde hervestigingsprogram, 1914–1952", MA dissertation, Randse Afrikaanse Universiteit, 1988.
- Freund, B., "A Ghost from the Past: The South African Developmental State of the 1940s", *Transformation*, 81/82 (2013).
- Freund, B., "The Poor Whites: A Social Force and a Social Problem in South African History", in Morrell, R. (ed.), *White but Poor: Essays on the History of Poor Whites in Southern Africa 1880–1940* (Unisa Press, Pretoria, 1992).
- Halpérin, V., *Lord Milner and the Empire: The Evolution of British Imperialism* (Odhams Press, London, 1952).
- Harper, M. and Constantine, S., *Migration and Empire. The Oxford History of the British Empire Companion Series* (Oxford University Press, Oxford, 2010).
- Jordaan, S.P., "J. D. Kestell. Sy Lewe en Werk", PhD thesis, Universiteit van die Oranje Vrystaat, 1979.

- Keegan, T., *Rural Transformations in Industrialising South Africa: The Southern Highveld to 1914* (Macmillan Press, London, 1987).
- Kokot, D.F., "Buchuberg Dam", *Civil Engineering* (30 January 1932).
- Koorts, T., *DF Malan en die Opkoms van Afrikaner-nasionalisme* (Tafelberg, Kaapstad, 2014).
- Kotzé, J.C., "Die Vaalhartsbesproeiingskema: 'n Ekonomiese en Sosiaal-geografiese Studie", MA dissertation, Stellenbosch University, 1961.
- Lavin, D., "Irrigation Development in South Africa: The Smartt Syndicate and the Cape Sundays River Settlement Co.", in Tempelhoff, J.W.N. (ed.), *African Water Histories: Transdisciplinary Discourses* (North-West University, Vaal Triangle Campus, Vanderbijlpark, 2005).
- Le Roux, A., "'n Historiese Ondersoek na die Ontwikkeling van Landbou in Oudtshoorn en sy Distrik, 1914–1980", MA dissertation, Stellenbosch University, 2013.
- Lewis, R.A., "A Study of Some Aspects of the Poor White Problem in South Africa", MA dissertation, Rhodes University, 1973.
- Mackenzie, L.A., "Irrigation in South Africa", Unpublished type-written manuscript of departmental bulletin issued by the Director of Irrigation, Pretoria, c. 1946–1948.
- Marks, S. and Trapido, S., "Lord Milner and the South African State", *History Workshop*, 8 (Autumn 1979).
- Meiring, J.M., *Sundays River Valley its History and Settlement* (A.A. Balkema, Cape Town and Amsterdam, 1959).
- Middelmann, T.J.D., "The Hartebeestpoort Irrigation Scheme: A Project of Modernisation, Segregation and White Poverty Alleviation, 1912–1926", *South African Historical Journal*, 67, 2 (2015).
- Moolman, J.H., "The Orange River, South Africa", *Geographical Review* 36 (October 1946).
- Morrell, R. (ed.), *White but Poor: Essays on the History of Poor Whites in Southern Africa 1880–1940* (Unisa Press, Pretoria, 1992).
- Patterson, F.T., "Kamanassie Irrigation Works", *S.A. Irrigation Magazine*, 1 (1922).
- Pyrah, G.B., *Imperial Policy and South Africa, 1902–10* (Clarendon Press, Oxford, 1955).
- Scott, J.C., *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed* (Yale University Press, New Haven and London, 1998).
- Shillington, K., "Irrigation, Agriculture and the State: The Harts Valley in Historical Perspective", in Beinart, W. et al (eds), *Putting a Plough to the Ground. Accumulation and Dispossession in Rural South Africa, 1850–1930* (Ravan Press, Johannesburg, 1986).
- Stander, O.P.J., "Die Voorkoms van Wit Armoede in Oudtshoorn tussen 1914 en 1937", PhD thesis, Stellenbosch University, 2017.
- Streak, M., *Lord Milner's Immigration Policy of the Transvaal, 1897–1905* (Rand Afrikaans University, Johannesburg, 1969).

- Swatuk, L.A., "The State and Water Resources Development through the Lens of History: A South African Case Study", *Water Alternatives*, 3 (2010).
- Tempelhoff, J.W.N., *An Introduction to the History of Water in South Africa* (North-West University, Vaal Triangle Campus, Vanderbijlpark, 2012).
- Tempelhoff, J.W.N., "Omgewingslagoffers of Armblikes? Water en Welvaartskepping in die Era van Hertzog, 1914–1939", Ongepubliseerde referaat gelewer tydens die jaarlikse Hertzog-gedenklesing van die Suid-Afrikaanse Akademie vir Wetenskap en Kuns, Pretoria, 21 September 2006.
- Van Biljon, F.J., *State Interference in the Economy of South Africa* (P.S. King & Son, London, 1939).
- Van Vuuren, L., *In the Footsteps of Giants: Exploring the History of South Africa's Large Dams* (Water Research Commission of South Africa, Gezina, 2012).
- Van Zyl, Z., *Boegoeberg se Mense: 'n Flukse Draai van die Wiel* (Private publication, Groblershoop, 2007).
- Venter, F.A., *Water* (Afrikaanse Pers-Boekhandel, Johannesburg, 1970).
- Wallis, J.P.R., *Fitz, The Story of Sir Percy Fitzpatrick* (Macmillan & Co Ltd, London, 1955).
- Willcocks, W., *Irrigation in South Africa* (Private publication, Johannesburg, 1901).
- Worsfold, W.B., *The Reconstruction of the New Colonies under Lord Milner, Volume 2* (Kegan Paul, Trench, Trübner & Co., London, 1913).