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# A tale of two towns: Water provision and management in the towns of Beaufort West and Vanrhynsdorp, c. 1900–1970

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The Karoo region of South Africa receives some of the lowest annual precipitation in South Africa. The towns of Beaufort West and Vanrhynsdorp share a history of unreliable water supplies, coupled with extreme poverty that left a large section of the population of these towns with little to no access to safe water and sanitation infrastructure. Vanrhynsdorp and Beaufort West had low populations and limited permanent infrastructure during the 19th century. As the 20th century progressed, agricultural market price drops, droughts, the opening of railway lines and the promise of better living conditions spurred on by local business pushed larger numbers of people towards the rural towns. This led to the rapid expansion of populations in rural towns that lacked the financial and practical means to accommodate the rising need for larger permanent water sources and supply infrastructure (often in the form of groundwater). This article will compare how Beaufort West and Vanrhynsdorp developed divergent water provision systems between 1900 and 1970. These two case studies represent a glimpse into the history of water provision struggles of towns in the arid interior during the first half of the 20th century.

**Contribution:** This article focusses on South African water history, and specifically on the problematics of water procurement to towns and communities in the arid Karoo region amid failing water infrastructure and recurring droughts. It augments the historical knowledge on strategies to provide water to rural communities under conditions of duress. The article falls within the scope of *New Contree's* scientific focus as it throws more light on the historical infrastructure challenges that two rural communities faced and what strategies they have implemented to overcome such challenges.

**Keywords:** droughts; Springfontein Dam; railways; water provision; Gamka Dam; Troe Troe River; private boreholes; sanitation; rainwater tanks; municipal council.

## Introduction

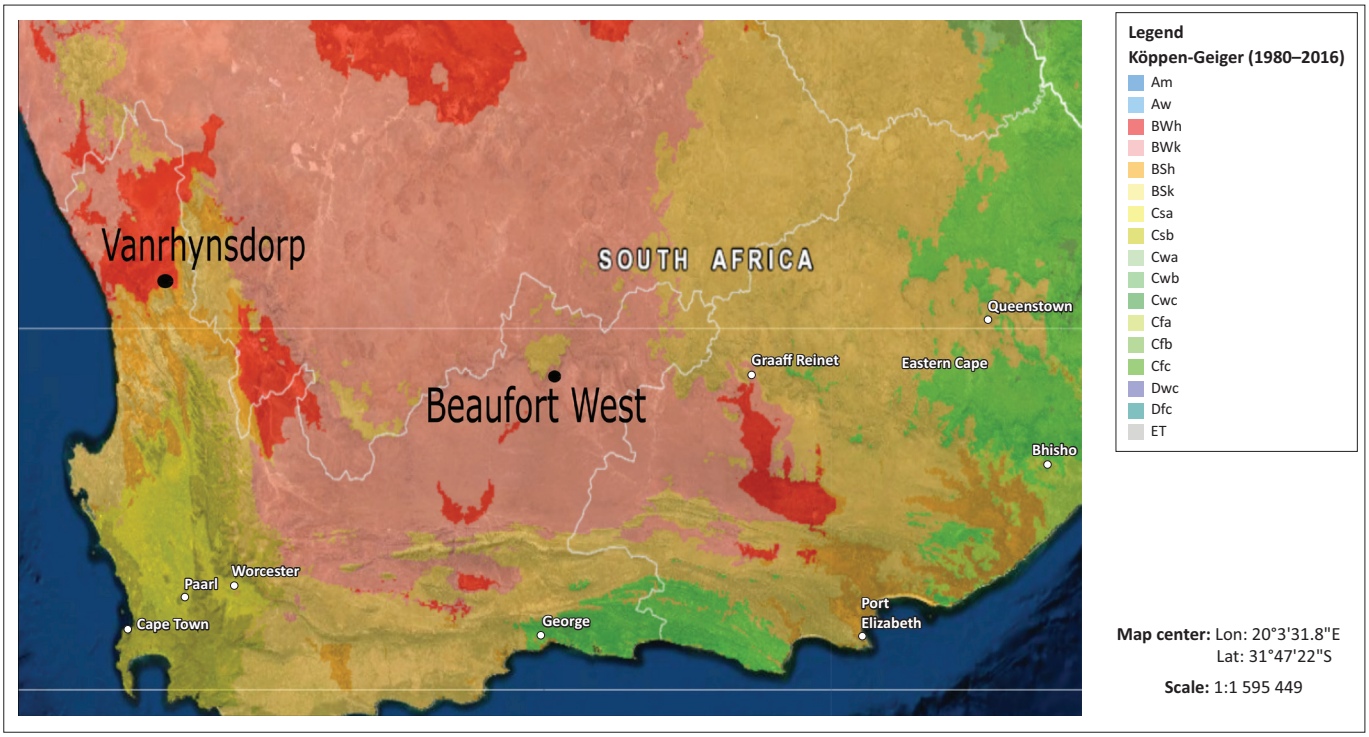
The provision of safe drinking water is a basic human necessity and right.[1] Historically, water provision in South Africa was left to private initiatives which prompted private users to exploit any available water sources to secure potable water. As a result, most households relied on rainwater collection, shallow wells, natural springs and open irrigation furrows to collect potable water – a situation that posed multiple threats to public health.[2] The subsequent introduction of the *1956 National Water Act (No. 54)* saw the government play a greater role in national water provision and management schemes.[3] This was prompted by population growth, increased municipal finances, changing perceptions on hygiene and the growing role of public health officials in South African society.[4] This paper will compare the 60-year development of water provision systems in the towns, Beaufort West and Vanrhynsdorp in the fiscal years between 1900 and 1960. Although many rural towns in South Africa faced obstacles to overcome water provision challenges, these two case studies represent a glimpse into the history of water provision struggles of major towns in the arid interior during the first half of the 20th century.

1.R. C. Nnadozie, "Access to Adequate Water in Post-apartheid South African Provinces: An Overview of Numerical Trends," *Water SA* 37, no. 3 (2011): 339.

2.H. Mäki, *Water Sanitation and Health: The Development of the Environmental Services in four South African Cities, 1840–1920* (Tampere: Juvenes Print, 2008), p. 304.

3.It should be noted that although the 1956 Act did created more responsibility by government over water provision matters this would not be fully actualized to the passing of the 1997 Water Services Act and 1998 National Water Act. See J. Tempelhoff, "The Water Act, No. 54 of 1956 and the First Phase of Apartheid in South Africa (1948–1960)," *Water History* 9, no. 2 (2011), 189–191.

4.Mäki, *Water Sanitation and Health…*, 310–17.




*Source*: Figure made using GIS system and data provided by Cape Farm Mapper application CFM by D.J.R. Rademan, https://gis.elsenburg.com/apps/cfm/ [Accessed on 7 July 2023].

**FIGURE 1:** Position of Vanrhynsdorp and Beaufort West within South Africa and climatic conditions illustrated using the Koppen-Geiger system 1980–2016.[10]

This study will mainly focus on the Karoo region of South Africa. With its naturally semi-arid climate, the Karoo region does not boast of extensive and dense perennial water sources and receives some of the lowest annual precipitation in the country – with rainfall averaging between 50 mm and 400 mm.[5] The Nama and Central Karoo, situated within the greater Karoo, are water scarce areas where conditions have been exacerbated by a vulnerability to climate shifts that often cause droughts or sudden flooding. The two towns of Vanrhynsdorp (Nama Karoo) and Beaufort West (Central Karoo), positioned at separate ends of the greater Karoo region (see Figure 1), were originally established as administrative centres for poor sheep farming districts with little permanent infrastructure and low populations in the 19th century. Rapid expansion in both towns occurred throughout the early 20th century – driven by the inflow of numerous poorer rural inhabitants searching for work and better living conditions (see Figure 2). This rapid expansion placed increased strain on the towns to create new water sources. Although the primary prompts (climate and migration) towards development were similar, differences in the rate of establishment of municipal bulk water supply and reticulation infrastructure varied. Causes in the divergence of development included government funding, local governance, resilience to hydrological disasters and different consumer demands. This is reflected in the way both towns developed their new water supply systems over the period 1900–1960 that still impacts both the towns today.

Although there have been multiple studies on the development of water supply systems in major urban areas of South Africa, historical research into the field of water supply management in rural South African towns requires more detailed discussions.[6] Nina Kruger's MA study discussed the development of Williston and Prince Albert's water systems over the 20th century. This study highlights the role that precipitation differences and hydrological factors played in different settlements' approaches to securing water resources.[7] A study by Heléne Klopper comparatively focussed on how drought and water scarcity drove the development of towns and more complex water infrastructure in the Namakwaland region of the Karoo. Klopper was interested in the important role boreholes played in providing reliable water supplies to rural dwellers in the region.[8] More recently, Wessel Visser published an article on the issue of drought and Beaufort West's historical water situation. Visser's work, much like Klopper and Kruger, emphasised the vulnerability of small towns in the Karoo to drought events and how these inherent vulnerabilities affect the social situations of their respective communities.[9] A general trend that is apparent throughout

5.M. Rouault and Y. Richard, "Intensity and Spatial Extension of Drought in South Africa at Different Time Scales," *Water SA*, 29, no. 4 (2003): 490; J.C. Du Toit and T.G. O'Connor, "Changes in Rainfall Pattern in the Eastern Karoo, South Africa, Over the Past 123 Years," *Water SA* 40, no. 30 (2014): 454.

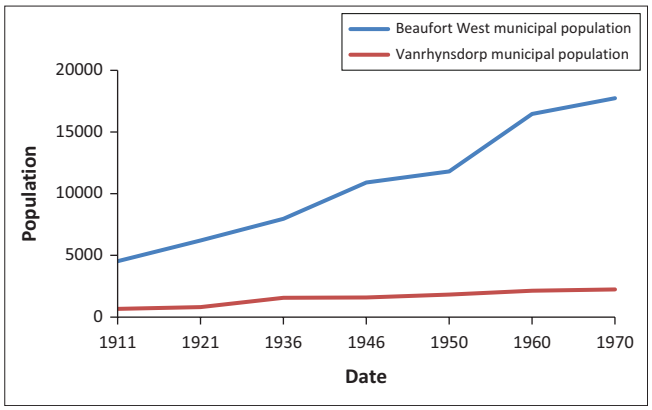
6.See Mäki, *Water Sanitation and Health…*; R. J. Laburn, *'n Historiese oorsig oor watervoorsiening aan die Witwatersrand", Voordrag*, Johannesburg Historical Society, 26 Augustus 1970 (Johannesburg: Walker & Snashall, c. 1970); E.M. Crosser, "Water Supply and Utilization in Johannesburg, 1886–1905," (MA, University of the Witwatersrand, 1987); D. Grant, "The Politics of Water Supply: The History of Cape Town's Water Supply 1840–1920," (MA, UCT, 1991); K. Wall, "Water, Civil Engineers and Multipurpose Metropolitan Government for the Old Cape Peninsula Municipalities: Technical Paper," *Journal of the South African Institution for Civil Engineers* 40, no. 3 (1998): 1–8.

7.N. Kruger, "A Socio-Environmental History of Water in the Karoo c.1762–2012, with Specific Focus on Prince Albert and Williston," (MA, Stellenbosch University, 2013), 132–37.

8.H.F. Klopper, "The Organised Expansion and Permanent Settlement of People in Boesmanland in Correlation with Accessible Water Sources: 1760 – C.1960," (MA, Stellenbosch University, 2020), p. 10.

9.W. Visser, "Between Drought and Deluge: A History of Water Provision to Beaufort West, ca. 1858–1955." *New Contree*, 85 (2020): 1–21.

10.Figure made using GIS system and data provided by Cape Farm Mapper application CFM by D.J.R. Rademan, https://gis.elsenburg.com/apps/cfm/ [Accessed on 7 July 2023].




Note: This graph was compiled using statistics from the South African annual census from 1911 to 1970.

**FIGURE 2:** Population of the municipalities Beaufort West and Vanrhynsdorp 1911–1970.[11]

the literature is the focus on the severe impact drought regularly had on municipal water supplies and the overall importance of groundwater in offering resilience.

Water history in the Southern African region illustrates a relatively large and diverse series of studies that cover discussions on a variety of topics such as legislation, policy, economics, sociology and conflict as pointed out by Nayandoro.[12] Publications relating to Zimbabwe have often shown strong relations in the country's history of conflict around access to land and the racially driven legislation of the former Smith government. This is best illustrated by the work of Muchaparara Musemwa who has in length discussed the development of water provision systems in the Zimbabwean cities of Bulawayo and Harare. Musemwa's research proved the negative impact colonial segregation polities had on water infrastructure and its continuation into the new post-colonial period of Zimbabwean urban areas and the growing role of water provision as a political tool.[13] Consequently, research within South Africa, mostly conducted by Tempelhoff, has mainly discussed the changing role of the South African government in control, protection and provision of water from the mostly agricultural 1912 *Irrigation Act* to the growing role of industry in the period of 1956 before finally discussing the modern focus on water for social needs.[14]

This study relied on the municipal records held by the Western Cape Archival Repository Services and the Western Cape Records Centre, with some sources from the collections of the National Archives of South Africa in Pretoria. These archives provided access to the minutes of municipal councils, health inspection reports from the Department of Health, and other internal local government documents. Although municipal minutes provide valuable primary sources on the day-to-day decision making of local councils, it does not provide as much information on the actual success or impacts of those decisions. This issue was dealt with by the addition of reports from the Department of Health that gave some insight on the success or failure of measures implemented within the towns. The addition of *The Courier*, a local newspaper in Beaufort West, also provided a better insight on the impacts of drought within the town from the accounts and perspectives of community members. All statistical data on the local population of the two towns were similarly sourced from the annual census publications of the Union of South Africa.

# Water provision to Beaufort West

## Beaufort West's geographical features

Beaufort West developed on the farm Hooyvlakte granted to one Jacob de Clercq in 1760.[15] Originally, a gushing spring on the Gamka River ensured a perennial stream even during severe droughts. To be able to establish a magistracy for the district, the British colonial authority bought plots on the banks of the Gamka River. The name Hooyvlakte was eventually changed to Beaufort West. It was proclaimed a town in 1818, and in 1837 became the first municipality in South Africa.[16]

Situated in the semi-arid central Great Karoo, halfway between Cape Town and Bloemfontein, Beaufort West is the major administrative, agricultural and economic centre of the region and a major road and rail transit. The town lies in a hollow between two hills and is flanked by the Gamka River in the west and the Kuils River in the east. Both rivers flow in a generally north to south direction.[17] The town's water supply is heavily reliant on rainfall and droughts are inevitable. Therefore, groundwater extracted from boreholes played an increasingly important role in the development of Beaufort West. The average rainfall in the area is 20.32 cm per year. A sill of dolerite or 'dyke' forms a barrier against the southward migration of underground water because it effectively compartmentalises the groundwater flow. Consequently, most springs are situated towards the northern parts of town and in periods of drought this was the area where the municipal council was prone to drilling of new boreholes in search of more water resources.[18] These geographical features would have a major impact on the history of water provision to the town.

11.This graph was compiled using statistics from the South African annual census from 1911 to 1970.

12.N. Nayandoro, "Water and Environment in Southern Africa: A Review of Literature Since 1990." *Journal for Transdisciplinary Research in Southern Africa*, 15, no. 1 (2019): 4.

13.See M. Musemwa, "From 'Sunshine City' to a Landscape of Disaster: The Politics of Water, Sanitation and Disease in Harare, Zimbabwe, 1980–2009", *Journal of Developing Societies*, 26, no. 2 (2010): 180–82, 198–200; M. Musemwa, "Early Struggles Over Water: From Private to Public Water Utility in the City of Bulawayo, Zimbabwe, 1894–1924," *Journal of Southern African Studies*, 34, no. 4 (2008), 881–82.

14.J. W. N. Tempelhoff, *South Africa's Water Governance Hydraulic Mission (1912–2008) in a WEF Nexus Context* (Durbanville: AOSIS, 2018).

15.W. G. H. Vivier and S. Vivier. *Hooyvlakte. Die verhaal van Beaufort-Wes 1818–1968* (Kaapstad: Nasionale Boekhandel Bpk., 1969), 3.

16.Vivier and Vivier, *Hooyvlakte …*, 10; A.P. Smit, *Gedenkboek van Nederduitse Gereformeerde Gemeente Beaufort-Wes (1820–1945* (Kaapstad: Nasionale Pers Beperk, c. 1945), 134.

17.P. Marais and F. Von Dürckheim, "Beaufort West Reclamation Plant," *Water and Sanitation in Africa*, 7, no. 1 (2012): 20.

18.Vivier and Vivier, *Hooyvlakte…*, 115; Marais and Von Dürckheim, "Beaufort West Reclamation Plant…", 20; Y. Xu, et al., *Towards a Sampling and Monitoring Protocol of Radioactive Elements in Fractured Rock Aquifers for Groundwater Resource Security in Beaufort West*, Water Research Commission Paper 1694/1/12, June 2012. https://researchgate.net/publication/272495076_Towards_a_Sampling_and_Monitoring_Protocol_of_Radioactive_Elements_in_Fractured_Rock..., 12, 35.

The available municipal demographic data on Beaufort West reveals an increasing trend in population growth which over time exerted more and more pressure on the sustainability of the town's water sources. By 1830, there were a mere 200 white inhabitants,[19] and by 1955, the total population had risen to 12 500.[20]

## Water provision and droughts in Beaufort West

Most early inhabitants on these ervens were self-sustaining dwellers, growing fruit, vegetables and fodder while keeping animals such as pigs, sheep, goats, fowl and cows as food source and horses as draught animals.[21] Situated on the flood plain between two rivers, many Beaufort West homeowners dug potable water wells on their properties as the water table was very shallow. However, the continued growth of the town demanded a more secure system of water provision. Water provision from existing springs was combined to strengthen the available irrigation supply.[22] In 1865, owing to a lingering dry spell, the town council decided to construct a permanent irrigation dam, the Springfontein Dam (completed in 1869), at the northern end of the town.[23]

The first water reticulation system was introduced only in 1898. The system entailed a water tunnel constructed from a spring at the foot of the Nieuweveld Mountains on the outskirts of the town. This potable water source was relayed to a 'waterhouse' or reservoir by means of gravitation.[24] However, the water reticulation system did not bring permanent water security to Beaufort West. A serious drought in 1898 caused the Springfontein Dam to run empty, so that water became a serious concern.[25] Efforts to remove the silting up of the dam were halted because of the high costs involved.[26] The silting up and periodic drying up of its irrigation supply prompted the town council to enlarge the Springfontein Dam which was completed in 1916.[27]

In 1915, Beaufort West experienced one of its worst droughts and even hardened pepper trees were beginning to die.[28] Another disastrous drought hit South Africa in 1926 with devastating consequences for rural agricultural and town communities.[29] A mere 6.3 cm of rain was measured in Beaufort West during that year, and it seems that the town's declining gradient had an adverse impact on underground water sources during periods of water duress. All boreholes in the lower end of town had weakened, and during the next 2 years many fruit trees and quince and pomegranate hedges in town parched completely. This drought threatened not only adequate water supply, but also loomed as a menace to the town's economic prosperity and caused widespread socio-economic misery as the town's number of unemployed increased.[30]

Between 1942 and 1947, the average rainfall for the town was 13.1 cm [31] leaving Beaufort West's domestic water supply in a 'critical condition' by 1943. Springs and boreholes were drying up with reductions in yields, and the town reservoir was almost empty. By December 1943, boreholes at the town's northern end were delivering 568.3 $m^3$ of water instead of 909.2 $m^3$ per day. In the light of this prolonged drought, a new big water scheme including a new reservoir completed in 1944 proved insufficient to guarantee a secured water supply to the town.[32] In October 1945, an existing borehole was deepened to 60.96 metre. By January 1946, Beaufort West's water situation became so critical that water provision to inhabitants was cut on certain days and hours, because the town's boreholes were giving in.[33]

Between 1948 and 1949, the level in the water house became 'extremely critical' again as the boreholes at the town's northern end gave in and called for a municipal state of emergency. Water rationing was immediately imposed and water was supplied for 2 h daily, only for domestic use.[34] Fortunately, by November 1949 the drought had been broken.[35]

## The influence of the railways on Beaufort West's water situation

The expansion of the Cape railway line to Beaufort West in February 1880 would become a major game-changer in terms of water provision to the town's growing population. By 1900, for example, the populace of Hillside, the neighbourhood established for railway personnel, grew to 400.[36] Especially during times of drought, the water demands of the railways would put considerable pressure on the water provision capacity of the municipal council. In the history of the town's recurring water crises, the dynamics of a dormant but polite

19.Vivier and Vivier, *Hooyvlakte…*, 8.

20.Stellenbosch University Library, Africana Collection, Anon., *Beaufort West*, c. 1955; No. 12, c. 1955, p. 2.

21.Vivier and Vivier, *Hooyvlakte…*, 7–8, 14, 32–33.

22.Vivier and Vivier, *Hooyvlakte …*, 23–24, 37; Smit, *Gedenkboek…*, 138.

23.Vivier and Vivier, *Hooyvlakte…*, 37.

24.Western Cape Archives and Records Service (hereafter WCARS). *Archives of the Town Clerk Beaufort West 1848–1990 (hereafter 3/BFW), Vol. 1/1/1/2, Minutes of a Council Meeting*, 13 September 1852; Ibid., 22 August 1898, 250; Vivier and Vivier, *Hooyvlakte…*, 10, 32–33.

25.WCARS, *3/BFW, Vol. 1/1/1/11, Minutes of a Council Meeting*, 23 January 1899, 325; Vivier and Vivier, *Hooyvlakte…*, 33–34.

26.WCARS, *3/BFW, Vol. 1/1/1/11, Minutes of a Council Meeting*, 16 October 1902, 224; Vivier and Vivier, *Hooyvlakte…*, 27, 34.

27.Vivier and Vivier, *Hooyvlakte…*, 27.

28.WCARS, *3/BFW, Vol. 1/1/1/15, Minutes of a Council Meeting*, 14 September 1915, 315–316; Ibid., 138; M. Deas, "The Water Question," *The Courier*, 31 March 1915, p. 2; Vivier and Vivier, *Hooyvlakte…*, 27.

29.D. J. R. Rademan, "The Socio-Economic Impact of Drought in the Period 1924–1934 on the Magisterial District of Vanrhynsdorp," (MA, Stellenbosch University, 2020).

30.WCARS, *3/BFW, Vol. 1/1/1/18, Minutes of a Special Meeting of the Council for the Purpose of Discussing the Augmentation of the Town's Water Supply*, 18 January 1927, 448; Vivier and Vivier, *Hooyvlakte …*, 37–38; B. B. Burger, "Die toestande in Beaufort-West," *De Kerkbode*, 1, no. XIX (1927): 195.

31.Anon., "Town Swelters in 105 Degrees", *The Courier*, 14 January 1948, 5.

32.Anon., "Need for Flood Protection," *The Courier*, 11 February 1948, 5.

33.WCARS, *3/BFW, Vol. 1/1/1/23, Minutes of a Special Council Meeting*, 01 November 1945, 367–369; Ibid., *Minutes of a Special Council Meeting*, 02 January 1946, 401–402; Anon., "Public Notice re Water Supply," *The Courier*, 23 January 1946, 2.

34.WCARS, *3/BFW, Vol. 1/1/1/23, Minutes of a Special Council Meeting*, 06 October 1949, 970–71; Anon., "Water Restrictions Imposed," *The Courier*, 24 August 1949, p. 5.

35.Anon., "Drought Breaking", *The Courier*, 23 November 1949, 5.

36.Smit, *Gedenkboek…*, 150–51; Vivier and Vivier, *Hooyvlakte…*, 16–18, 118–21.

tension between the council and the railway authorities would develop.

Adequate water provision to the railways remained an issue during the South African War of 1899–1902 when extra pressure was brought to bear on railway stock to transport military equipment and troops. The only option for the Railway Department was to sink new boreholes on the commonage in 1902.[37] As a result of South Africa's economic growth and development since the First and Second World Wars, the expanding transportation network required more railway rolling stock and locomotives.[38] This in turn, impacted directly on Beaufort West's water supply as the railway water demands increased exponentially. Therefore, the availability of water supply became a critical factor in times of drought. A perusal of the municipal council minutes reveals an interplay of rising tension between the municipal council and the railway authorities when the national interests of the Railway Department and the local interests of Beaufort West's ratepayers were at stake.[39]

During the extreme drought of 1942–1943, the continued exploitation of large volumes of water would lead to a slow but steady depletion of the railway's underground resources.[40] Between 1913 and 1947, for example, the railway's average water consumption had risen from 4363.3 $m^3$ to 21071.1 $m^3$ per annum.[41] By 1948, the tension between the municipal and railway authorities on the ever-increasing and unrelenting demands for water supply reached new heights. The mayor of Beaufort West, Dr J,N, Brummer, frustratingly complained that the railways 'were drawing off the life blood from our town'.[42]

By 1949, water for railway use had to be transported from Hutchinson, a railway station 210 km north of Beaufort West.[43] Water was trucked to the locomotive tanks to supplement the supply at the rate of one train per day.[44] In the light of the municipal and railway water predicament, it became clear that a new water procurement scheme had to be devised for Beaufort West.

### The quest for a more sustainable water source for Beaufort West

The severe pressure on the town's dwindling water resources and the competition between the municipality and the railways to extract water, demanded an urgent solution to the growing problem. After May 1948, when the National Party (NP) government came to power, wheels were set in motion to build a new storage dam for Beaufort West in the Nieuweveld Mountains north of the town. The national interests of the Railway Department and the local interests of Beaufort West became aligned politically, which expedited the initiation of the project. The Gamka Dam, completed in 1955, has a capacity of 454888.6 $m^3$ of water, of which by 1969, the railways had consumed 140928.79 $m^3$ monthly.[45]

## The development of a reliable water supply in the Municipality of Vanrhynsdorp from 1900 to 1960

The town of Vanrhynsdorp was built up around the local NG Kerk congregation on the farm of Troe Troe in the mid-1800s as a waypoint for trek farmers to gather and attend church services and access the local veld kornet. The town developed rapidly in the latter half of the 19th century with a population of 370 people in 1889 leading to the proclamation of a Village Management Board over the town before developing into a full municipality in 1916. The town's layout was that of a typical linear settlement, constructed parallel to the main road and the adjacent parallel Troe Troe River.[46]

Situated in the semi-arid northern portions of the west coast, with its distinct endemic Succulent Karoo Knersvlakte, Vanrhynsdorp has few permanent surface water sources beyond the seasonal flowing stream of the Troe Troe River. The town is positioned fairly far away from the major perennial Olifants River, which flows about 20 km south of the town, making it an unsuitable water resource option at the time. As a consequence, Vanrhynsdorp did not develop an official municipal water scheme until the 1970s. In the interim, water supply was relegated to private boreholes, wells and rainwater collection tanks. The history of water security issues in Vanrhynsdorp can be summarised into three major contributing obstacles:

- unequal access to water;
- the threat of source contamination causing gastrointestinal diseases; and
- poor municipal funding to support infrastructure development.

## Sanitation and water supply, the threat of contaminated water

In 1909, a health inspector described Vanrhynsdorp as suffering from poor sanitation regimes placing much of the

37.WCARS, *3/BFW, Vol. 1/1/1/12, Minutes of a Council Meeting*, 17 February 1902, 109; Ibid., 113.

38.B. J. Liebenberg and S. B. Spies. *South Africa in the 20th Century* (Pretoria: JL van Schaik Academic, 1993), 294; T. R. H. Davenport, *South Africa. A Modern History*, 3rd ed. (Johannesburg: Macmillan Publishers (Pty), Ltd, 1987), 524.

39.WCARS, *3/BFW, Vol. 1/1/1/15, Minutes of a Council Meeting*, 07 September 1915, 313.

40.WCARS, 3/W, *Vol. 1/1/1/23, Minutes of an Extraordinary Council Meeting*, 01 February 1943, 13; Ibid., Minutes of a Special Council Meeting, 26 October 1943, 113; Anon., "Water Position Serious," *The Courier*, 03 February 1943, 3.

41.WCARS, 3/BFW, Vol. 1/1/1/14 – WCARS, 3/BFW, Vol. 1/1/1/23.

42.Anon., "Need for Flood Protection," *The Courier*, 11 February 1948, 5.

43.WCARS, *3/BFW, Vol. 1/1/1/23, Minutes of a Council Meeting*, 20 Junie 1949, 919; Anon., "Water Restrictions Imposed," *The Courier*, 24 August 1949, 5.

44.WCARS, *3/BFW, Vol. 1/1/1/23, Minutes of a Council Meeting*, 19 September 1949, 96; *Minutes of a Special Council Meeting*, 29 September 1949, 969.

45.WCARS, *3/BFW*, *Vol. 1/1/1/24, Minutes of a Special Meeting of the Council*, 28 July 1950, 121; Ibid. *Minutes of a Special Meeting of the Council*, 26 March 1952, 524–26; Ibid., Vol. 1/1/1/25, *Minutes of an Extraordinary Council Meeting*, 27 October 1954, 165; Vivier and Vivier, *Hooyvlakte …*, 34–35; Anon., "Gamka dam to be started this year", *The Courier*, 12 Mei 1950, 5.

46.During the 1889 census it was enumerated that the town had a population of 370 men and women with 57 houses of which 24 were uninhabited. See *Statistical Register of the Colony of the Cape of Good Hope 1889* (Cape Town: Saul Solomon and Co, 1890), 34; G. Van Lill, *Ned. Geref. Gemeente Van Rhynsdorp 1877–1977* (Van Rhynsdorp: Ned. Geref. Gemeente Van Rhynsdorp, 1977), 41; WCARS, *Ministry of Health (hereafter MOH), Vol, 387, L106A, Inspections of Van Rhynsdorp Municipality, 1910–1910: Health inspection of the town of Van Rhynsdorp*, 10 September 1910.

population at risk of diseases. The inspector pointed to the fact that the town's water supply was heavily reliant on private wells which the inspector feared was open to contamination from multiple sources because of poor construction. The inspector was particularly disturbed that human waste was being dumped directly into the nearby Troe Troe River bed and communal grazing area, raising concerns of potential contamination of ground water sources.[47] The inspector's report would illustrate problematic features of Vanrhynsdorp's water supply for the next 20 years catalysing in severe health consequences for the municipal populace through repeated outbreaks of infectious diseases.[48]

Health officials would continue to be concerned over the problem surrounding poor sanitation regimes and a secure water supply for much of the town's history. These concerns reached a peak in 1914 and 1917 when two reports illustrated that the shallow wells which supplied the town's drinking water were highly susceptible to contamination from the nearby Troe Troe River. Multiple health inspectors issued warnings that much of the town's human waste was being deposited in shallow pits some 64 m (70 yards) outside town along the main road. This was deemed too close to the Troe Troe River, with concerns that waste percolated and leached into the groundwater and was ultimately contaminating both the river and surrounding ground water. The point-sourced contaminated groundwater during periods of higher flow regimes associated with the rainy season, further spread the contaminants downstream to the Olifants River.

Attempts at implementing closets (outhouses) and a reliable double bucket waste removal system proved insufficient, with some properties that had no closets, while others were dirty, poorly constructed, overflowing or used tin cans instead of pails. Rubbish removed from the town was dumped in a pit near the entrance to the town and near the Troe Troe River, while homeowners were expected to dump slop water in their gardens close to their wells. Many of these problems originated with the reality that most low-income households could not afford basic sanitation measures such as two sanitary pails. The sanitary situation was made worse by the flooding of the Olifants River in 1917 during which the Troe Troe River reached the town's main site for human waste disposal and carried much of the aforementioned waste into the town.[49] This sanitation situation was exaggerated when flash flooding following a period of drought led to large quantities of accumulated and concentrated human waste suddenly being introduced to the main water sources of the town, which led to outbreaks of diseases such as typhoid fever.

47.WCARS, MOH, *Vol. 387, File, L106A, Inspections of Van Rhynsdorp Municipality, 1910–1910: Health Inspection of the Town of Van Rhynsdorp*, 10 September 1910.

48.Ibid., *Health Inspection of the Town of Van Rhynsdorp*, 10 September 1910.

49.Many of the problems surrounding poor sanitation in the town during its early years originated from low-income households that could not afford even basic services from the municipality such as nightsoil removal. See, NASA, GES, Vol, 687, File, 201/13, Sanitation Van Rhynsdorp, 1913–1935: Health Inspector's report to Assistant Medical Officer of the Union, December 6 March 1917: Letter from Van Rhynsdorp Town Clerk to Chief Government Inspector, 17 October 1917.

The issue of unsanitary conditions and the knock-on effect it had on the town's groundwater came to a head with a major outbreak of *maagkoors*[50] (a frequent catchall term for typhoid or enteric fever) from 1920 to 1923. This prolonged period of gastrointestinal illnesses was one of the worst the town had experienced and led to stricter sanitation enforcement by the municipality.[51] In response to these events, the town clerk, in an attempt to disinfect the polluted water sources, began a regime of dumping chlorine and lime in the Troe Troe River, wells and boreholes of the town.[52] Before the 1920 outbreak, homeowners had been expected to clean their own wells; however, new regulations suggest a growing interest by local government to manage water provision directly.[53] The town clerk would eventually enforce the grouting of all private wells (made impervious using cement) and sealing of open wells.[54] Stricter enforcement of sanitation measures began to bear fruit as the outbreak subsided, and over the years reports of typhoid in the town decreased so that by the 1950s the district surgeon would remark that at least among the white population typhoid had almost completely ceased to exist.[55]

## Water supply of the town Vanrhynsdorp from the 1920s to the 1950s

Following the aftermath of the outbreak in the early 1920s, municipal control of water purification would become a much greater concern of the municipality. Although the town would continue to rely on groundwater sources (shallow wells) and rain water tanks, water provision would see some improvements from 1927 onwards. One such improvement was in the town's location (an area where only people of colour under segregation could reside)[56] which in preceding years had suffered from having no fixed water supply and residents had been forced to retrieve water from white households and businesses.[57] This situation changed in 1927 when the town drilled a borehole in the location to provide 2000 gallons (7570 L) of water per hour.[58] A galvanised tank was constructed later that year at the borehole with a windmill to pump water into the tank creating a more

50."Maagkoors" being a common phrase used to refer to any disease which caused diarrheic infections such as typhoid and enteric fever.

51.WCARS, *3/VRD, Vol. 1/1/1/2, Van Rhynsdorp Municipal Minute Book 1914–1922: Municipal Meetings for 20 March 1920 & 10 October 1920*.

52.Ibid., *Municipal Meetings for 20 March 1920*.

53.WCARS, *3/VRD, Vol. 1/1/1/1, Van Rhynsdorp Municipal Minute Book 1904–1914: Municipal Meetings for 31st of August 1906*.

54.Ibid., *Municipal Office of Van Rhynsdorp to Secretary for Public Health, Annual Health Reports for Year-end 30 June 1927*: Ibid., 04 August 1927.

55.TBK, SGD, *Vol. 62, File, 1 4 19, Van Rhynsdorp Municipality Annual Reports, 1954–1964: Gesondheidsrapport vir die distrik Vanrhynsdorp vir die jaar geeindig 31/12/1954*.

56.Location was the term used for areas set aside under segregationist legislation for the population of colour to live separately from the white population.

57.The health inspector deemed conditions in the location to be 'satisfactory'. See WCARS, MOH, *Vol, 387, File, L106A, Inspections of Van Rhynsdorp Municipality, 1910–1910: Inspection of the town of Van Rhynsdorp*, 10 September 1910.

58.NASA, GES, *Vol. 687, File, 201/13, Sanitation Van Rhynsdorp, 1913–1935: Municipal Office of Van Rhynsdorp to Secretary for Public Health, annual health reports for year-end 30 June 1927 and 4 August 1927*; Ibid., *Letter from office of the Magistrate of Van Rhynsdorp to Secretary of Native Affairs*, 13 September 1927; Ibid., *Letter from Municipal Office Van Rhynsdorp to Secretary of Native Affairs*, 05 May 1927.

constant supply of water to the coloured population.[59] It would appear that this water source would remain the primary source for the location till the 1960s when a new housing scheme with indoor taps was constructed.[60] There is also evidence of growing numbers of boreholes being drilled inside the town limits both by local government and private citizens to create more reliable water sources than private wells; and by the 1950s, wells had almost entirely been replaced by boreholes.[61]

One of the few notable aspects of Vanrhynsdorp's water supply history is the lack of reported impacts that drought had on access to water for the local population. During the major drought periods of the 1920s and 1940s, health officials regularly noted in their reports that the town's wells were very dependable even during drought years.[62] The few issues that were noticeable became apparent in 1927 when during a drought decreased flow rates in the Troe Troe river channel led to people having to use municipal borehole water to wash their clothing.[63] One likely reason for this lack of drought impacts was the small population of the town. Although Vanrhynsdorp's population had grown significantly from 370 people in the 1890s, it would only pass the 1000 mark in 1936 and reach 2248 people in 1970 (see Figure 2). Consequently, the town's small population and lack of large industries likely meant that water consumption was not sufficient on its own to affect local ground water sources, even during drought events.

The town's new water scheme implemented in 1973 was under significant stress because of drought conditions which had reportedly led to increasing cases of collapsing wells and boreholes, exponentially increasing demand among the town's population to be connected to the scheme.[64] Archival sources suggest that the impacts of drought on the general populace were likely under reported, and that only with a growing role for local government in water affairs did these issues truly begin to come to light in the late 20th century.

In 1927, there was hope that a reliable water supply for the town could be guaranteed through a water scheme to individual houses or street taps connected to a small water reservoir, were raised; but this suggestion was never implemented.[65] One health inspector noted that a clean, proximal water supply in small towns was vital, arguing that the lack of water was a threat to white people, as well as people of colour in the town. However, the only way Vanrhynsdorp could increase its water supply was through additional boreholes, which the town council at the time could not afford, leading private institutions to create their own boreholes.[66] Hopes of creating any kind of centralised water scheme for the town were eventually dashed in the 1930s by the municipal council because of the distance between homes, lack of sufficient water pressure and the high costs of extending a water pipeline from the Olifants River. Instead, health officials suggested that each home should have a water tank installed to distribute chlorinated water directly.[67] The proposed individual tank system would have made the job of chlorinating the water more accurate and reliable as it was difficult for the town clerk to estimate how much chlorine and lime individual wells required to purify the water.[68] None of these propositions were implemented by the town council, and the water supply situation would stagnate creating a situation multiple health inspectors considered hazardous.[69]

The unequal access to water that this dilemma created was presented in the annual reports of the local medical officer who pointed to a lack of access to adequate water for people of colour as a primary cause for increased susceptibility to diseases in the location over white households. Explanations for this inequality in service delivery can be found in the different levels of income between separate race groups and the negative impacts of segregation legislation. By 1960, the majority of the white urban populace[70] earned five times the average salary that people of colour received, as a consequence most could afford the costs of a private well or borehole.[71] Simultaneously, segregation laws separated the location financially from higher rate paying white households and businesses, forcing the area to rely on municipal and state funding to implement basic infrastructure projects. This situation greatly reduced the ability of the municipality to gain access to public loans for infrastructure projects since the municipality's revenues and assets were incapable of

59.Ibid., *Louis Rood Response to 1928 Health Report to Secretary of Public Health*, 27 March 1929.

60.TBK, SGD, *Vol. 62, File, 1 4 19, Van Rhynsdorp Municipality Annual Reports, 1954–1964: Gesondheidsrapport vir die distrik Vanrhynsdorp vir die jaar geeindig*, 31 December 1963.

61.NASA, GES, *Vol. 687, File, 201/13, Sanitation Van Rhynsdorp, 1913–1935: E.H. Culver to the Secretary of Public Health on water for the municipality, 22 May 1928*; Ibid., *Letter from Department of Irrigation About Boring in Van Rhynsdorp Municipality*, 11 June 1928.

62.NASA, GES, *Vol. 687, File, 201/13, Sanitation Van Rhynsdorp, 1913–1935: Health Inspector's report to Assistant Medical Officer of the Union, December 06 March 1917: Health report for the year 1934*.

63.WCARS, *3/VRD, Vol. 1/1/1/2, Van Rhynsdorp Municipal Minute Book, 1914–1922: Special Municipal Meetings*, 06 March 1928.

64.TBK, PAA, *Vol. F3/255, File, AA 122/101/37, Cape Provincial Administration: Local Government: Vanrhynsdorp Municipality: Water Regulations, 1938–1973. Watervoorsiening: Vanrhynsdorp poskantoor en landroskantoor, Letter from the magistrate's office to the department of public works*, 16 February 1972.

65.NASA, GES, *Vol. 687, File 201/13, Sanitation Van Rhynsdorp, 1913–1935: Letter to Town Clerk of Van Rhynsdorp from Secretary of Public Health Relating to Annual Health Report of 1928*, 22 March 1928.

66.It was noted that apparently Van Rhynsdorp had good boreholes at the gaol and school to supply water to them. See Ibid., *Van Rhynsdorp Municipality Annual Health Report 1929*, 05 March 1929; Ibid., *Note for Van Rhynsdorp Sanitation file*, 19 March 1929.

67.NASA, GES, *Vol. 687, File 201/13, Sanitation Van Rhynsdorp, 1913–1935: Health Inspectors Report for Van Rhynsdorp*, 30 June 1929; Ibid., *Health Reports for the Year ended 30 June 1931*, 01 July 1931.

68.Ibid., *Health Report for the Year Ended 30 June 1932*, 11 July 1932.

69.One Health inspector would even remark that he was disgusted that the town had spent large sums of money to construct a town hall and public library before first securing a reliable water supply system. TBK, PAA, *Vol, AA 122 9, File, F405, Van Rhynsdorp Municipality Health Reports*, 17 March 1927–25 February 1975: Health Inspection Report of Van Rhynsdorp Municipality, 15th February 1939; Ibid., *Inspection Report of Van Rhynsdorp Municipality*, 15 July 1972.

70.Urban in the context of this study refers to people living within a built-up town or area as declared within the census.

71.Population Census of the Republic of South Africa 1960, *Volume 7, No. 3, Characteristics of the Population in each Magisterial District and Economic Region Income by Work Status* (Pretoria: Government Printer, 1968), 9 and 179.

acting as securities before the 1960s.[72] Vanrhynsdorp's difficulties in securing funding were likely also exacerbated by the rapid growth of Vredendal from 1944 onwards as both a population and business centre for the local district, which led to Vredendal being allocated more of the district's funds over Vanrhynsdorp.[73]

However, the largest problem was an apparent apathy from the municipal council when facing issues involving the location, with little sign of initiative or effort to consult residents in the location on problems they faced with water supply. One example of this is that it took the municipality nearly two decades to finalise their plans for the implementation of an improvement scheme for the location.[74]

These problems eventually led to the implementation of a large-scale state-funded rehousing scheme for the population of colour in the late 1960s. As part of the scheme, new houses with indoor water connections to the municipality's planned water scheme were created to replace the former informal accommodation. The new municipal scheme implemented in the 1970s used a simple borehole-fed system of collection tanks that pumped water directly to the town's households and was heralded as a monumental achievement in improving access to water for the entire town. The new scheme would be recorded as supplying water to 28 white households and 231 households of colour raising R12 000 in revenue for the municipality.[75]

The water scheme was not as widespread as had been hoped, with multiple households still supplying their own water through private means while the scheme was unable to meet the demands placed on it in 1973 because of the small scale of the storage dam and feeder boreholes.[76] A second flaw of the new water scheme was the problem of water tariffs and the ability of consumers to actually pay for both the connection of water (R 25) to their homes and to use water per month (R2 per 13 Kl). A major problem of the new water tariffs was noted in 1972 by the municipal council who argued in favour of a lower tariff for households of colour than white households, although this was also at a lower provision rate of 5 Kl per month than white households at 13 Kl per month.[77] The Provincial Administration refused this suggestion and stated that water tariffs could not be applied at different rates according to race, forcing many households of colour to buy water at the same cost as white households, creating a situation that left many low-income households unable to afford the municipality's rates. The new scheme that fed water to the larger households of colour was almost immediately plagued by shortages with multiple days passing without water being provided in the summer months as boreholes struggled to meet user demands during decreased rainfall periods. These issues with the growing threat of boreholes becoming polluted and future population growth led to the town constructing a water pipeline to connect Vanrhynsdorp to the Olifants River for a more secure water supply by 1978.[78]

## Conclusion

Water security is a topic of great importance to modern South Africa as many people in the country are facing increasingly more frequent periods of water supply disruption because of events such as drought and infrastructure mismanagement affecting daily life. This is visible in incidents such as Cape Town's threats of severe water supply shortages in 2017, while other metros such as Kimberly and Bloemfontein have been paralysed by poor water resource management.[79] This however is not a new occurrence and for many parts of the country a history of water insecurity can be linked to more modern water supply failures. An example of this would be the town of Beaufort West, situated in the arid Central Karoo. The town has a long history of water supply interruptions spurred on by drought and over utilisation of water resources. In comparison, the town of Vanrhynsdorp presents almost the opposite example. Situated in the also arid Nama Karoo on the West Coast, Vanrhynsdorp has a history of reliable groundwater sources and relatively low demand; but a failure to implement important infrastructure to meet the needs of low-income families left many with no reliable water supply.

Vanrhynsdorp's water supply over the 20th century can be categorised by a strong reliance on ground water sources accessed through privately owned wells and boreholes and a lack of a municipal water schemes before 1972. This led to a reality where failures in implementing municipal sanitation regulations increased the risk of private water sources becoming contaminated by surface run off and percolation,

72.Rates raised from property owners in 1943 amounted to 438 pounds whilst Location fees had only brought in 30 pounds. See TBK, PAS (L-/C/-), *Vol. 5/522, File, L112/C/1, Van Rhynsdorp Municipality: Estimates 1944 Accounts 1943, 1943–1944, Municipality of Vanrhynsdorp Summary of Receipts and Payments for the year 1943*.

73.By 1947 Vredendal already had a population of 1000 people, a secure water supply from the Olifants River and rapidly developed local industries such as bottling plants. TBK, PAA (AA), *Vol. D/321, File, AA305/9, Vredendal Village management Board. Health Reports, 1946–1969: Rapport van 'n Gesondheidsinspeksie gemaak deur Inspekteur E. de Jager op*, 04 Oktober 1945; Ibid., *Inspeksie van Sanitere en gesondheidstoestande in die gebied van die dorpsbestuur van Vredendal*, 23.2.50; Ibid., Verslag oor 'n stelselmatige inspeksie van gesondheids en sanitere aangeleenthede asook voedsel en andere persele in die magsgebied van die munisipaliteit van Vredendal soos uitgevoer deur senior staatsgesondheidinspekteur Mnr. S.V. Stevens, 23 August 1968.

74.TBK, PAA, *Vol. AA 122 9, File, F405, Van Rhynsdorp Municipality Health Reports, 17/3/1927–25/2/1975: Letter from H. Afrika to Administrator of the Cape Province*, 1943.

75.TBK, PAA, *Vol. AA 122 9, File, F405, Van Rhynsdorp Municipality Health Reports, 17/3/1927–25/2/1975: Health Inspection Report of Van Rhynsdorp Municipality*, 15 July 1972; TBK, PAA, *Vol. F3/256, File, AB122/36, Cape Provincial Administration: Local Government Department: Vanrhynsdorp Divisional Council: Health Matters, 1971–1975: Stelselmatige Inspeksies uitgevoer met betrekking tot gesondheid aangeleentheede (Nie-Persoonlik) van Vanrhynsdorp munisipaliteit: Klawer: Lutzville: Nuwerus: Bitterfontein*: 12–14 Augustus 1974.

76.TBK, PAA, *Vol. F3/255, File, AA 122/101/37, Cape Provincial Administration: Local Government: Vanrhynsdorp Municipality: Water Regulations, 1938–1973. Watervoorsiening: Vanrhynsdorp poskantoor en landroskantoor, Letter from the Magistrate's Office to the Department of Public Works*, 16 February 1972.

77.Ibid., *Munisipaliteit Vanrhynsdorp. Regulasies insake watervoorsiening*, 1973; Ibid., *Letter from Town Clerk to Mr Van der Merwe*, 08 January 1973; Ibid., *Vanrhynsdorp Municipality, Additional Water Regulations*, 1973.

78.*Ibid*.

79.W. Visser, "A Perfect Storm: The Ramifications of Cape Town's Drought Crisis," *The Journal for Transdisciplinary Research in Southern* Africa 14, no. 1 (2018): 3–5; M. Mafata, *Kimberly Residents Are Fed up with Municipalities Handling of Water Crisis, Ground Up* [Newspaper Online], 15 March 2021 (available at Kimberley residents fed up with municipality's handling of water crisis | GroundUp; August, Mitchley, "Mangaung Unable to Pay Bloem Water Debt," *News 24* [Newspaper Online], 25 November 2021 (available at Mangaung unable to pay Bloem Water debt | News24.

posing a threat of increased gastrointestinal diseases. Water supply problems were also evidently worse in the location, where many low-income families of colour resided and were unable to afford private wells or boreholes, instead relying on a single municipal water source whose supply was often interrupted. The most evident improvement to these issues was brought about by the creation of the first municipal water scheme in 1972 which created a more reliable water supply to the households of the town. This study therefore illustrates the important function that a secure centralised water supply scheme provides in ensuring a more equitable distribution of water and better purification of bulk water chloritization. However, the water scheme was not an immediate solution to the town's problems and raised new issues such as high-water tariffs on low-income homeowners and the need to create a larger storage dam for the town.

The history of water supply to the towns of Beaufort West and Vanrhynsdorp might, from all appearances seem to be quite divergent. Yet, both narratives underline one salient point: the historical and present water infrastructural vulnerability of most rural towns in especially the arid parts of South Africa. Together with increased rural demographic growth, the continued neglect to augment, modernise and expand the ageing and shrinking water supplies of these towns could quite possibly bring untold social misery and disaster to their populations during future severe and prologued droughts.

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