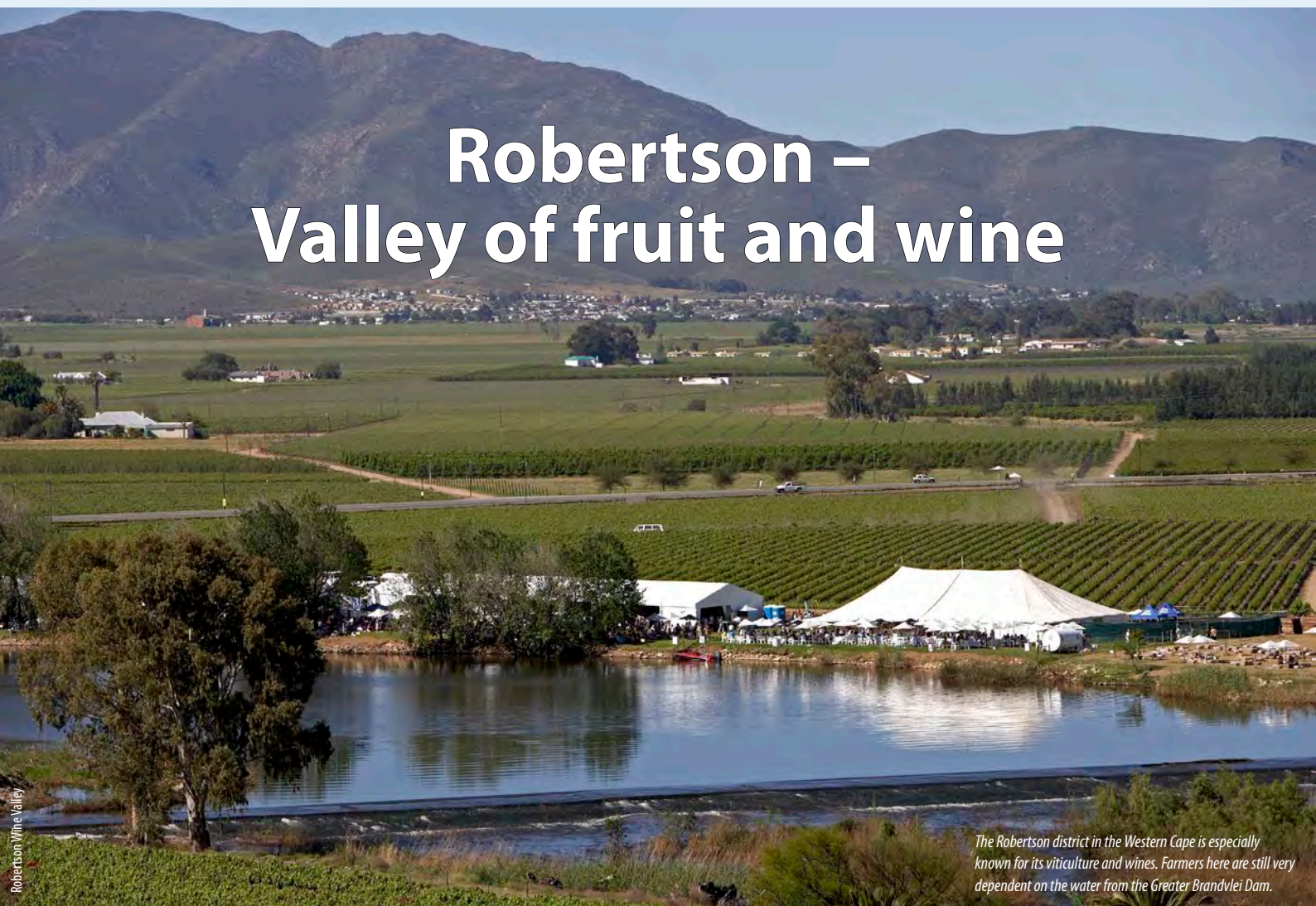


Robertson – Valley of fruit and wine



The Robertson district in the Western Cape is especially known for its viticulture and wines. Farmers here are still very dependent on the water from the Greater Brandvlei Dam.

In the area of Robertson, in the Western Cape, lies one of the oldest irrigation districts in South Africa. Article by Lani van Vuuren.

With a total catchment area of 12 600 km² the Breede River (also called Breë, meaning 'broad') is one of the largest rivers in the Western Cape. The river lies on the East Coast of the Western Cape and originates in the Ceres valley, from where it drains in a south-easterly direction, cutting through Mitchell's Pass and meeting the Indian Ocean at Witsand (Sebastian Bay). The river supports a key agriculture region, known for its wines, fruits and vegetables.

White farmers had settled most of the Breede River valley by the beginning of the 18th century, although large-scale development only took place following the cutting of passes through the mountains a century later. The valley was one of the first areas of South Africa where modern irrigation practices were applied – the earliest known irrigation works on the Breede River date back to the 1860s.

ROBERTSON IRRIGATION SCHEME

One of the oldest State-supported irrigation schemes in the country is situated at Robertson, in the Western Cape. From about

1860, the possibility of irrigating the rich soils along the north bank of the Breede River, reaching from the Vink River to the Kogmanskloof River was discussed among farmers and in Parliament. As far back as 1862, Civil Commissioner of the Robertson District, Mr Le Brun, requested State assistance to establish an irrigation scheme in this area.

Between 1865 and 1875 some minor attempts to use the river for irrigation were made with a certain degree of success. But it was not until 1896, backed by the Cape Irrigation Act, that concrete moves were made to establish irrigation in the area on a large scale. Between 1896 and 1897, at the request of the landowners, surveys were made by the Cape Public

Irrigation Board to undertake the scheme on their behalf. Parliament approved a loan of £23 500 (later increased to £33 000). The period for repayment was fixed at 40 years at an interest rate of three-and-a-half percent. Tenders were called for the work, but the Irrigation Department disapproved of all the submissions received and decided to construct the work on behalf of the Irrigation Board.

Construction of the scheme started in February 1900. Work comprised a diversion weir across the Breede River, about 8 km outside the town of Robertson. Government engineer TE Scaife was appointed Resident Engineer and work was carried out through small contracts and by day labour. The weir was described to be of 'singularly bold design', consisting as it did of a thin concrete wall some 2 m high and up to 0,9 m thick, flanked on both sides by steep slopes of loose rubble without mortar of any kind or other means of securing cohesion. In addition, the base of the wall was not founded on rock, but on gravel about 2,4 m below the riverbed. It was 366 m long.

Construction was interrupted by the South African War and further delayed by the river being in flood. The scheme was not completed until 1904. In 1902, considerable damage was caused to the unfinished weir by high floods in tributaries of the main river where they cross the line of the canal. Surprisingly, this unusual structure withstood the test of time and floods. In 1923, Cape Town Circle Engineer W Farrant notes: "A very small amount of maintenance has been necessary during the last 20 years. It is only recently that some of the loose stone on the downstream slope has been washed out. Floods have risen over 9 feet [2,7 m] in depth on the crest of the weir."

At the time the main crops produced through irrigation from the scheme were grain, lucerne, wine and fruit.

By 1918, several irrigation boards had been proclaimed in addition to

Robertson. These included Zand-drift Irrigation Board (proclaimed in 1909), Le Chasseur and Goree Irrigation Board (1910), and Angora Irrigation Board (1917). By the end of the second decade of the 1900s several small weirs and canal schemes had been constructed to abstract water from the river at various points.

Farmers frequently found themselves without adequate water supplies, especially during the dry summer months (the region being dependent on winter rainfall). As far back as 1906 proposals were put forward for the construction of a storage dam at Gerberspoort near Wolseley, together with a high-level canal known as the Ashton Scheme. The scheme appears in various reports of the Cape Irrigation

Department until 1909, after which it seems to have fallen off the radar, mainly due to the difficulty in obtaining suitable foundations for a dam.

BRANDVLEI DAM

Following the establishment of the Union Irrigation Department in 1912, the development of water storage works in the Breede River valley again came to the fore. At this time about 7 710 ha of land lie under irrigation in the valley. The department investigated several possible locations along the river and eventually settled for a site situated about 10 km from the town of Worcester.

Here the surveyors found a natural vlei (*Brandvlei*, meaning 'burning



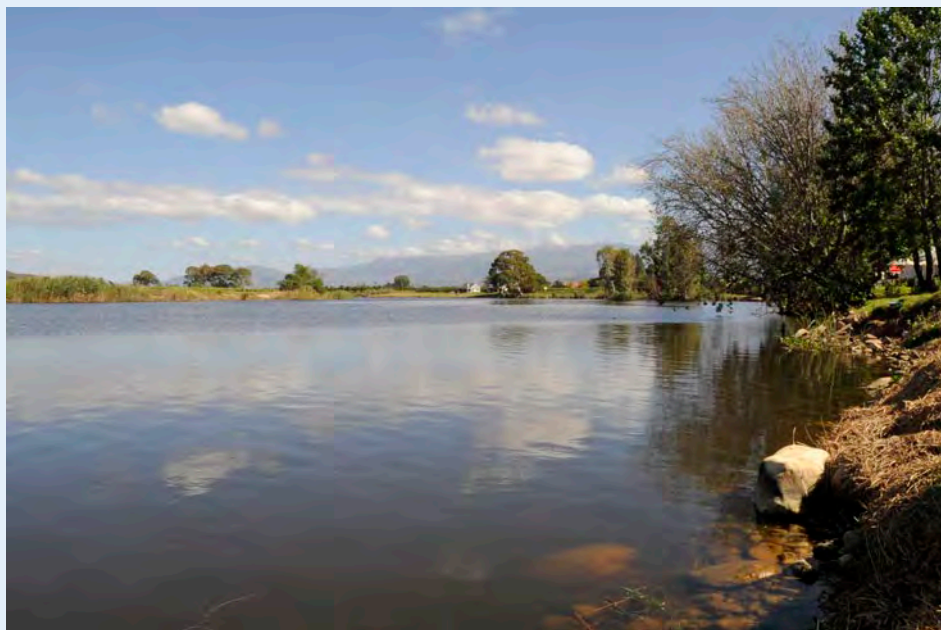
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Top left: A dry Brandvlei Dam, also known as Lake Marais, during the drought of the 1930s.

Bottom left: Brandvlei Dam in 1955, prior to its augmentation.



Above: The Breede River is one of the larger rivers in the Western Cape.

Right: Completed in 1981, Greater Brandvlei Dam is still a major water supplier to agricultural activities in the Robertson area.



DWA/eWISA

wetland') about 10 km in extent and fed by natural hot springs. The vlei was located close to the Breede River. At times of flood the Breede River backed up into Brandvlei through a gap 550 m in width between the hills flanking the river and formed a large expanse of water. As the river fell, this water receded back through the gap. The department's engineers conceived the idea whereby a dam would be placed across this gap, and filling the reservoir thus formed from the Holsloot River, a tributary of the Breede.

The original design was for a concrete dam, however, test borings revealed layers of sandy clay, sand and gravel, rock bottom being reached only at a depth of about 25 m, in the centre of the gap. Since this would make the cost of a concrete dam prohibitive, the designers instead opted for an earthen embankment without a core wall. A puddle clay apron was to be constructed on the upstream face. This apron extended to a width of 34 m opposite the highest part of the embankment, decreasing in width as

it approached the flanks. The original storage capacity of the dam was 45,8 million m³ and the area of water surface extended 15,5 km² (at full supply level).

The Breede River Conservation Board was proclaimed in 1918 to take ownership of the project, and Edmund Burrows was appointed Resident Engineer. Work started in March 1920 under contract with Messrs JW Wilson and Company from Johannesburg. The embankment was pitched on the downstream side as well as upstream to protect it from Breede River floods. In addition, five (hand-operated) regulating sluices, 1,8 m by 0,9 m, with steel gates were installed for the dual purpose of discharging the required water into the river for the numerous irrigation works downstream, and of allowing through floodwater. The total length of the dam wall was 990 m and it had a maximum height of 7 m.

Since the dam would submerge the old road from Worcester to Villiersdorp, it had to be diverted to pass along the crest of the dam, which was built wide enough to accommodate a 6 m roadway. Along the upstream edge of the crest, a metre high masonry wall was built to protect the surface of the roadway and the travelling public from the north-westerly gales which prevailed during winter months. These winds caused a great deal of inconvenience to the construction team.

Halfway through the project severe floods caused serious damage to the works, however, the work was eventually completed in 1922. The total amount of material in the structure of the dam, including apron, pitching and masonry amounted to 172 025 m³, and the total cost of the project (including roads) was £47 570.

GREATER BRANDVLEI DAM

Like many other dams in South Africa, Brandvlei Dam is

SOURCES

- Anon (1921) 'Brandvlei (Worcester) conservation dam' in *South African Irrigation Department Magazine* **1**(1), p14
- Anon (1978) 'Greater Brandvlei Dam' in *The Civil Engineer in South Africa* **20**(2), p46
- Burrows E (1923) 'Brandvlei Dam, Worcester' in *South African Irrigation Department Magazine* **2**(1), p33-34
- Department of Water Affairs (1969) *Notes on Some of the More Important Irrigation and Multi-purpose Schemes Built and/or Controlled by the Department of Water Affairs*. DWA: Pretoria
- Republic of South Africa (1972) Secretary for Water Affairs report on the proposed Greater Brandvlei Dam Government Water Scheme. Government Printer: Pretoria. Report No: WP J-'72
- Thanks to eWISA and Robertson Wine Valley for photographs

plagued by sedimentation, and in 1950 it became necessary to increase the capacity of the dam to 84 million m³. By 1972, this capacity had diminished to 76 million m³. During that time the Department of Water Affairs began investigations into suitable off-channel storage sites for a dam to control the runoff of the Breede River. At first it appeared that a dam at the northern exit of the Slanghoek Valley would be most suitable.

The department's engineers had reservations about constructing a major high dam at Brandvlei, mainly on account of the difficulties and high cost expected in the sealing of the pervious foundations at the sight. However, a technology had been developed overseas involving the excavation of a deep and narrow cut-off trench and then filling it with impervious slurry material. Engineers were confident that the method could be replicated successfully at the Brandvlei site.



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Above and left:
In the 1980s the Greater Brandvlei Dam was created by the concurrent raising of the Brandvlei and adjacent Kwaggaskloof dams.

So, instead the Brandvlei-Kwaggaskloof basin was selected as the site of the new main storage unit in place of the Slanghoek Valley. The project consisted of raising Brandvlei Dam together with the corresponding raising of the adjacent Kwaggaskloof Dam, which was under construction at the time. Several embankments were also built between some of the surrounding

hills. These two storage units then became an integrated off-channel storage unit. The original storage capacity of the combined rolled earthfill dam, completed in 1981, was 460 million m³. Today, the Greater Brandvlei Dam as it is known is still a major water supplier to agricultural activities in the area, specifically the wine farms around Robertson. □