

VAALHARTS

- A Garden in the Desert



Nearly 80 years after its construction, Vaalharts remains the largest irrigation scheme in South Africa. Lani van Vuuren explores the history of this scheme which dates back at least 130 years.

Situated at the confluence of the Harts and Vaal rivers on the border between North West and the Northern Cape, the Vaalharts irrigation scheme was first suggested by surveyor-general Francis HS Orpen. He surveyed the area, which then formed part of Griqualand-West after it was annexed by the British in 1871 for the establishment of settler farms.

Orpen found that the Vaal River bed was higher than the Harts River valley floor, making irrigation through the use of gravity-fed canals possible. In his report dated 22 December 1875 he wrote: "It is possible, by taking out the water of the Vaal River near Fourteen Streams, to irrigate about half a million of acres in the Harts River Valley."

The Griqualand-West war broke out before Orpen's idea could be investigated further. In 1882, statesman John X Merriman proposed in parliament that a committee should be appointed to deal with irrigation matters, among others the proposed irrigation works at the Vaal and Harts rivers. The proposal was based on a report by Cape hydraulic engineer John Gamble. Merriman argued that the Vaalharts irrigation works would turn the 'desert into a garden.' Unfortunately the lack of funds prevented anything further to be done on the scheme.

RHODES PUSHES THE VAALHARTS SCHEME

Cecil John Rhodes advocated strongly for the proposed Vaalharts scheme (then known as the Harts River Valley Irrigation Scheme), possibly because of its proximity to the rich Kimberley diamond mines. In 1886, he had already carried a motion to get some land between the Harts and Vaal rivers for the purposes of irrigation. Government granted him the land, however, he was unable to raise the money to implement the irrigation works.

Interestingly, it was Rhodes who first suggested that the land be made available to poor white farmers who had lost everything due to an outbreak of Rinderpest. He argued that the poor whites refused to work in the mines and would rather farm.

At that time the State was not prepared to pay for an irrigation scheme of that magnitude, however, it was decided that Crown Lands between the Harts and Vaal rivers would be granted to any company or individual prepared to implement such an irrigation scheme (at a cost not exceeding £130 000).

Unfortunately, no-one took up this offer. This, despite the fact that some Tswana-speaking and Korana communities had already been displaced in the locality of the proposed irrigation scheme to make room for white settlers. Rhodes even persuaded the government to carry out the works when he was Prime Minister, to no avail. The government's argument was that other parts of the country also needed irrigation works.

In 1898, further efforts were launched to get the Vaalharts scheme off the ground when engineer HC Litchfield was appointed to investigate the possibility of an irrigation scheme in the Harts River valley. The Anglo-Boer War put a stop to investigations a year later.

After the war, the Directors of Irrigation of the Cape and Transvaal (J Gordon and W Hurley) attempted to revive the Litchfield report. Each of them wrote a report recommending the construction of a dam in the Vaal River. Again, there were no funds available.

The Vaalharts scheme was further put on the backburner by J Kanthack, the first Director of the Irrigation Department established after the Union of South Africa in 1910. His argument was that the area in the Harts River valley to be irrigated was too widespread. He thought that the limited resources of the government should rather be devoted to the encouragement of a large number of smaller schemes throughout the country.

THE PLAN IS REVIVED

The Vaalharts irrigation scheme gained new impetus following the first World War as it became government policy to grant land to soldiers returning from the

war. The proposed scheme was studied intensively by the Irrigation Department for the first time in 1925. A large number of holes were drilled to test the depth of the soil. During 1926/7 planning of the project started and further precise measurements were made from Border station to Taung. Aerial surveys were also undertaken by the South African Air Force.



DWA

Gangs of ten to twenty men worked mostly with pick and shovel to construct the infrastructure for Vaalharts.



DWA/eWISA

The Vaalharts weir and main canal in 1946. Three hand-operated radial sluice gates of 3 m by 2,7 m make up the inlet sluices. These flow into a three-barrelled aqueduct, which controls the water flowing into the canal.



Vaalharts Water

The Vaalharts weir during construction.

In 1933, a decision was made to go ahead with the Vaalharts irrigation scheme (along with other large-scale public works) to relieve poverty among the white population, which had reached critical levels due to drought and the economic effects of the Great Depression. Originally, the plan was to construct a dam on the Vaal River at Christiana to provide water for the scheme. However, following negotiations with the Rand Water Board (who desperately needed to augment its water resources for a growing Johannesburg) the decision was made to construct the Vaal Dam at the confluence of the Wilge and Vaal rivers near Vereeniging. The Rand Water Board agreed to pay a portion of the cost to construct the dam. Water would flow from the Vaal Dam to a diversion weir 57 km downstream and then through the main canals to the scheme.

CONSTRUCTION OF THE SCHEME

In December 1933, construction teams started clearing land on the farm Andalusia, near Border Station, to make way for offices, accommodation and storage facilities. It was first thought that Warrenton would serve as the headquarters of the scheme, but when the town council refused, the project team had to find an alternative venue.

In 1934, work started concurrently on the Vaal Dam, the Vaalharts weir (then



Dana Grobler

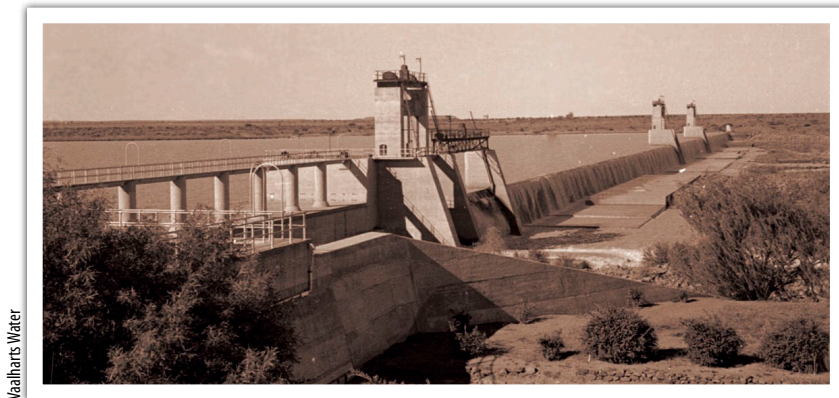
A concrete barrage-type structure, the Vaalharts weir has a height of 11 m and is 750 m long.

known as Knoppiesfontein Dam) and the main canal. It was government policy to only employ white labour. Labourers had to be unmarried (although married men were later also employed), between the ages of 18 and 45 and medically fit. Recruitment was done by

the Department of Labour. Due to the 'lack of white labour' experienced later on in the project, coloured and black workers were also employed on sections requiring only 'unskilled' labour.

The pay for white labourers was two shillings per day, with a bonus of one shilling 6d per day worked. These bonuses were paid into a Post Office Savings Bank and workers were only allowed to draw the money once they had completed their work. Money could be paid to dependents via a stop order. In the case of coloured labourers the greater of a man's wages was sent by cheque to his dependents and only a small part was paid out to the man himself for pocket money.

For all jobs of a routine nature where the output could be accurately measured, payment was made on a piece-work basis. A gang of 10 to 20 men worked as a unit and at the end of the month their output was measured up and its value worked out. The total value of the



Vaalharts Water

In 1967, the Vaalharts weir was raised by 1,2 m to increase its capacity to 48,7 million m³.



the power station closed down at 10 pm except when there was a special function on. Later, power was available throughout the night.

As the works were spread out over a linear distance of 80 km the job was divided into sections, each in charge of a section engineer, and all under the control of the resident engineer at the headquarters of the scheme. Each section had its own camp, number one being at the weir, near Fourteen Streams Station, section two being near Warrenton and section three next to the Headquarters Office near Border Station (this was later moved about a kilometre up the line and renamed Jan Kempdorp Station). Section four was started later near Pokwani – this job included the construction of two tunnels.

All meals were free, and large mess halls and kitchens were built and staffed. Contracts were given out for the supply of meat, vegetables and milk daily in

large quantities. A dry-goods canteen was also supplied at each camp. Goods here were not sold for cash, but rather coupons and were generally cheaper than in town.

Recreation facilities were also provided, among others a large recreation hall which could house 600 people. This had a stage and two small dressing rooms for staging concerts and plays. The hall was also provided with a 35-mm cinematograph projector and films were shown twice a week. Rugby fields, tennis courts, a golf course and swimming pool were also provided.

The works also had a small church, a school and a number of field hospitals. The latter could handle the ordinary run of medicines and provide first aid treatment, however, serious cases had to be sent to Kimberley. When there was an outbreak of epidemics (such as diphtheria or typhoid) mass immunisation was undertaken.

job was then divided up among the members of the gang in proportion to the number of Mondays each one had worked during the month. If the members of a gang found that any particular member was not pulling his weight, they could throw him out and invite someone else to join their gang.

LIFE ON THE SCHEME

Labourers were not entitled to have their families with them on the works, but were accommodated in camps composed of a large number of wood and iron bunkhouses, each containing four double-deck bunks (dubbed 'hoenderstellasies' or 'chicken coops'). The more skilled workers and office staff were allowed to have their wives and families with them on the works and were provided with houses at a reasonable rental.

Interestingly, Vaalharts was one of the first schemes on which electric light was provided for the staff. In the early stages

Top right: The post office and staff houses at Andalusia. The headquarters of the Vaalharts irrigation scheme later became a town on its own and in 1953 it was renamed Jan Kempdorp, after Genl Jan Kemp, Minister of Agriculture.

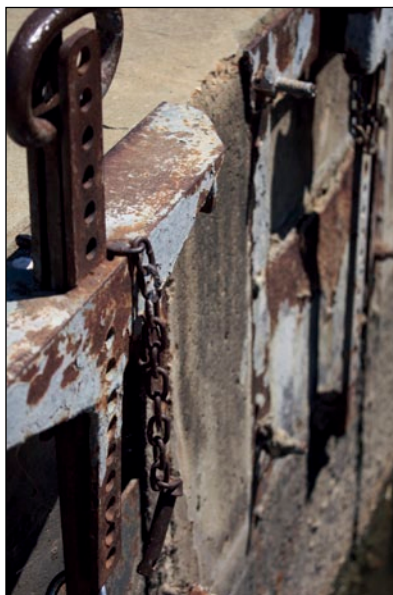
Bottom right: Mechanical and manual labour were employed at Vaalharts.



DWA



DWA



Almost all sluice gates at Vaalharts are still manually operated.

MAN AND MACHINE

At Vaalharts both mechanical and manual labour were used. Workers were transported to site by truck where each one got an area of 3 m by 3 m to dig out. Digging was done mainly by pick and shovel. Workers used 6 kg hammers used to break the rock, which was then placed in bags and hauled out of the steep sidewalls.

In really rocky areas it could take months to reach canal depth. The area known as the 'blue canal' was notoriously difficult to penetrate. Once one team had completed the digging another took over to cast the concrete lining.

The weir, a concrete barrage-type structure, has a height of 11 m and is 750 m long. It was designed to accommodate a flow of 10 000 cusecs (283,2 m³/s), with water 4 m deep flowing over the crest. Three sluice gates of 8 m by 6 m were built into the weir. In 1967, the weir was raised by 1,2 m to increase the storage capacity to 48,7 million m³.

Three hand-operated radial sluice gates of 3 m by 2,7 m make up the inlet

sluices. These flow into a three-barrelled aqueduct, which controls the water flowing into the canal. Vaalharts comprises two main canals – A North Canal and a West Canal. By 1936 the first 40 km of the canals were completed and water first flowed into the canals on 15 December.

Work on the feeder and distribution canals started in 1937. However, due to the outbreak of the Second World War these were only completed by 1946. The main canal, feeder and distribution canals total more than 800 km. Later 300 km of drainage canals were also constructed. All the canals are lined with concrete. To reduce pressure on the Vaal Dam, the Bloemhof Dam was constructed in the 1970s to feed the Vaalharts weir.

THE FIRST FARMERS

By 1938, the first 80 lots were ready for occupation. Applicants were selected by a special committee. Healthy persons under the age of 50 with dependent children were selected above unmarried applicants. *Bona fide* farmers, who lost farms due to circumstances 'beyond their control' were also preferred. Joblessness did not disadvantage applicants but could not be provided as the only reason why they should be allotted a piece of ground.

Once an applicant had been selected he had to go to the offices of the Department of Lands at Andalusia where he randomly chose a plot by picking a piece of paper out of a box containing the numbers of all the available plots. By 1940 there were 304 settlers on the scheme.


Basic housing was provided. Probationary lessees received livestock and production materials, for example a team of mules, dairy cows, a wagon, harnesses, a plough, harrow, small tools, seed and fertiliser. In exchange the lessee had to give the state a percentage of his harvest for the first four years. After four years the lessee's probation

was over and he had the choice to purchase his lot.

Lessees did not pay for their water quota and were provided with a social grant for the first 18 months, the amount depending on their marriage status and number of children. Initially, they were not allowed to hire labour and everyone had to pitch in, even the children.

Due to the nature of the soil, a decision was made to establish an agricultural research station at Vaalharts in 1935. These early researchers knew just as little about which crops would be most suitable as the new farmers and farming really was by trial and error. In the early years, farmers mostly grew lucerne, ground nuts, potatoes, grains and vegetables. Today, farmers also grow pecan nuts, cotton, olives, citrus, apricots, grapes, watermelon and peaches.

Wind was a considerable challenge and an early solution was to plant long rows of poplar trees along the hedges of fields. At one stage, Vaalharts had one of the longest hedgerows of poplars in the world. Today, few of these original poplar hedges remain.

The Vaalharts Water User Association took over the government scheme in 2003. It remains the largest irrigation scheme in the country, with a scheduled area of 29 181 ha. 

SOURCES

Hydropolitical History of South Africa's International River Basins (**WRC Report No: 1220/1/04**)

Living and working at Vaal Hartz, article in *Water*, House Journal of the Department of Water Affairs, August 1986
Vaalharts by Hans Bornman
Thanks to DWA, Vaalharts Water and eWISA for photographs