

WATER USE EFFICIENCY – Irrigators take the lead in Lower Olifants



The canal at Ebenhaeser settlement at the lower end of the Lower Olifants River scheme.

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Despite the challenges associated with operating an 80-year-old irrigation scheme, the Lower Olifants River Water User Association (LORWUA) is successfully supporting one of the most important agricultural areas in the country while continuously striving for water use efficiency. Lani van Vuuren reports.

Modernisation of farming has taken place in the Olifants River Catchment, in the Western Cape, since the arrival of Dutch settlers in the 1600s. Farmers initially planted crops in the fine alluvial deposits on the banks of the river. The first dam (Bulshoek) and associated canals were constructed just after the First World War. This was followed by the construction, through labour-intensive methods, of the Clanwilliam

Dam and additional open canals in the 1930s (for more information on the history of the scheme, see *Water Wheel*, September/October, 2010).

Today, the scheme comprises the Bulshoek and Clanwilliam dams, as well as a main canal split into a left bank canal of 136 km and a right bank canal of 123 km. A total of 1 052 sluices are used to draw off water for a scheduled area of 9 510 ha.

Apart from a betterment scheme in the 1960s which saw the canals

being lined with concrete, the canal system has had no major refurbishment. Yet this antiquated system is hardly obsolete. The semi-arid region receives only about 152 mm of rain per year, and without the system irrigated agriculture would be impossible. Irrigated agriculture is by far the largest employer here, and the Lower Olifants scheme supports a burgeoning wine and table grape sector, supplemented by other produce such as tomatoes, vegetables, deciduous fruits and citrus. Apart from commercial farmers, the canal system also feeds an emerging farming community at Ebenhaeser, agriculture-related industry as well as seven small towns dotted along the West Coast.

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“The region is about 90% dependent on agriculture and its associated industries,” reports LORWUA CEO Johan Matthee. “If irrigators are having a tough time and their buying power recedes, the effect can be felt by town businesses almost immediately. The sector also generates a considerable income for the State. Excise duties from the Lower Olifants Valley alone totals around R480-million a year.”

MANAGING WATER DEMAND

LORWUA was the first water user association to become operative in South Africa following the promulgation of the National Water Act in 1998, and has been operational since 2001. The scheme is subdivided into eight sub-districts or wards managed by seven water control officers. Each water control officer serves around 150 clients.

The Lower Olifants River scheme is among a growing number of schemes benefiting from the

international award-winning Water Administration System (WAS). The system, developed by Dr Nico Benadé with funding from the Water Research Commission (WRC) enables accurate and real-time collection of data regarding water levels, volumes and abstractions, and overall, has assisted irrigation schemes to realise huge improvements in water losses. Nationally, the system saves irrigation schemes more than 85 million m³ (21%) of water.

At LORWUA, irrigators request their water through strategically placed post boxes dotted across the scheme. Water allocation periods run from Mondays 06:00 to 06:00 the following Monday. The Lower

they use have been adapted for this purpose. The schemes also operates on a ‘rolbeurt’ (revolving chance) system, which means that farmers are not allowed to order water with the same starting day every week. This is done to ensure the maximum volume of water is placed in the canal without exceeding the maximum abstraction right.

LORWUA has a number of computers linked to a network, which means that the water orders can be captured on WAS simultaneously and in a short time period. Matthee reports that the WAS plays an enormously important role at the scheme. “WAS provides improved control of water orders (both current and historic), while the record of monthly accounts and reports that can be generated using the system are irreplaceable.”

Cancellations and additional water requests need to be done 72 hours in advance. The scheme has 30 water control aids who patrol the scheme (each one being responsible for a 6-10 km section) on bicycle and open and close sluices three times a day. Strict rules apply to water users on the scheme. No interference with sluices or the system is allowed.

The 127-million m³ Clanwilliam Dam is the main supplier of water to the Lower Olifants River scheme.



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Above: Most water losses are occurring as a result of the bad state of the concrete in the canal.

Below: Strandfontein is one of six little towns dependent on water from the Lower Olifants River scheme.

Those found taking more than their share can have their sluices painted red for all to see (name and shame).

Measuring the water that goes into the system is an extremely important part of the management of such an irrigation scheme. LORWUA has placed additional measuring stations at the start and end of each sub-district with the associated telemetry. V-notches have been installed, and more improvements are planned for the future.

According to Matthee, the greatest challenge on the scheme is ensuring that each irrigator or water user receives fair share of water on time. “The scheme is over-scheduled and the canal is physically too small to transport all the water required. In addition, the capacity of the Clanwilliam Dam is inefficient to meet the water requirements of the scheduled area.” While the yearly quota is 12 200 m³/ha, the limited capacity of the canal allows for a maximum extraction rate of 325 m³/ha each

week. Between October and middle-May (the water year) the scheme is only able to supply 8 200 m³/ha.

Raising of the Clanwilliam Dam by 13 m is on the cards. This will increase the water supplied from the dam by 70 million m³/year. However, this will require raising and strengthening the canal system. “Practically, it will be a real challenge supplying water and undertaking canal improvements at the same time,” says Matthee. The feasibility of this R1,8-billion project, which will have to be undertaken simultaneously with the raising of the dam, is currently being investigated by the departments of agriculture and water affairs.

“If irrigators are having a tough time and their buying power recedes, the effect can be felt by town businesses almost immediately.”

Meanwhile the current limitations of the scheme have caused irrigators themselves to become more water efficient. Flood irrigation has largely been replaced by drip irrigation, especially since the drought year experienced in 2003/04. This has resulted in substantial water savings per hectare.

CHALLENGES TO THE OPERATION

Despite these challenges the water user association has managed to reduce water losses from 48% (in 2002) to 24%. When one considers that the average losses on open canal systems are between 40% and 50%, this is an extremely good number. Water is now mainly lost to breakages and leaks in the system. Evaporation out of the canals caused by hot temperatures and winds also contributes to water losses.

LORWUA has gone out of its way to ensure that not a drop of water on the scheme is wasted unnecessarily. An evaluation of the state of



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infrastructure in 2003 highlighted areas in need of most urgent attention. Since 2002 the water user association has spent around R3,5-million each year to improve the state of concrete canals. This work is considerable when one realises that only 11 weeks of the year can be set aside for maintenance.

Last year the water user association did major repair work to the concrete in two high-risk sections of the canal (13 km in total) at a total cost of R11-million. "This summer we are reaping the benefits of this improvement, however, no water user association can afford to finance these kinds of repairs on a regular basis themselves," notes Matthee.

The scheme's siphons are also receiving attention. In 2009, LORWUA, with financial assistance from the Department of Water Affairs, replaced the largest siphon on the scheme (2,1 m diameter) at a cost of R24-million. A further five siphons need to be replaced and funding is being sought in this regard.

Unfortunately the Lower Olifants River scheme suffered a major setback in December. On 15 December 170 mm of rain fell within 24 hours between Lutzville and Koekenaap (The rest of the scheme received about 70 mm of rain). Despite LORWUA's efforts the resultant floods caused great damage to the canal infrastructure amounting to R2,5-million. Stormwater and sediment resulted in canal breakages at five sites, while large parts of the canal became blocked due to sediment and debris. Heavy machinery, including diggers, loaders and dump trucks, along with 80 workers, cleared the canals, and pumps were used to supply water to users at the lower end of the scheme. The mopping up exercise lasted until 31 December.

Despite these setbacks the Lower Olifants River scheme remains an important example of effective water management to achieve water savings in the irrigation sector. □



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Many farmers make use of balancing dams (so-called 'oornag damme') to tie them over between water orders.



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Today, the Lower Olifants River is known for its vineyards. Most farmers have replaced flood irrigation with drip irrigation techniques to save water.