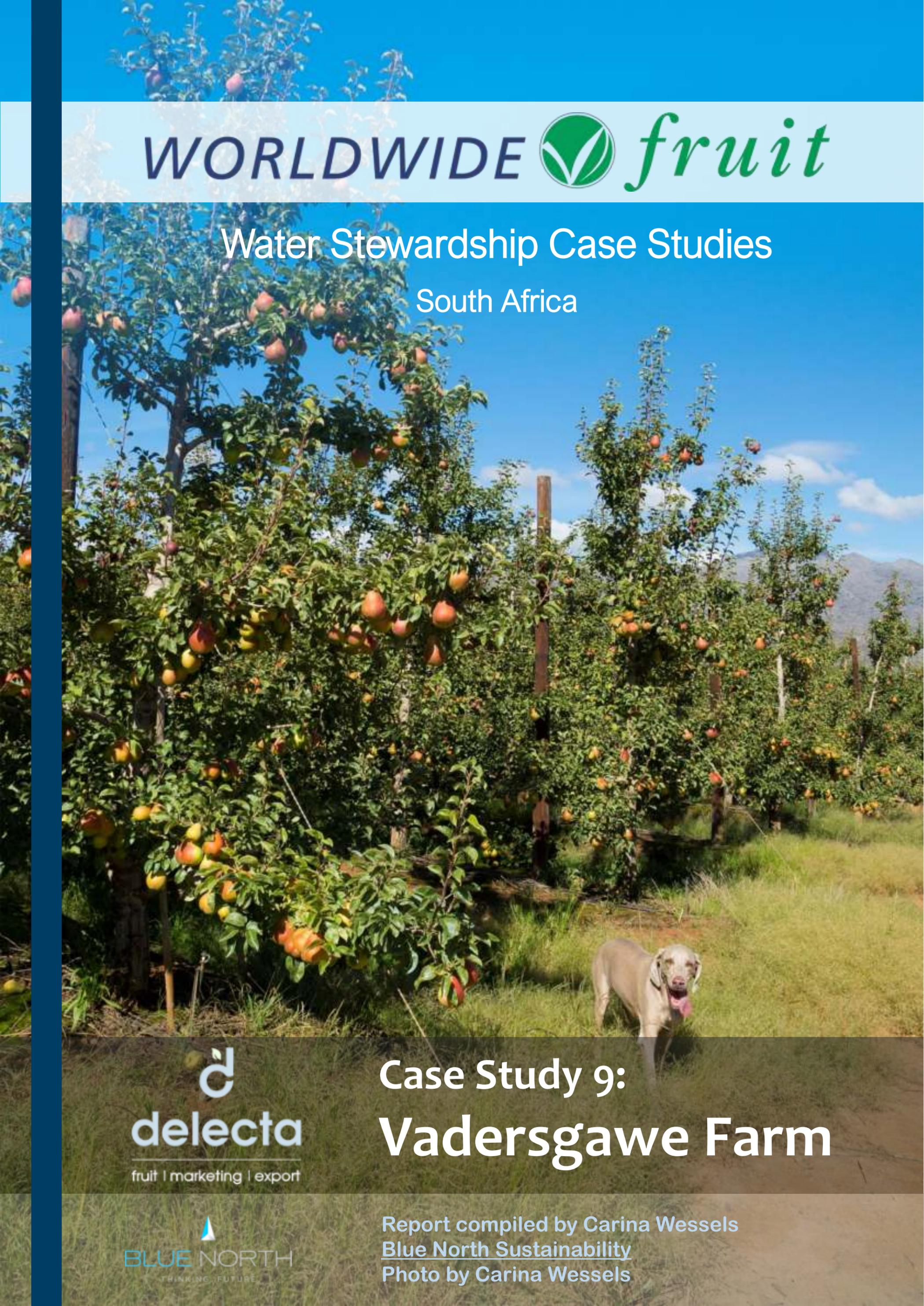


Water Stewardship Case Studies

South Africa



Worldwide Fruit Limited are investing in Water Stewardship across their supply-base and will be presenting Water Stewardship case studies from supplying farms over the next 12 months. Their aim is to raise awareness of the challenges that South African growers deal with on a daily basis. Water management challenges and the solutions implemented to overcome them will be explored, but we will also see how growers are driving ongoing good management of water resources. Apart from water, case studies will also look at current sustainability strategies implemented and plans for improving sustainability into the future.



Case study 9: Vadersgawe Farm (Delecta)

- Case study 8: Boplaas 1743 Landgoed (Core fruit)
- Case study 7: Waterford Farm (TFFG)
- Case study 6: Morgenzon Farm (Rubisco)
- Case study 5: Cerasus Farming (Stems)
- Case study 4: Dreem Fruit (Delecta)
- Case study 3: De Keur
- Case study 2: Dennegeur Farms
- Case study 1: Boomerang Fruits

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Summary

Vadersgawe Farm is situated in the Warm Bokkeveld region, in the picturesque Ceres Valley, and are renowned for their apples, pears and nectarines. The farm was converted from a 180 hectare wheat only farm to a 60 hectare fruit farming unit. In order to expand their orchards, a large dam was constructed. Vadersgawe also built a big pumphouse on the Titus River to move a lot of water very quickly. This pumping system gave them an advantage during the 2015-2018 drought, as some of their neighbours struggled to pump enough water when it did rain. Ian Versfeld, Managing Director of Vadersgawe Farm, is vice chairman of the Titus River Irrigation Board (IB). Other farmers in the region rely a lot on groundwater for their irrigation needs, so the Titus River IB, in collaboration with WWF, did a hydrocensus and review of the geohydrological conditions in the region. Now, a long-term groundwater monitoring and management initiative have been put in place in the Ceres valley, under leadership of the Titus River IB. When it comes to water saving techniques, the biggest positive change for Vadersgawe Farm was switching from drip irrigation to short range micro sprayers. It doubled their production in the first two years. Another initiative that made a difference for Vadersgawe Farm is when they installed a solar power system that could provide much more power than what they would require for the farm alone. With the cooperation of the local Witzenberg Municipality, the excess electricity is fed back into the grid for use where needed. Vadersgawe's solar project has increased the available electricity in the area so the whole community now has more electricity available to them.



Ian Versfeld, Managing Director of Vadersgawe Farm, and his dog named Eddie, who followed us everywhere. Photo: Carina Wessels

About

Vadersgawe (translates from Afrikaans to “gift from our Father”), or El Cuesta Farming as it is also known as, is situated in the Warm Bokkeveld region, in the picturesque Ceres Valley. We had the privilege of meeting with Ian Versfeld, Managing Director of Vadersgawe Farm. Ian and his brother bought the farm as a family business in 1998. It used to be a wheat farm, with three small irrigation dams, but with substantial water rights from the river. The two brothers started to develop the farm in 2003, however they decided to split their business in 2010. Ian now produces almost 60 hectares (ha) of apples, pears, and nectarines on Vadersgawe Farm. He has about 180 ha of land available, however factoring in water and other limitations, Ian feels that 80 ha of fruit orchards will be a good benchmark to aim for, keeping in mind that with a changing climate the target could move.



Harvest time at Vadersgawe Farm. Photos: Carina Wessels

Water Management

Vadersgawe Farm has water rights from the Titus River. The river does not flow over the farm, but they have a big pumphouse on the river, which is located about 1 km away from their own water storage dam. Vadersgawe's dam has quite a large surface area, about 23 ha when full. The dam has a capacity of 750 000 m³ of water, of which they get 690 000 m³ from the Titus River, and the rest comes from a canal system that runs from the top of the mountains. They also get some runoff from the mountains in winter, and they have two small boreholes mostly for domestic use.



Vadersgawe Farm's large water storage dam. Photo: Carina Wessels

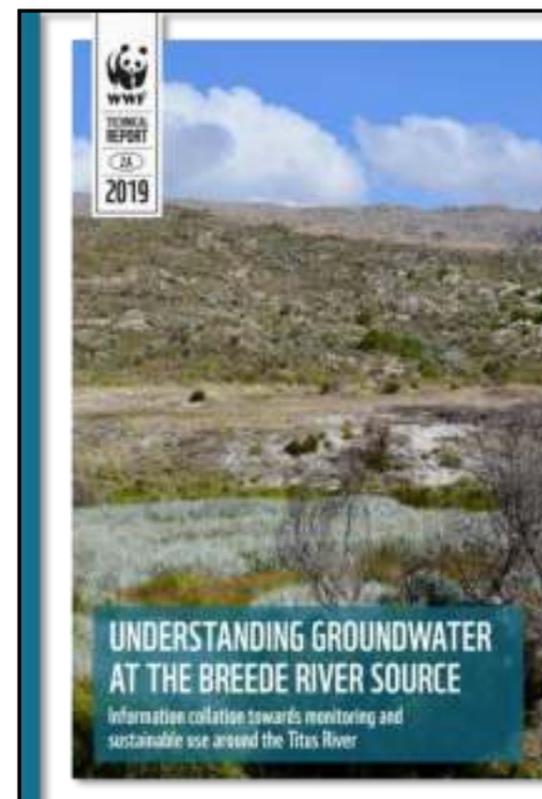
The Titus River is an upstream arm of the vital Breede River. The Upper Breede catchment forms part of the Boland Water Source Area which supplies water to most of the Western Cape. There's no dam in the Breede River. If the farmers upstream of the Breede River can have more water storing capacity, they can use less groundwater, however, going through the process to get water storage licenses for dams is a problem. It took Vadersgawe Farm six years to get a permit to build the large dam on the farm. For this reason, a high proportion of farms in the region extract groundwater for their irrigation needs, and groundwater needs to be replenished, which takes time.

The Titus River Irrigation Board (IB) is one of very few IBs that monitor groundwater use. Ian Versfeld is vice chairman of the Titus River IB, while his cousin, Steven Versfeld, is the chairman.

In 2018 WWF and the Titus River IB did a review of the geohydrological conditions in the region, paired with a hydrocensus. Along the Titus River in the Ceres valley, there are 30 farms that grow apples, pears, peaches, plums, and nectarines. Of the 30 Titus River farms, covering about 4 100 ha, 24 farms participated in the 2018 groundwater study.

The hydrocensus was used to ground-truth existing information and to gather information on number of boreholes and groundwater uses. In 2019, WWF produced a technical report which includes the baseline data on the geohydrology of the area, groundwater recharge and use, as well as groundwater levels and quality. This study formed the foundation for a long-term groundwater monitoring and management initiative in the Ceres valley, under the leadership of the Titus River IB.

In 2019 WWF produced a technical report on understanding groundwater at the Breede River source. Click on the image on the right for the full report.



Water Saving Techniques

“I would say the biggest positive change for us was switching from drip irrigation to short range micro sprayers. It changed everything for me. Our production doubled in the first two years.” – Ian Versfeld

Vadersgawe Farm experimented with drip irrigation on about 16 ha of orchards, but soon realised that drip irrigation does not work well in the region. Ian says that in the Warm Bokkeveld it is just too hot. They found that having cover crops in the rows in between the trees can help accommodate for those really hot days, but the cover crops need to be irrigated as well. They switched to short range micro irrigation, which has a range of 80 cm. All of Vadersgawe Farm’s orchards are also planted on ridges, and they make sure to irrigate the root system concentrated on these ridges. Vadersgawe Farm uses probes to monitor soil moisture, and a computerised irrigation scheduling system is also utilised. They irrigate according to the needs of the tree, and mulch is applied under the trees to reduce evaporation.



Left: Short range micro sprayer. Right: Mulch that will soon be applied under trees.
Photos: Carina Wessels

“The newer technology has helped us a lot, especially with measuring, so we know how much water we use and where it is going” – Ian Versfeld.

Something Ian has really found to work on Vadersgawe Farm is to alternate between two day irrigations and one night irrigation. You get better penetration into your root profile with night irrigation, however only irrigating at night has its challenges, as the micro sprayers have to be checked regularly. Therefore, Vadersgawe tries to irrigate in the early mornings, as this allows for a good water absorption rate. Ian found that blocks that are always irrigated in the mornings have better growth than those irrigated in the afternoon.

Drape nets is used over some of Vadersgawe’s orchards. Drape nets are not permanent structures, it covers the trees from December until after harvest, then it gets taken off again. Ian says that they have saved 33% of water on orchards covered with drape nets, and reduced sunburn to about 5% (compared to 15-20% sunburn without nets). The benefit of drape nets is that it is affordable and relatively easy to put on and take off. Unfortunately, life expectancy of drape nets is limited. If you are lucky you can get about seven years out of it, compared to around 15 years for permanent structures.



Drape nets covering orchard. Photo: Carina Wessels

Water Challenges

With completion of the Vadersgawe Dam Phase I, a leak in the wall stopped the filling process and had to be repaired. This resulted in delays, and Vadersgawe lost the water storage opportunity for the upcoming summer. Phase II of the dam was completed in 2018 and since then the dam is the most valuable lifeline for Vadersgawe's farming activities. "We have noticed that the flow of the Titus River is very unpredictable in the last number of seasons. At times we can constantly pump for weeks, and other seasons the level needs to be very well monitored," says Ian. In accordance with their abstraction permit, a flow monitoring system needed to be installed on the river to allow enough flow to pass downstream to other river users. This, a V-Plate, is monitored daily by Ian himself, and an analog water meter and camera was installed at the river pumphouse to ensure downstream flow. The flowrate can be adjusted via Variable Speed Drive installed on the motor which drives the pump, and this ensures that volumes of water is moved as efficiently as possible.



Ian Versfeld inside the pumphouse containing Vadersgawe Farm's water pump. Photo: Carina Wessels

The pipeline and riverpump was designed in such a way that 320m³ of water can be moved per hour when flow allows. With the challenges of the 2015 – 2018 drought, when rainfall was erratic and unpredictable, Vadersgawe could move enough water in a small timespan to see them through the following summers. For Ian the large capital investment of the oversize pumphouse and pipeline, which solely feeds the Vadersgawe dam, ensured they could still produce high quality produce and prevent tree stress in late season. The full winter water allocation of the farm can be pumped in 85 days during winter months and the summer allocation is then further used in early spring to keep the dam full, either for as long as the river has ample flow, or the allocation is fully utilised. As the farm prefers to have water reserves after each season, not just for biodiversity, but also water security, Ian tries to utilise as much of the excess winter rainwater as possible. Factoring in water security, evaporation, and good arable land for fruit production, Ian feels that 80 ha of fruit orchards will be a good benchmark to aim for, still keeping in mind that with a changing climate, the target could move.

Vadersgawe has challenges with too much grass in their dam, so they have introduced sterilised grass carp into the dam. Grass carp is an herbivore which effectively controls water grass and other aquatic weeds. As aquatic weeds spread throughout a dam, loss of water is increased by evapotranspiration of the plants in the dam (evapotranspiration is the combined loss of water through evaporation and plant transpiration). Aquatic weeds also clog up irrigation systems and disrupt the ecology of dams. Grass carp is therefore a valuable management tool in biological control of aquatic weeds and preserving water resources.

Managing Biodiversity

Not all areas of Vadersgawe Farm are economically viable for orchards. Some areas have previously been used to grow wheat and they have now started to restore those areas to its natural state. There is a smaller dam on the farm where promoting biodiversity and building a healthy ecosystem takes priority. They do irrigate out of the smaller dam, but always make sure there is enough water to sustain a healthy ecosystem. At this smaller dam there are ample bird life, some natural fish species, and many frog species. In the natural area surrounding the dam small antelope and porcupine are also often seen.



Vadersgawe Farm also has a smaller dam where they are promoting a healthy ecosystem for the local biodiversity. Photo: Carina Wessels

Vadersgawe Farm's Solar Story

Ian Versfeld noticed that with the sunny climate and open spaces on his farm solar power was an obvious solution. He realised that he could generate much more electricity than what was needed for his own farming activities and in the process he could help his community become independent from Eskom grid electricity. After Ian calculated the amount of power Vadersgawe Farm will need, he installed a system that would provide much more than the required amount of power. With the cooperation of the local Witzenberg Municipality, the excess electricity is fed back into the grid for use where needed.

Eskom is South Africa's 100% state-owned electricity utility. Eskom relies on coal fired power stations to produce approximately 90% of its electricity. Eskom uses over 90 million tons of coal per annum (www.eskom.co.za) and emits more than 40% of South Africa's total greenhouse gas emissions.

The solar project was completed in May 2020. The system includes 630 (360W each) solar panels, producing up to 226,8 kW power, and up to 376 882 kWh per year. The ground mounted system was built to take up minimal space on underutilised space not suitable for orchard development. According to Ian, the solar power system ensures a much more stable internal network. They are making use of Solar Edge technology, which makes monitoring and fault finding very easy. Ian is considering installing even more solar panels in an open field on the farm.

The solar project has increased the available electricity in the area so the whole community now has more electricity available to them. This also makes the community less vulnerable to electricity load-shedding. An added bonus for the staff working on the farm is also that they are now provided with free electricity.



Vadersgawe's solar project. Photo: Carina Wessels