

Canola on dryland with wheat under irrigation in the background. Canola presents many benefits when cultivated under irrigation together with wheat.

Canola performs well under irrigation

By Hugo Lochner

In the Southern Cape area canola under irrigation has traditionally not been able to compete with wheat in respect of yield and profitability. Yet canola has other benefits making it an excellent rotation crop in the region.

Canola can be profitably cultivated under irrigation in the Southern Cape. When managed correctly, canola has the potential to deliver a yield of three to four tons per hectare.

According to Francois Badenhorst of the farm Jubileeskraal near Swellendam, canola is not as profitable under irrigation as wheat, but it does create an opportunity for controlling grasses and relieving weed pressure throughout the year.

"In my farming operation I rotate wheat and maize under irrigation, with canola breaks that serve to lower the pressure of root disease. These diseases can become a major problem where wheat and maize are cultivated in short sequence."

Badenhorst started farming on Jubileeskraal together with his father in 2004 and took over in 2007. During 2007 he effected some major changes by moving away from conventional cultivation to a no-till system. He has been applying no-till for ten years now.

Two years ago he made another major change when he switched to a track management system, got rid of his livestock (now farming grains only) and diversified by cultivating crops under irrigation (centre pivots).

He realised that he had to dispose of this livestock component if he wanted to fully refine his track management and no-till, and to specialise in grain cultivation.

"Livestock remove too much crop residues from the soil, which I cannot afford. The soil needs as much cover as possible to protect it against erosion, conserve moisture and improve soil life."

The benefits of rotation

For example, when it rains in summer, maximum ground cover is needed to conserve soil, and weeds have to be controlled chemically in order to prevent moisture loss.

A good rotation system is important, as Badenhorst farms only with grains (continuous cropping). He plants wheat, canola and barley on dryland, with canola being planted every third year. Canola is also planted under irrigation every third year during winter, following two years of wheat. In summer he uses rotation to cultivate maize and soya beans under irrigation.

According to Badenhorst canola is an important link in his farm's rotation system on both dryland and under irrigation. The fact that it is a broadleaf crop allows him to apply good grass control on dryland every third year, especially where grasses develop resistance against certain herbicides.

The same applies to canola under irrigation, but with the added benefit that it serves to form a break against root diseases. These diseases increase where maize and wheat are cultivated shortly after one another. By planting canola every third year in winter, this cycle is broken and disease pressure is lowered.

Maize is rotated with soya beans every third year. The benefit of this crop is that it binds the nitrogen in the soil and does not transfer root diseases to maize. However, due to the fact that the heat units in the area are quite high and the water not suitable for soya beans, the yield does not compare as favourably with that of inland

production. Hence soya beans are used exclusively to create breaks on his land.

Badenhorst is considering replacing soya beans with a grazing mixture sold as silage to his neighbours, and which is also worked into the soil.

Planting information

The plant densities on his land are as follows: Wheat 70kg/ha, barley 40kg/ha and canola 2,5kg/ha. In the case of the irrigated crops he plants wheat at 90kg/ha and canola at 3kg/ha. Maize must have a stand of 90 000 at a row width of 0,762m.

The wheat under irrigation is planted between 20 April and 1 May, and the maize is planted from 15 October onwards as soon as the wheat has been harvested. With the wheat he plants rapid growers and for maize ultra-rapid growers.

Fertiliser is applied on the irrigated fields based on a potential of 7,5 tons of wheat and 16 tons of maize. The fertiliser includes 5m^3 of chicken manure per hectare every two years.

Finding suitable irrigation cultivars was a challenge, as seed companies don't breed cultivars for irrigation in the winter rainfall areas. The wheat cultivar he plants is a dryland cultivar. To prevent this cultivar from growing too vigorously, he applies a growth regulator to manage growth. This application leads to thicker plant stems with shorter internodes and larger veins with more seed pods.

The same applies to canola. The cultivars that are planted are also dryland cultivars with good standing ability. The maize and soya bean cultivars were also bred for the summer rainfall area.

The irrigation system

The irrigation operation is conducted with two seven-tower centre pivots. When he purchased the pivots, Badenhorst wanted certain requirements to be met. Firstly the product had to be of exceptional quality, secondly the supplier had to offer a fully automated package, and thirdly he wanted good aftersales service plus a good long-term relationship.

He bought two Zimmatic centre pivots from Lindsay Africa, as the products and the company met all his requirements. The systems are developed so that the pivots can release 10mm and 12mm in 24 hours. This is sufficient in his case, as the maximum water requirement of the maize is 8mm in 24 hours.

Because of the poor quality of the irrigation water on his farm, the water is not pumped via the pivot's pipes, but through the PVC pipes mounted on top of the pivot. Electric cables run through the pivot's pipes in a bid to prevent theft.

Badenhorst can manage the Zimmatic pivot with FieldNET from literally any place in the world – all he needs is internet access. In this way he can see where the pivot is located on the field, he can switch it on and off, determine the amount of water and fertiliser to be released, and he can see exactly how long it would take to complete the cycle. The system will also inform him should there be any errors or other problems.

Because the soil types under the pivot differ, he has divided each circle into quarters and installed a moisture probe in each quarter. The Zimmatic system allows him to manage each of the four zones differently by adapting the water and fertiliser release.

During winter he supplements irrigation on the wheat and canola fields. The crops that are cultivated under the pivot during the dry and hot summer months, are fully irrigated.

The water requirements of the crops are, among others, determined by the evaporation rate (information gained from a weather station on the farm), other information drawn from the moisture probes and field observations.

With the maize, for example, the point of departure is field capacity, after which gathered information is used to determine the irrigation levels. At Jubileeskraal the maize requires a total of 600mm which allows for an average water efficiency of 25kg per mm water.

Badenhorst believes that the ideal irrigation system is a fully automated one. The centre pivot, moisture probes and weather station must all be linked to the computer so that automatic measurements can be made. This is currently not possible, but he is in the process of testing one of Lindsay Africa's weather stations for this purpose – a step in the right direction.

Francois Badenhorst with the Zimmatic FieldBOSS control panel, mounted against the tower of the centre pivot. With FieldNET the pivot can be controlled from anywhere in the world via the internet.



The centre pivot's pipes are not used to pump water, as the water quality is too poor. Water is pumped through the PVC pipes on top of the pivot.

