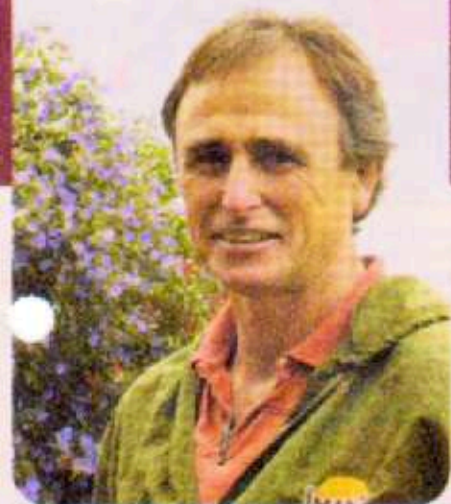


Fifteen years of no-till – the results



Karkloof's no-till pioneer René Stubbs has been at it for 15 years. His maize silage yield has increased from 8t/ha DM in 1995 to 14,5t/ha DM in 2008, with a saving of up to 40ℓ of diesel/ha in land preparation. On pastures, he saves up to 60ℓ diesel/ha which is close to R90 000 for 170ha of annual re-sown pasture, bringing total fuel savings to R132 000 a year, writes Robyn Joubert.

ABOVE RIGHT: No-till land showing the stooling rye cover crop recently planted to maize.

LEFT: René Stubbs proves the value of no-till.

BELOW: Irrigated annual ryegrass pasture.

PHOTOS: Robyn Joubert

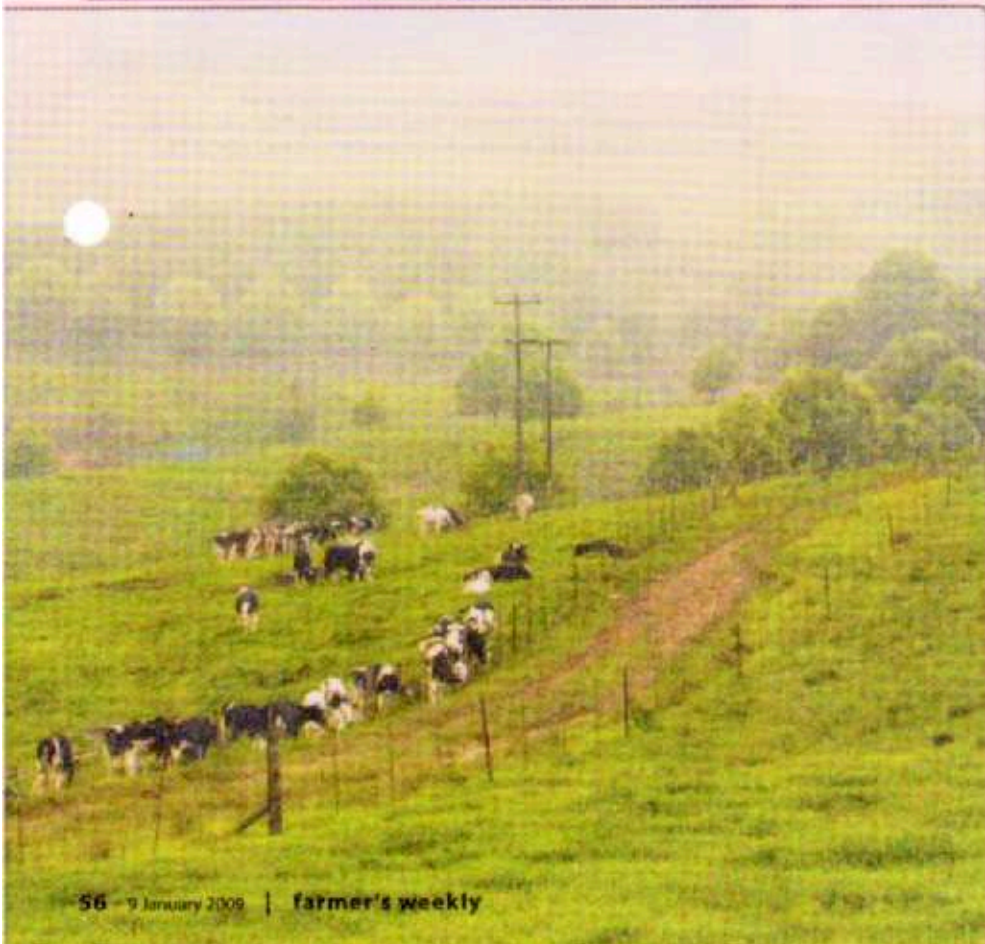
RENÉ STUBBS HAS COME A LONG way since he first dipped his toes into the milk industry in 1989. Not only has he built up his dairy from a small leased herd to his own impressive herd of 760 Holsteins in milk, René has also pioneered no-till farming in Karkloof outside Pietermaritzburg.

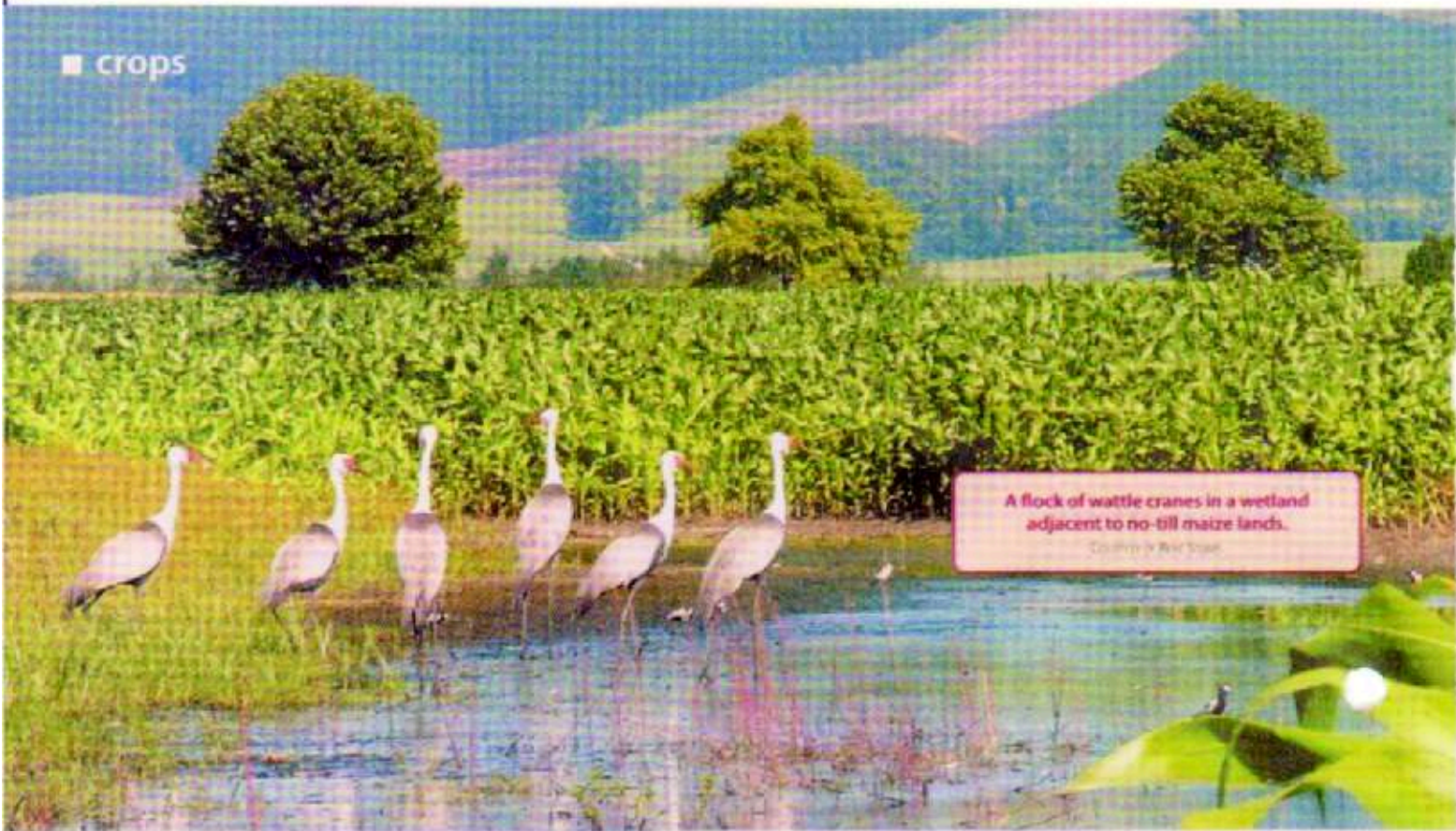
"When we bought Denleigh farm in 1986, the soils were shot," he recalls. "The land had continuously been farmed to produce maize for an intensive beef operation, as well as potatoes and later carrots. The soils were full of harmful

'The writing was on the wall – it was time to change the way we did things on the farm.'

pathogens, had very little structure and contained hardly any organic matter."

René explains that the contour banks were huge and poorly constructed, leading to severe erosion whenever they had a big storm. Conventional tillage practices required tractors and equipment clocking up many working hours and he was faced with mounting bills to replace equipment which he couldn't afford at the time. Despite his best efforts, René was unable to improve maize yields beyond 7t/ha. "The writing





A flock of wattle cranes in a wetland adjacent to no-till maize lands.

Colinny & Neil Toole

← a year on 110ha of maize silage produced. On the pastures, he saves 50¢ to 60¢ diesel/ha, which is close to R90 000 for 170ha of annual re-sown pasture, bringing total fuel savings to R132 000 a year.

"That's not taking into account the savings of up to 900 tractor-hours per year between maize silage and pasture establishment.

'We have also seen a spectacular increase in the earthworm population.'

The money I'm saving could buy a new 65kW tractor every 11 years," he points out.

Perhaps even more important for René than the economic aspect is the improvement in the condition of the soil. Soil pH has improved from 4,5 to 5 on average.

"We are consistently applying lime topdressings and gypsum at strategic times. The average soil acid saturation in 1995 for the entire farm was 16%, now it is close to zero." With the acid saturation coming down, calcium levels have improved to just below 1 000mg Ca/£ in the soil. Magnesium increased at the same time. Soil organic carbon is increasing slowly but steadily.

On average, most of Denleigh's soil contains over 4% organic carbon in 2008 compared to 2% in 1996, and

that improvement comes on fields that produce maize silage alone, René says. "We have also seen a spectacular increase in the earthworms and other indicator species. Earthworms have improved from no earthworms per square metre in soil that had been ploughed for many years to 300 earthworms per square metre after three years of no-till. We work in an amazingly forgiving environment."

Weeds have also been reduced significantly. "There has been an enormous change in weed species and reduced populations of grasses, especially stoloniferous types in maize and nutgrass in pastures."

A sharp decrease in soil pathogens has come as a welcome relief. "Soil pests like rootworm and wireworm, together with black maize beetle, were prolific 15 years ago and were costing us close to R500/ha to try and combat," René says. "Now we no longer treat for any of them. We only use Eco-T from Plant Health Products, which helps restore the balance in the soil of predatory fungi, ensuring improved germination and plant health."

Improving water, reducing erosion and returning wildlife

The no-till system has had a significant impact on the quality of catchment water. A Sappi water quality test repeated from 1999

to 2001, measuring the number of organisms in the water, found that while the Karkloof River was in "fair" health in the first two years, it was upgraded to "good" in 2001.

"We have seen a significant improvement in water quality in the river as more farmers adopt the no-till method," explains René.

Soil erosion has been reduced during heavy summer rainfall due to soil cover. "If the soil is tilled, cover is reduced and soil gets washed away. This fact drives us away from conventional to alternative cultivation methods."

The increase in cover and food for wildlife has resulted in the return to the valley of some indicator species such as the wattled crane and the bald ibis and an improvement in the numbers of other species such as the guinea fowl.

Promoting no-till

René is emphatic that the no-till production system is effective, economically sustainable and environmentally acceptable. "The system works. However, it requires a thorough understanding and needs a long-term commitment to see it through. As we are the custodians of our farms, we have a responsibility to become sustainable, innovative and economical in the way we manage our farms for future generations."

• Contact René Stubbs on (033) 3302822 or e-mail denleigh@rweb.co.za. |fw



ABOVE: maize no-till into a stooling rye cover crop.

RIGHT: Earthworms found in the planter row while planting no-till maize.



Timeline of silage maize and cover crop system

- Mid-September/mid-October: spray cover crop with glyphosate.
- November: plant maize and apply pre-emergent herbicide spray.
- November/December: nitrogen top dressing and post-emergence herbicide sprays.
- April: silage-making and simultaneous seeding of cover crop. Plant cover crop in the same four-day period that maize silage is harvested to prevent the soil from drying out.
- June to September: intermittent grazing of cover crop. If decent rain falls, put cows in to graze. But keep cows out if there is no rain or if it is muddy to prevent compaction.
- June to September: this is the ideal time to take soil samples and make soil fertility corrections. Apply lime and gypsum.
- September to October: allow cover crop to grow out.

'We've seen significant improvement in water quality in the river as more farmers adopt no-till.'

was on the wall – it was time to change the way we did things on the farm."

The no-till movement was gaining momentum then and good experience was emanating from the US, Brazil, and locally. "We were seeing improvements in no-till equipment and people were starting to understand that with the right equipment, herbicides and technique, the system was feasible," he says. "The price of glyphosate had also become more favourable and I was faced with an interesting challenge." René, who is chairperson of Midlands Milk (Pty),

uses two systems of forage production at Denleigh to support his dairy herd.

The first is maize silage and cover crops, the second is pastures consisting of kikuyu and perennial ryegrass for the summer and annual ryegrass for winter forage.

He has used no-till on maize for 15 years now and over that period, rain-fed maize silage yield improved from 8t/ha DM in 1995 to 12t/ha DM in 2002 and 14,5t/ha DM in 2008. In terms of pasture, René is going into the third year of no-till and expects to establish all newly sown pastures with this method.

Diesel savings and soil improvement
René estimates that on the maize fields alone, he saves 30€ to 40€ of diesel/ha in land preparation, which amounts to R38 000

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Timeline of no-till pastures

The no-till method for pasture is based on ensuring planting is done at the right time. René says they generally plant for winter production in February. Kikuyu over-sow:

- Late February: spray the cover crop with glyphosate (400ml/65€ water) and mulch if necessary.
- Early March: plant kikuyu seed and irrigate.
- Annual ryegrass:**
 - End December: stop grazing and bulk up organic matter.
 - Mid February: spray off with glyphosate (3€ /65€ water).
 - End February: spray off with glyphosate (1€ /65€ water).
 - End February: plant ryegrass into cover, band-applied fertiliser for pop-up.
 - Mid April: graze.

Veld hay cut and baled in the autumn for the dairy.



- René turned soil full of pathogens and lacking organic matter into fertile soil by applying no-till practices.
- There has been a spectacular increase in earthworms and other indicator species.
- No-till requires understanding and commitment.

