

FARMING IN CIRCLES

GROWERS CONSERVING WATER, MAINTAINING YIELDS

Cotton grower Clay Neill says he used to waste a lot of water.

"When I got my Zimmatic® system in 1991, that's when I said I wasn't going to waste water anymore," he said.

That's also when Neill started farming in a circle.

Neill is just one of the many Texas High Plains growers discovering that farming in circles can help produce the same yields with less water, as well as reduce wear and tear on machinery. Water is a major concern for many High Plains growers. Wells that used to supply 1,000 gallons per minute are now down to as little as 200 gpm.

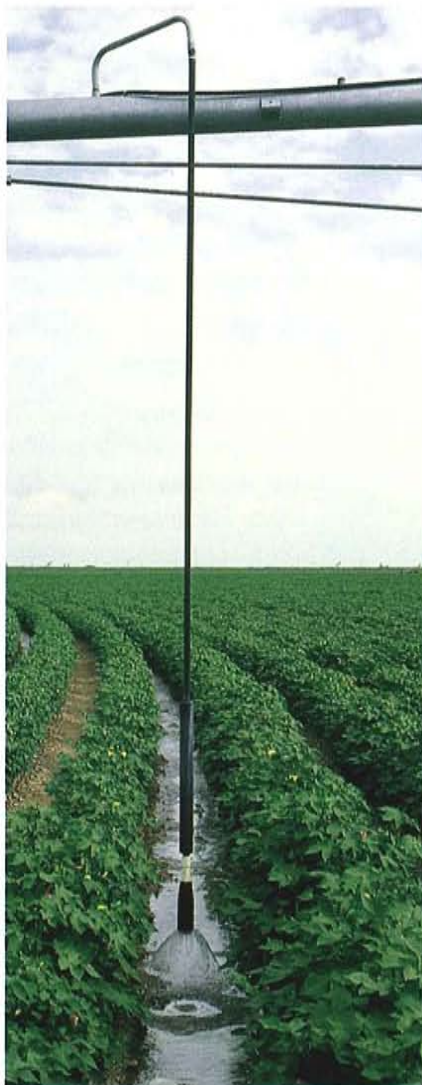
Neill, who is from Wellman, Texas, farms 950 acres of dryland cotton and another 250 acres of center-pivot irrigated cotton. His Zimmatic dealer is Mesa Irrigation located in Lamesa, 60 miles south of Lubbock.

Leon New, Extension Agricultural Engineer with Texas A & M at Amarillo, estimates that about 40 percent of growers with center pivots in the High Plains area farm in concentric rows.



When farmers plant in a circle, LEPA (Low Energy Precision Application) out-fitted center pivots are always able to apply water under the canopy. The drops no longer drag across foliage as they do in straight-planted rows, he said.

"According to a USDA-ARS (Agricultural Research Service) study, growers can save about 10 percent of



Left: Texas cotton grower Clay Neill.
Above: A LEPA-type pivot irrigates a cotton field.

their irrigation water by preventing evaporation of water dropped on plant foliage," New said.

Growers also are able to prevent at least another 20 percent water loss caused by wind, temperature and other climatic conditions by applying water under the canopy, according to New.

David Keeling of Ropesville, Texas, farms 650 acres of cotton in a circle under four pivots. "If you can see your water, you're wasting it," he said. "By dragging a hose every other row, you're able to save water and get more crop. It all depends on how you look at it."

Keeling, who started farming in circles in 1990, said he was one of the skeptics eight years ago. Now he talks with center pivot growers in his area about trying the practice for themselves.

"This one guy thought it would be so difficult," Keeling said. "Now he said he could just kick himself for not trying it sooner."

Along with increased water conservation, concentric rows provide other benefits including:

- Reduced wear on sprinkler systems and harvest equipment resulting from not crossing pivot tracks.
- Reduced soil compaction.
- Improved water infiltration, especially in "furrow-diked" fields.

Dan Smith of Lockney, Texas, farms three of his four quarter-section pivots in a circle. He grows 480 acres of wheat, corn and cotton under his Zimmatic center pivots. His Zimmatic dealer is Rhoderick Irrigation, located 75 miles southeast of Amarillo in Silverton, Texas.



Texas grower A.C. Pratt at one of his cotton fields.

“One important reason I plant this way is so I don’t have to cross over the wheel ruts left by my pivot,” Smith said. The smoother ride is easier on Smith and his machinery.

According to New, farming concentric rows not only makes farming operations smoother, but they can also reduce soil compaction because the same rows are always followed from planting to harvest.

For example, when using an eight-row, 40-inch planter pattern and a Zimmatic 160-foot span, 48 rows fit evenly under each span. This allows every other row to be used as a dry traffic row.

If the planting setup is consistent from year to year, traffic rows will remain the same. This allows for a soft middle row where the sprinkler drops run, New said.

This alternative row pattern provides a consistent firm traffic row while also allowing for quick water permeation in the softer middle rows—which is optimum for water-thirsty root systems and for reducing water lost through runoff.

According to Keeling, who bought his

Zimmatic pivots from Mesa Irrigation, “spoon feeding” every other row with water leaves the other rows dry enough to soak up any available rainfall.

“Other guys get their ground so saturated any rain just runs off the field,” he said. “All that moisture is just wasted.”

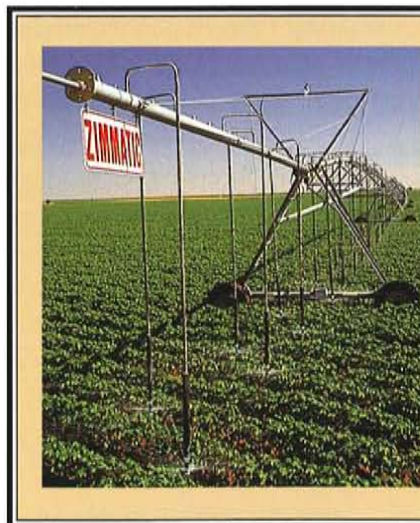
The concentric, alternate row system also helps equally distribute water among the plants, according to New.

“This system gives all plants a fair shake

at getting the water they need,” he said.

A. C. Pratt of Florydada, Texas, plants each of his four quarter-section Zimmatic pivots in concentric rows of cotton. Pratt farms 2,000 acres, 1,000 of which are under irrigation. About 500 acres are furrow-irrigated. His Zimmatic dealer is also Rhoderick Irrigation.

Pratt agrees that concentric rows
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ADJUSTING DROPS TO TRAVEL DOWN THE MIDDLE OF THE ROW

A difficult problem with farming in concentric rows is adjusting the sprinkler location so it follows directly in the middle of the row completely around the pivot. This problem can be solved by simply adding a 20-inch furrow arm. This arm allows you to easily adjust the sprinkler location if you switch your row spacing or need only small adjustments to keep water in the middle of the row.

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help with water distribution. "When you're dragging the LEPA sock every other row you get more even distribution of irrigation water," he said.

Depending on the slope, concentric rows also hold water better, according to New. The growers agree.

"The (concentric) rows hold water better," Smith said. "They act like little terraces and keep the water from running off the field."

According to New, the "trick of the deal" when farming in a circle is the setup. "There is extra work and time spent initially during layout of the rows," he said. "Growers almost need to look at each span as a separate field."

Two of the most crucial factors when setting up concentric rows are row width and span width. For example, a 160-foot span will exactly accommodate forty-eight 40-inch rows, sixty-four 30-inch rows or sixty 32-inch rows. When the span width or distance between tower tires is a multiple of the row width, that's optimum for alternative row watering systems.

But if there are not an even number of rows within a span width, concentric farming can still work. In a 179-foot Zimmatic span, an additional 12 inches is needed to fit seventy-two 30-inch rows underneath the span.



David Keeling, Texas cotton grower who farms in a circle.

DETERMINING NUMBER OF ROWS

The initial planning that goes into concentric farming involves diagramming how each pivot span and your planting equipment will match up. Zimmatic offers a wide range of span lengths that allows the irrigator the flexibility of finding the perfect match for their individual operation. The following chart and formula can serve as a guide to set up your field, or you can contact your local Zimmatic dealer for assistance.

Span Length	Planter Size	Row Spacing	Rows Under Span	Planter Rounds Per Span
160'	6 row	40"	48	8
	6 row	32"	60	10
	8 row	30"	64	8
	8 row	40"	48	6
	12 row	32"	60	5
180'	16 row	30"	64	4
	6 row	40"	54	9
	6 row	36"	60	10
	8 row	30"	72	9
168'	12 row	30"	72	6
	12 row	36"	60	5
	8 row	36"	56	7
186.8'	8 row	40"	56	7

Setup Formula: $\text{Span length in inches} = \text{Span length} \times 12 \text{ inches}$. $\text{Number of rows under span} = \frac{\text{Span length in inches}}{\text{row spacing}}$. $\text{Number of rounds in span} = \frac{\text{Number of rows under span}}{\text{planter size (\# of row units)}}$.

With an eight-row planter, eight passes and seven rows of the ninth pass are required to fill the span. Set the guide (row) marker to steal about an inch and a half from each guide row when making the first eight passes. By making eight rows approximately 28-inches wide, seventy-two 30-inch rows can be put in a 179-foot span.

New suggests growers follow these basic steps when they consider setting up concentric rows:

- Before planting, run the pivot around the circle to provide guide marks.
- Figure how many rows will fit under the span.
- Line up the tires, and work from both the outside and inside tracks towards the center of the span.

"Setting up straight rows is a lot easier," said Smith. "But you just have to be patient and real careful."

According to the growers, other cropping operations like cultivating and harvesting are very similar to straight-row farming—except when they get close to the center.

"I just have to grit my teeth," said Smith. "When you get close to the pivot it gets to be a real tight turn."

Despite the extra time in setup and tight turns on the inside span, Pratt said he highly recommends concentric rows. "For me it's just the right way to do it." ♦