



Circles for Rice

Effective Solutions for Irrigating Rice
with Center Pivots



The Leader in Precision Irrigation.®

A wide-angle photograph of a lush green rice field under a bright blue sky with scattered white clouds. In the background, a long, arched center pivot irrigation system spans across the field. The foreground shows the dense, vibrant green rice plants.

Circles for Rice – The Project

Worldwide, rice is most often grown with traditional flood irrigation methods. While this practice has been used for centuries, the availability of water for food production continues to decrease. Population growth will roughly double the need for food in the next 50 years, and the world needs to produce more food on less land. Because rice is a staple crop for those regions with the highest projected population growth, it is vital to develop efficient farming practices for rice that both protect soils and conserve resources.

Valmont® Irrigation has been the industry leader in precision irrigation equipment (center pivots and linears) for more than 50 years. With the goal of maximizing farm inputs and increasing grower profitability, Valmont is overseeing the worldwide production of rice under center pivots and linears with an initiative called Circles for Rice. With center pivot or linear irrigation, rice can be grown on fields with rolling hills or sandy soil, while significantly reducing the amount of water required.

We at Valmont Irrigation are proud of our groundbreaking work in various countries throughout the world. This booklet will give you an overview of some of the most common myths about rice production under pivots and linears, and what the growers cooperating with us are doing to show how Valley® machines can be successfully used to irrigate rice.

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FALSE

Myth #1

The machine won't be able to provide sufficient water during grain fill.

One of the most important factors to consider when thinking about irrigating rice with a center pivot is how much flow you should have. If the flow is sufficient and the appropriate machine length and drive train are specified, there is limited concern about being able to apply sufficient water.

- Rice is a shallow-rooted crop, so heavy irrigation applications are generally not appropriate.
- Moisture must be maintained from the surface down to approximately 8-10 inches (20-25 cm) when the root system is fully developed.
- In the early season, light, frequent applications are recommended.
- As the crop develops, the application depth is increased and the frequency of application is decreased. This will improve irrigation efficiency and allow the wheel tracks to dry. However, the application depth must be matched with the ability of the soil to accept water.

Previously, growers in the USA, Brazil and Pakistan have applied approximately .25 inches (6.35 mm) of water every other day from emergence through tillering. Upon inspection, rice root depth rarely exceeded 8-10 inches (20-25 cm).



Photos from left: Flooded corners of a pivot irrigated rice field; soybeans planted in the corners; nothing planted in the corners



FALSE

Myth #2

You will lose the corners of the field.

One of the challenges perceived when irrigating rice with a center pivot is figuring out how to maintain a rice crop in the corners of the field. While the center pivot alone cannot cover this section of the field, there are other options.

1. The first option is a corner arm that can be attached to the pivot itself. The arm will swing out when it reaches the corners and then back in once it has passed the corner. The corner arm will allow for approximately 95% of a square field to be irrigated. For irregularly shaped fields, the corner arm can actually be laid out to “follow” along a boundary.
2. The second option is to consider using a linear machine. Linears travel back and forth across the field instead of in a circle, covering up to 98% of the field.
3. The third option is to continue to use flood irrigation in the corners.
4. The fourth option is to consider planting alternative crops in the corners.

Another thing to consider is that you may be just as profitable by irrigating the center pivot circle alone when taking into account other savings that can be realized, particularly if you are water limited.

Rice growers with center pivots have chosen different ways to address the corners of their field. One grower in Arkansas flooded his corners. In Missouri, one grower used a corner arm in his field, while another planted soybeans in the corners. A farmer in Brazil left the corners of his field unplanted.

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Photos from left: Transplanting Basmati rice in Pakistan; blast in Pakistan; blast in untreated plot at Delta Research Center



Myth #3

Blast cannot be controlled when irrigating with a center pivot.

Blast can definitely be more of an issue when the ground is dry, because splashing water, such as that from a sprinkler, can transport blast spores onto the plant.

- The first key is selection of blast-resistant varieties or hybrids.
- Fungicides are very effective today. The University of Missouri Delta Research Center in the United States studied blast and brown spot in pivot-irrigated rice. Their research showed that with proper application of fungicides, good control could be achieved in blast-susceptible varieties, such as Wells, Cocodrie and Taggert.
- In all the commercial field trials of pivots on rice, where each grower chose to plant either a blast-susceptible variety or a blast-resistant hybrid, only two growers have needed to apply fungicide.
- Whether a blast-resistant hybrid or variety is used, careful scouting for disease should be done on a weekly basis, particularly as the rice moves into panicle initiation.

FALSE

Many growers are seeing the value of using blast-resistant hybrid seeds, where available. In 2009, a cooperater in Pakistan planted Basmati, an aromatic, blast-susceptible rice. The field crew was not scouting for diseases and a portion of the crop was affected by blast, requiring a fungicide application to treat it. The grower was, however, still able to achieve an acceptable yield. In 2010, in addition to increasing the area on his farm where rice was grown with a pivot, he planted some hybrid seeds and scouted for blast earlier in the season, reducing the amount of fungicide applied to the crop.



Photos from left: RAAFT Tracks and Boombacks; Four-Wheel Track Drive; wheel tracks in a rice field

Myth #4

Center pivots won't work because the wheels will get stuck.

This myth is common, and often brought up because individuals are not aware that a heavy application of water is NOT needed when irrigating rice. With careful irrigation management, knowledge of your soil type, proper hardware and the use of light, frequent irrigation applications, much of this concern can be eliminated.

- Possible hardware options that may be considered, depending on the soil type and machine management, include:
 1. Boombacks and part-circle sprinklers – boombacks are placed behind the wheels of the machine. Part-circles are placed on the standard drops nearest the wheels, but will only spray water out of half of the sprinkler. Both options will help keep water away from the wheel tracks.
 2. Flotation packages or larger tires – Valmont offers various flotation packages and tire sizes to help increase both flotation and traction.

FALSE

A number of rice growers with center pivots have used a combination of flotation packages and sprinkler packages. One grower chose to use boombacks and RAAFT tracks, and never got stuck. Another grower installed Valley Track Drives on four of the spans and Two-Wheel Drives on the remaining spans.

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Photos: Harvesting pivot irrigated rice



Myth #5

You cannot achieve the same yields with center pivots and linears as you can achieve with flood irrigation.

Ultimately, the most important result from growing rice is profitability, but we all know farmers like to talk about their yields and how they compare to other fields. It is commonly thought that center pivot and linear irrigation do not yield as well as flood-irrigated fields.

1. Historically, with any crop that has been converted from flood irrigation to center pivot irrigation, there may be an initial drop in yields.
2. A drop in yields can be largely due to the fact that the grower is learning a new method to grow the crop and often will try to apply the same practices that were used for flood irrigation.
3. Careful attention must be paid to the variety or hybrid chosen to plant under a center pivot or linear so as not to challenge your yields from the start of the season.
4. Many growers in the Circles for Rice project have found that their expectations have been achieved with very acceptable yields, at times with excellent milling quality, and good economic returns.

FALSE

2010 was a very hot and dry year across the mid-south of the USA. A traditional rice grower from southern Missouri ended his season with yields from his center pivot field surpassing that of his flooded fields. This was partially due to the hybrids he chose to plant in each of his fields, as well as the fact that the center pivot was able to continue to “feed” the rice crop while in the flooded fields he struggled to maintain the flood. The growers who were non-traditional rice growers also met and exceeded their profitability expectations due to growing rice as an additional rotational crop.



Photos from left: Weed-infested rice field; scouting for weeds; irrigating to activate the herbicide

Myth #6

Weeds can't be controlled when irrigating with a center pivot or linear.

The most common reason for flood irrigating rice is to control the weeds. With center pivot and linear irrigation, weeds can be controlled with careful planning and scouting of the field. Just as with flood irrigation, if issues are discovered, timely herbicide applications are required.

1. Sprinkler irrigation can activate the herbicides without needing to depend on rain or having to flush the entire field.
2. Soil moisture can be managed with a center pivot or linear, allowing the majority of post-emergence herbicides to be applied by a ground rig instead of aerial application.

FALSE

A grower in southern Missouri discovered that he had a problem with pigweed in his pivot-irrigated rice field. He quickly responded by applying Stam, but still kept his overall costs down. He was extremely pleased with his crop at harvest and plans to grow rice again with his pivot, after he rotates in soybeans.



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