

Valley® Circles for Rice

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VALLEY 

The Leader in Precision Irrigation

Circles for Rice – The Project

Worldwide, rice is most often grown with traditional flood irrigation methods. While this practice has proven successful for centuries, the availability of water for food production continues to become more scarce. Continuous population growth will roughly double food demand in the next fifty years, and the world is looking for additional food production with minimal increases in the amount of land used to produce this food. Because rice is a staple crop for those regions with the highest projected population growth, it is necessary to develop efficient farming practices for rice that both protect soils and conserve resources.

Valmont Irrigation has been the industry leader in the manufacturing and application of mechanized precision irrigation equipment (center pivots and linears) for over 50 years. With the goal of conserving farm inputs and increasing grower profitability, Valmont is currently overseeing the production of rice worldwide under center pivots and linears. This initiative is called **Circles for Rice**. With these machines, rice can be grown on fields with rolling hills or sandy soil. Using a center pivot or linear on a traditional rice field significantly reduces the amount of water required.

Many considering participation in the Valmont **Circles for Rice** trials may have misconceptions about irrigating rice with center pivots and linears. However, by working with the **Circles for Rice** team and having a growing number of pivot rice growers as references, new growers can be confident that there are more resources available to them today than ever before. Previous participants include first-time rice growers looking for an additional crop for rotation, and seasoned rice growers who are participating in order to conserve water, fuel, and other crop inputs with the expectation of becoming more profitable.

Despite the work we have done and the myths we have busted, grower concerns remain. For example, growers in California and Australia suggest that one important aspect of flooding is to keep the rice warm with flood waters as the air temperatures drop, particularly during grain fill. The **Circles for Rice** team is looking forward to having an opportunity in these areas to see if this, too, is a myth we can bust by proving the viability of center pivots and linears.

We at Valmont Irrigation are proud of our ground-breaking work in various countries throughout the world, and we hope that more people see the value in growing rice with center pivots or linears. This booklet will give you an overview of some of the most common myths discussed today in regards to rice production under pivots and linears, and what growers, who are cooperating with us, are doing to show how Valley[®] machines can be successfully used to irrigate rice.



Myth #1

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

BUSTED

- 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.

One American grower had an average flow of 450 gallons/minute (28.4 liters/second) on a 140 acre (56 hectare) field with sandy soil. It was quickly discovered that this flow would not be enough water to maintain a healthy crop. The sandy soil had minimal water holding capacity and the machine length was too long. Luckily, the region received a lot of rain during the growing season and the grower still produced an acceptable crop. However, if it had been a dryer season, the yield would have been extremely low as the grower lacked enough flow at that field to be profitable growing rice.

- Rice is a very 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 hardly ever exceeded 8-10 inches (20-25 cm).



Myth #2

You will lose the corners of the field.

BUSTED

- 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 irregular 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.



Myth #3

Blast cannot be controlled when irrigating with a center pivot.

BUSTED

- 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.

Many growers are seeing the value of using blast resistant hybrid seeds, where available. In 2009, a cooperator 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.



Myth #4

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

BUSTED

- 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.

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 2-Wheel Drives on the remaining spans.



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.

2010 was a very hot and dry year across the Mid-South, 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.



Harvesting pivot irrigated rice

Myth #6

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

DEBUSTED

- 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.

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.



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



See your local authorized Valley dealer for complete details.



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