The Indian Express

Paddy and the price of water

Jun 19, 2023 | Delhi | Pg No.: 17 | Middle Right | Harish Damodaran. | Sq Cm: 581 | AVE: 906611 | PR Value: 4533055

**EXPLAINED ECONOMICS**

**Paddy and the price of water**

Direct seeding of rice, instead of transplanting and flooding of fields, cuts down the massive water consumption of the paddy crop. Why is the DSR method still not very popular with farmers?

**Harish Damodaran**

The southwest monsoon season (June–September) has registered 22.2% deficient rain so far. With most global weather agencies predicting a below-normal monsoon, farmers in India are looking at a uncertain year. The monsoon season not only sustains rice cultivation but also supports the region’s water requirements. A below-normal monsoon can particularly impact paddy cultivation. A paddy farm is immensely water-intensive, as the seeds are first sowed into growing mats that are then transplanted around 30 days later in the main field. During the nursery stage, water equivalent to twice the volume of irrigation is given.

But the water consumption starts even before the field is sown. The nursery would be transplanted and is usually irrigated once, before being “pricked out” or transplanted in standing water. Paddling thrusts the soil-making mixture for transplanting, and floods it up to the paddy’s root zone for the next 7 days to ensure full root development. Water equivalent to three times the volume of irrigation is given. For the first two weeks or more after transplanting, farmers usually irrigate every 2-3 days to maintain a water-depth of 4-5 cm, necessary to prevent weed growth during the crop’s early stage. In the remaining 75-odd days – out of the total 105-110-day duration (seeds to grains) – the irrigation requirement reduces to six weeks.

In all, the conventional transplanting method requires 28 irrigations. It can go up to 60 irrigations, if high temperatures last for a longer period, and go down to 15-20 irrigations if the rains are generous for the entire season. The below-normal monsoon would have 30-50 irrigations. The one hectare crop requires 30,000 litres of water per hectare, which is one ton of standing water in one hectare area, equal to 50-60,000 litres.

**Direct seeding vs transplanting**

That’s where direct seeding of (DSR) comes in. Paddy is now sown directly in the field without any nursery preparation, paddling or flooding. In transplanting, the flooded fields basically keep oxygen in the seed seed in the soil, preventing their germination. Water, thus, acts as a natural herbicide, killing weed germinants. Farmer Makal Singh at his field with directly seeded rice, in Puphit village of Hariana’s Gurgaon district.

Makal Singh, a farmer from Puphit village in Gurgaon district, sews 10 acres a month, and he has planted his own paddy variety through DSR. He first ploughed the land and used a jetter machine to break through the field. A pre-sowing irrigation and 3-5 rounds of sprinkling to compact the soil in the entire field is then required. Sowing was done by a DSR machine after four to five days, when the field had sufficient soil moisture. Pre-sowing irrigation was then stopped, to reduce the evaporation and the soil’s water content and till the seeds germinate. DSR is also useful in areas prone to waterlogged. By the fifth day, the DSR machine stops working, and against 25-30 days after sowing, when the crop’s main stem has produced 2-3 leaves.

**Where DSR scores**

“DSR is effective against weeds and saves water compared to transplanting,” said Singh. The second irrigation is required only 1-2 days after sowing. Also, a second “pre-emergent” herbicide, trifluralin, is applied at 100-125 grams per acre (20-25 days after sowing), when the crop’s main stem has produced 2-3 leaves.

“After the second irrigation, you get water every week like in transplanted paddy. The water saving in DSR comes from no puddling and flooding of fields during the initial 2-3 weeks,” Singh explained.

For a 100-hectare crop, the output is 21-22% against 26% in transplanting. “In DSR, you also use less water per irrigation,” he added. But, the back-up layout is without water sources nearby, so no need for standing water at 2 inches. The field should be kept wet.

**Why DSR hasn’t caught on**

A key reason is that electricity for irrigation provides farmers with the infrastructure to display water-saving technology. A second reason — highlighted by Makal Singh, a progressive 120-acre farmer from Uttar Pradesh’s village of Toorut, Madhubani — is the lack of good machines. The recommended spacing for paddy is 20 cm row-to-row and 15 cm plant-to-plant, allowing for a plant population of 15-25 per square meter.

The DSR and DRR methods are mostly now used in areas that do not have the paddy field distance of 70 cm, one of the biggest hurdles. "In some villages, the DSR machine — named after its manufacturer, Sakhal Biotech Agrico Industries, in Hariana’s Munga district — which is better known among farmers."

The Haryana and Punjab governments are offering farmers Rs 4,410 and Rs 5,500 per acre respectively to grow paddy using DSR, instead of transplanting. But it’s the price of water and labour, not seeds, that is ultimately going to push farmers to adopt the technology.