



Extended Summaries : 5th International Agronomy Congress, November 23-27, 2021, India

## Impact of climate resilient practice on mustard production and profitability in Nicra village

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India is the fourth largest oilseed economy in the world after USA, China and Brazil. Rapeseed mustard (*Brassica juncea* L.) is the second most important oilseed crop in India, next to soybean, with almost one fourth share in area and production (Raghuvanshi *et al.* 2018). Mustard is a cash crop and more remunerative than other field crops. Mustard is the most important *rabi* season oilseed crop of Rajasthan. It is grown in 2.71 million ha with a production of 4.3 million tonnes and 1586 kg/ha of average productivity. The average production of the district is 906 kg/ha (Anonymous, 2019-20). Climate change becomes a major bottleneck for sustainable agriculture in recent years. Extreme climatic events such as frost, heat stress, moisture stress, new diseases and pests become major drivers in successful crop production. Frost or Tusar or Pala is a localized phenomenon which is fairly common in northern India. Due to Climate change frost becomes a regular phenomenon in recent years in semi arid regions of Rajasthan. Frost damage occurs when ice forms inside the plant tissue and injures plant cell. The extent of injury caused by frost mainly depends upon the temperature below freezing point, period of low temperature and the crop stage at which frost occurs. The freezing can be either extracellular or intracellular. The ice formation disrupts the protoplasts (Levitt, 1980).

### METHODOLOGY

Total 40 demonstrations on mustard crop were carried out at farmer's field in NICRA Village Bharu at Jhunjhunu (Rajasthan) during Rabi 2017-18 to 2020-21 to assess the effect of Dimethyl Sulfoxide (DMSO<sub>4</sub>) foliar spray on frost management. All the demonstrations were of one acre area is conducted at 40 partner farmer's field. Two foliar spray of DMSO<sub>4</sub> (78 g/ha.) at flowering and pod formation stage was done by knapsack/ power sprayer. The sowing was done during mid- October to last week of October under irrigated condition. Crop was harvested during second fortnight of March. The demonstrations on farmers' field were regularly monitored by the scientist of Krishi Vigyan Kendra, Jhunjhunu from sowing to harvesting for data collection. The Grain yield of demonstrations crop was recorded and analyzed.

### RESULTS

The data presented in the table-1 indicated that average production was 16.17q/ha under local check, where as the average production of demonstrations was 17.47q/ha, which was 8.04 % higher than local check. It can be concluded from the four years yield data that the increased percentage of demonstration yield was higher in the year when frost

**Table 1.** Technical parameters of mustard crop demonstration at farmer's field.

| Year    | Variety | No. of farmers | Area (ha.) | Average yield q/ha. |               |            | Lowest temperature of the crop season | Rainfall during crop season |
|---------|---------|----------------|------------|---------------------|---------------|------------|---------------------------------------|-----------------------------|
|         |         |                |            | Local check         | Demonstration | % increase |                                       |                             |
| 2017-18 | Giriraj | 10             | 4.0        | 17.78               | 19.90         | 6.30       | 04°C                                  | 27 mm                       |
| 2018-19 | Giriraj | 10             | 4.0        | 17.06               | 18.34         | 7.50       | 06°C                                  | 34 mm                       |
| 2019-20 | Giriraj | 10             | 4.0        | 15.65               | 17.25         | 10.25      | 01°C                                  | 11 mm                       |
| 2020-21 | Giriraj | 10             | 4.0        | 14.17               | 15.45         | 8.68       | -01°C                                 | 00 mm                       |
| Total   |         | 40             | 16.0       | 64.66               | 69.89         | 32.70      | -                                     | -                           |
| Avg.    |         |                |            | 16.17               | 17.47         | 8.04       | -                                     | -                           |

**Table 2.** Economical parameters of mustard crop demonstration at farmer's field.

| Year    | Local check |             |            |           | Demonstrations |             |            |           |
|---------|-------------|-------------|------------|-----------|----------------|-------------|------------|-----------|
|         | Gross cost  | Grossreturn | Net return | B:C ratio | Gross cost     | Grossreturn | Net return | B:C ratio |
| 2017-18 | 23600       | 73787       | 50187      | 3.13      | 24770          | 78435       | 53665      | 3.17      |
| 2018-19 | 24100       | 59710       | 35610      | 2.48      | 25820          | 64190       | 38370      | 2.49      |
| 2019-20 | 24700       | 62600       | 37900      | 2.53      | 25570          | 69000       | 43430      | 2.70      |
| 2020-21 | 24950       | 88563       | 63613      | 3.55      | 25890          | 96250       | 70360      | 3.72      |
| Total   | 97350       | 284660      | 187310     | 11.69     | 102050         | 307875      | 205825     | 12.08     |
| Avg.    | 24338       | 71165       | 46828      | 2.92      | 25513          | 76969       | 51456      | 3.02      |

Rate Rs. /qtl. (Grain + Straw): 2018-4150, 2019-3500, 2020-4000 & 2021-6250

(0°C temp.) was occurred. The average additional investment of Rs.1175 per ha was made under demonstrations. The average gross and net return was Rs. 76969 and Rs. 71165; Rs. 51456 and Rs.46828 of demonstration and local check, respectively. The B: C ratio was 3.02 and 2.92 for demonstration and local check, respectively, which was 3.42% higher than local check. The net profit was 24.45% higher over local check. The amount of net profit was higher than local check i.e. Rs. 4628/ha by investment of additional Rs. 1175/ha. It can be concluded that farmers can earn Rs. 3453/ha extra by adopting two foliar spray of DMSO<sub>4</sub> in their field. These results confirm the findings of Chaplot *et al.* (2012) and Singh *et al.* (2021).

### CONCLUSION

It can be concluded from the demonstrations data that two foliar spray of DMSO<sub>4</sub> (78 g/ha) increases the yield as well as net return of the mustard crop. Hence, the spray of DMSO<sub>4</sub> (78g/ha) at flowering and podding stage was found to be effective in mitigating the adverse impact of frost in mustard crop.

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## Comparative assessment of direct seeded rice and conventional method of transplanting for economic benefit and energy efficiency

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Rice is the staple food crop in India and occupies highest area among the cereal crops. Andhra Pradesh and Karnataka are the major rice growing states of India, together contributing to more than 15 percent of the total rice production of the country. In India, transplanting is the mostly adopted rice production system. However, rise in the cost of cultiva-

tion and depletion of water resources is forcing farmers to shift to alternative crop establishment methods in rice (Nirmala *et al.*, 2021). Direct Seeded Rice, a rice production system with less water and labour is being promoted widely in Andhra Pradesh and Karnataka states of India. Therefore, the identification of energy efficient rice produc-