*Case study*

Comment [WU1]: There are few grammar and language mistakes that should be corrected in the whole paper.

# Profitability of zero tillage wheat in rice fallows under NICRA project at Chhattisgarh Plaine zone Durg


## Abstract

Comment [WU2]: The abstract should contain a concise introduction, the aim of the work, a concise method of work, brief results, and recommendations.

The research evaluated the economics of producing wheat in NICRA village karga using zero tillage and conventional method, and it evaluated how much technology and inputs contributed to the higher productivity brought over by zero tillage (ZT). ZT method's higher net income is mostly attributable to its reduced production costs when compared to conventional methods. The study found that ZT technology is able to increase farmers' profitability and aid in resource conservation. The difference in gross returns between ZT and CT approaches has been divided into 45% related to ZT and the remaining due to changes in input costs. The adoption of ZT technology has been slow despite various economic and environmental benefits, and one major obstacle that has been found is the challenge of getting availability to a zero-till seed drill machine during the sowing season. According to the report, ZT technology should be made more widely available, and zero-till seed drill accessibility should be guaranteed with this point of view in this NICRA village farmers have been provided zero till seed drill machine through custom hiring center under NICRA project.



Key Words – Zero tillage, Cost reduce, Nicra, Seed drill and Climate




## Introduction –

India is the world's second-largest wheat producer (Anonymous, 2011a) With an average yearly production of 80 Mt (million tonnes), It produces about 11.79 percent of the wheat grown worldwide (FAO, 2011). In financial year 2021, over 248 thousand metric tons of wheat was produced in the northern state of Chhatisgarh in India.Increasing productivity and profitability of wheat production in the state is the main challenge. Many farmers raise late-maturing, fine-grained types of rice, which causes wheat to be sown later than usual. The grain production gradually decreases if planting is delayed by each additional day beyond the third week of November (Ali et al., 2010; Irfaq et al., 2005; Sharma, 1992).Hence, farmers have started

implementing resource-saving technologies like zero tillage and surface seeding in the production of wheat in order to avoid planting delays and reduce costs of production (Gupta and Seth, 2007). Due to the use of zero tillage in the cultivation of wheat, savings in input costs, fuel usage, and irrigation water use have been reported (Malik et al., 2003; Bhushan et al., 2007)Due of a lack of field labour and rising fuel expenses, farmers favour this technology. In order to compare the economics of producing wheat using zero tillage and traditional methods and to quantify the impact of technology and inputs to the predicted productivity differences due to zero tillage, the current study was done.

**Material and Methods**

A climatic intervention was laid out in village namely karga, Durg district of Chhattisgarh in 2022-2023 by KVK Pahanda, Durg under the NICRA project. These demonstrations were laid in irrigated silty loamy soils where farmers adopted normal wheat cultivation whereas zero tillage wheat is taken as improved technology. In this technology, after the harvest of kharif rice, one more crop could be taken up with no tillage for effective utilization of residual moisture by the second crop (wheat). Zero tillage wheat practice was demonstrated to minimize the cost of cultivation & for effective utilization of residual moisture, nutrients. The rice stubbles of 15-20 cm height were left in the field after the harvest. Sowings were started from November last week in order to capture the residual moisture from rice fields. CG 1029 Kanishka variety of wheat which is Late sown, heat tolerantand contain 12 % of protein. Seed (40kg/ac) are taken for zero tillage with 45 kg of DAP. Sowing was done with zero seed cum fertilizer drill provided by NICRA custom hiring center.

Table 1.Weekly data during crop season

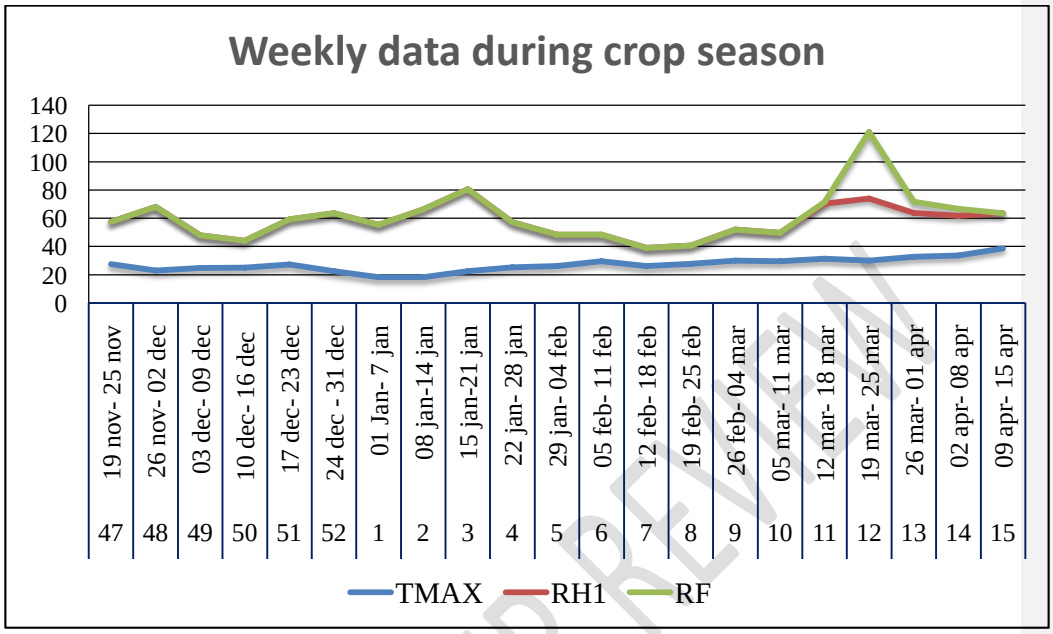


**Table 2.Comparison between demonstrated climatic intervention and traditional farmer's practice of wheat cultivation**

| S. No. | Interventions | Zero tillage Wheat | Conventional wheat |
|---|---|---|---|
| 1 | Soil | Silty Loamy | Silty Loamy |
| 2 | Cropping System | Zero seed cum fertilizer drill | Farmer's method |
| 3 | Time of sowing | 15 Nov to 5 December | 10 Dec to 25 December |
| 4 | Seed Rate | 40 kg per acre | 50- 60 Kg per acre |
| 5 | Method of Sowing | Line sowing | Broadcasting |
| 6 | Plant Protection | Not used | Used |
| 7 | Weed Management | Used (vesta) | Used (vesta) |

**Results and Discussion**

The climatic intervention demonstrations were conducted in nicravillageskarga of Durg district in Rabi 2022- 2023 seasons. The zero tillage practices resulted in giving better performance in average number of total number of tillers per plant average 7.5 when compared to farmers practice wheat which gave average 5.5 tillers per plant with numbers of irrigation required for zero tillage wheat was 4 whereas at farmers practice taken 6 numbers of irrigation. On an average the percent yield increase of demo plots over check was 7.7 % 2022-23. In these years if we observe the yield of demo practice was 1550kg/hac whereas farmers practice observed 1438.75 kg/ hac, thus enhancing the net income per ha was Rs 12475 with a reduced cost of cultivation of Rs.3250/ha. This reduction in the costs was due to reduced number of irrigations and lessened sowing operations cost. Thus, zero tillage wheat earned good net income with an impressive B:C ratio of 1.47 as compared to normal wheat cultivation in rabi seasons of year 2022. Higher yield in zero tillage wheat is a result of a greater number of productive tillers and filled grains which is due to timely sowing, healthy crop growth,good plant population and less effect of climatic hazard.

**Table 3.Yield parameters of demonstrations on zero tillage wheat conducted in Rabi 2022-2023**

| **2022-23** | **Number of tillers** | **Number of irrigations** | **Disease observed** | **Rainfall/ Temperature effect** | **Yield (kg/hac)** | **% Increase** |
|---|---|---|---|---|---|---|
| Zero tillage wheat | 7.5 | 4 | No | No (Harvested before rainfall) | 1550 | 7.7 |
| Farmer's practice | 5.5 | 6 | Black rust | Yes (Affected by rain at maturity) | 1438.75 | |

**Table 4.Economic analysis of zero tillage wheat productivity vs Normal conventional wheat cultivation during 2022-2023**

| Treatments | Seed yield | Cost of cultivation | Gross return | Net Return | B:C ratio |
|---|---|---|---|---|---|
| Zero tillage | 1550 | 26275 | 38750 | 12475 | 1.47 |
| Farmer's practice | 1438.7 | 29525 | 35950 | 6425 | 1.21 |

**Table 5.Benefit particulars demonstrations on zero tillage wheat conducted in Rabi 2022-2023**

| Particulars | Rabi wheat 2022-23 |
|---|---|
| % Increase in yield | 7.7 |
| Cost of cultivation reduced by | 3250/- |
| Net return increased by | 6050 |
| No. irrigation reduced by | 02 |

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**Comment [WU3]:** References should be rearranged alphabetically for example: Start with (Amarajyoti,P., Mounika, B., Kumar, G., N., Naidu, D., C. and Babu, G., C., (2022),Profitability of zero tillage maize in rice fallows of north coastal Andhra Pradesh,The Pharma Innovation Journal; SP-11(7): 3615-3616.) , then (Chahal G., B., S., Sood, A., Jalota, S., K., Choudhury, B., U., Sharma, P., K., (2007) Yield, evapotranspiration and water productivity of rice (Oryza sativa L.)–wheat (Triticumaestivum L.) system in Punjab (India) as influenced by transplanting date of rice and weather parameters, agricultural)

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