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Effect of different farming practices on yield and economics of *kharif* rice under lateritic soils of Konkan region

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Abstract
Adoption of suitable farming practice by farmers in India has occurred in mainly in the rice based cropping system. Among all the farming practices, the conservation farming practice spread rapid in north-western states which are relatively better endowed with respect to irrigation, mechanisation and relatively huge size of land holdings This practice was adopted primarily for the wheat crop. In India largely adoption of conservation tillage practice was started in Haryana. It is emerged to achieve enhanced productivity and profitability while conserving natural resources. In this study has been made to analyze the comparative yield and economics of low budget, organic, conservation and conventional farming practices of rice based cropping system. The study revealed that the grain and straw yield was significantly higher in conservation farming practice followed by conventional, organic and low budget farming practice. Whereas, net return and B:C ratio was higher under low budget farming practices followed by conservation, conventional and organic farming practices in that descending order during experimentation and in the pooled data. Low budget farming technology enabled farmers to increase returns and save crucial input cost. Hence, this is to be an alternative for creating higher farm income and protect scarce resources.

Keywords: conservation, conventional, low budget, *kharif* rice and organic

Introduction
Rice (*Oryza sativa* L.) is the main staple food for over half the population worldwide. Rice based agriculture is the largest source of livelihood of majority of rural mass in Konkan, which lies along the Arabian seacoast at the extreme western part of the Indian peninsular region. "Low input farming" is the new, socially acceptable term synonym to Zero budget farming and economic survival is the motivation for many newcomers. Zero Budget Natural Farming (ZNBF) is nothing but raising crops without using any fertilizers and pesticides or any other external substances. (Tripathi *et al*. 2018 and Palekar 2006) [10, 4] The concept of organic rice farming is not much new. It was practiced traditionally by the farming families, especially in some states of India such as Sikkim, Arunachal Pradesh, Manipur and Uttarakhand where resource-BPL farmers could not afford chemical fertilizers (Pandi *et al*. 2013) [5]. Conservation tillage is cultivation practice that not only helps to preserve soil fertility but also conserves scarce water and increases farmer's profits by reducing their production costs (Mircca Adrian, 2012) [2]. This type of technology in rice has not been evaluated widely in farmer's field. Hence, present study was undertaken with the objective to compare yield and economics of *kharif* rice under different farming practices.

Materials and Methods
A field experiment was conducted entitled "Studies on performance of various farming practices for sustainable production of rice based cropping system under lateritic soils of Konkan region" during the *kharif* season of 2020 and 2021 at the Agronomy farm, plot no. 57, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S.). The experimental soil was sandy clay loam texture, slightly acidic (pH) reaction, high in organic carbon, and low in available N, low in available P_2O_5 and medium in available K_2O.
The experiment was laid out in RBD for studying kharif rice crop, four treatments replicated five times. The main treatments comprised of different farming practices *viz*., low budget, organic, conservation and conventional farming practices. During the course of investigation, growth observations of rice was recorded periodically from 30 DAT till at the harvest at an interval of 30 days and yield contributing characters and yields were recorded at harvest to evaluate the treatment effects.

Economics of different treatments was worked on the basis of statistical analysis of the treatments. Net income was calculated as the difference between gross income and total cost of cultivation.

Result and Discussion

Effect on yield attributes

Yield attributes of *kharif* rice were influenced significantly difference due to various farming practices during investigation in the pooled data presented in Table 01. The data revealed that, conservation farming practice recorded significantly higher values of yield attributes *viz*., mean number of panicles hill^{-1} (11.62), length of panicle (21.81 cm) and weight of panicle hill^{-1} (41.47) than rest of the treatments under study followed by conventional, organic and low budget farming practices in that descending order of significance, whereas conventional and organic farming practices which were at par with each other in respect of mean number of panicles hill^{-1} (10.50 and 10.20, respectively) during investigation in the pooled data. Similar results were also found by Seema *et al.* (2016) [7] and Nahar *et al*. (2017) [3].

Effect on grain and straw yield

The data regarding grain and straw yield of *kharif* rice is presented in Table 2 discovered that the conservation farming practice reported significantly the highest grain (43.30 q ha^{-1}) and straw (66.15 q ha^{-1}) yield of *kharif* rice than rest of the treatments followed by conventional, organic and low budget in that descending order of significance during the study in the pooled data of two years. The grain yield of rice is a function of all these yield contributing characters of individual plants and ultimately higher grain and straw yield was received from the *kharif* rice. Similar results were observed in the research conducted by Singh *et al.* (2017) [9] and Gangaiah *et al.* (2019) [1].

Effect on economics

Data pertaining cost of *kharif* rice influenced due to the different farming practices are presented in Table 2. The *kharif* rice grown under conservation practice gained higher gross returns ₹ ha^{-1} (₹ 95, 692.47) followed by crop grown under conventional, organic and low budget. Whereas, Glimpse of the table insinuated that, the cost of cultivation (₹ ha^{-1}) was significantly higher when rice grown under organic farming practice (₹ 1, 26, 562.5) which was followed conventional, conservation and low budget farming practice in the declining order of significance. However, the *kharif* rice cultivated under low budget farming practice (₹ 18,389.5) recorded higher values of net returns (₹ 18389.5 ha^{-1}) and B:C ratio (1.32) under study followed by conservation, conventional and organic farming practice during pooled data of two years, respectively. Similar results reported by Singh (2012) [8] and Sapkota *et al*. (2015) [6].

Table 1: Effect of different farming practices on yield and yield attributes of *kharif* rice. (Pooled data of year 2020 and 2021)

Farming practices	Number of panicles hill^{-1}	Length of panicle (cm)	Weight of panicle hill^{-1} (g)	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})
C_1: Low budget	7.60	20.25	18.07	34.37	52.84
C_2: Organic	10.20	20.79	27.86	40.31	62.69
C_3: Conservation	11.62	21.81	41.47	43.30	66.15
C_4: Conventional	10.50	21.25	32.32	41.93	63.56
SE (m) ±	0.22	0.17	0.66	0.26	0.34
C.D. at 5%	0.56	0.43	1.64	0.63	0.84
GM	9.98	21.0	29.93	39.98	61.31

Table 2: Effect of different farming practices on economics of *kharif* rice. (Pooled data of year 2020 and 2021)

Farming practices	Gross returns (₹. ha^{-1})	Cost of cultivation (₹. ha^{-1})	Net returns (₹. ha^{-1})	B:C ratio
C_1: Low budget	76014.4	57625.0	18389.5	1.32
C_2: Organic	89315.1	126562.5	-37247.4	0.71
C_3: Conservation	95692.4	90212.7	5479.8	1.06
C_4: Conventional	92560.7	109928.9	-17368.2	0.84
SE (m) ±	522.3	332.0	541.6	0.01
C.D. at 5%	1609.2	1022.7	1668.6	0.02
GM	88395.7	96082.3	-7686.6	0.98

Conclusion

The study examined the effect of different farming practices on yield and economics of kharif rice. From the study, it can be concluded that adoption of conservation farming practice in rice crop could sustain productivity, whereas low budget farming practice reduce cost of cultivation with increasing net return.

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