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## Economic feasibility of organic manure-based treatments on crop performance in mustard, *Brassica juncea* (L.)

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### Abstract

Economics of Agriculture had direct impact on GDP of agri-based countries upto a large extent. The present study on field experiment was conducted during Rabi season on economic feasibility of mustard crop in 2020-2021. The experiment was laid with eight treatments and three replications in randomized block design. The result invoked that the cost of cultivation worth Rs. 49015 with gross income Rs. 131490 and net income costs Rs. 79640 per hectare in T5 (50% farm yard manure + 50% vermicompost + Natural liquid manure Jeevamrit). Which is at par with T6 (50% farm yard manure + 50% poultry manure + Natural liquid manure Jeevamrit) Whose cultivation cost Rs. 47980 with gross income Rs. 128655 and net income Rs. 61290 per hectare. Mathematically, the B: C Ratio of T5 (50% farm yard manure + 50% vermicompost + Natural liquid manure Jeevamrit) and T6 (50% farm yard manure + 50% poultry manure + Natural liquid manure Jeevamrit) treated plot was 1.62 and 1.59 respectively with with CD and SEM (+) revealed 0.15 and .05 respectively. Thus, application of T5 (50% farm yard manure + 50% vermicompost + Natural liquid manure Jeevamrit) was out yielded whereas T6 (50% farm yard manure + 50% poultry manure + Natural liquid manure Jeevamrit) was economically feasible for the mustard cultivation

**Keywords:** Mustard, FYM, vermicompost, poultry manure, Jeevamrit, gross & net income

### Introduction

India is fourth largest producer of oilseeds accounting for about 20% of the global area and 10% of the globe production. In terms of acreage, production and economic value, oilseeds are second only to food grains. Oilseed cultivation is undertaken across the country in about 27.04 million ha, largely under rained areas covering 72% and producing around 33.42 million tonnes of oilseeds during 2019-2020. Nine oilseeds are the major source of vegetable oil in the country. Among nine major oilseed soybean (33.5%), groundnut (30%), and rapeseed & mustard (27%), contribute more than 90% of total oilseeds production in the country. However in terms of vegetable oil production of mustard, soybean and groundnut contribute 27%, 34%, 30% respectively. The area and production of oilseeds is concentrated in the central and south part of India mainly in the state of Madhya Pradesh (27.89%), Rajasthan (21.49%), Maharashtra (14.84%), Gujarat, Andhra Pradesh and Karnataka. Central organization for oil industry and trade (COOIT) has estimated 89.5 lakh tonnes of mustard seed to be produced in the country in the ongoing Rabi season of 2021-2022 against 75 lakh tonnes recorded last year, which brings a growth of about 19% over last year. Due to the gap between domestic availability and actual consumption of edible oils, India has to resort to import of edible oils. Organic manures are being widely used these days in the cultivation of mustard. Rapeseed-mustard is considered as major source of income especially even to the marginal and small farmers. Organic manures have a balanced role in production efficiency of mustard. Organic manures when combinely used with inorganic fertilizers produces a good yield compared to conventional nutrient application of farming (Srikanth *et al.* 2020).

### Materials and Methods

The field experiment was conducted during Rabi season 2020-2021 at student instructional farm of A.N.D.U.A & T Kumarganj, Ayodhya (U.P). It is situated on Ayodhya-Raibareilly road about 42 km. Away from Ayodhya head quarter at 26°47' N latitude and 82°12' E longitude and at an altitude of about 113 meter above the mean sea level. The field was well leveled having assured irrigation and drainage facilities. All the required materials and facilities necessary for the cultivation are readily available in the Department.

The physio-chemical status of the surface soil (0-15 cm) of the experimental site are, sand 24.8%, silt 51.7%, clay 24.1%, soil texture: Silty Loam, Organic carbon: 0.51%, Available Nitrogen: 154 (kg ha<sup>-1</sup>), Available Phosphorus: 20.4 (kg ha<sup>-1</sup>), Available Potash: 218 (kg ha<sup>-1</sup>), Soil pH:8.1, EC 0.37 (dSm<sup>-1</sup>). Recommended dose of nutrients through Organic manures: Farm yard manure 10t ha<sup>-1</sup>, Vermicompost 8t ha<sup>-1</sup>, and Poultry manure 10t ha<sup>-1</sup>. The field experiment was laid out in RBD (randomized block design) with three replications. The experiment comprised 8 treatments i.e. T1-Control, T2-100% vermicompost, T3-100% farm yard manure, T4- 100% poultry manure, T5- 50% farm yard manure + 50% vermicompost + natural liquid manure jeevamrit, T6- 50% farm yard manure + 50% poultry manure + natural liquid manure jeevamrit, T7 - 50% farm yard manure+ 25% vermicompost+ 25% poultry manure+ natural liquid manure jeevamrit, T8- 25% farm yard manure+ 50% vermicompost+ 25% poultry manure + natural liquid manure jeevamrit.

Application of organic manure was applied and mixed in soil before sowing of mustard as per the treatments, half does of Jeevamrit was applied as basal and remaining half was applied as top drashing. Beejamrit treated Mustard seeds @ 6 kg ha<sup>-1</sup> were used in respective treatments for sowing manually with a distance of 45×20. Two irrigations (5 cm each) were given at rosette stage (25 DAS) and at silique formation stage (55 DAS), two hand weeding was done by khurpi at 30 & 60 DAS. Grain and stalk yields were recorded after proper sun-drying and tagged in bundles. Each bundle was weighed, threshed and cleaned separately and seed yield per plot was calculated from net plot. Grain and straw yields were recorded separately.

Moisture in the seed was 10 per cent at the time of harvesting. Randomly selected 5 plants were taken from each plot for agronomic observations of yield and yield parameters. Test weight of 1000 seeds from each plot was recorded with the seed yield.

Common cost of cultivation as well as treatment wise cost of cultivation on hectare basis was worked at the rates prevailed

during 2020-2021. The per hectare yield of the mustard crop was converted into gross return on the basis of current price of the produce. The net return was worked out by using following formula

$$\text{Net return (Rs.)} = \text{Gross return (Rs.)} - \text{Cost of cultivation (Rs.)}$$

The benefit cost ratio (BCR) was worked out on the basis of net return (Rs.) per unit cost of cultivation (Rs.).

$$BCR = \frac{\text{Net Return (Rs./ha)}}{\text{Cost of Cultivation (Rs./ha)}}$$

## Results and Discussion

As evident from the data given in table 1 and table 2, the effect of organic manure on cost of cultivation, gross income, net income and benefit cost ratio were found different in all the treatments. Use of 50% farm yard manure + 50% vermicompost + natural liquid manure jeevamrit in T5 treatment found most significant effect of organic manure over other treatments. Higher Cost of cultivation (49015 Rs/ha) was found in T5 while lowest (45378 Rs/ha) was found in control. Similarly Maximum Gross and net income (131490, 76640 Rs/ha) respectively found in T5 treatment and minimum (97562, 52184 Rs/ha) were recorded in control.

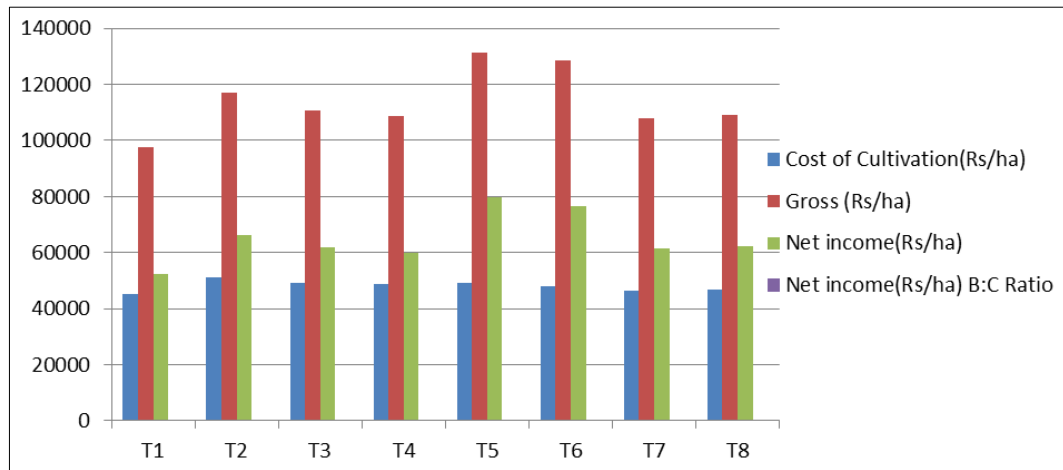
Application of 50% farm yard manure + 50% poultry manure + natural liquid manure jeevamrit in T6 treatment found relatively low cost of cultivation (47980 Rs/ha) than T5 treatment but the B:C ratio (1.59) of T5 treatment was found nearly close to T6 treatment B:C ratio (1.62). Thus application of T5- 50% farm yard manure + 50% vermicompost + natural liquid manure jeevamrit was out yielded whereas T6- 50% farm yard manure + 50% poultry manure + natural liquid manure jeevamrit was economically feasible for the mustard cultivation. The same findings are also supported by Dahiphale and Khandgale (2007) <sup>[1]</sup>, Ramesh *et al.* (2009) <sup>[4]</sup>, Patel *et al.* (2010) <sup>[3]</sup>, Donale *et al.* (2011) <sup>[2]</sup> and Tripathi *et al.* (2012) <sup>[6]</sup>.

**Table 1:** Effect of different organic manure on cost of cultivation and B: C Ratio of mustard in mustard

	Treatment combination	Cost of cultivation (Rs/ha)	B:C Ratio
T1	Control	45378	1.14
T2	100% vermicompost	51003	1.29
T3	100% farm yard manure	49115	1.25
T4	100% poultry manure	48802	1.22
T5	50% farm yard manure + 50% vermicompost + natural liquid manure jeevamrit	49015	1.62
T6	50% farm yard manure + 50% poultry manure + natural liquid manure jeevamrit	47980	1.59
T7	50% farm yard manure+ 25% vermicompost + 25% poultry manure + natural liquid manure jeevamrit	46512	1.31
T8	25% farm yard manure+ 50% vermicompost + 25% poultry manure + natural liquid manure jeevamrit	46625	1.33
	SEM (+)	100.87	0.05
	CD (P=0.05)	305.96	0.15

**Table 2:** Effect of different organic manure on gross income and net income (Rs/ha) in mustard

	Treatment combination	Gross income (Rs/ha)	Net income (Rs/ha)
T1	Control	97562	52184
T2	100% vermicompost	117137	66134
T3	100% farm yard manure	110840	61725
T4	100% poultry manure	108720	59918
T5	50% farm yard manure + 50% vermicompost + natural liquid manure jeevamrit	131490	79640
T6	50% farm yard manure + 50% poultry manure + natural liquid manure jeevamrit	128655	76510
T7	50% farm yard manure + 25% vermicompost + 25% poultry manure+ natural liquid manure jeevamrit	107802	61290
T8	25% farm yard manure+ 50% vermicompost+ 25% poultry manure + natural liquid manure jeevamrit	109035	62410
	SEM (+)	2474.77	408.77
	CD (P=0.05)	7506.49	1239.88



**Fig 1:** Effect of different organic manure on cost of cultivation, gross income, net income (Rs/ha), B:C Ratio of mustard

### Conclusion

On the basis of field experiment conducted on Economic feasibility of organic manure based treatments on crop performance in mustard, *brassica juncea* (L.). It can be concluded that T5 (50% farm yard manure + 50% vermicompost + Natural liquid manure Jeevamrit) was found superior among other organic based treatments in terms of yield. But economic feasibility was observed in T6 (50% farm yard manure + 50% poultry manure + Natural liquid manure jeevamrit) for the mustard cultivation.

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