



## ASSESSMENT OF ECONOMIC VIABILITY OF CHILLI (CAPSICUM ANNUUM L) CROP WITH APPLICATION OF DIFFERENT FERTILIZER TREATMENTS

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### **Abstract:**

Based on primary data as yield obtained from present research work and with the help of questionnaire through personal interview from farmers, cost benefit analysis on field experiment for Chilli crop was carried out. The present research aimed to analyze the cost and return of Chilli vegetable using organic and chemical fertilizer treatments. Experimental study area is one hectare with five treatments where T<sub>5</sub> was kept as control and four others treatment were T<sub>1</sub>-Vermicompost @ 3.5 t/ha, T<sub>2</sub>-NADEP compost @ 6.25 t/ha, T<sub>3</sub>-pit compost @ 6.25 t/ha, and T<sub>4</sub>-chemical fertilizer (300:150:150- N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O kg/ha). Yield of Chilli was harvested after 90<sup>th</sup> day. The per hectare cost of cultivation of Chilli crop was Rs 2,25,138 which gives gross returns of Rs 2,81,350 with the application of vermicompost treatment (T<sub>1</sub>). The per hectare cost of cultivation of Chilli crop was Rs 1,74,928 which gives gross returns of Rs 2,11,840 with the application of NADEP compost treatment (T<sub>2</sub>). The per hectare cost of cultivation of Chilli crop was Rs 1,70,239 which gives gross returns of Rs 2,54,870 with the application of pit compost treatment (T<sub>3</sub>). The per hectare cost of cultivation of Chilli crop was Rs 1,50,536 which gives gross returns of Rs 2,99,721 with the application of chemical fertilizer treatment (T<sub>4</sub>). The per hectare cost of cultivation of Chilli crop was Rs 1,37,501 which gives gross returns of Rs 1,83,705 in control treatment (T<sub>5</sub>). It was found that Chilli crop found more profitable with application of chemical fertilizer treatment (with yield - 9055 kg/ha) followed by pit compost (with yield - 7700 kg/ha), control (with yield - 5550 kg/ha), vermicompost treatment (with yield - 8,500 kg/ha) and NADEP compost treatment (with yield - 6400 kg/ha) respectively. The input output ratios were about 1.24, 1.21, 1.49, 1.99 and 1.33 in the treatment T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> respectively. The higher B: C ratios (1.99) clearly indicated that cultivation of Chilli crop with chemical fertilizer treatment was found to be profitable as compared to remaining fertilizer treatment. The analysis of the data revealed that, the B/C ratio was more (1:1.99) with higher yield (9055 kg/ha) with application of chemical fertilizer treatment to the Chilli crop followed by pit compost treatment with B/C ratio 1:1.33. Lowest profit came out (Rs 36,912) in NADEP compost treatment with B/C ratio 1:21. Chilli crop was most profitable with application of chemical fertilizer treatment followed by pit compost treatment.

### **Introduction:**

The analysis of the cost and returns (benefit) from the production will provide a synoptic view of the economics of production of Chilli crop. Organic agriculture can be significantly more profitable than conventional agriculture and also beneficial to soil health and environment. Organic farming provides uncontaminated food sustainably to the population of the world. The sustainable organic agriculture can be profitable (Reganold, 2011). The main factors those determine the

profitability of organic agriculture includes crop yields, labor costs, price premiums for organic products, potential for reduced income during the organic transition period, and potential cost savings from the reduced use of nonrenewable resources and purchased inputs (Zender et al, 2001). Organic farming tends to conserve existing soil fertility and system stability better than the conventional systems. This is mostly due to higher organic matter contents and higher biological activity in organically farmed agricultural soils than in conventionally managed soils (Pimentel, 2005). Agricultural sector provided the foods to the entire world which has to be valued based on health benefits. The Benefit to cost ratio (BCR) is the ratio of the benefits of an activity or production, relative to its costs, both expressed in tangible or monetary terms (Mehmood et al., 2011). Sanders and co worker (2008) shows that organic crops are more profitable than conventional production of crops based on their high price premium which they earn from the markets. Considering these aspects, the present study aimed to find out the most cost-effective of production of Chilli crop using different recommended rates of organic and chemical fertilizer and to identify the most profitable fertilizer treatment.

### Materials and methods:

In current investigation, based on primary data as yield obtained from present research work and with the help of questionnaire through personal interview from farmers, cost benefit analysis on field experiment for Chilli crop was carried out. The field experiment was conducted with five treatments via T<sub>1</sub> (vermicompost prepared from agricultural solid waste and cow dung), T<sub>2</sub> (NADEP compost prepared from agricultural solid waste and cow dung), T<sub>3</sub> (pit compost prepared from municipal solid waste), and T<sub>4</sub> (chemical fertilizer) and T<sub>5</sub> (control). Experimental study area is one hecter with five treatments where T<sub>5</sub> was kept as control and four others treatment were T<sub>1</sub>-Vermicompost @ 3.5 t/ha, T<sub>2</sub>-NADEP compost @ 6.25 t/ha, T<sub>3</sub>-pit compost @ 6.25 t/ha, and T<sub>4</sub>-chemical fertilizer (300:150:150- N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O kg/ha),. Yield of Chilli was harvested after 90<sup>th</sup> day. Yield of Chilli were harvested after 90<sup>th</sup> day. The required cost of assets and materials related to cultivation of Lady's figure plant were Presented in Table 1. Fertilizer treatments were detailed below,

#### Fertilizer treatment details:

- T<sub>1</sub> : Vermicompost prepared from agricultural solid waste @ 3.5 t/ha, (Ponmani and Udayasoorian, 2014)
- T<sub>2</sub> : NADEP compost prepared from agricultural solid waste @ 6.25 t/ha, (Aryal and Tamrakar., 2013).
- T<sub>3</sub> : Pit compost prepared from municipal solid waste @ 6.25 t/ha, (Aryal and Tamrakar, 2013).
- T<sub>4</sub> : Chemical fertilizer 300:150:150- N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O Kg/ha, (Krushidarshani, 2014).
- T<sub>5</sub> : Control

As per the recommendations of the Expert Committee Govt. of India, the items of cost of cultivation cover both the paid out costs and the imputed costs. The paid cost includes (1) hired labour cost (human + animal + machinery), (2)maintenance expenses on owned animals and machineries, (3) expenses on material inputs (4) depreciation on agricultural implements, machineries and farm building (5) cost against land revenue (6) miscellaneous expenditures (7) interest on working capitals. The imputed costs consists of value of family labour, rent of owned land and interest on owned fixed capitals for which the farmer does not incur any cash expense (Government of India, 1990).

Economic parameters were calculated by using following formulae's - (Nandeshwar et al, 2013; Grema and Gashua, 2014; Barakade et al, 2011; Mehmood et al, 2011; RAWE manual, 2017 and Vedpathak and Chavan, 2018).

Depreciation value = (Present value assets–Junk value assets)/Remaining life of assets

Junk value = 10 % from present value of assets

Per hecter depreciation cost = Total depreciation/cropped area

Cost of cultivation =  $\boxed{\text{Cost A}}$ +  $\rightarrow$  subsequent  $\boxed{\text{Cost B}}$ +  $\rightarrow$  subsequent  $\boxed{\text{Cost C}}$

Rental value of land = 1/6 of gross produce - Land revenue cess and taxes

Profit (Rs) = gross return – total cost of cultivation

BC ratio = Gross return/total cost of cultivation

The main objective of the present economic assessment is to evaluate cost of cultivation in Chilli crop with application of organic and chemical fertilizers treatments in comparison with control.

### Result and discussion:

The major objective of this study is to find the benefit cost ratio, unit cost of production of Chilli crop grown with the application of vermicompost, NADEP compost, pit compost, chemical fertilizer treatments. Number of labours, quantity of seeds, machinery charges, irrigation charges, land revenue and taxes, depreciation cost, interest on fixed capital were utilized same in all the treatments. Cost of vermicompost, NADEP and pit compost Rs. 6,000/ton, Rs. 3,000/ton and Rs. 3,000/ton were used in concern treatments. Required cost of assets and materials for the cultivation of Chilli crop were shown in Table No. 1.

**Table 1: Expenditure items for cultivation of Bitter Guard production (Vedpathak and Chavan, 2018)**

Sr. No.	Items	Expenditure (Rs)
1	Hired male labour	300 for 8 hours per day
2	Hired female labour	150 for 8 hours per day
3	Sowing through Bullock pair	Rs. 4500/- per hectore
4	Machinery charges (ploughing, clod crushing, harrowing and levelling)	Rs. 10000/- per hectore
5	Vermicompost	Rs. 6/- per kg
6	NADEP compost	Rs. 3/- per kg
7	Pit compost	Rs. 3/- per kg
8	Urea	Rs. 5.96/- per kg
9	Single super phosphate (SSP)	Rs. 7.6/- per kg
10	Murate of potash (MOP)	Rs. 11.3/- per kg
11	Drip irrigation set	Rs. 100000/- per hectore
12	Electric motor (3 HP)	Rs. 10000/-
13	Electrical charges	Rs. 1500 for three months (For 3 HP E. Motor)
14	Insecticides/Fungicides	Not used
15	Repairs to implements and machinery	Not repaired
16	Land revenue cess and taxes	Rs. 110/- per hectore for irrigated land.
17	Travelling cost for organic fertilizers	Rs. 500/- per tonne
18	Farm house/farm building	Rs. 100000/-
19	Sprayer (for one NAG)	Rs. 1500/-
20	Weeding hook for (one NAG)	Rs. 140/-
21	Sickle (for one NAG)	Rs. 140/-
22	Spade (for one NAG)	Rs. 250/-
23	Kudali (for one NAG)	Rs. 300/-
24	Pickaxe (for one NAG)	Rs. 500/-
25	Axe (for one NAG)	Rs. 300/-
26	Ghameli (For one NAG)	Rs. 220/-
27	Iron bar (For one NAG)	Rs. 500/-
28	Junk value	10% from present value of assets
29	Interest on working capitals	6% for seasonal crop
30	Interest on fixed capitals	10% per year

**Table 2**  
**Economics analysis of Chilli (*Capsicum annum L*) production after 90<sup>th</sup> days**

Sr. No	Treatments →	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
	Economics Particulars ↓	Expenditure (Rs)				
1	Hired human labours (Male)	3,600	3,600	3,600	3,600	3,600
	Hired human labours (Female)	11,550	11,550	11,550	11,550	11,550
2	Bullock labour	0	0	0	0	0
3	Machinery charges	10,000	10,000	10,000	10,000	10,000
4	Seed (125gm)	2,250	2,250	2,250	2,250	2,250
5	Fertilizers	37,500	18,750	18,750	2,699	0
6	Irrigation Charges	1,500	1,500	1,500	1,500	1,500
7	Plant protection	0	0	0	0	0
8	Repairs to implement and machinery	0	0	0	0	0
9	Land revenue cess and taxes	110	110	110	110	110
10	Expenses on acquisition of inputs and miscellaneous	3,000	3,000	3,000	100	100
	<b>Working capital (1 to 10)</b>	69,510	50,760	50,760	31,809	29,110
11	Depreciation on farm implements, machinery and buildings	11,722	11,722	11,722	11,722	11,722
12	Interest on working capital	4,171	3,046	3,046	1,909	1,747
	<b>Cost A (Working capital + 11 + 12)</b>	1,54,913	1,16,288	1,16,288	77,249	71,689
13	Rental value of land	46,782	35,197	42,369	49,844	30,508
14	Interest on fixed capital (Fixed cost Rs. 211928/-)	21,193	21,193	21,193	21,193	21,193
	<b>Cost B (Cost A+13+14)</b>	2,22,888	1,72,678	1,67,989	1,48,286	1,35,251
15	Family labours (Male/Female)	2,250	2,250	2,250	2,250	2,250
	<b>Cost C (Cost B + 15)</b>	2,25,138	1,74,928	1,70,239	1,50,536	1,37,501
16	Yield kg per ha.	8,500	6,400	7,700	9,055	5,550
17	Selling price (Rs per kg)	33.1	33.1	33.1	33.1	33.1
18	Gross return	2,81,350	2,11,840	2,54,870	2,99,721	1,83,705
19	Total income	56,212	36,912	84,631	1,49,185	46,204
20	BC ratio	1.24	1.21	1.49	1.99	1.33

T<sub>1</sub> indicates vermicompost, T<sub>2</sub> indicates NADEP compost, T<sub>3</sub> indicates pit compost, T<sub>4</sub> indicates chemical fertilizers, and T<sub>5</sub> indicates control. Fraction rounded off to complete figures.

### Conclusion:

The B/C ratio in present study was more (1:1.99) with higher yield (9055kg/ha) by the application of chemical fertilizer treatment to the Chilli crop. Therefore, the analysis of the data

revealed that, Chilli crop is most profitable with application of chemical fertilizer treatment followed by pit compost treatment.

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