

A Study on Cost Benefit Analysis of Tur (Red Gram) With Reference To Dry Land in

Solapur District

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The present study was carried out in all the tehsils in Solapur district to study cost of cultivation, prices and profitability of Tur (Red Gram) production. The study was based on the primary data of 50 Tur (Red Gram) cultivators for the year 2020-21. The average per acre cost of cultivation of Tur (Red Gram) was estimated to Rs. 18889 and per quintal cost was estimated to Rs. 5373. Amongst the different items of cost, human labour cost and machine labour cost was the major components of variable cost. Rental value of owned land is the major component of cost in case of fixed costs. The average production of Tur (Red Gram) was 3.52 quintal per acre. The minimum support price for Tur (Red Gram) crop was Rs. 5800. The gross returns obtained from Tur (Red Gram) crop were Rs. 19906 and Net Return was Rs. 1017 it means that Tur (Red Gram) growers have earned the profit. The benefit-cost ratio of Kharif Tur (Red Gram) in sample area was 1.05. It means that farmers have invested 1 rupee in Tur (Red Gram) production but they earn 0.5 paise net profit per rupees. This profit is not a significant profit.

Keywords: Cost, Prices, Profitability, Gross Return, Net Return, Cost Benefit Ratio, Area, Production, Productivity.

1. Introduction:

Pigeon pea (Arhar) commonly known as red gram or Tur is a very old crop of this country. After gram, Arhar is the second most important pulse crop in the country. It is mainly eaten in the form of split pulse as 'dal'. Seeds of Arhar are also rich in iron, iodine, essential amino acids like lysine, threonine, cysteine and arginine etc. Tur (Red Gram) is the most important Pulse crop in India. It is a drought tolerant crop which is cultivated in low rainfall. It was originated in Africa and India. This crop is raised in Kharif season. Uttar Pradesh, Madhya Pradesh, Maharashtra, Bihar, Andhra Pradesh, Punjab, Haryana, West Bengal, Assam, Orissa, Rajasthan, Himachal Pradesh, Gujarat, Jammu and Kashmir, Karnataka, Tamil Nadu, Kerala these are the major Tur (Red Gram) cultivating states in India. Tur (Red Gram) is used as human food in various forms. Tur is also used as a cattle feed (Dried Leaves in the form of Bhusa). Tur (Red Gram) crops are Kharif crops grown in the months of June and July and harvested between December and January. Duration of Tur (Red Gram) crop was 170 to 180 days. Total Estimated area under Tur (Red Gram) crop was 4714.55 thousand hectares, estimated production was 4092.56 thousand tonnes and productivity was 868 kg per hectore. In Maharashtra total area under Tur (Red Gram) crop was 1281.42 thousand hectares, production was

1173.97 thousand tonnes and productivity was 916 kg per hectore. In Solapur district total area under Tur (Red Gram) crop was 515.32 hundred hectares, production was 294.32 hundred tonnes and productivity was 571.13 kg. per hectore. Solapur district is also one of the major Tur (Red Gram) producing districts in Maharashtra. In all the tehsils of Solapur district Tur was cultivated. The present investigation was attempted to study cost of cultivation of Tur production, prices of Tur Production, profitability of Tur production and cost benefit ratio of Tur production in the study area.

2. Objectives Of The Study:

The main objective of study is to analyse the costs and prices of Tur (Red Gram) with reference to dry land in Solapur district and specific objectives of the present study are as follows-

1. To analyse the cost of Tur (Red Gram) Production in the area under study.
2. To study the prices for Tur (Red Gram) Production in area under study.
3. To study the profitability of Tur (Red Gram) Production in the area under study.
4. To estimate the benefit cost ratio of Tur (Red Gram) production in study area.

3. Hypothesis:

1. Tur (Red Gram) crop is not profitable.

4. Research Methodology:

For the study undertaken researcher has used the multistage sampling. For the selection of sample farmers researcher has used the purposive sampling method. For selection of farmers researcher has selected non-irrigated land farmers purposefully and quota sampling method is used to select the Tur (Red Gram) crop farmer. Therefore, the researcher has used the purposive quota sampling method because there is no exact data of non-irrigated farmers of selected crops in Solapur district. The study was conducted in Solapur district as whole. From Solapur district all 11 tahsils i.e Pandharpur, Mangalweda, Malshiras, Madha, Karmala, Akkalkot, Barshi, Mohol, Sangola, Solapur North & Solapur South having maximum area under Tur (Red Gram) cultivation were selected. The study was based on primary data for the year 2020-21. Thus for present study 50 Kharif Tur (Red Gram) growers were selected as per the quota sampling method. These 50 respondents were selected from each tehsil. Data collection was made by preparing separate questionnaire/ interview schedule for Tur (Red Gram) producer.

5. Result And Discussion:

1. Estimated Cost of Cultivation & Total Cost of Tur (Red Gram) in Solapur District

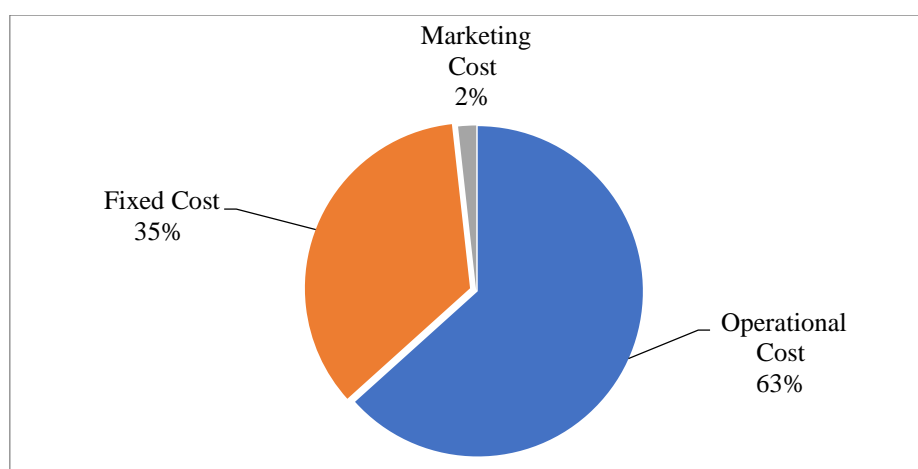
Table 4.1 Estimated Cost of Cultivation and Total Cost of Tur (Red Gram) in Solapur District

₹ Per Acre)

Sr. No	Elements of cost	ATC	%	Min.	Max.	SD
1	Human Labour- Hired	2713	14.36	0	10000	2154
2	Human Labour- Family	3029	16.04	0	12000	2631
3	Bullock Labour - Hired	452	2.39	0	6667	1161
4	Bullock Labour - Owned	8	0.04	0	933	132
5	Machine Labour - Hired	1922	10.18	0	5000	1244
6	Machine Labour - Owned	0	0.00	0	0	0
7	Seeds	575	3.04	80	1800	370
8	Fertilizer	869	4.60	0	3000	646
9	Manure	471	2.49	0	8000	1530
10	Insecticides	1020	5.40	0	6000	1028
11	Irrigation (Water + Electricity Charges)	144	0.76	0	350	93
12	Crop Insurance	110	0.58	0	650	180
13	Interest on Working Capital	648	3.43	264	1379	257
14	Miscellaneous	2	0.01	0	40	7
I)	Operational Cost (1 to 14)	11963	63.33	6287	28079	5006
15	Rental Value of Owned Land	5556	29.41	2800	14000	1821
16	Rent Paid on Leased land	0	0.00	0	0	0
17	Land Revenue, Cesses & Taxes	27	0.14	0	260	51
18	Depreciation of Farm Builds & Implements	287	1.52	0	840	188
19	Interest on Fixed Capital	725	3.84	187	2800	652
II)	Fixed Cost (15 to 19)	6594	34.91	3083	16393	2172
III)	Total Cost of Cultivation (I + II)	18557	98.24	11116	34765	5758
20	Packaging cost	91	0.48	4	1200	173
21	Transportation Cost	191	1.01	10	1200	215
22	Sales Expenses in Market Committee	50	0.27	4	167	42
IV)	Selling And Distribution Cost (20 to 22)	332	1.76	14	2460	394
	Total Cost / Cost of Sales (III + IV)	18889	100.00	11140	34799	5912

(Source: Field Survey)

Figure 4.1, Estimated Cost of Cultivation and Total Cost of Tur (Red Gram)



Variable Cost/ Operational Cost of Tur (Red Gram)-

In Tur production human labour cost is the major variable cost. Hired Human labour cost incurred was ₹ 2713 (12.75%) per acre, and family labour cost incurred was ₹ 3029 (14.24%) per acre. Family labour cost is more as compared to hired human labour cost. Hired Bullock labour cost incurred was ₹ 452(2.12%) per acre and there is no owned bullock labour cost because the farmers have not owned the bullock labour. Hired machine labour cost incurred was ₹ 1952 (9.04%) per acre and there is no owned machine labour cost because the farmers have not owned the machine labour. Seeds cost incurred was ₹ 575 (2.70%) per acre for Tur production. Fertilizer cost incurred was ₹ 869 (4.08%) per acre. In case of Tur production manure cost incurred was ₹ 471 (2.21%) per acre. Insecticides cost incurred was ₹ 1020 (4.80%) per acre. Irrigation cost incurred was ₹ 144 (0.68%) per acre which includes water and electricity charges. In Tur production crop insurance cost incurred was ₹ 110 (0.52%) per acre. Interest on Working capital cost incurred was ₹ 648 (3.05%) per acre and miscellaneous cost incurred was ₹ 2 (0.01%) per acre in the sample study area. The average total operational or variable cost incurred was ₹ 11963 (56.24%), minimum cost incurred was ₹ 6287, maximum cost incurred was ₹ 28079 per acre and standard deviation was 5006 in the selected sample study area. So, from the variable cost analysis it was observed that human labour cost and machine labour cost is the major components of operational or variable cost. Cost of miscellaneous, crop insurance and irrigation are very less in case of Tur production.

Fixed Cost of Tur (Red Gram)-

In the case of Tur production rental value of owned land is the major component of fixed cost. Rental value of owned land cost incurred was ₹ 5556 (29.41%) per acre in sample study area. There is no cost of rent paid on leased land because in sample area no any farmer was taken land on lease. Land revenue, cesses and taxes cost incurred was ₹ 27 (0.14%) per acre. Depreciation of farm builds and implements cost incurred was ₹ 287 (1.52%) per acre. Interest on fixed capital cost incurred was ₹ 725 (3.84%) per acre. Average total fixed cost of Tur cultivation incurred was ₹ 6594 (34.91%), minimum cost was ₹ 3083, maximum cost was ₹ 16393 per acre and standard deviation was 2172. So, from the analysis of fixed cost it was observed that rental value of owned land is the major component of cost in case of fixed costs. It was also observed that there is no cost of rent paid on leased in land because all the selected farmers have their own land. Land revenue, cesses and taxes cost is very less in fixed costs.

Total Cost of Cultivation of Tur (Red Gram)-

The average total cost of cultivation of Tur was ₹ 18557 (98.24%), minimum cost was ₹ 11116, maximum cost was ₹ 34765 per acre and standard deviation was 5758. Out of total cost of cultivation operational cost was ₹ 11963 (63.33%) and fixed cost was ₹ 6594 (34.91%).

In the case of Tur production the packaging cost was incurred ₹ 91 (0.48%) per acre in drought prone area of Solapur district. Majority of the Tur farmers sale their production at local markets (block and district market) the transportation cost from farm to local market was ₹ 191 (1.01%) per acre. The average sales expenses in market committee (portage, weight & other cost) incurred was ₹ 50 (0.27%) per acre. The average total selling and distribution cost of Tur was ₹ 332 (1.76%), minimum cost was ₹ 14, maximum cost was 2460 per acre and standard deviation was 394 in the study area of Solapur district.

Total Cost /Cost of sales of Tur (Red Gram)-

In Tur farming, per acre average total cost or cost of sales incurred was (total cost of cultivation + total marketing cost) ₹ 18889, minimum cost was ₹ 11140 and maximum cost was ₹ 34799 per acre and standard deviation was 5912 in the study area. The share of variable cost in total cost or cost sales was ₹ 11963 (63.33%), fixed cost was ₹ 6594 (34.91%) and selling and distribution cost was ₹ 332 (1.76%). From this table it was observed that per acre cost of Tur production was ₹ 18889.

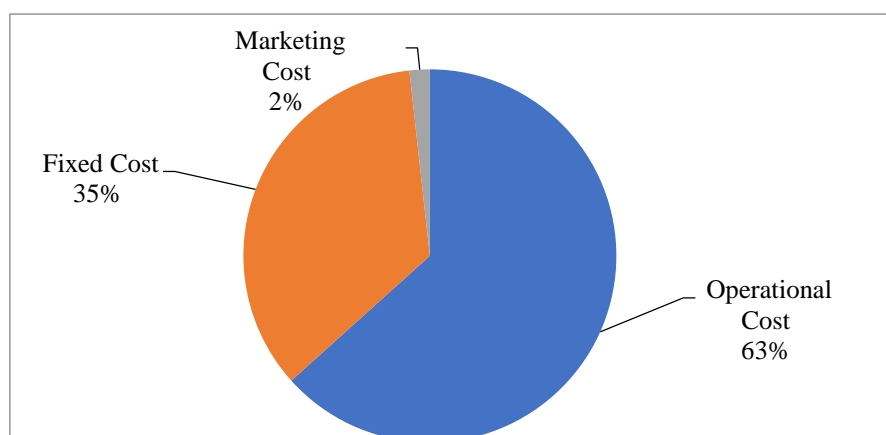
2. Estimated Cost of Production and Total Cost of Tur (Red Gram) in Solapur District: Table4.3 Estimated Cost of Production and Total Cost of Tur (Red Gram) in Solapur District (₹ Per Quintal)

Sr. No	Elements of cost	ATC	%	Min.	Max.	SD
1	Human Labour- Hired	772	14.36	0	6000	1390
2	Human Labour- Family	862	16.04	0	13000	2001
3	Bullock Labour - Hired	129	2.39	0	3750	560
4	Bullock Labour - Owned	2	0.04	0	933	132
5	Machine Labour - Hired	547	10.18	0	5000	922
6	Machine Labour - Owned	0	0.00	0	0	0
7	Seeds	163	3.04	33	1667	290
8	Fertilizer	247	4.60	0	2500	387
9	Manure	134	2.49	0	1333	294
10	Insecticides	290	5.40	0	5000	712
11	Irrigation (Water + Electricity Charges)	41	0.76	0	600	105
12	Crop Insurance	31	0.58	0	1400	205
13	Interest on Working Capital	184	3.43	53	2070	310
14	Miscellaneous	0	0.01	0	16	3
D)	Operational Cost (1 to 14)	3403	63.33	1177	36570	5575
15	Rental Value of Owned Land	1580	29.41	267	14000	2445
16	Rent Paid on Leased land	0	0.00	0	0	0
17	Land Revenue, Cesses & Taxes	8	0.14	0	120	27
18	Depreciation of Farm Builds & Implements	82	1.52	0	567	136
19	Interest on Fixed Capital	206	3.84	46	2800	576
II)	Fixed Cost (15 to 19)	1876	34.91	288	16110	3061
III)	Total Cost of Cultivation (I + II)	5278	98.24	1516	52680	8355
20	Packaging cost	26	0.48	3	80	16
21	Transportation Cost	54	1.01	7	150	28
22	Sales Expenses in Market Committee	14	0.27	3	100	18
IV)	Selling and Distribution Cost (20 to 22)	94	1.76	17	330	54
	Total Cost / Cost of Sales (III + IV)	5373	100.00	1633	52680	8090

(Source: Field Survey)

Figure 4.2

Estimated Cost of Production and Total Cost of Tur (Red Gram)



Variable Cost/ Operational Cost of Tur (Red Gram)-

In Tur production human labour cost is the major variable cost. Hired Human labour cost incurred was ₹ 772 (14.36%) per quintal, and family labour cost incurred was ₹ 862 (16.04%) per quintal. Family labour cost was more as compared to hired human labour cost. Hired Bullock labour cost incurred was ₹ 129 (2.39%) per quintal and owned bullock labour cost is incurred ₹ 2 (0.04%). Hired machine labour cost incurred was ₹ 547 (10.18%) per quintal and there is no owned machine labour cost incurred due to farmers have not owned machines. Seeds cost incurred was ₹ 163 (3.04%) per quintal for Tur production. Fertilizer cost incurred was ₹ 247 (4.60%) per quintal. In case of Tur production manure cost incurred was ₹ 134 (2.49%) per quintal. Insecticide's cost incurred was ₹ 290 (5.40%) per quintal. Irrigation cost incurred was ₹ 41 (0.76%) per quintal which includes water and electricity charges. In Tur production crop insurance cost incurred was ₹ 31 (0.58%) per quintal. Interest on Working capital cost incurred was ₹ 184 (3.43%) per quintal and miscellaneous cost incurred was ₹ 0 (0.01%) per quintal in the sample study area. The average total operational or variable cost incurred was ₹ 3403 (63.33%), minimum cost incurred was 1177, maximum cost incurred was 36570 per quintal in the selected sample study area and standard deviation of operational cost was 5575. So, from the variable cost analysis it was observed that human labour cost (30.40%) and machine labour cost (10.18%) was the major components of operational or variable cost. Cost of miscellaneous (0.01%), bullock labour owned (0.04) and crop insurance (0.58%) was very less in case of Tur production.

Fixed Cost of Tur (Red Gram) -

In the case of Tur production rental value of owned land is the major component of fixed cost. Rental value of owned land cost incurred was ₹ 1580 (29.41%) per quintal in sample study area. There is no cost of rent paid on leased land because in sample area no any farmer was taken land on lease. Land revenue, cesses and taxes cost incurred was ₹ 8 (0.14%) per quintal. Depreciation of farm

builds and implements cost incurred was ₹ 82 (1.52%) per quintal. Interest on fixed capital cost incurred was ₹ 206 (3.84%) per quintal. The average total fixed cost of Tur cultivation incurred was ₹ 1876 (34.91%), minimum cost was ₹ 288, maximum cost was ₹ 16110 per quintal and standard deviation of fixed cost was 3061. So, from the analysis of fixed cost, it was observed that rental value of owned land (29.41%) is the major component of cost in case of fixed costs. It was also observed that there was no cost of rent paid on leased in land because all the selected farmers have their own land. Land revenue, cesses and taxes cost (0.14%) was very less in fixed costs.

Total Cost of Cultivation of Tur (Red Gram) -

The average total cost of cultivation of Tur per quintal was ₹ 5278 which was 98.24% of total cost or cost of sales. Minimum cost was ₹ 1516 and maximum cost was ₹ 52680 per quintal. The standard deviation of total cost of cultivation was 8355. Out of total cost of cultivation operational cost was ₹ 3403 (63.33%) and fixed cost was ₹ 1876 (34.91%).

Selling and Distribution Cost of Tur (Red Gram) -

This table shows the selling and distribution cost of per quintal Tur production. The packaging cost was incurred ₹ 26 (0.48%) per quintal in draught area of Solapur district. Majority of the Tur farmers sale their production at local markets (block and district market) the transportation cost from farm to local market was ₹ 54 (1.01%) per quintal. The average sales expenses in market committee (portage, weigh & other cost) incurred was ₹ 14 (0.27%) per quintal. The average total selling and distribution cost of Tur was ₹ 94 (1.76%), minimum cost was ₹ 17 and maximum cost was ₹ 330 per quintal in study area of Solapur district. Standard deviation of selling and distribution cost was 54.

Total Cost /Cost of sales of Tur (Red Gram)-

In Tur farming, the average total cost or cost of sales was (total cost of cultivation + total selling and distribution cost) ₹ 5373, minimum cost was 1633 maximum cost was 52680 per quintal in the study area. The standard deviation of total cost was 8090. The share of variable cost in total cost or cost sales was ₹ 3403 (63.33%), fixed cost was ₹ 1876 (34.91%) and marketing cost was ₹ 94 (1.76 %). From this table it was observed that per quintal cost of Tur production was ₹ 5373.

3. Gross Returns, Net Return and Benefit-Cost Ratio of Tur (Red Gram):Table 4.3

Gross Returns, Net Return and Benefit-Cost Ratio of Tur (Red Gram) (₹ Per Acre)

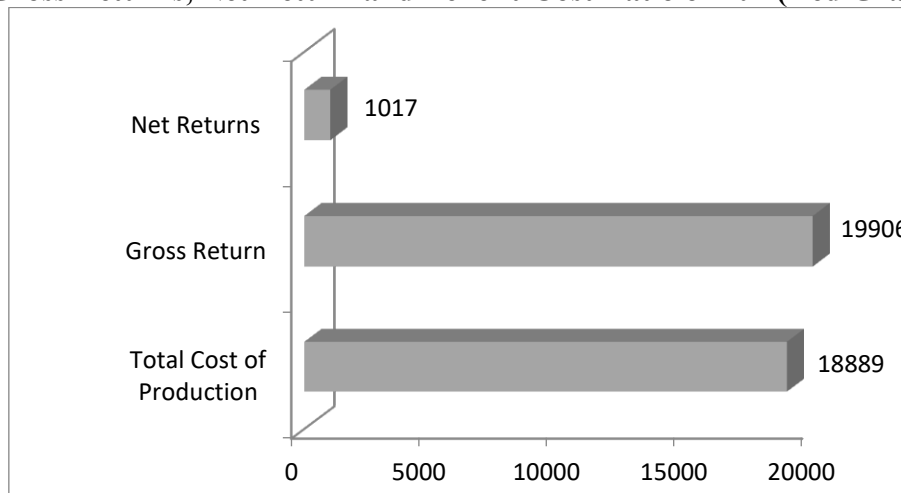
Sr. No	Factor	Details	Returns
1	Gross Return	A) Own Consumption (in quintal)	0.03
		Price (in Rs.)	5100
		Gross Return (output* price)	153
		B) Production Sold (in quintal)	3.49
		Price (in Rs.)	5660
		Gross Return (output* price)	19753
		C) Total Production A+B (in quintal)	3.52

		Gross Return (output* price) A+B	19906
2	Net Return	Total Cost of Production	18889
		Gross Return	19906
		Net Returns (gross return- total cost)	1017
3	Benefit-Cost Ratio	Gross Return / Total Cost	1.05

(Source: Field Survey)

Figure 4.3

Gross Returns, Net Return and Benefit-Cost Ratio of Tur (Red Gram)



In case of Tur farming, productivity of non- irrigated Tur is 3.52 quintal per acre and farmers get averagely ₹5660 price per quintal at local market. Out of total production own consumption of Tur is 0.03 quintal per acre and production sold is 3.49 quintal per acre. Gross return of Tur is ₹ 19906 per acre out of which ₹ 19753 (99.23%) is from sell of Tur production and ₹ 153 (0.77%) is from own consumption of Tur by farmers. During the filed survey it was observed that farmer keep some Tur production for own consumption but in very less quantity. Net return of Tur production is ₹ 1017. The benefit-cost ratio of non-irrigated Tur in sample area is 1.05. It means that farmers have invested rupee 1 in Tur production and they gain 0.05 paise net profit per rupee.

6. Hypothesis Testing:

Researcher has formulated the hypotheses on the profitability of Tur (Red Gram) in area under study. This hypothesis is-

Tur (Red Gram) Crop is not profitable.

To study the hypothesis Tur (Red Gram) Crop is not profitable, Researcher was used the one sample t-test to test the hypothesis and taken test value = 0.

Table 4, Profitability of Tur (Red Gram) Crop

Variable	Test value = 0						
	N	Mean	SD	SE Mean	95% Lower Bound	T	P
Tur (Red Gram)	50	6508	52545	7431	-5951	0.88	0.193

The above testing of hypothesis reveals that p value of Tur (Red Gram) crops is greater than the level of significance i.e. 0.05 hence it is concluded that the null hypothesis i.e. Tur (Red Gram) Crop is not profitable is accepted and the study reject the alternative hypothesis i.e. Tur (Red Gram) Crop is profitable. It concludes that Tur (Red Gram) is not profitable in the area under study.

7. Conclusion:

In Tur (Red Gram) cultivation, per acre average total cost or cost of sales was ₹ 18889. The share of variable cost in total cost or cost sales was ₹ 11963 (63.33%), fixed cost was ₹ 6594 (34.91%) and selling and distribution cost was ₹ 332 (1.76 %). In Tur (Red Gram) farming, per quintal average total cost or cost of sales was ₹ 5373. The share of variable cost in total cost or cost sales was 3403 (63.33%), fixed cost was ₹ 1876 (34.91%) and selling and distribution cost was ₹ 94 (1.76 %). Productivity of Kharif Tur is 3.52 quintal per acre and farmers get averagely ₹ 5660 price per quintal at local market. Gross return of Tur is ₹ 19906 per acre out of which ₹ 19753 (99.23%) is from sell of Tur production and ₹ 153 (0.77%) is from own consumption of Tur by farmers. Net return of Tur production is ₹ 1017. It means that Tur growers have a profit of ₹ 1017. The benefit-cost ratio of non-irrigated Tur in sample area is 1.05. It means that farmers have invested rupee 1 in Tur (Red Gram) production but they earn only 0.05 paise net profit per rupee. The minimum support price for Tur (Red Gram) crop was Rs. 5800 it was not sufficient to cover the cost of production. So it was suggested to government to increase the MSP of Tur (Red Gram) crop and it was also suggested to take all the costs into consideration while declaring MSP. It was suggested to farmers to increase the productivity of Tur (Red Gram) crops in area under study by using the high yield variety programme means varieties of improved seeds, enhanced application of the fertilizers and extended use of pesticides etc. because productivity of Tur (Red Gram) crop was low in the area under study.

8. References:

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