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# A Comparative Analysis of Economics of Paddy and Vegetables in Haryana: A Case Study of Sonipat District

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## Abstract

*A sustained economic growth, increasing per capita income and urbanization are causing a shift in the consumption pattern towards high-value crops such as vegetables, fruits and dairy products from staple food like rice and wheat. Such a shift in the consumption pattern shows the ongoing process of changes in the cropping pattern. In the present study an attempt has been made to examine the relative economics of paddy vis-à-vis vegetables by using benefit-cost ratio (BCR). The important vegetable crops competing with paddy during kharif season viz., ladyfinger, bottle gourd and tomato were selected for the in-depth analysis spreading over the district with a total sample of 160 farmers. For the purpose of collection of data, a scheduled questionnaire was structured for the farmers. All the questionnaires were filled by direct interview and personal visits to farmers. The result of the study showed that the investment in paddy as well as in vegetables is economically viable as benefit cost ratio of paddy and vegetables explain that on an average Rs. 1 investment brings more than Rs. 1*

*returns for the farmers but vegetables generate higher returns as compared to paddy.*

**Key-words** *Urbanization, High-value crops, Vegetables, Benefit-cost ratio.*

## INTRODUCTION

Paddy is grown almost throughout the year in hot and humid regions of eastern and southern parts of India but it is an autumn (kharif) season crop in the northern parts of the country. The average rainfall required for paddy is 150 cm and it is a dominant crop in the areas where average rainfall is above 200 cm annually. Paddy can be grown with the help of irrigation where the average rainfall is less than 100 cm as is done in Punjab, Haryana and Western U.P. and about 40 per cent of paddy is raised under irrigation in India (Khullar, 2014). Haryana which is traditionally not a paddy growing state has made tremendous progress in the production of paddy after the introduction of green-revolution by adopting the new agricultural technologies. The share of Haryana in all India

production of paddy was 3.78 per cent during the year 2014-15 (Handbook of RBI, 2015-16).

Now-a-days horticulture sector is the fastest growing sector with in agriculture. The diverse agro-climatic conditions of Haryana are favorable for the cultivation of alternate kharif crops including horticulture crops such as vegetables. A large variety of vegetables has been grown in the state Most of the vegetables are of short duration. As a result two or three crops are raised in one year. Since different vegetables are grown in different seasons, the process of cultivation continues throughout the year. Ladyfinger, tinda, bottle gourd, cucumber, chillies, tomato, carrot, muskmelon, brinjal and bitter gourd are the vegetables of kharif season while peas, onion, potato, palak, methi, raddish, tomato, turnip, capsicum, carrot, bitter gourd and coriander are considered as the important vegetables of rabi season in Haryana.

Economics or profitability of the crops is the dominant factor of production of agricultural commodities that steers the propensity of the producers. In reality, it is the perception of the profitability that derives crop options to the farmers. It means farmers grow crops, having highest returns per unit of their precious resources such as land and other inputs are prioritized. Taking cognizance of most

important role of profitability in increased production of agricultural commodities cost of cultivation and economics of production of paddy vis-à-vis vegetables is proposed and analyzed for kharif season of 2015-16 on sampled farmers of Sonipat district of Haryana.

An attempt has been made in this research to examine the gross and net returns from selected crops with the help of primary data collected from field survey. The variable costs constituted land preparation cost, cost of irrigation, cost of seeds, labour cost, cost of machine and other tools, fertilizers cost, pesticides cost and other costs of input (transportation and marketing). The net returns for each crop were worked out by subtracting costs from gross returns. In the analysis net returns and profitability are used interchangeably.

However, the results of primary data on various aspects related to paddy and vegetables of sampled farmers for the period 2015-16 have been presented in this paper. Specifically, empirical findings on cost of cultivation and economics of production of paddy vis-à-vis vegetables crops are discussed in the study.

## **OBJECTIVE**

The main objective of the study is to examine the relative economics of paddy vis-à-vis vegetable crops in Sonipat district of Haryana.

## REVIEW OF LITERATURE

Review of literature is an important exercise in research because it helps the researcher to find out the research gap. A number of research studies have been undertaken by different researchers in the field of fertilizer consumption in India.

**Joshi, et al. (2006)** have examined “Sources of Agricultural Growth in India: Role of Diversification towards High-value Crops” in their study. The researchers revealed that the technological advancement was considered as the prime mover for agricultural growth in 1980’s while rising prices and diversification towards high-value crops were the dominant sources of growth during 1990s. There were regional variations in the pattern of growth sources as mounting prices was considered as an important source of growth in the grain-dominated northern and eastern states during 1990’s while the crop income growth was led by diversification into higher-value crops in the southern and western states.

**Kumar and Gupta (2015)** highlighted Crop Diversification towards High-value crops in India. The study was based on secondary sources of data and the researchers analyzed the data by using Simpson Index of Crop Diversification (SID) and regression model. The

researchers observed that the area under high-value crops was increased during the study period and also found that the agricultural economy in India was diversifying from traditional food grains to high value crops but the diversification was not evenly distributed among the states.

**Lalrinsangpuii and Malhotra (2016)** have examined “Agricultural Diversification in North Eastern Region of India” in their study covers a period of 20 years (1994-95 to 2014-15). The study was based on the time series data. The researchers revealed that during the past few years the area and production of cereals had decreased whereas, spices, vegetables, pulses and fruits had shown an increasing trend. This result showed that the agricultural sector of the study area was slowly diversifying towards high value crops, such as fruits, vegetables and spices.

**Rao, et al. (2006)** highlighted high value crops in their study Diversification towards High Value Agriculture. The study revealed that urbanization and sustained economic growth was helpful for the rapid growth of demand for high value crops such as fruits, vegetables, meat, milk, egg etc. The researchers found that intensive high-value agriculture was practiced in the coastal and hilly areas, extensive agriculture

was mostly in central and north western regions and moderate incidence of high value agriculture was in the north and eastern regions during the study period.

## RESEARCH METHODOLOGY

This study is based on the cross-sectional data. A multistage simple random sampling method has been used for this purpose. The sampling has been done at four stages i.e. District, Blocks, Villages and Farmers. At the first stage, Sonapat district has been selected by using purposive sampling as the district is the largest producer of vegetables in Haryana. At the second stage, two blocks Ganaur and Murthal has been selected again by using purposive sampling. As both the blocks are approached by NH-1, which is helpful for the farmers for their easy communication to Azadpur Mandi, New Delhi. At the third stage, four villages have been selected out of the selected blocks, two from each by using random sampling and at the last stage; farmers have been conferred for interview. A list of those farmers has been prepared by personal investigation; who are growing paddy and vegetables from the selected four villages. And out of this list a sample of 40 farmers i.e. 10 from each category of farmers has been selected randomly from a village and interviewed. In this way a total of 160 farmers have been interviewed for the study.

Farmers in selected villages have been categorized in four categories on the basis of the area of land holdings viz.

Marginal Farmers- (0-2 acre)

Small Farmers - (2-5 acre)

Medium Farmers - (5-8 acre)

Large Farmers - (8- and above acre)

Categorization of farmers is based on the classification according to Agriculture Ministry of India.

For the purpose of collection of data, a scheduled questionnaire was structured for the farmers. The questions cover the information about the cost and returns of paddy and vegetable crops. All the questionnaires were filled by direct interview and personal visits to farmers.

### Cost and Return Analysis:

For comparing the cost and benefits of paddy and vegetable crops, benefit cost ratio analysis has been used in the study.

The cost of cultivation has been worked out by following variable cost components classification and standard cost concepts. The production cost includes following variable costs.

$$C_P = C_L + C_I + C_S + C_{LA} + C_M + C_F + C_P + C_O$$

Where s

$C_p$  = Total production cost

$C_L$  = Land preparation cost

$C_I$  = Cost of irrigation

$C_S$  = Cost of seeds

$C_{LA}$  = Labour cost

$C_M$  = Cost of machine and other tools

$C_F$  = Fertilizers cost

$C_P$  = Pesticides cost

$C_O$  = Other costs of input (transportation and marketing)

The gross returns have been calculated by multiplying total production with average price.

The net returns over production cost have been calculated as the difference between gross return and production cost.

#### **Benefit cost ratio:**

To assess the economies of crops / farming system benefit cost ratio analysis is an important tool. It is the ratio of benefit with the cost. As the ratio indicate the rate of gross returns from the use of an input (Grover et al, 2015).

$BCR = \text{Gross returns} / \text{Total production cost}$

### **RESULT AND DISCUSSION**

#### **Cost of Cultivation of Paddy vis-à-vis Vegetables:**

Table No. 1 shows the different cost variables. Basically the production cost of first stage i.e. cost of cultivation has been divided into eight parts i.e. land preparation cost, cost of irrigation, cost of seeds, labour cost, cost of machine and other tools, fertilizers cost, pesticides cost and other costs of input (transportation and marketing).

The average per acre cost of cultivating paddy was Rs. 21318 for all farmers of different categories. The average land preparation cost was estimated Rs. 3299 per acre for all the farmers while it was highest among marginal farmers as compared to other categories of the farmers. The maximum share of cost was from labour cost i.e. (19.05 per cent) for all sampled farmers and the cost was highest for large farmers i.e. 7084 Rs. per acre followed by medium (5227.6 Rs. per acre), small (2424 Rs. per acre) and marginal farmers (1505.5 Rs. per acre) respectively.

**Table No. 1**  
**Cost of Cultivation of Paddy, Sampled Households in 2015-16**

(Rs. Per acre)

Sr. no	Input cost	Marginal	Small	Medium	Large	For all farmers
1	Land preparation cost	3728 (19.12)	3480 (17.23)	3244 (14.37)	2744 (11.94)	3299 (15.48)

2	Cost of irrigation	3944 (20.22)	3880 (19.21)	3876 (17.16)	3448 (15.00)	3787 (17.76)
3	Cost of seeds	1700 (8.72)	1728 (8.55)	1712 (7.58)	1696 (7.37)	1709 (8.02)
4	Labour cost	1505.5 (7.72)	2424 (12.00)	5227.6 (23.15)	7084 (30.81)	4060.3 (19.05)
5	Cost of machine and other tools	1500 (7.69)	1480 (7.33)	1500 (6.65)	1475 (6.42)	1488.7 (6.98)
6	Fertilizers cost	2292 (11.75)	2528 (12.52)	2552 (11.30)	2580 (11.22)	2488 (11.67)
7	Pesticides cost	3440 (17.64)	3380 (16.73)	3252 (14.40)	2948 (12.82)	3255 (15.27)
8	Other costs of input (transportation and marketing)	1392 (7.14)	1298 (6.43)	1218 (5.39)	1016 (4.42)	1231 (5.77)
9	Total cost	19501.5 (100)	20198 (100)	22581.6 (100)	22991 (100)	21318 (100)

*Source: Calculations based on primary survey*

As paddy is a water intensive crop. So 17.76 per cent of total cost was spent on irrigation i.e. Rs. 3787 per acre for all farmers and it was highest Rs. 3944 per acre for marginal farmers. The cost of seeds was almost similar between different categories of farmers as it was highest i.e. Rs. 1728 per acre for small farmers while it was lowest for large farmers which was Rs. 1696 per hectare and Rs. 1709 per acre for all farmers.

During the survey it was observed that the expenditure incurred on various inputs varied among different categories of farmers. Around 6.98 per cent of total cost was spent on machine and other tools by all the sampled farmers. The

average cost of fertilizers and pesticides for all farmers was Rs. 2488 and 3255 per acre respectively. Fertilizers cost was estimated highest for large farmers while the pesticides cost was found highest among marginal farmers. Transportation and marketing cost were estimated Rs.1231 per acre for all category farmers in which marginal farmers spent higher cost as compared to large farmers because of lack of machinery like tractor, trolley etc. The per acre cost of cultivation of paddy varied among different categories of farmers due to differences in expenditure incurred on various items of cost. It was estimated higher in case of large farmers in comparison to other categories.

**Table No. 2**  
**Cost of Cultivation of Ladyfinger, Sampled Households in 2015-16**

(Rs. Per acre)

Sr. no	Input cost	Marginal	Small	Medium	Large	For all farmers
1	Land preparation cost	4000 (4.47)	3880 (4.03)	3480 (2.86)	3160 (2.28)	3630 (3.26)
2	Cost of irrigation	1620 (1.81)	1480 (1.54)	1480 (1.22)	1420 (1.02)	1500 (1.35)
3	Cost of seeds	17400 (19.44)	17960 (18.67)	17700 (14.54)	17700 (12.77)	17690 (15.86)
4	Labour cost	14000 (15.64)	21100 (21.93)	49000 (40.24)	68400 (49.36)	38120 (34.18)
5	Cost of machine and other tools	-	-	-	-	-
6	Fertilizers cost	14800 (16.53)	15100 (15.69)	14600 (11.99)	14700 (10.61)	14800 (13.27)
7	Pesticides cost	10200 (11.39)	9900 (10.29)	10400 (8.54)	11000 (7.94)	10375 (9.30)
8	Other costs of input (transportation and marketing)	27500 (30.72)	26800 (27.85)	25100 (20.61)	22200 (16.02)	25400 (22.78)
9	Total cost	89520 (100)	96220 (100)	121760 (100)	138580 (100)	111515 (100)

*Source: Calculations based on primary survey*

Table No. 2 highlighted the production cost of first stage i.e. cultivation cost for different categories of ladyfinger growers. Clearly; per acre cost of ladyfinger cultivation for all sampled farmers was much higher in comparison to paddy. It was Rs. 111515 per acre at aggregate level. Among different categories of farmers, large farmers spent an amount of Rs.138580 per acre which was observed high in comparison to marginal, small and medium categories of farmers.

Land preparation cost and cost of irrigation was higher among marginal farmers as these were Rs. 3630 and 1500 per acre respectively for all farmers. Further, small category farmers spent higher amount on seeds as compared to other categories i.e. Rs.17960 per acre while Rs. 17690 was estimated for all the farmers. As ladyfinger is a labour intensive crop (as reported by sample farmers), so 34.18 per cent of total cost was spent on labour i.e. Rs. 38120 per acre for all the farmers and it was highest Rs. 68400 per acre for large category farmers while Rs.

14000 per acre was estimated for marginal farmers as lowest. Labour cost includes the payment for human labour excluded family members. The labour cost was lower in case of marginal size of farmers. The reason reported by the sampled farmers was that the family members participated in agriculture work so that they can save at least labour expenditure. That's why the labour cost for marginal size farmers were reported lower than other groups. The cost spent on fertilizers was highest among small farmers while that of pesticides was estimated highest among large category of farmers as

compared to others. Transportation and marketing cost in case of ladyfinger having 22.78 per cent share in total cost of cultivation as Rs.25400 per acre was borne by all farmers in which marginal farmers bears higher cost as compared to large farmers because of having less machineries like tractor, trolley etc. for transportation. The per acre cost of cultivation of ladyfinger varied among different categories of farmers due to differences in expenditure incurred on various items of cost. It was estimated higher in case of large farmers in comparison to other categories.

**Table No. 3**  
**Cost of Cultivation of bottle gourd, Sampled Households, 2015-16**

(Rs. Per acre)

Sr. no	Input cost	Marginal	Small	Medium	Large	For all farmers
1	Land preparation cost	3880 (7.42)	3860 (7.09)	3560 (5.96)	3200 (4.62)	3625 (6.15)
2	Cost of irrigation	1620 (3.09)	1520 (2.79)	1480 (2.48)	1440 (2.08)	1515 (2.57)
3	Cost of seeds	2650 (5.06)	2580 (4.74)	2560 (4.29)	2520 (3.63)	2577.5 (4.37)
4	Labour cost	7000 (13.37)	10200 (18.73)	24290 (40.69)	34700 (50.04)	19047.5 (32.31)
5	Cost of machine and other tools	-	-	-	-	-
6	Fertilizers cost	4400 (8.40)	4600 (8.45)	4300 (7.21)	4140 (5.97)	4360 (7.39)
7	Pesticides cost	8500 (16.24)	8300 (15.24)	8700 (14.58)	8740 (12.60)	8560 (14.52)
8	Other costs of input (transportation and marketing)	24300 (46.42)	23400 (42.96)	14800 (24.79)	14600 (21.06)	19275 (32.69)
9	Total cost	52350 (100)	54460 (100)	59690 (100)	69340 (100)	58960 (100)



*Source: Calculations based on primary survey*

Table No. 3 explained the cost of cultivation of bottle gourd among different categories of farmers. The total cost on per acre basis for bottle gourd was found to vary between Rs. 52350 for marginal farmers to 69340 for the large farmers which is due to the high other costs of input (transportation and marketing) and high labour cost. On overall basis, the total cost for all farmers was estimated Rs. 58960 on per acre basis. Around 65 per cent of the cultivation cost was incurred on labour cost and other costs of input (transportation and marketing).

Land preparation cost and cost of irrigation was higher among marginal farmers as these were Rs. 3625 and 1515 per acre respectively for all farmers. Marginal category farmers spent higher amount on seeds as compared to other categories i.e., Rs.2650 per acre while Rs. 2577.5 was estimated for all the farmers. The labour cost was highest in case of large category

farmers i.e. around 50 per cent share of total cost was spent on labour while that of lowest in case of marginal farmers which was 13.37 per cent of total cost. It may be noticed from the above table that the cost of machine and other tools was zero because this cost was estimated along with land preparation cost as the farmers had not differentiated these costs. Further, expenditure on fertilizers and pesticides were the other important components of the cultivation cost and the expenses on these were about 7 and 14 per cent of the total cost respectively for all farmers. Transportation and marketing cost in case of bottle gourd having 32.69 per cent share in total cost of cultivation as Rs.19275 per acre was borne by all farmers in which marginal farmers (Rs. 24300/acre) bears higher cost as compared to large farmers (Rs. 14600/acre) because marginal farmers having less machineries like tractor, trolley etc. for transportation.

**Table No. 4**  
**Cost of Cultivation of Tomato, Sampled Households in 2015-16**

(Rs. Per acre)

Sr. no	Particulars	Marginal	Small	Medium	Large	For all farmers
1	Land preparation cost	4360 (6.77)	3960 (6.00)	3560 (4.55)	3320 (3.99)	3800 (5.21)
2	Cost of irrigation	1640 (2.55)	1540 (2.33)	1400 (1.79)	1180 (1.42)	1440 (1.97)

3	Cost of seeds	5000 (7.78)	4800 (7.27)	5250 (6.70)	4900 (5.89)	4987.5 (6.84)
4	Labour cost	7000 (10.89)	10300 (15.61)	24500 (31.29)	35200 (42.31)	19250 (26.39)
5	Cost of machine and other tools	-	-	-	-	-
6	Fertilizers cost	6400 (9.95)	6100 (9.24)	6300 (8.04)	6000 (7.21)	6200 (8.50)
7	Pesticides cost	9700 (15.09)	9900 (15.00)	9700 (12.39)	9800 (11.78)	9775 (13.40)
8	Other costs of input (transportation and marketing)	30200 (46.97)	29400 (44.55)	27600 (35.24)	22800 (27.40)	27500 (37.69)
9	Total cost	64300 (100)	66000 (100)	78310 (100)	83200 (100)	72952.5 (100)

*Source: Calculations based on primary survey*

Table No. 4 indicated cultivation cost for different categories of tomato growers. The total cost on per hectare basis for tomato was found to vary between Rs. 64300 for marginal farmers to 83200 for the large size farmers due to differences in expenditure incurred on various inputs of cost. On overall basis, the total cost for all farmers was estimated Rs. 72952.5 on per acre basis.

Marginal category farmers spent higher amount on land preparation and irrigation as compared to other categories i.e. Rs. 4360 and 1640 per acre respectively while Rs. 3800 and 1440 on per acre basis was estimated for all farmers. The expenditure incurred on seeds was highest among medium farmers as compared to other categories i.e. Rs. 5250 per acre while Rs.

4987.5 was estimated for all farmers. The above table revealed that the medium and large size farmers spent huge amount on labour cost i.e., 31.29 and 42.31 per cent share of total cost respectively due to the use of more hired labour instead of marginal and small category farmers (as reported by sample farmers). The cost of machine and other tools was zero in the above table 5.1(f) because the cost was already included in land preparation cost as provided by sampled farmers. Fertilizers cost was found highest among marginal size farmers i.e. Rs. 6400 per acre followed by medium (Rs. 6300/acre) and small farmers (Rs. 6100/acre) while that of lowest was estimated for large category farmers (Rs. 6000/acre). The overall expenditure incurred on fertilizers by all farmers

was Rs. 6200 per acre. Further, the expenditure incurred on pesticides was found same i.e. Rs. 9700 per acre for marginal and medium category farmers but the share of pesticides cost in total cost was different for both the categories i.e. 15.09 per cent share of pesticides cost was estimated among marginal size farmers and 12.39 per cent was in case of medium farmers while the highest pesticides cost was found among small category farmers (Rs. 9900/acre). For all farmers the cost of pesticides was estimated Rs. 9775 on per acre basis. Transportation and marketing cost in case of tomato was estimated Rs.27500 per acre for all farmers in which marginal farmers spent higher cost as compared to other categories because of lack of machinery like tractor, trolley etc.

#### **Economics of Paddy vis-à-vis Vegetables:**

The economics of paddy was compared with the vegetables during the kharif season and the

results of the collected data are presented in table no. 5. The table presents yield, gross and net returns from paddy, ladyfinger, bottle gourd and tomato of sampled farmers. The per acre yield of paddy of all sampled farmers was 20.09 qtls. Clearly, marginal farmers grew around 20.24 qtls/acre in comparison to 19.84 qtls/acre by large category farmers. At the aggregate level, farmers realized a price of Rs. 1817.3/qlt. It was lower in case of medium category of farmers while that of highest in case of small size farmers. The sampled farmers reaped gross returns of Rs. 36509.56/acre at the overall level. It was higher in case of marginal category in comparison to remaining categories of farmers. After subtracting the cultivation cost from the gross returns, farmers realized net returns of Rs. 15191.56/acre by cultivating paddy. Among different categories of farmers, marginal farmers realized higher net returns as compared to other categories.

**Table No. 5**  
**Economics of Paddy vis-à-vis Vegetables, Sampled Households in 2015-16**

Particulars	Marginal	Small	Medium	Large	For all farmers
Paddy					
Yield(qtl/acre)	20.24	19.96	20.32	19.84	20.09
Price(Rs./qlt)	1822.8	1828.4	1806	1812	1817.3

Gross returns	36893.47	36494.86	36397.92	35950.08	36509.56
Total cost	19501.5	20198	22581.6	22991	21318
Returns over cost	17391.97	16296.86	13876.32	12959.08	15191.56
Benefit cost ratio	1.89	1.81	1.61	1.56	1.71
<b>Ladyfinger</b>					
Yield(qtl/acre)	245	249	251	248	248.25
Price(Rs./qtl)	1008	1000	1006	1060	1018.5
Gross returns	246960	249000	252506	262880	252842.63
Total cost	89520	96220	121760	138580	111515
Returns over cost	157440	152780	130746	124300	141327.63
Benefit cost ratio	2.76	2.58	2.07	1.89	2.27
<b>Bottle gourd</b>					
Yield(qtl/acre)	246	236	254	240	244
Price(Rs./qtl)	710	720	700	730	715
Gross returns	174660	169920	177800	175200	174460
Total cost	52350	54460	59690	69340	58960
Returns over cost	122310	115460	118110	105860	115500
Benefit cost ratio	3.34	3.12	2.98	2.53	2.95
<b>Tomato</b>					
Yield(qtl/acre)	347	346	348	336	344.25
Price(Rs./qtl)	820	770	824	810	806
Gross returns	284540	266420	286752	272160	277465.5

Total cost	64300	66000	78310	83200	72952.5
Returns over cost	220240	200420	208442	188960	204513
Benefit cost ratio	4.42	4.04	3.66	3.27	3.80

*Source: Calculations based on primary survey*

Results for ladyfinger in the table indicate that the ladyfinger has emerged as a highest input crop of sampled farmers. The average yield of ladyfinger was observed 248.25 qtls/acre at the aggregate level. The medium size farmers reaped marginally higher yield in comparison to other categories. The price received by farmers after ladyfinger was Rs.1018.5/ctl. for all the sampled farmers. The gross returns were Rs. 252842.63/acre at the aggregate level while it was estimated highest among large category farmers mainly due to the differentials in per unit price realized. The net return from ladyfinger cultivation was Rs. 141327.63/acre for all sampled farmers. Evidently, marginal size farmers reaped higher net returns per unit of land in comparison to other categories.

The examination of the same table indicates that the productivity of bottle gourd was 244 qtls/acre at the aggregate level of sampled farmers. The medium size farmers produced maximum bottle gourd as compared to other categories of farmers. On the other hand, large farmers reaped higher price i.e., Rs.730/ctl. as

compared to others. Evidently, a gross return per acre by cultivating bottle gourd was found Rs. 174460 at the aggregate level. The medium size farmers realized the maximum gross returns among all categories. After subtracting cultivation cost from gross returns, farmers reaped a net return of Rs. 115500/acre at an aggregate level and it was highest in case of marginal size farmers.

Finally, the results of tomato have been explained in the table which shows that the average yield of tomato was 344.25 qtls/acre for all the sampled farmers. It was almost uniform among different categories of farmers. The farmers realized an average price of Rs. 806/ctl. Further, medium farmers received Rs. 824/ctl as highest among all categories of farmers. The gross return from cultivating tomato was found Rs. 277465.5/acre for all the sampled farmers. The medium size farmers realized higher gross returns among different categories. After subtracting the cultivation cost, farmers earned profit of Rs. 204513/acre on overall basis and it was highest among marginal category farmers.

The benefit cost analysis indicates that the investment in paddy as well as in vegetables is economically viable as benefit cost ratio of paddy and vegetables explains that on an average Rs. 1 investment brings more than Rs. 1 returns for the farmers. The benefit cost ratio was highest for tomato (3.80) followed by bottle gourd (2.95) and ladyfinger (2.27) but it was lowest for paddy (1.71) for all the sampled farmers. Paddy has lowest cost as compared to vegetables but vegetables generate higher benefits as compared to paddy. So from economic point of view vegetables are more economically viable as compared to paddy.

## CONCLUSION

It may be concluded from the above tables that in case of marginal and small farmers the share of other costs of input (transportation and marketing) was higher in comparison to other categories while in case of medium and large size farmers the share of labour cost was higher because the whole agriculture work was done mostly by the hired labour as the contribution of family members in farming was very low in case of medium size farmers and the family members of large size farmers contribute almost a negligible share in farming (as reported by sample farmers). The cultivation of ladyfinger emerged as highest input intensive crop among

all crops and therefore, cost of cultivation per acre was found more than five times that of paddy for sampled farmers and the share of inputs in the cultivation of vegetables was found higher than that of paddy. Further above tables conclude that the irrigation cost was higher in case of paddy as compared to vegetables because paddy is a water intensive crop (as reported by sample farmers). Furthermore, the cost of cultivation was found lowest for paddy growers but vegetables generate higher returns as compared to paddy. So from economic point of view vegetables are more economically viable in comparison to paddy.

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