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COST BENEFIT ANALYSIS AND MARKETING OF MUSHROOM IN UTTAR PRADESH

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Abstract

The study was conducted in Uttar Pradesh throughout the period of 2016-17, which has examined the various costs, its returns and the break-even point analysis under various categories of farms. It also included the studies of marketing systems, their costs, margins and marketing efficiency. The study discovered that (1) The fixed cost and its investment in mushroom production is doubled for medium and large farms when its compared with small farms due to lack of credit availability to farmers and shows a affirmative association with farm size. (2) The cost of compost and spawn is directly proportional to farm size. (3) There exist an affirmative correlation between mushroom production, farm size and income. (4) Channel IV is the most common channel as maximum produce passes through this channel, but Channel I has the maximum share of producer in consumer price which makes the channel I best for farmers as well as consumers. The study suggested that the mushroom cultivation requires more capital hence low interest capital should be provided and its being perishable crop, infrastructure should be improving to increase the self-life of mushroom production.

***Keywords*:** Break even point analysis, Cost benefit ratio, Marketing Margins and Efficiency, Mushroom and Price spread

Introduction

Uttar Pradesh one of the mushroom delivering state which have a possibility to build the generation of mushroom in future (Singh *et al.,* 2011) Almost 65 per cent of entire production of mushroom comes from the growers in various districts. The growers are using crop as to make a compost. Kanpur and Lucknow which is nearby, being the main consumer of mushroom is a big marketplace for the mushroom sales. (Singh *et al.,* 2010; Kumar and Dwivedi 2018a; Kumar *et al*., 2018b; Kumar *et al*., 2018c; Kumar and Dwivedi, 2018d; Kumar *et al*., 2018e; Kumar and Pathak, 2019f; Kumar *et al*., 2019g).

All the mushroom growers are essential to have full information of fabrication expertise and understanding of economies of the same (Chitra *et al.,* 2016; Chandra *et al.,* 2018). The accessibility of labor, foundation, crude materials and market making arrangements for the large, medium and small units. The optimum output level to determine the viability of farm is necessary (Naveen *et.al,* 2016). The finances of mushroom cultivation may differ through the state as well as the country which may fluctuate the cost benefit ratio of the same (Shirur and Chandregowda *et al., 2017*). Observance in view all the following sides, the following study was led in the specific regions of Kanpur and Kanpur Dehat with the subsequent objectives

1. To analyze the various costs, its returns and break even point analysis of mushroom production under different categories of farms.
2. To study the prevailing mushroom marketing system along with their marketing costs, margins and marketing efficiency.

Material and methods

The study was directed in the district of Uttar Pradesh for the year 2016-2017. Five villages were selected purposively from each district which were as follows Bhadana, Khabru, Mimarpur, Bayanpur and Rohaat from Kanpur district and Khika, Bahrampur, Sultanpur, Dhaula and Pathrahari from Kanpur Dehat district. Based on the cumulative frequency total method (Singh *et al.,* 2001), the farmers were characterized based on production level into small farms (100 q), medium farms (100-150 q) and large farms (more than 150 q). Obtainable of the particular villages, 100 farmers were selected purposively 10 from every village in proportion of 40 small farmers, 30 medium farmers and 30 large farmers. In respect of the above 15 wholesalers and 10 retailers were also taken under consideration for the interview. For calculating costs, the expenditures on different inputs like spawn, straw, bran, human labour, plant protection chemicals and interest on working capital @10 per cent was operated out. The return received was calculated by the prices received by the producers and growers.

Break-even point (BEP) was calculated by

$$BEP = TFC / (ASP – AVP) \quad \ldots(1)$$

Where

TFC- Total Fixed Cost

ASP- Average Sales Price (Rs/kg)

AVP- Average Variable Cost (Rs/kg)

The data collected from various marketing functionaries were examined to estimate marketing costs and margins. The marketing channels for the mushroom were

1. Mushroom grower – Consumer
2. Mushroom grower- Retailer- Consumer
3. Mushroom grower- Wholesaler- Consumer
4. Mushroom grower- Wholesaler- Retailer- Consumer

Marketing efficiency can be calculated by

$$\text{Marketing Efficiency} = \frac{\text{Value of produce per kg}}{\text{Marketing cost per kg}}$$

Higher the ratio, higher is the efficiency and vice versa.

Result and Discussion

Cost on Mushroom Production

Table 1: Money investment on mushroom production under various farms

Particulars	Category of farms			
	Small	Medium	Large	Weightage Mean
Investment on building				
Kuccha	41591 (35.94)	92316 (28.72)	294122 (67.97)	132568 (48.64)
Pucca	63612 (54.97)	213313 (66.36)	92997 (21.49)	117338 (43.05)
Sub Total	105203 (90.91)	305629 (95.09)	387119 (89.46)	249906 (91.70)
Investment on equipments				
Generators			15340 (3.54)	4602 (1.69)
Trays, forks, tubs and buckets	1347 (1.16)	2978 (0.93)	6549 (1.51)	3397 (1.25)
Spray pump, nozzle and water pipes	2759 (2.38)	3457 (1.08)	5577 (1.29)	3814 (1.40)
Exhaust fan, cooler, heater etc	1911 (1.65)	2372 (0.74)	1550 (0.36)	1941 (0.71)
Thermometer, basket, petis, knife, etc	180 (0.16)	324 (0.10)	183 (0.04)	224 (0.08)
Weighting Balance	350 (0.30)	349 (0.11)	530 (0.12)	404 (0.15)
Electrical fitting	1278 (1.10)	2976 (0.93)	6222 (1.44)	3271 (1.20)
Motor	2696 (2.33)	3341 (1.04)	9653 (2.23)	4977 (1.83)
Sub Total	10522 (9.09)	15797 (4.91)	45604 (10.54)	22629 (8.30)
Total	115725	321426	432723	272535

The table 1 pageants the average investment on overall farm was Rs 272535. The investment on building is thorough going to be 91.70 per cent (90.91 per cent, 95.09 per cent and 89.46 per cent respectively as per farm size), followed by venture on motor, generator, Spray pump, nozzle and water pipes, Trays, forks, tubs and buckets, Electrical fitting, Exhaust fan, cooler and heater, Weighting Balance and least in Thermometer, basket, petis, knife, etc. The investment on equipment was Rs 22696 (8.30 per cent) which was maximum per cent wise in large farms and minimum in medium farms.

Table 2: Break-up analysis of cost of cultivation under various farms

Particulars	Category of farms			
	Small	Medium	Large	Weightage Mean
Fixed Cost				
Depreciation on building	5258 (7.78)	15620 (11.05)	17258 (7.13)	11967 (8.43)
Depreciation on equipments	2194 (3.25)	3807 (2.69)	6594 (2.73)	3998 2.82)
Interest on fixed capital @12 per cent per year	3183 (4.71)	7491 (5.30)	20079 (8.30)	9544 (6.72)
Total	10635 (15.74)	26918 (19.05)	43931 (18.16)	25509 (17.96)
Variable Cost				
Labour charges	5962 (8.82)	34011 (24.06)	52458 (21.68)	28325 (19.95)
Electricity charges	1387 (2.05)	1780 (1.25)	2990 (1.24)	1986 (1.40)
Compost	30197 (44.69)	45125 (31.93)	60125 (24.85)	43654 (30.74)
Pesticides & Insecticides	3070 (4.54)	4687 (3.32)	19691 (8.14)	8541 (6.01)
Casing soil	2928 (4.33)	5104 (3.61)	18834 (7.78)	8352 (5.88)
Spawn	10679 (15.80)	18265 (12.92)	28535 (11.79)	18311 (12.89)
Generator fuel			5940 (2.46)	1782 (1.53)
Interest on variable cost for 6 months @10 per cent	2711 (4.01)	5449 (3.85)	9429 (3.90)	5548 (3.91)
Total	56933 (84.26)	114420 (80.95)	198001 81.84)	116500 (82.04)
Grand Total	67568 (100)	141338 (100)	241932 (100)	142008 (100)

The cost break up for mushroom cultivation has been offered in the table 2, which reveals the mean cost for production to be Rs 142008 (17.96 per cent as fixed cost and 82.04 per cent as variable cost). The fixed cost was more in medium farms (19.05 per cent) as compared to large farms (18.16 per cent) and small farms (15.74 per cent), whereas the variable cost was more (per cent wise) in small farms tracked by large and medium farmers. In average the maximum contribution in cost was compost (30.74 per cent), tracked by labour charges, spawn, Depreciation of building, Pesticides & Insecticides, Casing soil (Siddique and Kumar, 2018h; Siddique *et al*., 2018i; Pathak *et al*., 2017j; Prakash and Kumar, 2017k; Kumar and Mandal, 2014L; Kumar *et al*., 2014m; Kumar *et al*., 2014n; Kumar, P. 2013o; Kumar and Dwivedi, 2015p; Gogia *et al*., 2014q).

Among the critical inputs i.e compost occupied the major share 30.74 per cent (Rs 43654) which was highest in small farms (Rs 30197 i.e. 44.69 per cent) and lowest in large farms (Rs 60125 i.e. 24.85 per cent). The cost of labour was on second position with mean cost Rs 28325 (19.95 per cent), which was maximum in medium farms and lowest in small farms.

Table 3: Cost and their returns from production under various categories of farms

Particulars	Category of farms			
	Small	Medium	Large	Weightage Mean
Total Fixed Cost (Rs)	10635	26918	43931	25508.79
Total Variable cost (Rs)	56933	114420	198001	116499.5
Total Production cost (Rs)	67568	141338	241932	142008.3
Mushroom production (kg)	2158	4358	7452	4406.2
Average Selling price (Rs/Kg)	82	88	93	87.1
Gross Return (Rs)	176956	383504	693036	393744
Net Return (Rs)	109388	242166	451104	251736
Benefit cost ratio	1.62	1.71	1.86	1.72
Cost of production (Rs/kg)	31.31	32.43	32.47	31.99
Break even point (Kg)	191.21	435.95	661.31	405.66
Net Returns (Rs/kg)	50.69	55.57	60.53	55.10

Cost and Returns from Mushroom Production

Table 3 reveals, mean production through the sample was 4406.2 kg, whereas it was 2158 kg, 4358 kg and 7452 kg with small, medium and large farmers respectively. Thus, a proportional relationship between farm size and production. The production cost ranges from Rs 67568 to Rs 241932 among various categories of farms showing the affirmative association between cost and farm size. The gross return improved with the growth in the quantity of compost used. The gross return (Mean- Rs 393744) and net return (Mean- Rs 251736) showed the increase trend with escalation in farm size. In overall table the Benefit cost ratio, Cost of production, Breakeven point and Net Returns (Rs/kg) showing increasing trend due to increase in farm size (Kumar, 2014r; Kumar *et al*., 2012s; Mishra *et al*., 2012t; Kumar *et al*., 2011u; Kumar *et al*., 2011v; Kumar and Pathak, 2016w; Pathak *et al*., 2016x; Kumar *et al*., 2018y; Kumar *et al*., 2018z).

Marketing Margins and their Costs

The figures in table 4 reveals about marketing cost sustained by diverse groups of mushroom growers. On an average the marketing cost incurred was Rs 8.98 which increased with decrease in farm size showing negative relationship. The major contributors were commission (24.50 per cent), followed by transportation (24.00 per cent). It is also seen from the gable that the marketing cost incurred increased with decrease in the farm size, thus showing the inverse relationship between marketing cost and farm size (Kumar *et al*., 2018aa; Kumar *et al*., 2018bb; Kumar *et al*., 2018cc).

Table 4: Marketing cost acquired under various categories of farms. (Rs/Kg)

Particulars	Small	Medium	Large	Weightage Mean
Packaging and weighing	1.87 (18.68)	1.82 (20.94)	1.75 (22.15)	1.82 (20.05)
Washing of mushroom	1.14 (11.39)	1.07 (12.31)	1 (12.66)	1.08 (11.99)
Spreading on cloth sheet	0.25 (2.50)	0.2 (2.30)	0.15 (1.90)	0.21 (2.28)
Transportation	2.5 (24.98)	2 (23.01)	1.85 (23.42)	2.16 (24.00)
Loading and unloading	0.25 (2.50)	0.2 (2.30)	0.15 (1.90)	0.21 (2.28)
Commission	2.5 (24.98)	2.1 (24.17)	1.9 (24.05)	2.20 (24.50)
Miscellaneous	1.5 (14.99)	1.3 (14.96)	1.1 (13.92)	1.32 (14.70)
Total	10.01 (100)	8.69 (100)	7.9 (100)	8.98 (100)

The table 5 reveals the marketing cost and margins. The expected share of the producer in consumer's price was least in Channel IV (66.58 per cent) while it was highest at Channel I (91.95 per cent). But the price expected by growers was more in channel IV as compared to other channels present. The marketing cost was found to be more in channel III followed by channel IV, channel II and least in channel I. The marketing cost as well as well as margins in all the channels was almost same. The price paid by consumer increased from channel I (Rs 82), followed by Channel Ii (Rs 101.56), Channel III (Rs 103.50) and Channel IV (Rs 119.17) respectively.

Table 5: Marketing costs and their margins under different marketing channels (Rs/Kg)

S. No	Particulars	Channels			
		I	**II**	**III**	**IV**
1	Price received by growers	82 (100.00)	88 (86.65)	93 (89.86)	87.1 (73.09)
2	Market cost incurred by growers				
A	Washing of mushrooms	1.08 (1.32)	1.08 (1.06)	1.08 (1.04)	1.08 (0.91)
B	Spreading of cloth sheets	0.21 (0.26)	0.21 (0.21)	0.21 (0.20)	0.21 (0.81)
C	Packing and Packaging	1.82 (2.22)	1.82 (1.79)	1.82 (1.76)	1.82 (1.53)
D	Transportation	2.17 (2.65)	2.21 (2.18)	2.31 (2.23)	2.16 (1.81)
e	Loading and unloading	-	-	0.21 (0.20)	0.21 (0.18)
f	Commission	-	-	2.3 (2.22)	2.2 (1.85)
g	Miscellaneous	1.32 (1.61)	1.3 (1.28)	1.22 (1.18)	1.27 (1.07)
	Sub Total	**6.6 (8.05)**	**6.62 (6.52)**	**9.15 (8.84)**	**8.95 (7.51)**
3	Net Margin of Growers	**75.4 (91.95)**	**81.38 (80.13)**	**83.85 (81.01)**	**78.15 (66.58)**
4	Marketing cost incurred by wholesaler				
a	Packing	-	-	3.87 (3.74)	3.12 (2.62)
b	Handling	-	-	1.12 (1.08)	1.12 (0.94)
	Sub Total	**-**	**-**	**4.99 (4.82)**	**4.24 (3.56)**
5	Net Margin of wholesaler	-	-	10.5 (10.14)	11 (9.23)
6	Price received by wholesaler	**-**	**-**	**99.34 (95.98)**	**93.39 (78.37)**
7	Marketing cost incurred by retailer				
a	Loading and unloading	-	0.21 (0.21)	0	0.21 (0.18)
b	Price paid by retailer	-	15.47 (15.23)	0	12.12 (10.17)
	Sub Total	-	15.68 (15.44)	0	12.33 (10.35)
8	Net Margin of retailer	**-**	**4.5 (4.43)**	**0**	**4.5 (3.78)**
9	Price paid by consumer	**82 (100.00)**	**101.56 (100.00)**	**103.50 (100)**	**119.17 (100)**
10	Marketing efficiency	**3.21**	**4.78**	**7.27**	**9.84**

Clearance pattern of Mushroom Production through various Marketing channels

The clearance outline of the product is, showed in Table 6, where it reveals that the finest quantity (more than 45 %) of produce was traded from channel-IV, through which there have been participation of all, viz. farmer, wholesaler, retailer and customer followed by channel II, Channel III and Channel I by 23 per cent, 19 per cent and 13 per cent respectively. The straight dispose of product by growers to consumers was virtually not tailed by large growers, but by the small and medium farms which almost sell 7-8 per cent

of their produce by this channel. Hence, the direction of clearance of mushroom done by different channels was:

channel-IV > channel-II > channel-III > channel-I.

Table 6: Clearance pattern of Mushroom Production through various Marketing channels

Marketing Channels	Small Growers		Medium Growers		Large Growers	
	No. of growers	Average quantity sold	No. of growers	Average quantity sold	No. of growers	Average quantity sold
Mushroom grower – Consumer	7 (17.50)	450 (20.85)	5 (16.67)	570 (13.08)	0 (0.00)	785 (10.53)
Mushroom grower-Retailer-Consumer	10 (25.00)	560 (25.95)	7 (23.33)	1247 (28.61)	3 (10.00)	1458 (19.57)
Mushroom grower-Wholesaler-Consumer	13 (32.50)	680 (31.51)	8 (26.67)	875 (20.08)	12 (40.00)	1125 (15.10)
Mushroom grower-Wholesaler-Retailer-Consumer	10 (25.00)	468 (21.69)	10 (33.33)	1666 (38.23)	15 (50.00)	4084 (54.80)
Overall	40 (100.00)	2158 (100.00)	30 (100.00)	4358 (100.00)	30 (100.00)	7452 (100.00)

Conclusion

1. The fixed cost investment and fixed cost in mushroom production is twofold in medium as well as large farms as associated to small farms due to lack of credit availability to farmers and shows a affirmative association with farm size
2. The cost of compost and spawn is directly proportional to farm size.
3. There is a affirmative association between production and farm size.
4. There is an affirmative association between farm size and income from production due to better management practices.
5. Channel IV is the most common channel as maximum produce passes through this channel, but Channel I has the maximum share of producer in consumer price which makes the channel I best for farmers as well as consumers.

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