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AV Naik

M.Sc Student, Department of Agricultural Economics, Dr. B.S. Konkani Krishi Vidyapeeth, Dapoli, Maharashtra, India

PJ Kshirsagar

Associate Professor, Department of Agricultural Economics, Dr. B.S. Konkani Krishi Vidyapeeth, Dapoli, Maharashtra, India

SS Manerikar

Ph.D. Scholar, Department of Agricultural Economics, Dr. B.S. Konkani Krishi Vidyapeeth, Dapoli, Maharashtra, India

Aiswarya GB

M.Sc Student Department of Agricultural Economics, Dr. B.S. Konkani Krishi Vidyapeeth, Dapoli, Maharashtra, India

RA Chavan

M.Sc Student Department of Agricultural Economics, Dr. B.S. Konkani Krishi Vidyapeeth, Dapoli, Maharashtra, India

DB Malave

Assistant Professor Department of Agricultural Economics, Dr. B.S. Konkani Krishi Vidyapeeth, Dapoli, Maharashtra, India

Corresponding Author:

AV Naik

M.Sc Student Department of Agricultural Economics, Dr. B.S. Konkani Krishi Vidyapeeth, Dapoli, Maharashtra, India

Economic analysis of white onion in Raigad district of Maharashtra

AV Naik, PJ Kshirsagar, SS Manerikar, Aiswarya GB, RA Chavan and DB Malave

Abstract

The current investigation was conducted in the Raigad district of Maharashtra State to examine the economics of white onion cultivation in this region. For this purpose, 120 white onion cultivators were randomly selected from two tehsils viz., Alibag and Pen. White onion production in the study area required 313.46 labour days per hectare. The per hectare fertilizer used was 118.96 kg N, 56.44 kg P and 62.98 kg K at overall level and per hectare cost for fertilizers was ₹ 10,337. Per hectare seed utilized at overall level was 12.03 kg costing ₹ 48,120. The per hectare FYM utilised was 9.11 cartloads costing ₹ 22,775. The per hectare cost of cultivation at overall level was ₹ 2,87,164. Per hectare cost of cultivation increased with increase in farm size. The study concluded that gross return obtained per hectare at overall level was ₹ 4,33,950. As farm size increased, the gross return per hectare increased as well. The per hectare yield was found to be increased with increase in land holding. The benefit-cost ratio for white onion cultivation was found to be 1.51 indicating the profitable nature of the enterprise. The MVP/MFC ratio indicated that fertilizers and human labour days used in the production of white onions are under-utilized while the area planted with white onions, the seed, the number of machinery hours, the FYM and irrigation were over utilized.

Keywords: White onion, labour utilization, cost of cultivation, productivity, gross returns

Introduction

White onion is an important vegetable crop having the health benefits like heart ailments, remedy for cough, cold, fever and allergies and also heals wounds as it has antibiotic, antiseptic, antimicrobial properties and carminative properties. In Raigad district of Maharashtra, white onions are historically grown using only traditional and genuine seeds. It has got a unique taste and colour due to soil texture in which it is grown. The white onion growing in the Raigad region does not have a strong aroma like the regular onion that is frequently found in markets. Its sweet flavour sets it apart from other onions in a big way. White onion is not entirely spherical in shape but appears slender towards the bottom which makes it aesthetically more appealing. Considering the uniqueness, white onion of Alibag region of Raigad district has received G. I. tag on 29 September 2021.

White onion has high quercetin which is an antioxidant. The presence of high antioxidant compound quercetin affects the mechanism of platelet aggregation, resulting in lower cardiovascular diseases (Pizzorno and Murray; Platt, 2003) [1]. In a study about white onion, it was reported that it has beneficial health effects such as anti-carcinogenic, cardioprotective, anti-inflammatory, antioxidants, and vasodilatory properties (Shon *et al.*, 2004) [2]. Considering the importance of white onion, grown in specific region of Alibag in Raigad district, it is necessary to understand the cultivation cost, disposal and marketing of such unique white onion which is having the G.I. tag. Thus, an attempt has been made to study economic analysis of White Onion in Raigad District of Maharashtra.

Methodology

The white onion is concentrated in Alibag and Pen tehsil of Raigad district, Therefore Raigad district was selected purposively. Similarly, five villages from each tehsil were selected randomly. From each selected village 12 farmers were selected randomly. Thus, the final sample consisted of 120 farmers. The data was collected by survey method through personal interviews from the selected farmers, with the help of pre-tested comprehensive schedule specially designed for the purpose.

Result and Discussion

Per hectare labour utilization in white onion cultivation

White onion crop is labour intensive crop. The important operations involved in onion cultivation are raising of seedlings, preparatory tillage, transplanting, application of fertilizers and manures, irrigation, interculture, plant protection, harvesting and curing and wreath making and packing. Table 1 provides information on per hectare labour used for white onion production on sample farms.

It is seen from Table 1 that, the per hectare operation wise labour utilized for white onion cultivation were estimated 313.46 human days. Out of which 52.06 percent (163.19

days) human labour were hired and remaining were 47.94 percent (150.27 days) family labour. Maximum 47.83 days (15.26 percent) labour were utilized for harvesting which was followed by weeding 42.94 days (13.70%), transplanting 37.81 (12.06%), irrigation 28.11 days (8.97%), application of FYM and compost 27.90 days (8.90%), fertilizer application 25.84 days (8.24%), preparation of seed bed 25.73 days (8.21%), wreath making and packing 24.36 days (7.77%), preparation of seedling 23.05 (7.35%), plant protection 14.27 days (4.55%), sun drying 8.89 days (2.84%) and ploughing 6.73 (2.15%).

Table 1: Per hectare operation wise labour used for white onion production on sample farms

Sr. No.	Operations	Family labour			Hired labour			Total labour(days)
		Male	Female	Total	Male	Female	Total	
1	Ploughing	6.73	0	6.73	-	-	-	6.73 (2.15)
2	Preparation of seed bed	7.02	7.06	14.08	5.51	6.14	11.65	25.73 (8.21)
3	Preparation of seedling	5.85	9.02	14.87	3.17	5.01	8.18	23.05 (7.35)
4	Application of FYM/compost	6.39	5.93	12.32	7.69	7.89	15.58	27.90 (8.90)
5	Transplanting	7.06	9.9	16.96	4.14	16.71	20.85	37.81 (12.06)
6	Irrigation	4.59	7.02	11.61	8.48	8.02	16.5	28.11 (8.97)
7	Weeding	8.23	8.73	16.96	5.51	20.47	25.98	42.94 (13.70)
8	Fertilizer application	6.96	5.85	12.81	6.64	6.39	13.03	25.84 (8.24)
9	Plant protection	10.26	-	10.26	4.01	-	4.01	14.27 (4.55)
10	Harvesting	7.56	10.57	18.13	4.09	25.61	29.7	47.83 (15.26)
11	Curing (sun drying)	-	5.72	5.72	-	3.17	3.17	8.89 (2.84)
12	Wreath making and packing	-	9.82	9.82	-	14.54	14.54	24.36 (7.77)
	Total	70.65 (22.54)	79.62 (25.40)	150.27 (47.94)	49.24 (15.71)	113.95 (36.35)	163.19 (52.06)	313.46 (100.00)

Per hectare physical input utilization

The per hectare physical input utilization is presented in Table 2. In the small, medium and large groups, the per hectare quantity of white onion seed used was found 11.88 kg, 11.97 kg and 12.32 kg, respectively, whereas at the overall level, it was 12.03 kg per hectare. The FYM/compost used was highest in the large size group (9.25 cartloads), followed by the medium size group (9.10 cartloads) and the small size

group (8.97 cartloads). At overall level, the quantity of FYM/compost was observed to be utilized 9.11 cartloads per hectare. In the case of fertilizers, large-sized farmers had applied the highest quantity of fertilizers that is 127.34 kg of N, 59.13 kg of P and 65.02 kg of K per hectare, followed by medium-sized farmers with (126.46 kg of N, 56.23 kg of P, 58.63 kg of K) and small-sized farmers (108.23 kg of N, 56.23 kg of P and 58.63 kg of K per hectare).

Table 2: Per hectare physical input utilization for white onion cultivation

Sr. No.	Particulars	Unit	Small	Medium	Large	Overall
1	Hired human labour					
	a) Male	Days	24.55	51.48	58.68	49.24
	b) Female	Days	79.24	115.20	138.74	113.95
	Sub total	Days	103.79	166.68	197.42	163.19
2	Family human labour					
	a) Male	Days	94.48	68.62	59.70	70.65
	b) Female	Days	112.55	78.34	62.85	79.62
	Sub total	Days	207.03	146.96	122.55	150.27
3	Total human labour					
	a) Male	Days	119.03	120.10	118.38	119.89
	b) Female	Days	191.79	193.54	201.59	193.57

	Total	Days	310.82	313.64	319.97	313.46
4	Bullock pair days	Days	8.58	6.83	5.70	6.73
5	Machinery hours	Hours	8.26	8.84	9.74	8.97
6	Seed	Kg	11.88	11.97	12.32	12.03
7	FYM	Cart load	8.97	9.10	9.25	9.11
8	Fertilizers					
	a) Nitrogen	Kg	108.23	126.46	127.34	118.96
	b) Phosphorus	Kg	56.23	58.94	59.13	56.44
	c) Potassium	Kg	58.63	64.66	65.02	62.98

The per hectare bullock pair days and machinery hours utilised were 6.73 days and 8.97 hours respectively at the overall level. The per hectare expenditure incurred on plant protection for white onion was highest in the large size group (₹12,611), followed by the medium size group (₹12,508) and the small size group (₹12,394). At the overall level, it was ₹12,368 per hectare. Similarly, the per hectare cost of irrigation was highest in the large size group (₹1,329),

followed by the medium size group (₹1,290) and the small size group (₹1,212). At the overall level, the cost incurred on irrigation was estimated to ₹1,281 per hectare.

Per hectare cost of production in white onion cultivation

The per hectare cost of cultivation of white onion is presented in Table 3.

Table 3: Per hectare cost of cultivation of white onion

Sr. No.	Particulars	Small	Medium	Large	Overall
1	Hired labour	27175 (9.59)	44244 (15.37)	52289 (17.86)	43259 (15.06)
2	Bullock pair days	8580 (3.03)	6830 (2.37)	5700 (1.95)	6730 (2.34)
3	Machinery (hrs)	4956 (1.75)	5304 (1.84)	5844 (2.00)	5382 (1.88)
4	Seed (kg)	47520 (16.77)	47880 (16.63)	49280 (16.83)	48120 (16.76)
5	FYM (CL)	22425 (7.92)	22750 (7.90)	23125 (7.90)	22775 (7.93)
6	Fertilizers				
	a. Nitrogen (N)	1393 (0.48)	1628 (0.57)	1639 (0.56)	1532 (0.53)
	b. Phosphorus (P)	3542 (1.25)	3713 (1.29)	3725 (1.27)	3556 (1.24)
	c. Potassium (K)	3694 (1.30)	4074 (1.42)	4096 (1.40)	3968 (1.38)
7	Irrigation (Rs.)	1212 (0.43)	1290 (0.45)	1329 (0.45)	1281 (0.45)
8	Plant Protection (Rs.)	12394 (4.37)	12508 (4.35)	12611 (4.31)	12368 (4.31)
	Input cost	132891 (46.91)	150221 (52.18)	159638 (54.52)	149371 (51.89)
9	Land revenue and other cesses	175 (0.06)	175 (0.06)	175 (0.06)	175 (0.06)
10	Depreciation on implements and machinery	2312 (0.82)	2385 (0.83)	2392 (0.82)	2358 (0.82)
11	Interest on working capital	1993 (0.70)	2253 (0.78)	2395 (0.83)	2241 (0.78)
	Cost A	137371 (48.48)	155034 (53.86)	164600 (56.22)	153745 (53.54)
12	Interest on fixed capital (@10% on fixed capital)	5284 (1.87)	5701 (1.98)	5128 (1.75)	5232 (1.82)
13	Rental value of land (1/6th of gross value) – Land revenue	70885 (25.02)	71940 (24.99)	73465 (25.09)	72150 (25.13)
	Cost B	213540 (75.36)	232675 (80.83)	243193 (83.06)	231127 (80.49)
14	Family labour	56481 (19.94)	40171 (13.95)	33623 (11.48)	41100 (14.31)
15	Supervision charges (10% of input cost)	13289 (4.69)	15022 (5.22)	15964 (5.45)	14937 (5.20)
	Cost C	283310 (100.00)	287868 (100.00)	292780 (100.00)	287164 (100.00)

It is observed from the Table 3 that, the total per hectare cost of cultivation (Cost C) of white onion production at the overall level worked out to be ₹ 2,87,164 and for the small, medium and large size groups it was found to be ₹ 2,83,310, ₹ 2,87,868 and ₹ 2,92,780 per hectare respectively. This revealed that the cost of cultivation was highest for the large size group, followed by the medium and small size groups. For the overall level, it was observed that out of total cost (Cost C), the maximum cost incurred was on human labour days, including both hired labour days and family labour days ₹ 84,359 (29.38%), followed by rental value of land ₹72,150 (25.13%), cost of seeds ₹ 48,120 (16.76%), cost of FYM ₹ 22,775 (7.93%), cost of plant protection ₹ 12,368 (4.31%), cost of fertilizers ₹9,056 (3.15%), cost of bullock pair days ₹ 6,730 (2.34%), cost of machinery hours 37 ₹ 5,382 (1.88%) and cost of irrigation ₹ 1,281 (0.45%). Similarly, it was also observed that input costs, cost A and cost B were ₹ 1,49,371 (51.88%), ₹ 1,53,745 (55.54%) and ₹2,31,127 (80.49%), respectively.

Per hectare profitability of white onion cultivation

The profitability of white onion at various level of cost has been worked out and presented in Table 4. The per hectare productivity of white onion at overall level were worked out and it was found to be 144.65 quintals. The per hectare gross returns from white onion were accounted to ₹ 4,33,950 per hectare and net returns at Cost A, Cost B and Cost C were also estimated and accounted to be ₹2,79,805, ₹2,02,423 and ₹ 1,46,386 respectively. The per quintal cost of white onion at overall level was estimated to ₹1,988. The benefit cost ratio for small, medium and large size group of white onion was estimated to 1.49, 1.50 and 1.51 respectively, However the benefit cost ratio at overall level was found to 1.51.

Table 4: Per hectare yield and returns from white onion obtained by sample farmers of different size groups

Sr. No.	Item	Small	Medium	Large	Overall
1	Yield (qtl)	142.12	144.23	147.28	144.65
2	Gross returns (₹)	426360	432690	441840	433950
3	Cost				
I.	Cost A	137371	155034	164600	154145
II.	Cost B	213540	232675	243193	231527
III.	Cost C	283310	287868	292780	287164
4	Net returns at				
	i. Cost A	288989	277656	277240	279805
	ii. Cost B	212820	200015	198647	202423
	iii. Cost C	143050	144822	149060	146786
5	Per quintal cost (₹)	1993.46	1995.90	1987.91	1988.00
6	Benefit cost ratio	1.49	1.50	1.51	1.51

Resource use efficiency in production of white onion

The information regarding resource use efficiency is presented in Table 5. MVP/MFC ratio for fertilizers and human labour days used in the production of white onions were both greater than one shows that these resources are not being used to their full potential. However, the MVP/MFC ratios for the area planted with white onions, the seed, the number of machinery hours, the FYM and irrigation were all smaller than one, indicating overuse of those resources.

Table 5: Efficiency of resource use in white onion production

Resources	MPP	MVP	MFC	MVP/MFC	Level of resource use
Area under white onion (X ₁)	0.1842	552.7324	16842.25	0.0328	Excess utilization
Human labour days (X ₂)	0.4124	1236.9446	269.12	4.5963	Under utilization
Seed (X ₃)	0.7914	2374.0532	4000.00	0.5936	Excess utilization
Fertilizers (X ₄)	0.1317	394.8326	37.99	10.3931	Under utilization
Machinery Hours (X ₅)	-0.4130	-1238.9371	600.00	-2.0649	Excess utilization
FYM (X ₆)	0.0368	110.1388	2500.00	0.0441	Excess utilization
Irrigation (X ₇)	-0.5084	-1524.9570	136.42	-11.1784	Excess utilization

Constraints faced by farmer in production and marketing of white onion

The information regarding the constraints faced by white onion cultivator in production and marketing of white onion is presented in Table 6. It is observed from Table 6 that, in study area, the major constraints experienced by the sample farmers in production of white onion were non-availability of seeds (77.50%), lack of knowledge about ideal fertilizer dose (71.67%), high incidence of pests and diseases (68.33%) and inadequate labour during peak hours (59.17%). The constraints faced while marketing of white onion by sample farmers were low price offered by market intermediaries (76.67%), involvement of large number of intermediaries (69.17%), lack of market information (62.50%) and high transportation charges (54.17%).

Table 6: Constraints in production and marketing of white onion at producer level

Sr. No.	Constraints	Proportion of Respondents			
		Small (N=47)	Medium (N=46)	Large (N=27)	Overall (N=120)
Production					
1	Non-availability of seeds	37 (78.72)	39 (84.78)	17 (62.96)	93 (77.50)
2	High incidence of pests and diseases	36 (76.60)	32 (69.57)	14 (51.85)	82 (68.33)
3	Lack of knowledge about ideal fertilizer dose	31 (65.96)	36 (78.26)	19 (70.37)	86 (71.67)
4	Inadequate labour during peak hours	27 (57.45)	24 (52.17)	20 (74.07)	71 (59.17)
Marketing					
1	Lack of market information	33 (70.21)	29 (63.04)	13 (48.15)	75 (62.50)
2	Involvement of large number of intermediaries	32 (68.09)	36 (78.26)	15 (55.56)	83 (69.17)
3	High transportation charges	26 (55.32)	23 (50.00)	16 (59.26)	65 (54.17)
4	Low price offered by market intermediaries	38 (80.85)	43 (93.48)	11 (40.74)	92 (76.67)

Conclusions

1. The per hectare labour utilized for white onion was 313.46 labour days, out of which 163.19 were hired labour days and 150.27 were family labour days which indicated hired 53 labour days were more than family labour days. Highest labour days were utilised for harvesting.
2. The per hectare fertilizer, seeds and FYM utilized increased with increase in land holding.
3. The per hectare cost of cultivation at overall level was ₹ 2,87,164. In case of small, medium and large size group the per hectare cost of cultivation was ₹ 2,83,310, ₹ 2,87,868 and ₹2,87,164 respectively. The present study concluded that per hectare cost of cultivation increased with increase in farm size.
4. The study concluded that gross return obtained per hectare at overall level was ₹ 4,33,950. As farm size increased, the gross return per hectare increased as well.
5. The per hectare yield was found to be increased with increase in land holding, at overall level it was found to be 144.65 quintal and in case of small, medium and large size group it was 142.12 quintal, 144.23 quintal and 147.28 quintals respectively.
6. MVP/MFC ratio for human labour days and fertilizers were greater than one indicating underutilization of these resources. This revealed that, the white onion crop has further advantage in expanding output level.
7. The major constraints faced by the white onion cultivators were non-availability of seeds, lack of knowledge about ideal fertilizer dose, high incidence of pests and diseases, and inadequate labour during peak hours.
8. The constraints faced during marketing by white onion cultivators were low price offered by market intermediaries, involvement of large number of intermediaries, lack of market information and high transportation charges.

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