COST AND RETURNS ANALYSIS OF ONION: A CASE OF NASHIK DISTRICT OF MAHARASHTRA

Kumud Shukla[1], Amrita Jain[2], Manmeet Kaur[3]

[1] Assistant Professor, School of Agriculture, Galgotias University,Gautam Buddh Nagar, UP, India

[2] Assistant Professor, G.L. Bajaj Institute of Management and Research, Gautam Buddh Nagar, UP, India

[3] Assistant Professor, Department of Agricultural Extension & Communication, College of Agriculture, Swami Keshwanand Rajasthan Agricultural University, Bikaner, India

Email: kumud.shukla@galgotiasuniversity.edu.in

Abstract

India is second large vegetable grower at global level, trailing only China. Onion is main vegetable crop of Maharashtra more than half of the country yield comes from Maharashtra. The present research was to investigate the economics of onion production on farms of various sizes. The research was carried out in the Nashik district (2016-17), which was chosen due to the largest onion growing area in Maharashtra. A survey was undertaken to collect the opinions of 131 farmers from various farm sizes, which were chosen according to the probability proportion to the number of farmers from each size farm group. Area and yield were typically used to calculate production data. Onion is important cash crops so production takes significantly more capital than other crops. As a result, caution is required. On average, Rs. 69325.01 was spent per hectare on onions. Small farms had the greatest cultivation costs, at Rs. 72559.57, followed by medium size farms (Rs. 69174.81) and large size farms (Rs. 66240.66). Large size farmers had higher net returns per hectare (Rs. 45,970.94/ha) than medium and small size farmers (Rs. 43,248.49/ha and Rs. 45,445.94/ha, respectively). Large size farms had the highest benefit/cost ratio (1:1.69) followed by medium size farms (1:1.63) and small size farms (1:1.58). As a result, the sample average Benefit/Cost ratio in various farm sizes was 1:1.63.

Keywords: Cost of Cultivation, Onion, Return, Benefit/Cost Ratio, Nashik, Maharashtra

1. Introduction

Researchers from all around the world have been paying close attention to onion study. Many Indian academics, policymakers, and researchers have investigated various areas of onion study. The onion (*Allium cepa*) offers a wide range of culinary, nutritional, medicinal, commercial, revenue, and employment prospective. Onion crop is a labor-intensive crop and cultivated everywhere in India primarily by small and marginal farmers. With 1624.34 thousand ha of land and 26641.03 thousand metric tonnes of onion production, India is second only to China **(Source: NHRDF, 2020-21).** Onions must be supplied year-round from either new harvests or stockpiles due to the actual need for them both domestically and for export. In terms of overall onion output, the three main seasons of kharif (monsoon), late

4452

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

kharif, and rabi (winter) account for 15%, 20%, and 65% of the total accordingly **(Source: NHB, 2020-21).**

Maharashtra is known as the "onion basket of India" since it ranks first in onion production. Maharashtra stands alone contribution is 39.32 per cent in total production and rest followed by Madhya Pradesh (17.07 per cent), Karnataka (9.99 per cent), Gujarat (6.22 per cent), Rajasthan (5.20 per cent), Bihar (4.98 per cent) and other states (17.22 per cent) in India **(NHB, 2019-20).** In Maharashtra, onion production, area and productivity were 703.80 thousand ha, 10476.46 thousand metric tonnes, and 14.89 ton/ha in **2020-21** respectively **(Source: NHRDF).** The major onion growing districts of the Maharshtra are Nashik, Ahmednagar, Pune, Aurangabad, Jalgaon covering about 95 per cent of area under onion cultivation of the state **(NHB, 2019-20).** Nashik produces the most onions in the country. Nashik onion is not only consumed throughout India but it is also exported to a number of countries. Although India is the second large onion growing country at global level but the productivity of country 16.40 t/ha which is at least 4 times less compared to Republic of Korea (57.03 t/ha). Despite this, Maharashtra is key onion producing state accounting most of India's onion production yet its productivity is 14.89 per cent which is quite below from all India productivity (16.40) and far below to world productivity**(FAO,2012)**

The study main aim is to investigate the reason behind low level of productivity in study area. So the study of resource use efficiency of onion production would be evaluated to find out the best combination that could be suggested to maximize the productivity. Since, onion is grown on a commercial scale in the study area at a great extent so the study of economics of onion production would be useful to farmers. The costs and returns of onion would be quite beneficial to the onion growers for having first hand prior knowledge of the profitability in the onion cultivation. If onions are produced profitably, which requires adequate resource management and higher per-unit resource usage efficiency, onion production can become more economically lucrative. It may also help to reduce production costs. Given the significance of the onion harvest, a research was carried out to determine the expenses and profits of the crop.

2. Methodology

The present study performed in Nashik district of Maharashtra in 2016-17. Nashik district was chosen purposely for its outstanding onion production in Maharashtra. Niphad and Yeola blocks in Nashik district were chosen for the study because they are the major onion producing blocks with better market access. Seven villages from Niphad block and six villages from Yeola block were chosen based on the highest onion area production. From each village 10% of farmers were chosen at random. As a result, the survey included 13 villages from two blocks of Nashik, totaling 131 respondents. By using the personal interview method, data was collected from sample farmers using a pre-tested structured interview schedule. The survey questioned 131 farmers, with 93 being marginal, 26 being small and 12 being large.

3. Analytical Tools

In India, the cost technique is frequently used in farm management to determine output profitability. Cost A1, A2, B, and C make up the cost idea.

Cost-A1: This section examines the respondent's overall cash expenses.

4453

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

- Imputed value of hired labour
- Imputed value of hired and owned machine charges
- Charges of hired and owned Bullock
- Seed costs
- Manure and fertiliser costs
- Plant protection chemical costs
- Charges for irrigation
- Additional charges
- Working capital interest
- Depreciation for fixed assets
- Government receives land revenue

A2 = A1+Rent given for leased land, but applicable.

Cost B = Cost A2 + Imputed leasing value of owning land + Fixed capital interest

None of the farmers in this study leased their land. As a result, Cost A1 is equivalent to Cost A2. The whole cost of cultivation, or gross cost is cost C.

Production costs: The given formula was used to estimate the cost of production:

Production cost per qt = cultivation cost per hectare/main product quantity per hectare

Measures of income: The income measures below were calculated:

Gross Income = price/quintal * yield (quintal)/ hectare

Farm Business Income = Gross Income - Cost A_2

Farm Investment Income = Farm Business Income- Imputed family labour.

Family Labour Income = Gross income - Cost B

Net income = Gross income - Cost C

Input-output ratio (C/B ratio) = Cost C: gross income

4. Results And Discussion

The cost and returns per hectare of onion growing were computed in an economic analysis. Following are the findings, which are also summarised in tabular form.

1. Resource utilisation and cultivation costs in various farm size groups

It is crucial to understand cost and return structures in order to assess the crop enterprise's economic feasibility. As a result, this part assesses the cost of production and profitability analysis of onion farming in the chosen Maharashtra blocks. **Table.1** reveals that small farms had the highest overall cost (Rs. 72,559.57/ha) compared to medium and large size farms (Rs. 69,178.81/ha and Rs. 66,240.66/ha). In the diverse size of farms group, the average total cost was Rs.69325.01/ha.

Human labour, fertilisers, seeds, and bullock labour were the cost components with the largest percentage of variable costs whereas most of the processes, such as harvesting and weeding, required human labour while land preparation and interculture required bullock labour. According to the distribution of operational cost patterns under varied inputs, the cost of human labour was highest in large size farms (Rs. 8250/ha) following by medium size farms (Rs.7650/ha) and small size farms (Rs.6600/ha), **Aher V.K. *et al.* (2011), Sameer and Kulkarni (2014), Uma and Shanmugam (2015) found comparable results.** The sample human labour charge was 7500 Rs/ha which was high. This can be because the business

4454

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

requires a lot of labour. The findings show that site preparation and nursery raising are also expensive processes in the onion growing industry. **(Ranjith P. C. *et al.* 2021).** Bullock labour cost was the highest in small size farms (Rs. 2700/ha) followed by medium farms (Rs. 2100/ha) and large farms (Rs. 1800/ha).

In diverse sizes of farms, the cost of machinery labour was Rs. 6,500/ha. Seed cost the most on small farms (Rs. 5,380.48/ha) and the least on large farms (Rs. 4,334.80/ha), respectively. Because onion responds well to fertiliser, the expenditure of farm yard manure utilised varied from Rs. 2442.71 (small farms) to Rs. 1596.77 (large size farms). This is similar with **Ghulghule *et al.* (2008)** findings. Small farms spent the most on fertilisers (Rs.5,565.52/ha) compared to medium size farms (Rs. 5,291.29/ha) and large size farms (Rs. 5,116.64/ha). Finding supported by **Channabasavanagouda *et al.* (2010)** and **Punit Kumar Agarwal and Manish Kumar (2018).**

In addition, small farms had the highest pesticide expenditure (Rs. 2,266.56/ha) when compared to medium (2050.85/ha) and large farms (1909.05/ha). Depreciation on fixed assets was Rs.826.67 on average, while interest on fixed capital and operating capital was 1,890.02 Rs./ha and Rs.2,318.02 Rs./ha respectively. ***Barakade et al*., (2011)** and ***Rameez et al*., (2014)** both came up with similar findings. The government got Rs. 73.48 in land revenue from farms of various sizes. On farms of various sizes, the rental value of own land was Rs.18000/ha. In the small, medium, and large size of farms groups, interest on fixed capital was Rs.1891.81/ha, Rs.1889.42/ha, and Rs.1888.82/ha, respectively. It was also discovered that family labour expenses were highest on small farms (Rs.12,000/ha) and lowest on large-scale farms (Rs.9,450/ha). This is consistent with ***Meena et al. (2016)*** findings.

Table 1: Resource utilisation and cost of onion crop cultivation per hectare for various farm sizes.

Sl. No	Details of Farm Operations	Farming Group Size			Average Sample
		Small	**Medium**	**Large**	
1	Charges for Hired Human Labor	6600.00 (9.10)	7650.00 (11.06)	8250.00 (12.45)	7500.00 (10.87)
2	Charges of Bullock Labor	2,700.00 (3.72)	2,100.00 (3.04)	1,800.00 (2.72)	2,200.00 (3.16)
3	Labor Charges for Machines	6,500.00 (8.96)	6,500.00 (9.40)	6,500.00 (9.81)	6,500.00 (9.39)
4	Seed Cost	5,380.48 (7.42)	4,818.48 (6.97)	4,334.80 (6.54)	4,844.59 (6.97)
5	Farmyard manure costs	2442.71 (3.37)	1923.27 (2.78)	1596.77 (2.41)	1,987.58 (2.85)
6	Fertilizers costs	5,565.52 (7.68)	5,291.29 (7.65)	5,116.64 (7.72)	5,324.48 (7.68)
7	Charges for Irrigation	4,700.52 (6.48)	3,950.96 (5.71)	3,210.58 (4.85)	3,954.02 (5.68)
8	Charges for Plant Protection	2,266.56	2,050.85	1,909.05	2,075.49

4455

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

		(3.12)	(2.96)	(2.88)	(2.99)
9	Miscellaneous charges	1,027.82 (1.42)	1,153.75 (1.67)	1,210.44 (1.83)	1,130.67 (1.64)
10	12 percent interest on working capital	2566.03 (3.54)	2302.63 (3.33)	2085.39 (3.15)	2,318.02 (3.34)
11	Fixed Resource Deprecation	850.00 (1.17)	820.00 (1.19)	810.00 (1.22)	826.67 (1.19)
12	Land Taxes Paid to the Government	68.12 (0.09)	74.16 (0.11)	78.17 (0.12)	73.48 (0.11)
13	Rent Paid for Land Leased	-	-	-	-
14	Own Land Rental Value	18000.00 (24.81)	18000.00 (26.02)	18000.00 (27.17)	18,000.00 (26.00)
15	10 percent interest on fixed capital	1891.81 (2.61)	1889.42 (2.73)	1888.82 (2.85)	1,890.02 (2.73)
16	Charges of Family Labor	12000.00 (16.54)	10650.00 (15.40)	9450.00 (14.27)	10,700.00 (15.40)
17	**Total Cultivation Cost**	**72,559.57 (100)**	**69,174.81 (100)**	**66,240.66 (100)**	**69325.01 (100)**

2. Cost concepts for onion crops per hectare in various farm sizes

Table.2 shows the cost concepts for various farm sizes per hectare unit. Small size farms had the greatest cost A1 (Rs. 40,667.76/ha) followed by medium size farms (Rs. 38,635.39/ha) and large size farms (Rs. 36,901.84/ha). Cost A2 was Rs. 40,667.76/ha, Rs. 38,635.39/ha, and Rs. 36,901.84/ha for small, medium, and big farms, respectively. These outcomes are consistent with findings of **Anon. (2017) and Kantariya *et al.* (2018).** Small farms had the highest cost B (Rs.60,559.57/ha) followed by medium farms (Rs.58,524.81/ha) and large farms (Rs.56,790.66/ha). Small farms had the highest cost C (Rs.72,559.57/ha) while large farms had the lowest cost C (Rs.66,240.66/ha). *Ghulghule et al*. **(2009)** came up with the same outcome. In the different size of farms group, the overall average for Cost A2, Cost B, and Cost C was Rs.38735.00/ha, Rs.58,625.01/ha, and Rs.69,325.01/ha respectively. *Aher V.K. et al.* **(2011)** backed up this conclusion.

Table.2 Cost Concepts in Onion Crop Per Hectare in Various Farm Sizes

Sl. No	Cost Concepts	Farms Group			Sample Average
		Small	**Medium**	**Large**	
1	Cost A_1	40,667.76	38,635.39	36,901.84	38,735.00
2	Cost A_2	40,667.76	38,635.39	36,901.84	38,735.00
3	Cost B	60,559.57	58,524.81	56,790.66	58,625.01
4	Cost C	72,559.57	69,174.81	66,240.66	69,325.01

4456

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

3. Costs and Returns of onion crop in diverse Farm Size Groups

A study of the economics of onion production in various sizes of holdings is necessary to determine their profitability in order to select the best alternative resources, cultivation methods, and scale of economies, among other things. Second, it provides an estimate of how much money will be needed to cultivate different sized agricultural holdings with varying levels of technological adoption. It is common knowledge that crop production profitability is determined by the cost of production, yield per unit of land, and market prices. As a result, the current study examines all of them.

Table.3 reveals the cost and returns of onion farming for various farm sizes. Small farms had the highest total cost of cultivation (Rs. 72,559.57/ha) compared to medium (Rs. 69,174.81/ha) and large farms (Rs.66,240.66/ha). In the diverse size of farms group, the average total cost of agriculture was Rs.69,325.01/ha. Same findings supported by **Kantariya et. al (2018)**.The findings of the cost of cultivation demonstrated that in the case of large farmers, the least overall cost of cultivation. It demonstrates economies of scale due to large farms. Medium-sized farmers are more likely to employ hired and bullock labour, resulting in greater production costs. Small farmers use a greater number of yield attributing inputs, resulting in higher costs. Aside from that, due to the tiny size of their holdings, small farmers are unable to manage agronomical procedures economically.

Small farms generated higher gross returns per hectare (Rs. 115005.50/ha) than medium and large farms (Rs. 112423.30/ha and Rs. 112211.60/ha) respectively. Large size farms had higher net returns per hectare (Rs. 45,970.94/ha) than medium and small size farms (Rs. 43,248.49/ha and Rs. 45,445.94/ha) respectively. This is consistent with the findings of **Kulkarni K.P. et al. (2011), Barakade et al. (2011) and MakhareP. K. and Korade V. C. (2018)** respectively. Large farmers received better net income owing to bulk sales through an acceptable marketing system, followed by medium farmers due to efficient functioning and small farmers received the lowest net return due to higher cost, selling at an unpleasant location, at a low price and at an unfavourable time.

In the varied size farm groups, the average production of onion was Rs. 175.08 qtl /ha. Small farms produced the maximum production of 180.96 qtl/ha, followed by medium farms (174.63 qtl/ha) and large farms (169.65 qtl/ha). The average production cost per quintal was Rs. 646.91. Farmers, in general, have low economic conditions and less resources, hence they sought a larger economic return per rupee invested. Large farms (1:1.69) had the highest benefit/cost ratio, followed by medium farms (1:1.63), and small farms (1:1.58). The findings are consistent with those of **Jagtap et al. (2012).** As a result, the sample average Benefit/Cost ratio in various farm sizes was 1:1.63. **Aher V.K. et al. (2011)** came up with the same outcome.

Table.3 Onion Crop Costs and Returns per Hectare in Different Farm Sizes

Sl. No	Particulars	Farms Group			Sample Average
		Small	**Medium**	**Large**	
1	Output (Qtls)	180.96	174.63	169.65	175.08
2	Price per quintal (Rs.)	635.53	643.78	661.43	646.9133

4457

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

3	Gross Returns (Rs)	115005.50	112423.30	112211.60	113213.50
4	Total Cultivation Costs (Rupees)	72,559.57	69,174.81	66,240.66	69,325.01
5	Net Returns (Rs)	42,445.94	43,248.49	45,970.94	43,888.46
6	B/C Ratio	1.58	1.63	1.69	1.63
7	Quintal Cost of Production (Rs)	400.97	396.12	390.45	395.85

4. Profitability of the onion crop per hectare in various farm sizes

Three efficiency indicators are identified by economic theory: allocative or resource usage, economic efficiency, and technological efficiency. **(Boris et al., 1997, Effiong and Onyenweaku, 2006, Ogunniyi L.T, 2011**). Technical efficiency (TE) measures a farm's ability to produce the maximum output possible from a given set of inputs. **(Bhendi and Kalirajan, 2007; Wakili, 2012; Karthick et al., 2013).** It is also known as the capacity to operate on the isoquant or production frontiers. **(Effiong and Onyenweaku, 2006).**

Table 4 shows measures of farm profitability in diverse farm sizes. Study revealed that small size farms had higher gross returns per hectare (Rs.115005.50/ha) than medium size farms (Rs.112423.30/ha) and big size farms (Rs.112211.60/ha). As a result, the overall average for gross income in all sizes of farms was 113213.50/ha. Farm business income was Rs. 74,337.75/ha, Rs. 73,787.91/ha, and Rs. 75,309.76/ha for the small, medium, and big farms groups, in that order. In the varied sizes of farms group, the average farm business income was 74,478.47/ha. Farm investment income was the highest in small farms (Rs. 62337.75/ha) followed by medium farms (Rs. 63137.91/ha) and large farms (Rs. 65859.76/ha) respectively. As a result, the sample average for farm investment income in all sizes of farms was Rs. 63778.48/ha. Same findings supported by **Kumar *et al.* (2017).** Large size farms had higher net income per hectare (Rs. 75,309/ha) than medium and small size farms (Rs. 73,787.91/ha and Rs. 74,337.75/ha, correspondingly). In the varying size of farms group, the average net income was 74,478.4/ha. In the diverse size of farms group, the average family labour income was Rs. 54,588.46/ha. Large farms had the highest input-output ratio (1:1.69) followed by medium farms (1:1.63), and small farms (1:1.58). As a result, the sample average input-output ratio in various farm sizes was 1:1.63. We draw the negative link between net benefit and benefit-cost ratio as a result of this sort of outcome. The findings are similar with those of **Shampi Jain and Jayant Kumar Gupta** *(*2018). Because they can better manage all of their demands and requirements for onion farming at a lower cost per hectare than farmers with small areas, the kind of farmers who had large farms had superior benefit-cost ratios. This finding indicates that good farm management practices are crucial for improving onion output, which is subpar among small farmers in Nashik district of Maharashtra **(Abu and Asember, 2011; Otieno *et al.,* 2012).**

Table.4 Measures of Farm Profitability in Onion Crop per Hectare at Different Farm Sizes

Sl. No	Details	Farms group			Sample Average
		Small	**Medium**	**Large**	
1	Gross Income	115005.50	112423.30	112211.60	113213.50
2	Income from Farming	74,337.75	73,787.91	75,309.76	74,478.47
3	Farm Investment Income	62337.75	63137.91	65859.76	63778.48

4458

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

4	Net Income	74,337.75	73,787.91	75,309.76	74,478.47
5	Labor income of the family	54,445.94	53,898.49	55,420.94	54,588.46
6	Input – Output Ratio	1:1.58	1:1.63	1:1.69	1:1.63

5. Conclusion

Onion is important commercial crop of India and Maharashtra has best unique advantage for onion production. The demand of Nashik onion within country and for the export has made it essential commodity round the year. In this study, Economics of Onion production was done on different farm sizes in Nashik district. The study revealed that the farmers who were having small holdings had better gross return because they can effectively manage their resources for onion cultivation in better way than the farmers having large area. This result shows that effective farm management practice is utmost thing for profitability of onion production. As acknowledged the onion in important commercial crop in study area, therefore its production may be increased more in future. However, yield gap exists due to biological and socio-economic constraints which should be minimized at farmer's level by the efforts of research, extension and by different institutional supports as well. In terms of productivity, there is more choice to employ more manure and fertilisers as well as working capital, to boost productivity. However, the support of financing institutions can help to close this significant financial gap in production of onion. Improved early maturing and high yielding variety seed types must be used to increase onion production because increasing land under onion cultivation has limitation but there is always scope of rising per hectare yields. Therefore, onion production will continue to thrive, but we will need more government policy intervention to become the global leader in onion production.

References

[1]   Abu, O., Asember, D.J. (2011). Opportunities for smallholder spinach, farmers in Nigeria; A profit efficiency analysis. *Journal of Economics*, 2(2),75- 79.

[2]   Agarwal P. K. and Kumar M. (2018). An Economic Analysis of Onion Cultivation in Giridih District of Jharkhand, Economic Affairs, 63(3),703-707

[3]   Agricultural and Processed Food Products Export Development Authority (2016-17), New Delhi www.apeda.gov.in/

[4]   Aher V. K., Shelke R. D., Bhosale M. Y. and Gharge S.H. (2011). Economics of production of *Rabi* onion in Ahmednagar district, *International Research Journal of Agricultural Economics And Statistics*, 2(2), 205-208

[5]   Anonymous (2017). Research Report, Department of Agricultural Economics. J.A.U., Junagadh, Gujarat

[6]   Barakade A.J., Lokhande T.N. and Todkari G.U. (2011). Economics of Onion Cultivation and its Marketing Pattern in Satara district of Maharashtra, *International Journal of Agriculture Sciences*, 3(3), 110-117

[7]   Bhendi, M.J. and Kalirajan, K.P. (2007). Technical efficiency of major food and cash crops in Karnataka (India), *Indian Journal of Agricultural Economics*, 62(2), 176-192.

[8]   Boris, E., Bravo-Ureta and Antonio, E.P. (1997). Technical, Economic, and Allocative efficiency in peasant farming. Evidence from the Dominican Republic. *Development Economics*, 35(1), 48-67

[9]   Channabasavanagouda, P. and Bokkal Nagendrappa (2010). Economic Analysis of Tur Cultivation in Karnataka, *Oxford Book Company,* Jaipur, New Delhi, 2, 81- 91

4459

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460

[10]   Effiong, E.O. and Onyenweaku, C.E. (2006). Profit efficiency in Bloilerproduction in Akwa Ibom State, Nigeria. Department of Agricultural economics, Michael Okpara University of Agriculture, Umudike, Umuakwa, Abia State, Nigeria. International Journal of Agriculture and Rural Devlopment, 7(1), 72-79.

[11]   FAO (2012), Production Year Book; Food and Agric. Org., Rome, Italy.

[12]   Ghulghule J. N., More S. S. and Thombre A. P.(2008). Resource use efficiency of kharif and rabi onion in Ahmednagar district of Maharashtra state, *Agriculture Update*, 3(4), 362-365

[13]   Ghulghule,J.N., Mohd. Asmatoddin and Thombre,A.P.(2009). Profitability of *kharif* onion production, *The Asian journal of Horticulture,* 4(1), 86-88

[14]   Jagtap, P.P., Shingane, U.S., Kulkarni, K.P. and S.V. Bodhe (2012). Economics of production of chilli in Amravati district, *International Journal of Agriculture Sciences*, 3(2), 240-243

[15]   Jain Shampi and Gupta J. K. (2018). Benefit - Cost Analysis of Onion Producer in Sagar District of Madhya Pradesh, India, *Int.J.Curr.Microbiol.App.Sci.* 7(1), 894-900.

[16]   Kantariya G.K., Ardeshna N.J., Rohini A.V. and Thumar V.M. (2018). Resource use efficiency and economics of onion cultivation in Bhavnagar district of Gujarat, Journal of Pharmacognosy and Phytochemistry 2018, 7(5), 1333-1338

[17]   Kumar A., Pannu R.S. and Sumit (2017). An economics of resources use efficiency in production of onion crop in Haryana, Plant Archives 17(2), 924-928.

[18]   Makhare P. K. and Korade V. C. (2018). Economics of onion production in Nashik district of Maharashtra, *International Research Journal of Agricultural Economics and Statistics,* 9 (1), 97-100

[19]   Meena S., Singh I.P. and Meena R. L.(2016). Cost of cultivation and returns on different cost concepts basis of onion in Rajasthan, *Economic Affairs,* 61(1), 11-16.

[20]   National Horticultural Research & Development Foundation (2016). New Delhi AreaAnd ProductiionReport (nhrdf.org)

[21]   National Horticulture Board (2019-20). *2nd Advance estimate*, New Delhi, http://nhb.gov.in/

[22]   Ranjith P. C., Sharma S. (2021). Yield and Economic Performance of Onion Cultivation in Maharashtra. *Agriculture Situation in India,* 4(7), 25-36.

[23]   Sameer L. and Kulkarni, G.N. (2014). Economics production of vegetables in Belgaum district in Karnataka*, International Research Journal of Agricultural Economics and Statistics,* 5 (2), 139-142.

[24]   Uma Gowri, M and Shanmugam, T.R. (2015). Economic Analysis of Production and Marketing of Banana in India, *American International Journal of Research in Humanities, Arts and Social Sciences,* 15 (174), 234-240

4460

Eur. Chem. Bull. 2023, 12(Special Issue 4), 4452-4460