"Estimation of Cost and Income of Onion Production: A case study of Ballia District of Eastern Uttar Pradesh"

ABSTRACT:

The system of India's economy predominantly depends on agriculture. It is contains attractive good qualities of calories, source of dietary fiber and vitamin C. ~~The present study on "An Economic Analysis of Onion Cultivation of Ballia" District of eastern region of Utter Pradesh .~~This study focused on the f~~ollowing~~ specific objectives such as ~~one to~~ work out the cropping intensity, costs-return and input-output relationship of onion cultivation in the District and ~~objective Two:~~ also to find out the constraints in production of onion confronted by respondent. Multistage stages sampling technique were used for selection of respondent. Primary data was collected by personal interview methods with the use of pre structured and pre listed schedule questionnaire. Finally hundred, farmers were selected randomly from four selected villages. The data were related to the Rabi season in the agriculture cropping year 2021-22.An overall average cost of cultivation of respondent were found per hectare to be Rs. 111493.95. The higher costs of cultivation were observed on medium farms to Rs.118430.40 fallowed by small farms and marginal as Rs.109070.72 and Rs.106980.72 per hectare respectively. It observed that cost of cultivation was maximum on medium size of farms due to more invested variety of seeds at Rs.15262.12, Farm Yard Manure (FYM)Rs.11904.46,irrigation Rs.10882.69 and also paid higher interest rate on fixed capital at Rs.21896.07. Cost of production of per quintal of onion was calculated on the C1, C2 and C3and cost of Input –output analysis was done on the basis of Cost A1 to cost C3. ~~An overall average cost of production of input- output ratio of all size groups varies from 1:3.61 to1:230. And also seen that the ratio of input and output in case of marginal farms is varies from 1:3.45 to1:2.10, small farms 1:3.47 to1:2.31 and medium farms 1:3.61to 1:2.30 respectively. The major constraints of onion cultivation were found such as high cost of fertilizers, cost of quality seed, charges of labour - machinery and scarcity of water for irrigation etc.~~

Keywords: Onion cultivation, input-output ratio, optimum output constraints, farmer, Ballia, Uttar Pradesh India

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1. INTRODUCTION:

The system of Indian economy predominantly depends on agriculture [1]. In all amongst vegetable crops, onion is one of the most important vegetable crops. Which is used each household for consumption. Approximately 13 lakh tonnes onions are consumed in every year .It are being grown as a cash crop since some years. [2] And view point of health's, it is good source of calories, dietary fiber and vitamin C.

India has stand ranks first in term of area which covers an area of 194 thousand hectare and kept rank second in production which covers 31703 thousand MT in 2021-22. [3].The country had harvested to 26.64 million tones of onion during crop years 2021-22 (July-June) [4]

As per the ministry's first advance estimate, sown area is estimated to be higher at 1.91 million hectare in the 2022-23 crop year from 1.62 million hectare in crop year 2021-22.[4]

Through comparative study of two district of onion B:C ratio of accounted in term of net returns were found 1.51 in Rewari district and 1.40 in the Bhiwani district respectively. After comparing of counterparts of both district selected farmers, in Rewari district farmers were more successful in harvesting of onions than the in Bhiwani district farmers .[5]

The various major onion producing states of India like as Maharashtra, Madhya Pradesh, Karnataka, Rajasthan, Bihar Andhra Pradesh, Haryana, Telangana and Gujarat have

contributed more than 60 percent share in total onion production. In which Maharashtra rank first in production with a share of alone of 42.53 per cent fallowed by Madhya Pradesh with a share15.16 percent in 2021-22[2]

The Commerce Ministry & Industry has stated that In the context of onion export policy "The extant export policy is free and only the export of onion seed is 'restricted' and that too is permitted under authorization from DGFT," (Directorate General of Foreign Trade.[6].Onion is not known with certainty as a wild plant. It is believed to have originated in an area which includes Iran, West Pakistan and the mountainous countries to the North [7]

In India onion is an important spice and commercial crop which can improve livelihood of poor farmers. It also plays a crucial role in food and nutritional security of human beings. Which is consumed almost every day in every home and it is consumed as salad and cooked in various ways in curies, fried, boiled, baked and used in soup making and pickles.

And also other vegetables, their requirement is daily in the kitchen and therefore augmentation of daily supply in the market at reasonable prices for both producers as well consumers in highly essential.

Besides fresh consumption, onion provides very good raw material for processing industry as it is processed in the form of dehydrated powder, rings, shreds .Onion in vinegar as medicinal herb is known to ancient world, as it is mentioned in the medicinal treaties like "Charak Samhita"of third or fourth century[8] .Sanskrit language equivalent signifying Vedic period and Aryan usage is available for onion as "Palandu"[9].

Studied the Economic Analysis of Onion(Allium cepa L.) Production and Marketing in District Awaran, Baluchistan ~~.Analyzed that average per acre total cost of production of Rs. 75050.00. And total revenue found per acre of Rs. 172800.00~~ [10]

Conducted study on An Economic Analysis of Onion Cultivation in Giridih District of Jharkhand . Analysis that the average cost of cultivation in block of dhanwar was found Rs.` 57687.95 per acreage which was comparatively higher than Birani block Rs.` 50374.30.The per acre production found 65.52 ~~quintal~~ and 46.00 quintal in Dhanwar and Birani block respectively . [1]

Analysis that the costs and benefits ratio of the farmers were observed as 1:2.09 as well as shows per quintal onion price of Rs. 700.00[11]

Studied that An economic Analysis of Production of Onion in Mahbubnagar District of Telangana, stated that coast of cultivation per hectare was highest on small farms lowest on large and medium farms.[12]

Studied on Cost of cultivation and returns on different cost concepts basis of onion in Rajasthan. The an average cost of cultivation was calculated as Rs.77850 per hectare and also focused on more labour is required for harvesting and cutting period. [13]

Onion production was found much higher in Rabi season compared to that during Kharif season. Market price of input that was prevailing at the time of their use was considered for working out of cost of cultivation. [14]

The gross return was calculated on the basis of market price of the produce at the time when the produce is ready for sale. Net returns Rs. Per hectare was calculated by deducting the cost of cultivation from the gross income. [15]

Table 1 ~~**Year and area wise production and yield**~~

Onion Area - Million Hectares
Production - Million Tonnes
Yield - Kg./Hectare

Year	Area	Production	Yield
1978-79	0.21	2.20	10403

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Year	Area	Production	Yield
1983-84	0.27	2.70	9992
1992-93	0.32	3.49	10791
1998-99	0.47	5.33	11 391
2003-04	0.42	4.21	9912
2008-09	0.83	13.48	16260
2013-14	1.20	19.40	16120
2018-19	1.20	22.82	18705
2021-22	1.91	31.27	16339

All-India Area, Production and Yield
Source: Department of Agriculture & Farmers Welfare

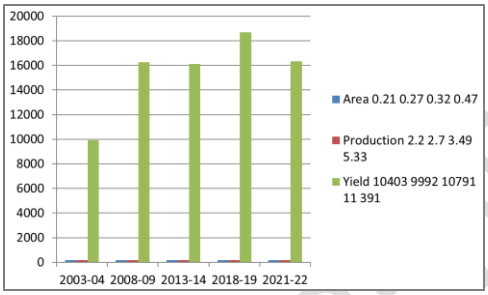

Figure: 1.*Major Producing States (Area, Production and Yield)*

Table.2 State wise production and yield

Area - '000 Hectares
Production - '000 Tonnes
Yield - Kg./ Hectare

State/UTs	Area%	%	Production	%	Yield
Maharashtra	925.20	48	13301.70	43	14377
Madhya Pradesh	196.70	10	4740.60	15	24101
Karnataka	231.84	12	2779.50	9%	11989
Gujarat	100.00	5	2555.00	8	25550
Rajasthan	92.00	5	1591.00	5	17229
Bihar	58.00	3	1375	4	23707
West Bengal	43.85	2	866.35	3	19757
Andhra Pradesh	44.60	2	722.90	2	16209
Tamil Nadu	52.80	3	555.70	2	10525
Haryana	24.10	1	514.00	2	21328
Uttar Pradesh	30.00	2	509.00	2	16796
Other	115.09	6	1761.96	6	15309
All India	1914,18	100%	31272.71	100%	16337

Source: Department of Agriculture & Farmers Welfare Note: States have been arranged in descending order of percentage share in production during 2021-22

India is the second largest onion growing country in the world. It's cultivate in two crop cycles, such as first harvesting starts in November to January and the second harvesting from January to May.

The Major Onion producing states area Maharashtra, Karnataka, Madhya Pradesh, Gujarat, Bihar, Andhra Pradesh, Rajasthan, Haryana and Telangana. Maharashtra ranks first in Onion production with a share of 42.53%. [2]

It is one of the important vegetable in Southern state of India mainly in Tamil Nadu, Andhra Pradesh and Karnataka. It is used in specially *sambar dish* preparation in South Indian kitchen. There is a lot of demand of Indian onion in the world, the country has

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exported 2,525,258.35 MT of fresh onion to the world for the worth of Rs. 4,522.79 corers/ 561.38 USD Millions during the year 2022-23[2]. In India amongst states Uttar Pradesh is also the onion producing state which covers 454.03 thousand million tone and its contributes 1.69 per cent of national production (State Directorate of Horticulture 2019-20) With about 1.4 million hectare under cultivation and production of about 24 million metric tonnes (MMT) annually on average (2015-16 to 2021-22), India is the second-largest onion producer globally. The bulk of the supply comes from four states Maharashtra (13.3 MMT), Madhya Pradesh (4.7 MMT), Karnataka (2.7 MMT), and Gujarat (2.5 MMT) which together accounted for 75% of India's production as of 2021-22. [2]

The farmers of Ballia district are not interesting to grown of onion crops for commercial purpose due to lack of irrigation facilities in local situation. Mostly onion are comes from outside of the district for consumption purpose and prices of the onion keep increasing through the year.

For the farmers, disposal of their produce has become as important as the adoption of new agricultural technology for improving his income from agriculture. Unless marketing system is improved, no incentive to increase production will attract the cultivators. It is often observed that the farmers do not get remunerative prices for their produce while the consumers have to pay higher prices. Whenever, there is an increase in price of the commodity, farmers of the region will cultivate the same crop which has exposed the inadequacies in handling, transportation, storage and packaging of the produce. This in turn has adverse effects on the farmers. Onion is one of the most volatile agricultural commodities.

A sharp increase in price impacts consumer budgets, while a fall in onion prices below the cost of cultivation reduces the income of farmers. And this way the price of onion keeps increasing and decreasing throughout years due daily demand of local, regional and international consumption.

Recently the demand for onion has been continuously increasing while supply of onion is declining. It is revealing high fluctuation in the prices. In this context it is necessary to know to what extent the arrivals and prices are being fluctuated and to draw meaningful policy conclusion. Keeping in the view economic evaluation of production of onion is necessary and information of this study would be great importance to research worker and policy maker to build less price policy and good mechanism of distributions system. This considering points of view the present study on "Estimation of Cost and Income of Onion Production: A Case Study of Ballia District of Eastern Uttar Pradesh "Hence, the present study focuses on the following specific objectives.

1. To work out the cropping intensity, costs -return and input-output relationship onion cultivation on sample farms in the district.
2. To find out the constraints in production of onion confronted by respondent in the study area.

2.0 RESEARCHMETHODOLOGY

2.1 SAMPLING:

This study was conducted to Ballia District of Uttar Pradesh is based on cost and return relationship. Multistage stages sampling design was employed for selection of the district, blocks and villages. At first stage of sampling district Ballia was selected. Regarding second stage of sampling from 17 blocks of Ballia district namely one block Bansdih having highest area of onion was selected purposively. Primary data was collected by personal interview methods with the use of pre structured ~~and pre-listed~~ schedule ~~questionnaire~~, secondary data were obtained farm book, journals, reports magazines and record of block and district profile.

There after an in third stage of sampling, list of villages growing onion crop was obtained with the help of block official record and finally four villages reasonably having higher area under onion crop were chosen randomly. A list of all onion farmers from each selected village is prepared with the help of the villages heads .It was arranged in ascending order on the basis of operational holding. The cultivators were classified into three categories Below 1

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ha(Marginal),1-2 ha(small) and 2-4 ha (medium).Fourth and last stage of sampling, a list of all the cultivators of each selected village was prepared along with their size of the operational holding. Finally hundred, farmers were selected randomly from four selected villages.

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2.1.1 Period of enquiry:

Agriculture year 2021-2022

2.1.2 Statistical tools for analysis: ~~To analyze the data for tabular analysis arithmetic mean (average) was used to estimation of the data.~~

~~$S.A. = \frac{\Sigma XI}{N}$~~

~~Where,~~

~~S= Simple~~

~~A= Average~~

~~Σ= sum of observation~~

~~X=Variable~~

~~N = No. observation of X~~

2.1.3 Methods of evaluation of Costs and Income Measures:

The different concept of cost approach of farm production analysis is mostly applied for evaluating profitability of crop.

The separate concepts of cost are identifying in short, likewise Cost A1, A2, B1, B2, C1, C2, and cost C3.

Cost A1: Generally this cost is incurred by the farmer or owner or operator in term of cash farm. It considered the following costs have been giving as under ~~belo~~

1. Value of family and hired human labour.
2. Value of bullock labour.
3. Value of fertilizers and manures
4. Value of machinery charges
5. Value of owned and higher seeds
6. Value of weedicide, insecticides, and pesticides and.
7. Irrigation charges
8. Interest on working capital
9. Depreciation on farm implements
10. Land revenue paid by operators to government.
11. Miscellaneous charges paid by land owner or farmers

COST A2 = Cost A1+ Rent paid for leased in land, if any.

COST B1 = Cost A1 + Interest on value of owned fixed capital assets

COST B2 = Cost B1 + Rental value of owned land less land revenue

COST C1 = Cost B1 + Imputed value of family labour

COST C2 = Cost B2 + Imputed value of family labour

COST C3 = Cost C2 + 10% of Cost C2 on account of Managerial functions performed by the farmer.

In this study, the zero rent was paid for leased in land because of the no one sample farmers were not feel need for take-up of land on lease basis. Then, both cost A1 and cost A2 are similar observed.

3. RESULT AND DISCUSSION:

3.1 Cropping Intensity:

Cropping intensity is an index of intensity of land use determined by number of crops

grown in a particular field during a year. It has been workout by using the fallowing formula.

$$\text{Cropping Intensity} = \frac{\text{Total Cropped Area}}{\text{Net cultivated area}} \times 100$$

The cropping intensity of the all size sample farms groups is presented in the ~~Table 3.1~~.the maximum cropping intensity was observed at marginal group of as213.33 per cent fallowed by small group ~~212.8600~~ per cent and medium group 109.62 per cent respectively with an overall average of 209.62 per cent.

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Table 3.Cropping intensity of the sample farms in the study area.

S.No	Size of farms (ha)	Net CultivatedArea (ha)	Total CroppedArea (ha)	CroppingIntensity (%)
1	Marginal(below 1ha)	0.45	0.96(7.59)	213.33
2	Small(1-2ha)	1.34	2.85(27.73)	212.68
3	Medium(2-4ha)	3.20	6.65(64.68)	207.81
All Farms		4.99	10.46(100)	209.62

(Figure in parenthesis shows in percentage)

3.1.2 COST AND INCOME STRUCTURE

The separate cost of concept such ascostA1/A2, B1/B2, C1/C2 and C3 were used for analysis of the data. Likewise various income such as gross income, farm business income, family labour income and farm investment income were calculated for different size of sample farms. And thereafter cost of production of onion crop Rs./quintal, input-output relationship workout on the basis of different cost concept.

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4.0Cost of Cultivation of Onion

Cost of production per hectare of onion crop of various input factor workout and presented in Table 4.This table illustrated an overall average cost of cultivation was found Rs. 111493.95 The cost of cultivation was higher on medium farmstoRs.118430.40 ~~fallowed~~ by small and marginal as Rs.109070.72 andRs.106980.72 per hectare respectively. it was observed the per hectare cost was maximum on medium farm due to heavy expenditure of verity of seed and resources.

Table4.Cost of cultivation of Onion on different size group of farms (Rs./ha) in the study area.

S.No.	Items	Size group of farms			
		Marginal Farms	Small Farms	Medium Farms	Over all farms
		Value (Rs)	Value (Rs)	Value (Rs)	Value (Rs)
1	Family labour	13150.88(12.29)	5284.20	4406.72	7613.93
2	Hired labour	4350.00	11123.6	10492.24	8655.28
3	Total	17500.88	16407.20	14898.96	16269.013
4	Tractor Charges	6288.10	6444.80	7805.69	4912.863
5	Seed	13400.34	14421.40	15262.16	14361.16
6	Irrigation Charges	10740.50	9150.44	10882.69	10591.21
7	FYM	9000.00	10828.80	11904.46	10577.75
8	Fertilizer (a)Nitrogen	5643.00	4135.89	4339.25	4706.046
	(b)Phosphorus	4228.11	4930.51	5365.86	4841.493
	(c)Potash	3825.65	3531.22	3653.98	3670.283
	Total (a+b+c)	13696.76	12597.62	13359.09	13217.823
9	Plant Protection	4860.89	4518.16	4613.24	4664.096
10	~~Incidental~~Expenditure	825.00	1148.23	1232.89	1068.706
9	**Total Working Capital**	**76312.47**	**75516.65**	**76959.18**	**76929.43**
10	Interest onworking Capital (3%)	2289.37	2265.50	2308.77	2307.88
11	Total	78601.84	77782.15	79267.95	78550.647
12	Rental Value own land	6500.00	6500.00	6500.00(12.89)	6500.00

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S.No.	Items	Size group of farms			
		Marginal Farms	Small Farms	Medium Farms	Over all farms
		Value (Rs)	Value (Rs)	Value (Rs)	Value (Rs)
13	Interest on fixed capital	12153.36	14873.05	21896.07	16307.493
14	Sub Total	97255.2	99155.20	107664.02	101385.14
15	10% Marginal of Sub Total	9725.52	9915.52	10766.40	10135.813
16	Grand Total	106980.72(100)	109070.72(100)	118430.42(100)	111493.95

Table.5 Measurement of cost and return in the study area (Rs. /ha)

Sr. No.	Items	Size group of farms			
		Marginal	Small	Medium	Average
1	Cost A_1 /A_2	65450.96	72497.95	74861.23	70936.71
2	Cost B_1	71950.96	78997.95	81361.23	77436.72
3	Cost B_2	84104.32	93871.00	103257.30	93743.20
4	Cost C_1	85101.84	84282.15	85767.95	85050.64
5	Cost C_2	97255.20	99155.20	107664.02	101348.14
6	Cost C_3	106980.72	109070.72	118430.42	111493.95
7	Yield in quintal(M.P	270.30	285.76	310.15	288.73
	Yield in quintal(B.P.)	00.00	00.00	00.00	00.00
	Price per quintal of Main product	834.83	880.75	950.00	915.92
	Total income of M.P.	225654.55	251683.12	294642.50	257326.71
	Total income of B.P	00.00	00.00	00.00	00.00
	Total Gross Income	225654.55	251683.12	294642.50	257326.71
8	Net Income	118673.83	142612.40	176212.08	145832.76
9	Farm Business Income	160203.59	179185.17	219826.27	186404.98
10	Farm Investment Income	147052.62	173900.97	215419.55	178791.04
11	Family Labour Income	141550.23	157812.12	191385.20	163582.51
Cost of production per quintal					
	Cost C_1	314.84	294.94	276.54	295.44
	CostC_2	359.80	346.99	347.13	351.30
	CostC3	395.78	381.68	381.85	386.43
12	**Input-Output Ratio**:				
(i)	On the Cost] '$A_{1/A2}$' basis	1:3.45	1:3.47	1:3.93	1:3.61
(ii)	On the Cost 'B_1' basis	1:3.15	1:3.18	1:3.62	1.3.31
(iii)	On the Cost 'B_2' basis	1:2.68	1:2.69	1:2.85	1:2.74
(iv)	On the Cost 'C_1' basis	1:2:65	1:2.98	1:3.43	1:300
(v)	On the Cost 'C_2' basis	1:2.32	1:2.54	1:2.74	1:2:25
(vi)	On the Cost 'C_3' basis	1:2.10	1:2.31	1:2.49	1:2.30

*__M.P__=Main Product, **B.P**. = By Product

It is concluded that the marginal, small and medium farmers were want more expended for cultivation of onion crop separate on resources but at the last yield and income analysis shows not much differences at varying size of farms in the regarding of economics of onion production (figures in parenthesis indicate percentage of cost of cultivation of onion.)

4.1 Measurement of cost and return:

Per hectare cost and return of paddy crop was measured on different categories of farms were workout and presented in Table.5. ~~it is depicted from the table that an overall average cost of cultivation cost C_3 basis came at Rs. 111493.95 and calculated as per hectare costC_3 was maximum at Rs.118430.40 in medium size of farms is followed by small farms and marginal farms at Rs.109070.72and Rs.106980.72 respectively~~ it observed that cost of cultivation was maximum on medium size of farms due to more invested variety of seeds at

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Rs.15262.12,FYM Rs.11904.46,irrigation Rs.10882.69 and also paid higher interest rate on fixed capital atRs.21896.07 whereas maximum investment was done by marginal size farms on fertilizer at Rs. 13696.76 and plant protection Rs.4860.89 and further observed that by the small size farms maximum expenditure was not done on cultivation of these factors.

It is concluded that medium groups of farmers were keeping well awareness. They were using latest technology for increasing production, but small farmers were not keeping self resources of cultivation ,they hired by others and paid maximum Rs/hour of cultivation of land resources, also observed that more family members engaged in agriculture due to lack of employment and ~~they have not self resources of cultivation.~~

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As for as in the context of income measure observed from the table that an overall gross income were calculated to Rs. 294642.50 of all size of farms.

Gross income per hectare found to Rs.294642.50 in medium size of farms fallowed by small and marginal farms corresponding to Rs.251683.12 and Rs.225654.55 respectively. And also other income measures such as net income, farm business income, and family income, farm investment income were also calculated and presented ~~in the table 3.~~ It is revealed that the study marginal farmers were much aware regarding use of improved technologies in order to found more yield from their scare holding.

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Cost of production of per quintal of onion was calculated on the C1, C2 and C3 basis it is displayed in the table that per quintal cost of production the basis of C1.

Similarly input –output analysis was done on the basis of Cost A1 to cost C3. An overall average cost of production of input- output ratio of all size groups varies from 1:3.61 to1:230. And also seen that the ratio of input and output in case of marginal farms is varies from 1:3.45 to1:2.10, small farms 1:3.47 to1:2.31 and medium farms 1:3.61to 1:2.30 respectively.

It is concluded that in the study area marginal, small and medium farmers more expended for cultivation of onion distinguish resources but at the last yield and income analysis shows not much differences at varying size of farms in the regarding of economics of the onion production.

Table.6 Constraints faced by the farmers in the study area of the district.

S.No.	Particulars / No of Problems(Constraints	Categories of farms				
		Marginal	Small	Medium	total	Rank
1	High cost of labour and machinery	10	5	3	18	III
2	High cost of quality seed	16	6	5	27	I
3	Scarcity of water for irrigation	11	4	2	17	IV
4	Disease, pest and weed infestation	8	4	3	15	V
5	High cost of fertilizers	13	7	3	23	II
Total farmers		58	26	16	100	

5. MAJOR CONSTRAINTS:

Different constraints faced by the farmers have been presented in the Table 6. This table is depicted that the farmers were facing distinguish constraints in related to onion cultivation the problems is related to high cost of quality seed stand rank first is more serious problems observed in two categories seeds such as local and branded seed were available in market but not truthfully believed on local seeds because these gave less output than the branded seeds.

High cost of fertilizer also was the most savior problems stand rank second observed because of during timely fertilizers availability were not provided by government agencies whenever for using fertilizers were purchasing by private institutions fallowed by high cost of labour and machineries were also observed as constraints during planting and weed eradication periods were increasing cost per hours or per days. Generally farmers faced highly problems of water scarcity during month of March to June in every year, as result which production may affects. Disease, pest and weed infestation were less problems observed in the fields of onion growers because they adopted better practice of management.

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6.0 CONCLUSION

~~This paper has basically focused on cropping intensity, identification of cost of onion cultivation, major constraints of production. The respondent gives message that cultivation is more profitable on the basis of the study area. If we grow onion in whole eastern Uttar Pradesh region, we will earn more profit per hectare.~~

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Abbreviations:

SF=Small farmer, MD= Medium farmer, FL= family Labour, F C=Fixed Cost, VC=Variable Cost,MC=Managerial Cost,MP=Main Product,BP= By Product,PS = Price Spread,M C=Marketing Cost,MM=Marketing Margin,WS= Whole Seller,VT=,Village Trader,PS=Producer Surplus,Rs= Rupee, CI=Cropping Intensity ,FYM= Farm Yard Manure ,Net Income ,G I=Gross Income ,FBI=Farm Business Income, FLI=Family Lbour Income I.I.=Investment Income,N=Nitrogen.,P=phasphoras,k= Potash., P.P.=Plant Protection.

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