



## A Study on Cost of Cultivation in Onion (*Allium cepa* L.) Under Poplar Based Agroforestry System

Rajesh Kumar Dewangan<sup>1</sup>, Ramchandra<sup>2</sup> and Harishchandra Darro<sup>3</sup>

1-3Department of Agroforestry, School of Forestry & Environment, Sam Higginbottom Institute of Agriculture, Technology and sciences, Allahabad (U.P).

Email: [rajesh.dewangan0506@gmail.com](mailto:rajesh.dewangan0506@gmail.com)

### ABSTRACT

The experiment was laid out in Randomized Block Design (Factorial) with three replication and 12 treatments under use different levels of N fertilizer. The results revealed that the economy of different is concerned, the treatment V<sub>1</sub>T<sub>4</sub> provide net profit of Rs. 81410 with benefit cost ratio of 2.65 and the minimum net profit of Rs. 4110 was recorded in the treatment V<sub>2</sub>T<sub>5</sub> with benefit cost ratio 0.13.

**Key Words:** Onion, Poplar, Agroforestry

Received 24.09.2019

Revised 15.10.2019

Accepted 06.11.2019

### INTRODUCTION

Onion (*Allium cepa* L.) is one of the important cash vegetable crops grown throughout the world. Onion belongs to the family Alliaceae and is said to be native of Central Asia and Mediterranean region [1]. The major onion producing countries are China, India, USA, Turkey, Japan, Iran, Pakistan, Spain and Brazil. India is the second largest producer of onion in the world and occupies 1052.00 thousand hectare area with a production of 168113.10 thousand tonnes and productivity of 16.00 is tonnes hectare [2]. Sowing and planting time is one of the most important factors that greatly influence the growth and yield of onion [3]. The increasing cost of chemical fertilizers and their harmful effects on the soil health is also an important consideration for the use of organic nutrients [4]. Agroforestry as the deliberate growing of wood perennials on the same unit of land as agricultural crops and /or animals, either in some form of spatial mixture or sequence. He also mentioned that there must be a significant interaction (positive and / or negative) between the woody and non woody component of the system, either ecologically and / or economically [5]. Poplars respond well to nutrients application of nitrogenous, potassic and phosphatic fertilizers as well as micronutrients applied to intercrops utilized by poplar trees in agroforestry system. It may create the source competition for nutrients between poplars and wheat in Agroforestry system, thus intercrop wheat may suffer from nutrients availability [6]. Because of these recourses, fertilizers requirement of intercropped may differ to that grown in open field. It is also a matter of research as no authentic research information is available on the subject for the area of present investigation.

### MATERIAL AND METHODS

The present investigation entitled "A Study on Cost of Cultivation in Onion (*Allium cepa* L.) Under Poplar Based Agroforestry System" was conducted at the research and nursery area of a Department of Forestry, Sam Higginbottom Institute of Agricultural, Technology & sciences, (Deemed to be University), Allahabad (U.P) during the period October, 2015 to April, 2016. Onion varieties and nitrogen levels use in different combination is -

#### Varieties (Main Plots)

V1 Nasik Red  
V2 Pusa Red  
V3 PusaMadhavi  
T4 120 Kg ha<sup>-1</sup>

#### N-Levels (Sub Plots)

T1 Control (No nitrogen)  
T2 40 Kg ha<sup>-1</sup>  
T3 80 Kg ha<sup>-1</sup>

T - Treatment, V - Variety, N - Nitrogen.

The sowing of onion under Poplar formed the materials for this investigation. The study was conducted under 4years old Poplar plantations. Whereas, seed of onion varieties (Nasik, Pusa red and Pusamadhavi) was selected for this experiment. Under good management practices the variety can yield 25 – 35 t/ha and is resistant to all diseases. The botanical description of the species is furnished below. The study was conducted by the use of three levels of nitrogen for both of the variety that is written below:

**Treatment Combination of varieties with different nitrogen levels.**

Treatments Combination	
T1	V1 + N 0 kg
T2	V1 + N 40 kg
T3	V1 + N 80 kg
T4	V1 + N 120 kg
T5	V2 + N 0 kg
T6	V2 + N 40 kg
T7	V2 + N 80 kg
T8	V2 + N 120 kg
T9	V3 + N 0 kg
T10	V3 + N 40 kg
T11	V3 + N 80 kg
T12	V3 + N 120 kg

T – Treatment, V - Variety, N- Nitrogen

**RESULTS AND DISCUSSION**

It was observed for the economy of different is concerned the T<sub>4</sub> (Nasik red) provide highest cost ratio of 2.65 in the poplar based Agroforestry system. Patel and Patel [4] reported that Optimum fertilizers application for onion and cultivation of suitable varieties in specific environment are necessary for obtaining good yield of onion [7]. However, treatment T<sub>4</sub> (Nasik red) provide highest net profit of 81410 Rs/ha in poplar based Agroforestry system.

**Table1: Fixed cost of cultivation of crop per hectare for Onion (*Allium cepa*) for all varieties and fertilizer level.**

Particular	Unit	Requirement	Rate/Unit (Rs)	Cost (Rs.ha <sup>-1</sup> )
<b>Land preparation</b>				
Ploughing with M.B.plough	3	Hour	600	1800
Disc harrow	3	Hour	600	1800
Planking and levelling	2	Hour	600	1200
Layout of the field	5	Labour	200	1000
<b>Seed and transplanting</b>				
Cost of seed	4	Kg	1000	4000
Transplanting	20	Labour	200	4000
Labour for fertilizer application	10	Labour	200	2000
<b>After care</b>				
Gap filling	4	Labour	200	800
Three hand weeding( 4 labour per weeding 0	12	Labour	200	2400
<b>Irrigation</b>				
Tube- well charge - 4 irrigation (2 hr/ irrigation)	8	Hr	300	2400
Labour for irrigation(2 labour/irrigation)	8	Labour	200	1600
Harvesting and other operation	15	Labour	200	3000
Rental value of land	5	Month	500	2500
<b>Total</b>				<b>28500</b>

**Table 2: Cost cultivation different treatment**

Treatment	Fertilizer dose			Total (Rs)	Fixed cost	Interest @ 12% for 4 month 9Rs)	Total cost
	kg	Rates@Rs	Amount				
T <sub>1</sub>	Control	00	00	00	28500	1140.00	29640
T <sub>2</sub>	40	10	400	400	28500	1140.00	30040
T <sub>3</sub>	80	10	800	800	28500	1140.00	30440
T <sub>4</sub>	120	10	1000	1000	28500	1140.00	30640
T <sub>5</sub>	Control	00	00	00	28500	1140.00	29640
T <sub>6</sub>	40	10	400	400	28500	1140.00	30040
T <sub>7</sub>	80	10	800	800	28500	1140.00	30440
T <sub>8</sub>	120	10	1000	1000	28500	1140.00	30640
T <sub>9</sub>	Control	00	00	00	28500	1140.00	29640
T <sub>10</sub>	40	10	400	400	28500	1140.00	30040
T <sub>11</sub>	80	10	800	800	28500	1140.00	30440
T <sub>12</sub>	120	10	1000	1000	28500	1140.00	30640

**Table 3: Total cost of cultivation and cost benefit ratio of onion**

Treatment	Cost of cultivation	Yield	Gross return (Rs/hac)	Net return (Rs/hac)	Benefits cost
		ton/hac			
T <sub>1</sub>	29640	3.54	53100	23460	0.79
T <sub>2</sub>	30040	4.84	72600	42560	1.41
T <sub>3</sub>	30440	6.02	90300	59860	1.96
T <sub>4</sub>	30640	7.47	112050	81410	2.65
T <sub>5</sub>	29640	2.25	33750	4110	0.13
T <sub>6</sub>	30040	3.40	51000	20960	0.69
T <sub>7</sub>	30440	4.42	66300	35860	1.17
T <sub>8</sub>	30640	5.47	82050	51410	1.67
T <sub>9</sub>	29640	3.15	47250	17610	0.59
T <sub>10</sub>	30040	4.25	63750	33710	1.12
T <sub>11</sub>	30440	5.30	79500	49060	1.61
T <sub>12</sub>	30640	6.40	96000	65360	2.13

Selling price of onion = Rs 1500/q

## CONCLUSION

As for the economy of different is concerned, the treatment V<sub>1</sub>T<sub>4</sub> provide net profit of Rs. 81410 with benefit cost ratio of 2.65 and the minimum net profit of Rs. 4110 was recorded in the treatment V<sub>2</sub>T<sub>5</sub> with benefit cost ratio 0.13.

## ACKNOWLEDGMENTS

We also thank Dr. Ramchandra for providing guidance to us. This work was conducted at the School of Forestry & Environment Department of Agroforestry, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad (Uttar Pradesh). We are gratefully thankful to them for providing us research support.

## REFERENCES

1. McCollum, G.D.(1976). Evolution of crop plants, ed. N.W. Simmonds, Longman, London and New York, pp. 186-90.
2. FAO, (2013). India Horticulture Database. National Horticulture Board
3. Amin, M. M. U. and M. A. Rahim. 1995. Effect of plant density, planting time and nitrogen on the growth and yield of onion. *Progress. Agric*, 6(2): 69-75.
4. Patel, V. B., Singh, S. K., Asrey, R. and Sharma, Y. K. (2005). Response of organic manures and biofertilizer on growth, fruit yield and quality of mango cv. Amrapali under high density orcharding. *The Karn. J. Hort.*, 1 (3): 51-56.
5. Nair PKR (1993) An Introduction to Agroforestry: Kluwer Academic Publishers, Netherlands.
6. Mathur, R.S. and Sharma, K.K., (1983). In: R.S. Mathur (Editor), *Poplar Special No 1. Indian For.*, 109 (9): 589-695.

## CITATION OF THIS ARTICLE

R K Dewangan, Ramchandra and H Darro. A Study on Cost of Cultivation in Onion (*Allium cepa* L.) Under Poplar Based Agroforestry System. *Bull. Env. Pharmacol. Life Sci.*, Vol 8 [Suppl. 1] November 2019: S80-S82