

Economics of Mustard and Linseed Cultivation Undermangobased Agri-Horticulture System

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ABSTRACT

The study entitled "Performance of Mango Based Agri-Horticulture System at Bhandra Block of Lohardaga District in Jharkhand" was conducted at Dhanamunji Village, Bhandra Block and Lohardaga District of Jharkhand, India was carried out during the year 2017-2018 with the objective to study the economics of Agri-Horticulture system in combination of Mustard and Linseed with Mango. The design adopted was RBD with five treatments and four replications. The treatments were T₁: Mango+Mustard, T₂: Mango+ Linseed, T₃: Sole Mango, T₄: Sole Mustard and T₅: Sole Linseed. The maximum net return (Rs. 86,209 per ha) was found in T₁ treatment followed by T₂ (Rs. 75,621 per ha), T₃ (Rs. 43,090 per ha), T₄ (Rs. 26,708 per ha) and minimum (Rs. 19,931 per ha) in T₅. The benefit-cost ratio was found maximum (3.61) in T₁ followed by T₂ (3.12), T₃ (1.86), T₄ (1.76) and minimum (1.28) in T₅.

Keywords: -Mango, Linseed, Mustard, Agri-horticulture, Economics; C: B Ratio

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INTRODUCTION

Jharkhand is characterized by undulating topography, generally classified as uplands, medium uplands and low lands. The region receives an average annual rainfall of 1100 to 1600 mm mostly during four months of monsoon. Owing to the characteristic topography, most of the rainwater is lost through surface run off resulting in erosion of the topsoil. The soils of the region have poor organic matter content and low water holding capacity. As a result of the typical edaphic feature of this state, the soil of uplands remains dry during most part of the year in spite of the heavy rainfall. The uplands are seldom utilized for production of agricultural crops and if at all utilized for crop production, it is risky proposition. The annual crops can be put as a ground storey crop in the initial years to enhance the unit productivity whereas the shade loving crops like turmeric, ginger, elephant foot yam and *colocasia* can be grown after few years [5].

Forest in India is under unbearable biotic pressure and deforestation is taking place at an alarming rate which is estimated to be 1.3 m ha per year. Agroforestry is a collective name for land use systems and technologies where woody perennials (trees, fruit trees, shrubs, bamboos, etc.) are deliberately used on the same land management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry system, there are different components and interaction between ecological and economic factors [1]. In other words, agroforestry is combination of agricultural technology and foresting in order to complete, variety, productivity, health and sustainability of land [8].

The climate of the region is suitable for production of different fruits, vegetables and other horticultural crops in a pure or agri-horticulture system. To minimize risk, improve livelihood, ensure high returns from such degraded uplands in this plateau region and to improve the soil characteristics, perennial fruit plants based multi-storied production system consisting of fruit trees having bigger canopy as main crop, dwarf stature fruit trees as filler crop and seasonal crops like vegetables and tubers as intercrop have been most effective. The multi-storied models can be based on mango, litchi and aonla and Jackfruit where these perennial trees are planted as main crop. The dwarf stature fruit plants like guava, lemon, and custard apple can be accommodated within and between the rows and plants as filler crops [4].

Mango (*Mangifera indica* L.) is the most important commercial fruit crop of the tropical and subtropical regions of the world. It is considered as the king of fruits due to its excellent flavor, beautiful colour, attractive fragrance and delicious taste. It is a major fruit crop of India and occupies an area of 1.23 million hectares with an annual production of 10.98 metric tons [6]. India has the richest collection of mango cultivars. Cultivation of mango is believed to have originated in South-East Asia. Mango is being cultivated in southern Asia for nearly six thousand years. Mango is the national fruit of India and also of Pakistan and Philippines and national tree of Bangladesh. India ranks first among world's mango producing countries accounting for about 50% of the world's mango production.

MATERIAL AND METHODS

The study site is located in hilly region of Chotanagpur Plateau of Jharkhand, which is situated at a distance of about 68 km west from Faculty of Forestry, Birsa Agricultural University, Ranchi. The district is situated between 23°30' and 23°40' north latitudes and 84°40' and 84°50' east longitudes with an elevation of around 647 m from mean sea level. The district covers an area of 1491 km². The design adopted was Randomized Block Design with five treatments and four replications. They were: T₁: Mango+Mustard, T₂: Mango+Linseed, T₃: Sole Mango, T₄: Sole Mustard and T₅: Sole Linseed.

Mango cultivar Amrapalli was used for the present study and intercrops used were Mustard (var. Laxmi) and Linseed (var. Neelum). The Mango variety taken was 10 years old at a spacing of 10m x 10m. Mango was planted in the field in the year, 2009 and intercrops were directly sown in the field in the month of October, 2017 at a spacing of 25 × 30cm. The soil of the experimental field was well leveled. The fertility status and textural class of the soil were judged by chemical and physical analysis. For this purpose, soil samples were taken randomly from 5 places of each experimental plot from the depth of 30 cm. just before sowing and fertilizer application. The soil of these samples was mixed thoroughly and a representative soil sample was drawn. The quantity of soil sample was reduced to about one kg through quartering technique.

RESULTS AND DISCUSSION

The results of the investigation, regarding the economics of mustard and linseed cultivation under mango based agri-horticulture system have been presented.

Results on economics of mango based agroforestry system; total cost of cultivation; gross return and net return of mango under different treatments are presented in Table 1 and are depicted in figure 1. It is apparent from the data that the total cost of cultivation, gross return and net return of the *Mangifera indica* varies under different treatments. The maximum total cost of cultivation (₹ 24,250 per ha) was found in T₂ treatment followed by T₁ (₹ 23,850 per ha), T₃ (₹ 23,150 per ha), T₅ (₹ 15,500 per ha) and minimum T₄ (₹ 15,100 per ha). The maximum total return (₹ 1,10,059 per ha) was found in T₁ treatment followed by T₂ (₹ 99,871 per ha), T₃ (₹ 66,240 per ha), T₄ (₹ 41,808 per ha) and minimum T₅ (₹ 35,431 per ha) whereas the maximum net return (₹ 86,209 per ha) was found in T₁ treatment followed by T₂ (₹ 75,621 per ha), T₃ (₹ 43,090 per ha), T₄ (₹ 26,708 per ha) and minimum (₹ 19,931 per ha) in T₅. The scrutiny of the data revealed that the benefit cost ratio varies from 1.28 -3.61. The benefit cost ratio was found maximum (3.61) in T₁ followed by T₂ (3.12), T₃ (1.86), T₄ (1.76) and minimum (1.28) in T₅. Hossain et al. [2] found that the economic performance of mango tree based tomato production system showed that both the net return and BCR of mango and guava based system was higher over control and olive based system. Similar results

were also stated for chilli, cowpea, bhindi and brinjal as an intercrop by Kashyap *et al.* [3]; Raturi and Hiwale [7].

Table: 1: Economics of different treatments for cultivation of Mustard (*Brassica juncea*) and Linseed(*Linum usitatissimum*) under Mango (*Mangifera indica*) based agri - horticulture system

Treatment No.	Cost of cultivation	Seed Yield		Sale Rate		Gross Return	Net Return	Cost : Benefit Ratio
	Rs. ha ⁻¹	q ha ⁻¹		Rs. q ⁻¹		Rs. ha ⁻¹	Rs. ha ⁻¹	
		Mango fruit	Crop	Mango fruit	Crop			
T ₁	23,850	36.68	9.41	2,000	3,900	1,10,059	86,209	1 :3.61
T ₂	24,250	34.57	7.78	2,000	3,950	99,871	75,621	1 :3.12
T ₃	23,150	33.12	-	2,000	-	66,240	43,090	1 :1.86
T ₄	15,100	10.72		3,900		41,808	26,708	1 :1.76
T ₅	15,500	8.97		3,950		35,431	19,931	1 :1.28

(Note: All prices are as per MSP)

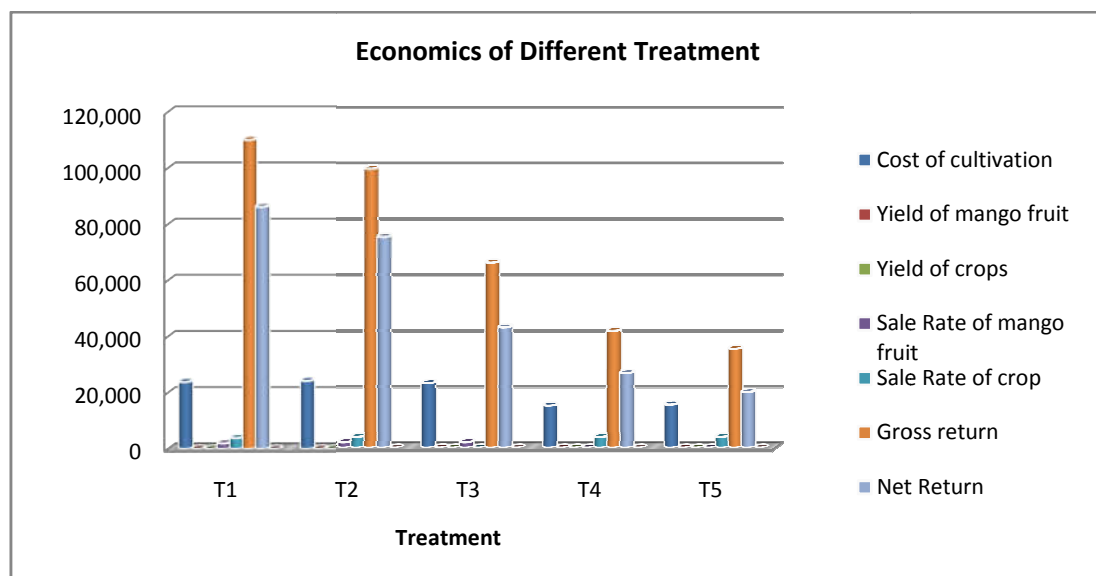


Fig: 1: Economics of different treatments for cultivation of Mustard (*Brassica juncea*) and Linseed (*Linum usitatissimum*) under Mango (*Mangifera indica*) based agri horticulture system.

CONCLUSION

In view of the results obtained during the present investigation, it is concluded that the maximum economics of gross return (₹1, 10,059), Net return (₹86,209), cost benefit ratio (1:3.61) was recorded in treatment T₁ (mango + mustard) based agri-horticulture system than gross return (₹35,431), Net return (₹19,931), cost benefit ratio (1:1.28) while minimum was in treatment T₅ (Sole Linseed). Hence cultivation of mustard under agri-horticulture system is profitable cultivation practices for farmers of Jharkhand region. Therefore, in the mango plantation the farmers will get benefit from this agroforestry system through better protection of mango trees from weeds and cattle, soil health improvement, additional income, more employment and better food security.

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