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Journal homepage: <http://www.plantarchives.org>

DOI Url : <https://doi.org/10.51470/PLANTARCHIVES.2024.v24.no.2.350>

## ECONOMIC ANALYSIS OF HORTICULTURAL NURSERY ENTERPRISE IN ALLURI SITARAMA RAJU DISTRICT OF ANDHRA PRADESH, INDIA

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(Date of Receiving-23-05-2024; Date of Acceptance-24-08-2024)

### ABSTRACT

Horticultural nursery enterprise is a self-employment business that can contribute to income generation and socio-economic development of an individual. A study was conducted to study the economic analysis of horticultural nursery enterprise at our Krishi Vigyan Kendra, Pandirimamidi of Dr. Y.S.R. Horticultural University, East Godavari district, Andhra Pradesh during the years 2018-19 to 2020-21. Nursery is a place where quality planting material production will take place. As per the farmer's needs, we undertaken cashew grafts production and also worked out its economics. With respect to cashew nursery, a total of 5,00,000 no. poly bags were filled with rooting media and cashew nuts were sown. The average germination percentage was recorded as 86.26% with 4,31,100 no. seedlings grafted to produce 24,39,97 no. of cashew grafts with a survivability rate of 57.33 per cent. For the period of three years, the total cashew nursery production cost, gross income and net income were recorded as Rs. 36,48,100, Rs. 76,42,000 and Rs. 39,93,000 respectively with a mean cost benefit ratio was 1:2.15. With this activity nearly 1394 ha area under cashew plantation was increased in the coastal area of Andhra Pradesh.

**Key words :** Horticultural nursery, Cashew grafts, Gross income, Net income, Cost benefit ratio.

### Introduction

In horticulture crops, plantation crops like cashew nut are high valued product. Cashew is native to Brazil. It was introduced into India by Portuguese travellers in the 16th Century for afforestation and soil conservation (Bhat *et al.*, 2010). The crop is mainly grown in waste lands, as it requires low inputs for production in early days, it is called as 'gold mine' of waste lands. Now it became the dollar earning crop plantation crop in India.

It is a perennial crop and produce pseudocarp type of fruit. This can be grown in soils having high organic matter such as forest soil, high water retention capacity like sandy loam soils. Climatic conditions suitable for growing cashew nuts are under temperatures ranges between 20 to 30° C with annual precipitation of 1000-1200 mm/year are ideal for cashew growing (Sudepta *et al.*, 2020).

In India, cashew is growing across many states. In Andhra Pradesh, cashew cultivation is in 198848 ha of

area with annual production of 127220 MT of raw nuts with a productivity of 764 kg/ha (Reports of DCCD, Kochi, 2022-23). Although Andhra Pradesh is having second largest area under cashew cultivation next to Odisha, but Maharashtra ranks first in production i.e. 189710 MT and productivity of 1145 kg/ha. Major Cashew growing areas in Andhra Pradesh are Srikakulam, Vizianagaram, Vishakapatnam and up land areas of east and west Godavari districts, Krishna, Guntur, Prakasham, Nellore, coastal zone of Chittoor and Rayalaseema districts. Most commonly growing varieties in Andhra Pradesh are BPP 4, BPP-5, BPP 6, BPP 8 and BPP 9 (Sudepta *et al.*, 2020 and Venkattakumar, 2009).

In East Godavari district, area and production of cashew are 33414 ha and 22722 MT respectively with a productivity of 680 kg/ha which less than our national productivity. It may be due to many reasons like non availability of quality planting material, selection of low yielding varieties, using of seedlings instead of grafts in

tribal areas, poor cashew orchard management practices, uneven rains or lack of irrigation facilities during critical periods of crop growth, poor nutrient management, in addition to neglected pest and disease management practices (Mane *et al.*, 2009 and Nagaraja, 2010). To achieve higher productivity, use of high quality planting material having potential for higher yield as well as adopting scientific management practices in all future plantation programmes is a paramount importance factor (Hegde, 1997 and Subbaiah *et al.*, 2018). Production of quality planting material can be achieved through a regulated network of nurseries set up for production of certified planting material *i.e.*; public or private ownership (Adebanjo, 1996 and Mailumo, 2006).

Hence, this economic study on cashew nursery gives an insight to many entrepreneurs or even farmers or farmer groups to establish nurseries to produce quality planting material of high yielding cashew varieties in our district, state as well as in India.

## Materials and Methods

The study was conducted at Krishi Vigyan Kendra Nursery, Dr. Y. S. R. Horticultural University, Pandirimaimidi (17° 26' 03.7" N and 81° 47' 56.4" E), East Godavari district (India) from 2018-19 to 2020-21. The nursery was raised in 750 sq.m area shade net house with 50 per cent shade.

### Cashew nursery

#### i. Rooting media for cashew rootstocks

The red soil, Farm yard manure (FYM), SSP and Folidol dust were used for preparation of rooting media. The rooting media contains red soil, FYM in the ratio of 2:1:1. The prepared rooting media was filled in 6 × 9 inch poly bags and watered thoroughly. Each bag with rooting media weighs around 1 to 1.2kg.

#### ii. Preparation of cashew rootstocks

The selected cashew nuts were soaked in water for 24 hrs. The floated nuts were discarded as those are unfit for sowing. The remaining nuts were sown in the poly bags at appropriate depth. The sown bags were covered with paddy straw for good germination. The seed germinates in 10-15 days and seedlings become ready for grafting (soft wood grafting) in 45 days after sowing.

#### iii. Precuring of Scion material

Non-flowered, 2-3 month old lateral shoots of current season growth was selected as scion material for grafting. The selected shoots were 15 cm long straight; uniformly round with pencil thickness, brown coloured having dormant plump terminal buds. The selected scion shoots

were prepared before 10-15 days of grafting by clipping of leaf blades, leaving the petiole called as precuring. Soon after separation from the mother plant, scion sticks were dipped in water and placed in a gunny bag and brought to the shade net house for grafting (Ghose, 1991).

#### iv. Soft wood grafting technique

**Preparation of root stock :** Disinfect the grafting knives by dipping them in fungicide solution. Root stock seedling brought from the nursery beds should be kept in the nursery shed under shade for grafting. Remove the leaves by a sharp grafting knife leaving two pairs bottom leaves. At a height of 15-20 cm from ground level a transverse cut is made on the root stock and the terminal shoot is removed. A cleft of 6-7 cm deep is made in the middle of the decapitated stem by giving a longitudinal cut. A little portion of wood is removed from the inner sides of the cleft at the top, so that after grafting the joint will be perfect.

**Preparation of scion :** Choose a matching scion stick of the same thickness as that of the root stock of 10-12cm long by cutting off the excess portion at the bottom. Shape the cut end of the scion in to a wedge of 6-7 cm long by chopping off the bark and little portion of wood from two opposite sides. While preparing the wedge, the gum on the cut surface should not be disturbed and the cut surfaces should not be soiled by touching with fingers.

**Grafting :** The wedge of the scion is put into the cleft of the root stock to see that the cambial layers of both the root stock and the scion come in perfect contact with each other. The graft joint is secured firmly with 2.5cm wide and 30cm long polythene strip of 100 gauge thickness.

The grafting work was carried out during June – August months. The successful cashew grafts were sold after 3- 4 months of grafting. As per university sanction, the price of each graft was Rs.30/- (2018-19) and Rs. 40/- (2019-20 and 2020-21).

## Results and Discussion

A total of 5,00,000 poly bags were filled with rooting media and cashew nuts were sown. The average germination percentage was recorded as 86.26% and days taken for germination of cashew nuts was 15-20days. A total of 4,31,100 seedlings (rootstock) were ready to graft in 45-50 days after sowing. The grafting work carried out on the same number of seedlings during the months of June- August. The average success rate noticed as 57.33%. This may be attributed to moderately high temperature coupled with high humidity, less





Polybags filled with potting mixture



Soaking of cashew nuts in water for 24 hrs.



Dipping of nuts in Copper oxy chloride solution for disinfection



Sowing of cashew nuts in poly bags



Cashew root stock



Grafting operation under shade net



Cashew grafts (45 days old )



Cashew grafts (BPP-8, BPP-9) for sale

**Plate 1 :** Figures showing different operations involved in cashew grafts production.

Table 1 : Economic analysis of Cashew nursery at KVK, Pandirimamidi.

S. no.	Item/work	Expenditure details for Cashew grafts production					
		2018-19		2019-20		2020-21	
		Quantity	Amount (Rs.)	Quantity	Amount (Rs.)	Quantity	Amount (Rs.)
1	a. Polythene bags (size: 6 inches x 9 inches)	1500 kg@ Rs.135/- per kg	2,02,500/-	1200 kg@ Rs.135/- per kg	1,62,000/-	500 kg@ Rs.135/- per kg	67,500/-
	b. Polythene strips	100 kg@ Rs. 3500/- per 25 kg	14,000/-	75 kg@Rs. 3500/- per 25 kg	10,500/-	40 kg@ Rs. 3500/- per 25 kg	10,500/-
	c. Polythene caps	-	20,000/-	-	10,000/-	-	6,000/-
2	Cashew nuts for raising seedlings	20 quintals@ Rs. 17000/- per quintal	3,40,000/-	20 quintals @ Rs. 12000/- per quintal	2,40,000/-	8 quintals@ Rs. 9000/- per quintal	72,000/-
3	Potting Mixture						
	a. Red soil	100 tractor trails @ Rs. 300/- per trail	30,000/-	120 tractor trails @ Rs. 300/- per trail	36,000/-	60 tractor trails @ Rs. 300/- per trail	18,000/-
	b. Farm Yard manure	25 tractor trails @ Rs.1000/- per trail	25,000/-	40 tractor trails @ Rs.1000/- per trail	40,000/-	30 tractor trails @ Rs.1500/- per trail	45,000/-
	c. SingleSuper Phosphate	20 bags @ 400/- each	8,000/-	20 bags @ 400/- each	8,000/-	10 bags @ 400/- each	4,000/-
4	d. Chlorodust	10 bags @ 300/ each	3,000/-	10 bags @ 350/ each	3,500/-	6 bags @ 350/ each	2,100/-
	Bag filling with potting mixture	2,00,000 No's	1,00,000/-	2,00,000 No's	1,00,000/-	1,00,000 No's (Rs. 0.60/- each)	60,000/-
5	Grafting charges	1,80,000 No's (Rs. 3/- each)	5,40,000/-	1,80,000 No's (Rs. 3/- each)	5,40,000/-	80,000 No's (Rs. 3/- each)	2,40,000/-
6	Plant protection chemicals	—	50,000/-	—	50,000/-	—	30,000/-
7	Shade net (50% )	—	—	5 x 4000/- (150 sq m - 5 no.)	20,000/-	4 x 4000/- (150 sq m - 4 no.)	16,000/-
8	Miscellaneous	—	20,000/-	—	25,000/-	—	20,000/-
9	Daily Labour	5x200x100	1,00,000/- (5/day @ 200/- per day for 5 months)	6x200x150 (6/day @ 200/- per day for 6 months)	1,80,000/-	6x200x150(6/day @ 200/- per day for 6 months)	1,80,000/-
	<b>Total</b>	<b>Total</b>	<b>14,52,000/-</b>		<b>14,25,000/-</b>		<b>7,71,100/-</b>



**Table 2 :** Income details of Cashew grafts production.

Income details of Cashew grafts production					
S. no.	Particulars	2018-19	2019-20	2020-21	2018-19 to 2020-21
1	No. of bags filled and nuts sown	2,00,000 no.	2,00,000 no.	1,00,000 no.	5,00,000 no.
2	Germination percentage (%)	87.2%	85.1%	86.5%	86.26%
3	No. of seedlings ready for grafting	1,74,400 no.	1,70,200 no.	86,500 no.	4,31,100 no.
4	Cashew grafts ready for sale	95,920 no.	95,312 no.	52,765 no.	24,39,97 no
5	Survivability rate (%)	55 %	56 %	61 %	57.33%
6	Cost of each graft (Rs.)	30/-	40/-	40/-	-
7	Gross returns (Rs.)	95,000 x 30/- i.e. 28,50,000/-	72,300 x 40/- i.e. 28,92,000/-	47,500 x 40/- i.e. 19,00,000/-	76,42,000
8	Net returns (Rs.)	28,50,000 – 14,52,000 = 13,98,000	28,92,000 – 14,25,000 = 14,67,000	19,00,000 – 7,71,100 = 11,28,900	39,93,000
9	Cost Benefit ratio	1:1.97	1:2.02	1:2.46	1:2.15

**Table 3 :** Overall gist of income details of Cashew grafts production.

Overall gist of income details of Cashew grafts production		
S. no.	Particulars	2018-19 to 2020-21
1	Total no. of bags filled and nuts sown	5,00,000 no.
2	Germination percentage (%)	86.26%
3	Total no. of seedlings ready for grafting	4,31,100 no.
4	Total Cashew grafts sold	243997
5	Survivability rate (%)	57.33%
6	Gross returns (Rs.)	76,42,000
7	Net returns (Rs.)	39,93,000
9	Cost Benefit ratio	1:2.15

fluctuation in maximum and minimum temperatures, adequate supply of healthy and matured scion sticks because the mother trees resume the active growth phase after the onset of monsoon with adequate supply of moisture and nutrients, fast cambial activity and high accumulation of carbohydrates in scion shoots. Similar observations were reported by Subbaiah *et al.* (2018), Latha and Salam (2001), Sawke (1992), Singh *et al.* (1989) and Syed and Rao (1989).

With respect to economics of the cashew nursery, In 2018-19, the cashew nursery production cost, gross income and net income were Rs. 14,52,000, Rs. 28,50,000 and Rs. 13,98,000 respectively with a cost benefit ratio was 1:1.97. In 2019-20, the cashew nursery production

cost, gross income and net income were Rs. 14,25,000, Rs. 28,92,000 and Rs. 14,67,000 respectively with a cost benefit ratio was 1:2.02. In 2020-21, the cashew nursery production cost, gross income and net income were Rs. 7,71,100, Rs. 19,00,000 and Rs. 11,28,900 respectively with a cost benefit ratio was 1:2.46.

From 2018-19 to 2020-21, cashew nursery production cost, gross income and net income were Rs. 36,48,100, Rs. 76,42,000 and Rs. 39,93,000 respectively with a mean cost benefit ratio was 1:2.15.

## Conclusion

Economic analysis of horticultural nursery enterprise *i.e.*; cashew grafts production at KVK, Pandirimamidi gives a deep insight about the aspects of nursery establishment *i.e.*; root stock production, preparation of scion, grafting techniques, maintenance of grafts after grafting etc. This information helps farmers/entrepreneurs to initiate cashew nursery as a small scale horticultural enterprise.

## References

- Adebanjo, A., Adedoyin S. and Alabi D.A. (eds) (1996). Hortson (Horticultural Society of Nigeria) conference proceedings, Ago-Iwoye. Hortson, Lagos.
- Bhat, M.G, Nagaraja K.V. and Rupa T.R. (2010). Cashew research in India. *J. Hortl. Sci.*, **5(1)**, 1-16.
- Directorate of Cashew nut and Cocoa Development, Kochi Reports on Area and Production, 2022-23.
- Ghose, S.N. (1991). Studies on screening of cashew types for rootstock in softwood grafting. *The Cashew*, **5**, 3-4.
- Hegde, M.V. (1997). Evaluation of introduced nut (*Anacardium occidentale* L.) cultivars under transitional tract of

- Karnataka. *M.Sc. (Agri.) Thesis*. University of Agricultural Sciences, Dharwad.
- Latha, A. and Salam M.A. (2001). Screening of cashew varieties for drought tolerance. *J. Plant Crops*, **29**, 27-30.
- Mailumo, S.S., Okonkwo M.C. and Afrika B.M. (2006). Socio-economic analysis of tree seedlings production in nurseries: evidence from municipal area council, Abuja, FCT, Nigeria. In: Popoola L (ed). *Forestry at cross roads in Nigeria*. Proceeding of the 31<sup>st</sup> annual conference of Forestry Association of Nigeria (FAN), held in Makurdi, Benue state, Nigeria, Forestry Association of Nigeria, pp 492-499.
- Mane, M.S., Mahadkar U.V., Ayare B.L. and Thorat T.N. (2009). Performance of mechanical soil conservation measures in cashew plantation grown on steep slopes of Konkan. *Ind. J. Soil Conserv.*, **37**, 181-184.
- Nagaraja, K.V. (2010). *Biochemical characteristics of released varieties*. (Ed. Bhat, P.S.), Directorate of Cashew Research, Puttur, pp 49.
- Sawke, D.P. (1992). Standardization of soft wood grafting technique in cashewnut, *Ph.D. Thesis* submitted to Uni. Agric. Sci., Dharwad.
- Singh, M.P., Gill S.S. and Khajuria H.N. (1989). Standardization of propagation techniques in mango. *Acta Hort.*, **231**, 179-181.
- Sudeepta, Pattanayak, Siddhartha Das and Hari Keerthi (2020). Biotic Stress Related Challenges on Cashew Production in Andhra Pradesh, India. *Int. J. Curr. Microbiol. App. Sci.*, **9(6)**, 3875-3885.
- Syed, Ismil and Rao S.N. (1989). Studies on propagation time and method of operation for mango cv. Banginapally. *Acta Hort.*, **231**, 203-206.
- Venkattakumar, R. (2009). Socio-Economic Factors for Cashew Production and Implicative Strategies : An Overview. *Indian Res. J. Ext. Edu.*, **9(3)**, 55-62.
- Venkata Subbaiah, K., Reddy R.V.S.K., Shaliraju G, Karunasree E., Deepthi V., Vijaya Nirmala T. and Devivaraprasad Reddy A. (2018) Economic analysis of small scale horticultural nursery enterprise in West Godavari district of Andhra Pradesh. *Bull. Env. Pharmacol. Life Sci.*, **7**, 79-83.