

## AN ANALYSIS OF ADOPTION OF PRE-AND POST-HARVEST MANAGEMENT TECHNOLOGIES OF CASTOR CROP

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### ABSTRACT

*Castor (Ricinus communis) is a key non-edible oilseed crop with India leading globally in both area (59%) and production (81%). This study, conducted in Mahabubnagar district, Telangana, revealed a significant yield gap between farmers' fields and demonstration plots, largely due to the non-adoption of recommended technologies. Among 120 respondents from 8 villages, 61.6% had a medium level of adoption. Positive factors influencing adoption included landholding size, farming experience, income, irrigation potential, social participation, and risk-taking ability. Education, annual income, information-seeking behavior, and knowledge were highly significant in adopting pre- and post-harvest management technologies.*

**Keywords:** castor farmers, socio-economic characters, adoption, pre- and post- harvest technologies.

### INTRODUCTION

Castor (*Ricinus communis*) is one of the important non-edible oilseed crop in the world due to their wide array of uses. Castor oil derived from the seeds of the castor plant, have various applications in pharmaceuticals, cosmetics, manufacturing, and agriculture. India is the leading producer of castor in the world, accounting for approximately 89.8 % (18.42 lakh tonnes) in total world castor seed production in 2020 (Kalamkar & Sharma, 2022). The NARS has developed many new technologies for improving the yield of castor, but to the actual situation of adoption of these technologies by the farmers at the field level is low. There is huge yield gap between the FLD plot and farmers' practice (Kakkad et al, 2021). A major challenge in enhancing agricultural production in developing countries lies in the ineffective transfer of technology from research institutions to the farming community. The non-adoption of the recommended technologies by the farmers might be due to several reasons such as lack of knowledge, use of sub-optimal doses of chemical fertilizers and lack of plant protection measures and socio-economic factors also contributes to the non-adoption of the recommended technologies (Gogoi et al, 2024). Hence, farmers need to be made aware about the suitable available technologies in castor cultivation. Adoption of proper pre- and post- harvest management technologies plays a crucial role for improving farmers' production and yield. Ensuring the timely and appropriate adoption of recommended technologies holds paramount importance in effectively managing pest and disease outbreaks while maximizing

potential crop yields. If the existing castor production technologies are effectively applied within the production systems, it has the potential to significantly increase current agricultural yields, possibly even doubling them. Achieving this goal necessitates a continuous exchange of knowledge from researchers to farmers.

### OBJECTIVES

- (1) To examine the profile characteristics of castor farmers
- (2) To analyse the extent of adoption of pre- and post-harvest management technologies across different practices in castor crop.

### METHODOLOGY

An ex-post facto research design was utilized for the present study, aligning with the view of Kerlinger (1969), who emphasized that this design is suitable when the independent variable has already influenced the outcome. The research study was conducted in Mahabubnagar district located in Telangana State. Two mandals were selected from the district viz Koilkonda and Addakal based on the highest area under castor. From each mandal 4 villages were selected, based on the area under castor and FLD conducted in the villages. A total of 120 respondents were selected based on the castor cultivation from the 8 villages by simple random sampling method. The variables for the study were selected based on the discussion with the experts. A semi-structured schedule was developed for the study and data were collected

by personal interview of the respondents. To measure the extent of adoption of recommended pre- and post- harvest technologies in castor, the important practices (14 items) were listed and responses of the farmers were recorded on a three-point continuum Full adoption, Partial adoption and Non-adoption and assigned scores of 3, 2, and 1 respectively. Farmers' responses were categorized into three groups Low medium and High.

**RESULTS AND DISCUSSION**

**Socio - economic characteristics of the respondents**

The results (table 1) indicated the categorization of farmers according to their profile characteristics. Top of Form More than half of the respondents were categorized into middle age group (63.33%), while most (25.67%) farmers were educated up to primary level. Regarding land holding size, the majority of farmers (41.67%) had small holdings, while the majority of farmers (40.00%) belonged to lower- middle group in terms of annual income. Majority (66.67%) of the farmers had medium farming experience. In case of trainings undergone most (60.67%) of the farmers were categorized under low training. Regarding irrigation potential, the majority of farmers (46.56%) depended mostly on bore well as a major source of irrigation. Majority of the farmers (58.33%) had medium level of social participation, with medium input acquisition pattern (56.64%), medium information seeking behaviour (65.00%), medium achievement motivation (66.67%) also medium risk orientation (58.33%), medium knowledge (61.67%) and low market intelligence (43.33%). The findings are similar with Kakkad et al., (2021); Damor et al., (2021); Kumar Naik et al., (2015); Vinaya and Tapan (2023).

**Table 1: Distribution of the respondents according to their socio- economic characters (n=120)**

Sr. No.	Characteristics	Frequency (Percentage)
1	<b>Age</b>	
	Young age (up to 35 years)	20 (16.67)
	Middle age (36-50 years)	76 (63.33)
	Old age (above 50 years)	24 (20.00)
2	<b>Education</b>	
	Illiterate	18 (15.00)
	Can read and write	16 (13.33)
	Primary school	30 (25.67)
	Upper primary school	22 (18.33)
	Secondary school	16 (13.33)
	Senior secondary	08 (6.67)
	Under graduation	06 (5.00)
	Post-graduation	04 (3.33)

3	<b>Land Holding</b>	
	Marginal (<1 ha)	14 (11.67)
	Small (1-2 ha)	50 (41.67)
	Semi-medium (2-4 ha)	30 (25.00)
	Medium (4- 10ha)	20 (16.67)
	Large( above 10 ha)	06 (5.00)
4	<b>Annual Income</b>	
	Low income (<₹ 70,069)	28 (23.33)
	Lower- middle (₹ 70,070- ₹ 2,73,099)	48 (40.00)
	Upper-middle (₹ 2,73,1000 - ₹ 8,45,955)	32 (26.66)
	High (>₹ 8,45,956)	12 (10.00)
5	<b>Farming experience</b>	
	Low	16 (13.43)
	Medium	80 (66.67)
	High	24 (20.00)
6	<b>Trainings undergone</b>	
	Low	72 (60.00)
	Medium	32 (26.67)
	High	16 (13.43)
7	<b>Irrigation potential</b>	
	Wells	32 (26.67)
	Bore wells	56 (46.56)
	Canals +wells	22 (18.33)
	Canals	10 (8.33)
8	<b>Social participation</b>	
	Low	18 (15.00)
	Medium	70 (58.33)
	High	32 (26.67)
9	<b>Input acquisition pattern</b>	
	Low	18 (15.00)
	Medium	68 (56.64)
	High	38 (31.66)
10	<b>Information seeking behaviour</b>	
	Low	28 (23.34)
	Medium	78 (65.00)
	High	14 (11.66)
11	<b>Achievement motivation</b>	
	Low	16 (13.43)
	Medium	80 (66.67)
	High	24 (20.00)
12	<b>Risk taking ability</b>	
	Low	18 (15.00)
	Medium	70 (58.33)
	High	32 (26.67)
13	<b>Knowledge</b>	
	Low	22 (18.33)
	Medium	74 (61.67)
	High	24 (20.00)
14	<b>Market Intelligence</b>	
	Low	52 (43.33)
	Medium	26 (21.67)
	High	42 (35.00)

**Extent of adoption of pre- and post-harvest technologies by the farmers**

The results (table-2) revealed that the majority of farmers fully adopted practices such as land preparation (81.6%), use of improved seeds (76.6%), fertilizer use (68.3%), time of sowing (66.0%), threshing (61.6%), and pest and diseases management (58.3%). Farmers adopted

the practices because they were adequately informed about practices, noticed benefits from them, such as yield loss is reduced and high quality of produce is obtained by sowing at the optimum time, using high-quality seeds, and managing pests and diseases. Once farmers are convinced of the benefits of adopting the practices, they will continue to do so for the entire growing season. The findings are similar with Salunkhe et al., (2020); Damoret al., (2021).

**Table 2 : Practice wise adoption of the recommended castor production technologies** (n=120)

Sr. No	Practices	Full adoption F (%)	Partial adoption F (%)	Non-adoption F (%)
1	Land preparation	98 (81.66)	14 (11.66)	8 (6.66)
2	Time of sowing	80 (66.00)	26 (21.66)	14 (11.66)
3	Use of improved seeds	92 (76.67)	20 (16.66)	8 (6.66)
4	Seed rate	42 (35.00)	50 (41.67)	28 (23.33)
5	Seed treatment	12 (10.00)	22 (18.33)	86 (71.67)
6	Seed spacing	28 (23.33)	66 (55.00)	26 (21.67)
7	Fertilizer use	82 (68.33)	26 (26.67)	12 (10.00)
8	Weed management	60 (50.00)	34 (28.34)	26 (21.66)
9	Water management	64 (53.33)	40 (33.33)	16 (13.33)
10	Pest and diseases management	70 (58.33)	18 (15.00)	32 (26.77)
11	Time of harvesting	84 (70.00)	12 (10.00)	24 (20.00)
12	Method of threshing	74 (61.67)	30 (25.00)	16 (13.33)
13	Method of storage	20 (16.77)	22 (18.33)	78 (65.00)
14	Value addition practices	10 (8.33)	0 (0.00)	110 (91.67)

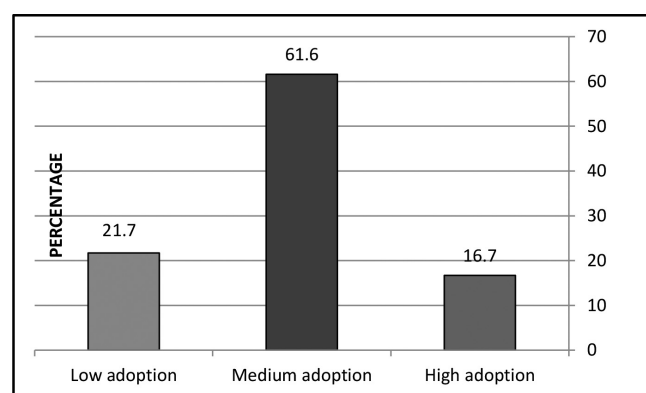
(F- Frequency), (%- Percentage)

**Over all adoption level of respondents towards pre- and post- harvest management technologies of castor crop**

The (table-3) results revealed that most farmers (61.60%) belonged to the medium adoption level, and followed by low adoption (21.70%) and high adoption (16.60%). Due to medium knowledge, lack of appropriate management technology training, medium input consumption pattern medium risk-taking capacity, and low level of awareness of new technologies might be the contributing factors to the medium to low adoption rate. The findings of the study are in lined with the studies conducted by Gogoi et al., (2024); Kakkad et al., (2019); Bhoi et al.,(2014).

**Table 3 : Overall adoption levels of respondents towards pre- and post- harvest management technologies of castor crop** (n=120)

Sr. No.	Levels of adoption	Frequency (Percentage)
1	Low adoption	26 (21.66)
2	Medium adoption	74 (61.66)
3	High adoption	20 (16.66)



**Fig 1 : Overall adoption level of respondents towards pre- and post- harvest management technologies of castor crop.**

**Relationship between profile characteristics of castor farmers and their extent of adoption of pre- and post-harvest management technologies**

The results (table- 4) indicated that the age had negative and non- significant relationship with extent of adoption of the castor recommended practices. The independent variables such as education, size of landholding, annual income, trainings undergone farming experience, irrigation

**Table 4 : Relationship between selected profile characteristics of castor farmers and their extent of adoption of pre- and post- harvest management technologies (n=120)**

Variable No.	Characteristics	Correlation coefficient (r)
X <sub>1</sub>	Age	-0.205 NS
X <sub>2</sub>	Education	0.318**
X <sub>3</sub>	Size of landholding	0.281*
X <sub>4</sub>	Annual income	0.214*
X <sub>5</sub>	Farming experience	0.228*
X <sub>6</sub>	Trainings undergone	0.458**
X <sub>7</sub>	Irrigation potential	0.252*
X <sub>8</sub>	Social participation	0.289*
X <sub>9</sub>	Input acquisition pattern	0.286*
X <sub>10</sub>	Information seeking behaviour	0.247**
X <sub>11</sub>	Achievement motivation	0.263*
X <sub>12</sub>	Risk taking ability	0.234*
X <sub>13</sub>	Knowledge	0.368**
X <sub>14</sub>	Market intelligence	0.213*

\* = Significant at 0.05 level; \*\* = Significant at 0.01 level, NS = Non- significant

potential, social participation, input acquisition pattern, achievement motivation, information seeking behaviour, risk taking ability, knowledge and market intelligence had positive an significant relationship with extent of adoption pre- and post- harvest management technologies of castor crop. The results are similar with Singh (2014); Meena et al., (2019); Saxena (2016); Rai et al., (2018) and Mandavkar and Talathi (2013); Singh and Mohanty (2024).

**CONCLUSION**

The results show that most castor farmers had a medium level of adoption. Key practices like value addition, seed treatment, and proper storage methods were largely not adopted. Farmers need training on crop management practices, demonstrations, and awareness about the importance of value addition. Regular contact with extension agencies should be increased for timely information, and establishing processing units in or near villages could help farmers earn more by processing their produce rather than direct selling.

**RECOMMENDATIONS**

It is recommended that targeted extension interventions and capacity-building programs be strengthened to improve awareness and adoption among farmers. Policy support should focus on subsidizing post-harvest equipment, promoting farmer-led demonstrations, and enhancing market linkages. Additionally, integrating local knowledge with

scientific practices can further improve adoption rates and reduce post-harvest losses.

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**CONFLICT OF INTEREST**

Authors have declared that no competing interests exist.

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