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Adoption level with respect to various practices of mango production technology in Meerut district of Uttar Pradesh, India

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Abstract

This study aimed to assess the current adoption level of mango production technologies among orchardists in Meerut district, Uttar Pradesh. Understanding adoption rates is crucial for promoting new and improved practices. Based on maximum area and production, researchers randomly selected 10 orchardists from each of two purposefully chosen villages with the help of progressive orchardists and village leaders. This resulted in a sample size of 80 orchardists. The study found that a majority of respondents (61.25%) had partially adopted the use of improved mango varieties. Adoption rates were lower for other practices. For instance, nearly half (45%) of orchardists partially adopted recommended land preparation practices, while over half (56.25%) did not adopt recommended plantation practices. Similarly, over half (51.25%) did not adopt the recommended fertilizer and manure application rates. However, a higher proportion (58.75%) partially adopted recommended irrigation practices.

Keywords: Mango production technology, adoption level, recommended practices, land preparation etc.

Introduction

The most significant commercially grown fruit crop in the country is the mango (*Mangifera indica* L.), which belongs to the Anacardiaceae family. It's known as the "king of fruits." Mango cultivars can be found in the greatest variety in India. Mango farming is thought to have begun in South East Asia. Since about 6,000 years ago, mango has been grown in south Asia. Mango is native to South Asia, from where it has been distributed worldwide to become one of the most cultivated fruits in the tropics.

India holds the title of the second largest fruit producer globally (after China), boasting a production of 109.06 million metric tonnes of fruits grown on an area of 72.8 million hectares in 2021-22 (NHB, 2023) ^[9]. Notably, mango cultivation alone covers 23.76 million hectares and contributes 21.1 million metric tonnes annually (NHB, 2023) ^[9].

While Andhra Pradesh remains the leading state in terms of area under cultivation (4.86 million hectares), Uttar Pradesh holds the top spot for both production (5.27 million metric tonnes) and productivity (22.18 tonnes per hectare) in 2021-22 (APEDA, 2023) ^[11]. Together, Andhra Pradesh, Uttar Pradesh, Bihar, Karnataka, Maharashtra, West Bengal, and Gujarat contribute approximately 83% of the total mango production in India (NHB, 2021) ^[9].

Mango is well-adapted to tropical and subtropical climates,

but it can also be cultivated up to 1,100 meters above sea level. Conditions during flowering should be devoid of humidity, rain, or frost. The ideal temperature for cultivation ranges between 24 and 27 °C. Higher temperatures during fruit development and maturity result in better quality fruits. Regions experiencing frequent showers and high humidity are prone to many pests and diseases. Therefore, mangoes thrive best in areas with rainfall between 25cm and 250cm. Regions characterized by bright sunny days and moderate humidity during flowering are optimal for mango cultivation. According to Gitonga (2010), 92.20% of farmers encountered pest problems in their mango trees. The most common pests were the mango seed weevil (48.10%), fruit fly (36.40%), thrips (1.30%), and aphids (1.30%). The prevalent diseases included powdery mildew (46.80%), anthracnose (18.20%), and scab (2.60%).

Mangoes serve as a rich source of vital nutrients such as vitamins A (1400 I.U.) and C. The fruit contains 73.0-86.7% moisture, 11.6-24.3% carbohydrates, 0.3-1.0% protein, 0.1-0.8% fat, 0.3-0.7% minerals, 650-25900 µg of vitamin A, and 3-83 mg of vitamin C per 100 grams of fruit. Mango seed kernels consist of 9.5% protein, 8-12% fat, 79.2% starch, 2% mineral matter, and 2% fibers (Tanwar, 2013) ^[15].

Among mango orchardists, 57.50% fully adopt the 10m x 10m planting distance. Dashehari, Langra, and Chousa

varieties are predominantly adopted for plantation in mango orchards. Regarding fertilizer and manure application, most mango growers demonstrate full adoption. While the ring and furrow method for irrigation is partially adopted by most orchardists, 67.50% fully adopt the flood method. There is 100% full adoption of wet table sulfur, 97.50% for Karathan and hexaconazol for disease control. Full adoption is also observed in Monocrotophos, Endosulfan, and Imidacloprid for pest management. Maximum farmers fully adopt grading and packing of mangoes, while some orchardists partially adopt processing practices. All mango orchardists fully adopt Mandy samities for marketing fruits, while most have no adoption of direct fruit sales to consumers and wholesalers in the same town and village or for fruit exports (Tanwar *et al.*, 2013) [15].

Materials and Methods

The present study was conducted in Meerut district of Uttar Pradesh due to the sufficient area dedicated to mango cultivation in this region. Meerut district comprises 12 community development blocks, out of which two blocks, namely Sardhana and Machhara, were purposely selected based on the need and availability of mango orchards. The revenue villages were arranged in descending order according to the maximum area and number of mango orchardists, and the top 4 revenue villages were selected from each block based on maximum area and production. Ten orchardists were randomly selected from each selected village with the assistance of progressive orchardists and village pradhans, resulting in a total sample size of 80 orchardists for the present investigation. Data were collected using a pre-structured interview schedule covering all aspects of the present study. To ensure reliability and accuracy of the procedure and information, the investigator personally collected data from each individual mango orchardist, either at their farm or home. A developed schedule was employed for collecting comprehensive information. Prior to data collection, the purpose of the interview and the study as a whole were explained to the orchardists. Methodologies of tools are discussed below.

Percentage

$$\text{Percentage} = \frac{\text{Frequency}}{\text{Number of respondent}} \times 100$$

Mean $(\bar{X}) = \frac{\sum x}{N}$

Where,

(\bar{X}) = Average or mean

$\sum x$ = Total number of scores obtained by respondents

N = Total number of respondent

1. Standard Deviation

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2}$$

Where,

σ = Standard deviation

d = Deviation from variables mean

n = Total number of items

Results and Discussion

To assess the adoption level with respect to various practices of mango production technology

Mango plays a pivotal role in the fruit cultivation scenario of Western Uttar Pradesh, often hailed as the "king of fruits." Despite the efforts of numerous researchers aimed at increasing productivity and total production of mango, the expected surge has not been realized. This shortfall can be attributed to the low adoption rate of mango production technology among mango orchardists. Various new production technologies concerning mango orchards have emerged as a result of these research endeavors. However, their impact on increasing production and productivity has been limited due to the reluctance of mango orchardists to adopt them.

Table 1: To assess the adoption level with respect to various practices of mango production technology

S. No.	Statements	Fully adopted		Partially adopted		Not adopted	
		F	P	F	P	F	P
1	Improved varieties	17	21.25	49	61.25	14	17.50
2	Land preparation	14	17.50	36	45.00	30	37.50
3	Plantation practices	4	5.00	31	38.75	45	56.25
4	Manures and fertilizers application	4	5.00	35	43.75	41	51.25
5	Irrigation practices	7	8.75	47	58.75	26	32.50
6	Use of plant growth regulators	1	1.25	16	20.00	63	78.75
7	Plant protection measures	9	11.25	33	41.25	38	47.50
8	Suitable inter crops in mango orchards	10	12.50	50	62.50	20	25.00
9	Storage of fruit after harvesting	8	10.00	37	46.25	35	43.75
10	Packing Procedure (for long and short distance)	13	16.25	27	33.75	40	50.00
11	Marketing procedure	39	48.75	21	26.25	20	25.00

F-frequency, P-percentage

Improved Varieties

Analysis of the data from Table 1 revealed that the majority of respondents had partially adopted improved varieties of mango. Among the total sample size, 61.25% of respondents were categorized as partially adopted, while 21.25% were

fully adopted. Only 17.50% of respondents were classified as not adopted regarding the improved varieties of mango. It was concluded, based on descriptive data from blocks Saradhana and Machhara, that varieties such as Dashehari, Langra, Chausa, Fazli, and Ramkela were commonly used.

Orchardists in the selected villages reported that they did not replace trees unless they died, and when new trees were planted, attention was given to new varieties. However, only varieties that had already been tested for productivity were planted.

Land preparation

Analysis of Table 1 data revealed that a majority of respondents had partially adopted land preparation practices for mango orchards. Among the total sample size, 45.00% of respondents fell under the partially adopted category, while 37.50% were categorized as not adopted. Only 17.50% of respondents were fully adopted in their land preparation practices for mango orchards.

Plantation practices

Data from Table 1 indicates that most orchardists had not adopted appropriate plantation practices for mango plants. Among the total sample size, 56.25% of orchardists were not adopted, while 38.75% were partially adopted. Only 5.00% of orchardists were fully adopted in their plantation practices for mango plants.

Manures and fertilizers application

Table 1 data showed that most orchardists had not adopted the recommended dose of manures and fertilizers in mango orchards. Among the total sample size, 51.25% of orchardists were not adopted, while 43.75% were partially adopted. Only 5.00% of orchardists were fully adopted in the use of recommended doses of manures and fertilizers.

Irrigation practices

Observations from Table 1 indicate that most orchardists had partially adopted irrigation practices for mango orchards. Among the total sample size, 58.75% of orchardists were partially adopted, while 32.50% were not adopted. Only 8.75% of orchardists were fully adopted in their irrigation practices.

Use of plant growth regulators

Table 1 data revealed that the majority of orchardists had not adopted the use of plant growth regulators for proper growth of mango fruit plants. Among the total sample size, 78.75% of orchardists were not adopted, while 20.00% were partially adopted. Only 1.25% of orchardists were fully adopted in using plant growth regulators.

Plant protection measures

Data from Table 1 indicated that most orchardists had not adopted proper plant protection measures in mango orchards. Among the total sample size, 47.50% of orchardists were not adopted, while 41.25% were partially adopted. Only 11.25% of orchardists were fully adopted in their plant protection measures.

Suitable intercrops in mango orchards

Table 1 data showed that a majority of orchardists had partially adopted suitable intercrops in mango orchards. Among the total sample size, 62.50% of orchardists were partially adopted, while 25.00% were not adopted. The remaining 12.50% of orchardists were fully adopted in growing suitable intercrops.

Storage of fruit after harvesting

Table 1 data indicated that most orchardists had partially adopted the correct storage method of fruits after harvesting. Among the total sample size, 46.25% of orchardists were partially adopted, while 43.75% were not adopted. Only 10.00% of orchardists were fully adopted in their fruit storage methods after harvesting. There appears to be a significant technological gap in fruit storage after harvesting, which needs to be addressed through appropriate extension strategies provided to orchardists in a timely manner.

Packaging procedure (for short and long distance markets)

Table 1 data revealed that most orchardists had not adopted proper packaging methods for mango fruits intended for short and long-distance markets. Among the total sample size, 50.00% of orchardists were not adopted, while 33.75% were partially adopted. The remaining 16.25% of orchardists were fully adopted in their packaging methods for mango fruits.

Marketing procedure: Table 1 data showed that most orchardists were fully adopted in the marketing procedure of mango fruits. Among the total sample size, 48.75% of orchardists were fully adopted, while 26.25% were partially adopted. The remaining 25.00% of orchardists were not adopted in their marketing of mango fruits.

Conclusion

From the above discussion we highlight the fact that the majority of the orchardists 61.25 percent were observed in the partially adopted category about improved varieties of mango. It was observed that the maximum numbers of orchardists 45.00 percent were observed in the partially adopted category about the land preparation practice of mango orchard. Orchardists 56.25 percent were observed in the not adopted category about the plantation practices of mango plant. It was observed that the most of the orchardists 51.25 percent were possessed in the not adopted category about the use of recommended dose of manures and fertilizer in mango orchard. It was clear from the study that the maximum number of orchardists 58.75 percent were observed in the partially adopted category about irrigation practices in mango orchards. The maximum number of orchardists 47.50 percent were observed in the not adopted category about the proper plant protection measure in mango orchard. The maximum number of orchardists 62.50 percent were observed in the partially adopted category about suitable inter crops in mango orchards. The majority of the orchardists 78.75 percent were possessed in the not adopted category about use of plant growth regulators for proper of plant growth in mango orchards. Orchardists 46.25 percent were observed in the partially adopted category about the storage correct of method fruit after harvesting. The maximum number of orchardists 50.00 percent were possessed in the not adopted category about packaging of mango fruits for disposal at long and short distance market respectively. It was observed that the maximum number of orchardists 48.75 percent were in the fully adopted category about marketing procedure of mango.

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