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### Adoption of improved cotton cultivation practices by the farmers in Rayagada district of Odisha

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#### Abstract

This study examines the socio-economic characteristics and adoption levels of improved cotton cultivation practices among farmers in Rayagada District, Odisha. The analysis of socio-economic data reveals that the majority of respondents are middle-aged males engaged primarily in agriculture combined with other occupations, and most live in joint families in semi-cemented houses. Landholding sizes are predominantly low, and information sources, scientific orientation, and risk orientation are mostly at medium levels. The adoption of various improved practices, including field preparation, improved varieties, and irrigation, shows significant variation. While practices like improved variety and line sowing have relatively higher adoption rates, others such as seed treatment and plant spacing have lower adoption levels. The overall distribution of respondents by adoption level indicates a concentration in the medium category, with lower and higher categories also represented. Correlation analysis identifies strong positive relationships between adoption levels and factors such as progressiveness, mass media exposure, and source of information. Significant correlations are also observed with scientific orientation, risk orientation, and economic orientation. Conversely, age, gender, and land holding exhibit varying degrees of influence, with age showing the strongest correlation. These findings underscore the need for targeted interventions to address barriers to adoption and enhance the effectiveness of extension services and information dissemination in promoting improved cotton cultivation practices.

**Keywords:** Adoption, cotton, farming, Rayagada

#### Introduction

The adoption of improved cotton cultivation practices represents a significant shift towards modernizing agricultural methods to enhance productivity, sustainability, and economic viability in cotton farming. This approach involves integrating advanced techniques and technologies to address the challenges faced by traditional farming methods, such as low yields, soil degradation, and pest management issues. Improved practices typically include the use of high-yielding and pest-resistant cotton varieties, efficient irrigation systems, and innovative soil management strategies. Additionally, these practices emphasize the importance of sustainable methods, such as integrated pest management and conservation tillage, to reduce environmental impact. The adoption of these practices is crucial for increasing crop yields, improving the quality of cotton, and ensuring the long-term sustainability of cotton farming. By incorporating these advancements, farmers can achieve greater efficiency, reduce input costs, and contribute to the overall growth and stability of the agricultural sector. Rayagada District in Odisha, India, is a key agricultural area where cotton cultivation plays a vital role in the local economy. Despite its importance, traditional cotton farming in this region is plagued by issues such as low productivity,

pest problems, and environmental concerns. Adopting improved cotton cultivation practices offers a promising solution to these challenges. These modern practices include using high-yielding, pest-resistant varieties, advanced soil and water management techniques, and integrated pest management (IPM). By transitioning to these enhanced methods, cotton farmers in Rayagada can potentially boost their yields, reduce costs, and promote sustainable farming, thus addressing current constraints and supporting economic stability in the district.

#### Objective

To assess the adoption of improved cotton cultivation practices by the respondents.

#### Research Methodology

The study employed a Descriptive Research Design to systematically describe the socio-economic characteristics of farmers and their adoption levels of improved cotton cultivation practices in Rayagada District, Odisha. This design was chosen to capture detailed information about the population and provide a comprehensive analysis of the adoption patterns without influencing or altering the behavior of the subjects.

## Results and Discussion

**Table 1:** Socio-economic characteristics distribution of respondents towards improved cotton cultivation practices

Category	Frequency	Percentage
<b>Age in years</b>		
Young (18-35)	29	24.17
Middle (36-55)	88	73.33
Old (Above 56)	3	2.50
<b>Gender</b>		
Male	81	67.50
Female	39	32.50
<b>Occupation</b>		
Agriculture	35	29.17
Agriculture + Business	39	32.50
Agriculture + Labour	34	28.33
Agriculture + Service	12	10.00
<b>Family Type</b>		
Nuclear	43	35.83
Joint	77	64.17
<b>Type of House</b>		
Semi- cemented	62	51.67
Cemented	58	48.33
<b>Land Holding</b>		
Low (Less than 0.5)	75	62.50
Medium (0.5-1)	35	29.17
High (More than 1)	10	8.33
<b>Source of Information</b>		
Low (Less than 18.21)	27	22.50
Medium (18.21-20.62)	68	56.67
High (More than 20.62)	25	20.83
<b>Scientific Orientation</b>		
Low (Less than 8.73)	19	15.83
Medium (8.73-11.84)	74	61.67
High (More than 11.84)	27	22.50
<b>Risk Orientation</b>		
Low (Less than 8.88)	10	8.33
Medium (8.88-12.20)	95	79.17
High (More than 12.20)	15	12.50
<b>Progressiveness</b>		
Low (Less than 0.27)	27	22.50
Medium (0.27-2.14)	78	65.00
High (More than 2.14)	15	12.50
<b>Mass Media Exposure</b>		
Low (Less than 8.41)	15	12.50
Medium (8.41-11.11)	97	80.83
High (More than 11.11)	8	6.67
<b>Economic Orientation</b>		
Low (Less than 5.05)	26	21.67
Medium (5.05-8.83)	60	50.00
High (More than 8.83)	34	28.33
<b>Extension Contacts</b>		
Low (Less than 8.05)	27	22.50
Medium (8.05-10.88)	56	46.67
High (More than 10.88)	37	30.83

The table 1 presents a distribution of socio-economic characteristics among respondents regarding improved cotton cultivation practices. A majority of respondents are in the middle age group (36-55 years, 73.33%) and predominantly male (67.50%). Occupations are varied, with agriculture plus business being the most common (32.50%). Family types are mostly joint families (64.17%), and the majority of respondents live in semi-cemented houses (51.67%). Land holding is primarily low (less than 0.5

hectares, 62.50%). Information sources are generally medium (56.67%), and scientific orientation is also predominantly medium (61.67%). Risk orientation is mostly medium (79.17%), while progressiveness is primarily medium (65.00%). Mass media exposure is high for most (80.83%), and economic orientation is mainly medium (50.00%). Extension contacts are largely medium (46.67%), with a notable proportion of respondents falling into low or high categories across different socio-economic aspects.

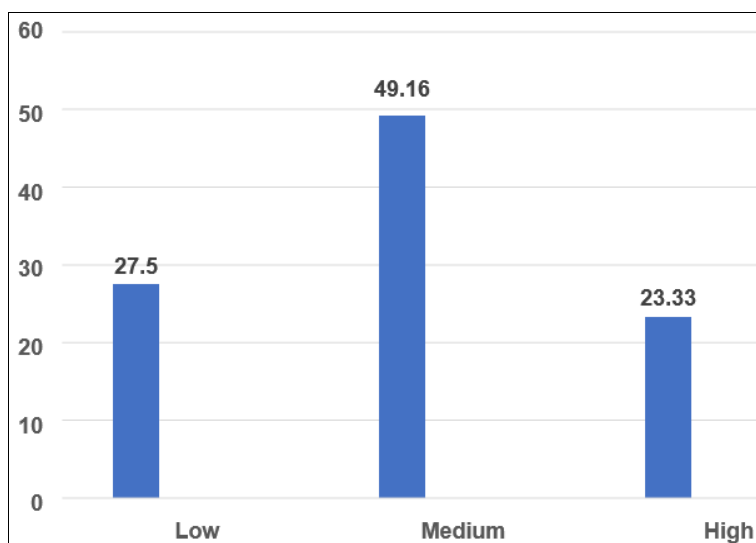
**Table 2:** Distribution of respondents according to level of adoption towards improved cotton cultivation practices.

Practices	Adopted	Partially adopted	Not adopted
Field Preparation	28 (23.33%)	44 (36.67%)	48 (40%)
Improved Variety (Tulasi, Rashi, Takat, A Wall. Bg)	44 (36.67%)	26 (21.67%)	50 (41.67%)
Seed Rate	27 (22.50%)	27 (22.50%)	66 (55%)
Seed Treatment	21 (17.50%)	28 (23.33%)	71 (59.17%)
Sowing Time	26 (21.67%)	25 (20.83%)	69 (57.50%)
Line Sowing	44 (36.67%)	21 (17.50%)	55 (45.83%)
Plant Spacing	22 (18.33%)	48 (40%)	50 (41.67%)
Fertilizers	39 (32.50%)	25 (20.83%)	56 (46.67%)
Irrigation	25 (20.83%)	31 (25.83%)	64 (53.33%)
Weed Control	39 (32.50%)	28 (23.33%)	53 (44.17%)
Plant Protection Measures	25 (20.83%)	39 (32.50%)	56 (46.67%)
Harvesting	35 (29.17%)	17 (14.17%)	68 (56.67%)
Yield	31 (25.83%)	44 (36.67%)	45 (37.50%)

The table 2 illustrates the distribution of respondents according to their level of adoption of various improved cotton cultivation practices. Among the practices listed, "Improved Variety" has the highest proportion of adoption (36.67%), with 41.67% not adopting this practice. "Field Preparation" and "Line Sowing" are also relatively well-adopted at 23.33% and 36.67%, respectively, though a significant portion of respondents have either partially adopted or not adopted these practices. Practices like "Seed Treatment" and "Sowing Time" have lower adoption rates, with 59.17% and 57.50% not adopting them, respectively. "Plant Spacing" and "Irrigation" show considerable non-adoption rates at 41.67% and 53.33%, respectively. On the other hand, "Fertilizers" and "Weed Control" have notable adoption at 32.50%, though a substantial number of respondents have not adopted these practices either. "Harvesting" and "Yield" practices reflect a mix of partial and non-adoption, with a high percentage of non-adopters in harvesting (56.67%) and a significant percentage in yield (37.50%). Overall, while some practices are relatively well-adopted, many still see a high level of partial or non-adoption.

**Table 3:** Overall distribution of respondents according to their adoption level towards improved cotton cultivation practices.

Sl. No.	Categories	Frequency	Percentage
1	Low (24-26)	33	27.5
2	Medium (27-29)	59	49.16
3	High (30-32)	28	23.33
	Total	120	100

**Fig 1:** Level of adoption

The table 3 & graph provides a breakdown of respondents based on a specific categorical measure, with three distinct levels. The majority of respondents fall into the "Medium" category (27-29), representing 49.16% of the total sample. This is followed by the "Low" category (24-26) with 27.5% of respondents. The "High" category (30-32) includes 23.33% of the respondents. Overall, the distribution is fairly balanced among the categories, with a clear concentration in the medium range.

**Table 4:** Correlation between socio-economic profiles of the respondents with their adoption level towards improved cotton cultivation practices.

Sl. No.	Independent Variable	Correlation coefficient
1.	Age	0.988*
2.	Gender	0.129NS
3.	Marital Status	0.952*
4.	Family Size	0.859*
5.	Family Type	0.904*
6.	House Type	0.417NS
7.	Land Holding	0.01NS
8.	Occupation	0.868*
9.	Source of Information	0.994**
10.	Scientific Orientation	0.959*
11.	Risk Orientation	0.979*
12.	Progressiveness	0.999**
13.	Mass Media Exposure	0.996**
14.	Economic Orientation	0.929*
15.	Extension Contacts	0.878*

\* Significant at 0.05 percent level of probability

\*\* Significant at 0.01 percent level of probability NS= Non-Significant

The table 4 illustrates the correlation coefficients between various socio-economic profiles of respondents and their adoption of improved cotton cultivation practices. The

strongest positive relationship is observed with progressiveness, which has a near-perfect correlation coefficient of 0.999, indicating that those who are more progressive are highly likely to adopt improved practices. Mass Media Exposure and Source of Information also show very high correlations, with coefficients of 0.996 and 0.994 respectively, suggesting that greater media exposure and access to better information sources are strongly linked to higher adoption rates. Scientific Orientation and Risk Orientation exhibit strong positive correlations of 0.959 and 0.979, respectively, reflecting that respondents with a scientific approach and higher risk tolerance are more inclined to adopt new practices. Economic Orientation and Extension Contacts show moderate to strong correlations, with coefficients of 0.929 and 0.878, highlighting that economic considerations and frequent extension contacts positively influence adoption. Occupation, Family Type, and Marital Status also demonstrate significant positive correlations, with coefficients ranging from 0.868 to 0.952, indicating their importance in adoption. Family Size shows a moderately strong correlation at 0.859, while House Type has a weaker positive correlation of 0.417. Age exhibits a strong correlation of 0.988, suggesting that older individuals may be more inclined to adopt improved practices. In contrast, Gender and Land Holding show very weak or non-significant correlations, with coefficients of 0.129 and 0.01, respectively, indicating minimal influence on adoption levels.

### Conclusion

In conclusion, the investigation into the knowledge and adoption of improved cotton cultivation practices in Rayagada District of Odisha underscores the pivotal role that socio-economic factors play in shaping agricultural outcomes. The study reveals a strong correlation between

various socio- economic profiles and the level of adoption of these advanced practices. Factors such as progressiveness, mass media exposure, and access to information sources significantly influence farmers' willingness to embrace modern techniques, highlighting the importance of targeted educational and informational interventions.

The findings suggest that increased exposure to mass media and effective communication channels can greatly enhance farmers' knowledge and facilitate the adoption of improved practices. Additionally, fostering scientific and risk-oriented attitudes among farmers, along with providing robust economic support and extension services, can further accelerate the adoption process. While factors like family size and occupation also show notable correlations, the impact of less significant factors like house type, gender, and land holding are minimal, indicating that a focused approach addressing major influencers is more effective.

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