



# Influence of Socio-economic Attributes of Groundnut Growers on Adoption of Various Farm Practices in Balasore District of Odisha, India

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## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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## ABSTRACT

In the coastal state of Odisha (India), Groundnut covers a larger part of oilseed cultivation giving a sustainable source of income for the farmers. It provides nutritional as well as economic benefits for the consumers. Nevertheless, the groundnut growers faced many constraints across the stages of production and harvesting across Odisha. Thus, it is an essential move to promote the adoption of

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suitable technologies to maximize groundnut cultivation. The research design selected for the study was *ex post facto* design. One hundred twenty (120) respondents were selected from three blocks of the Balasore district of Odisha following the random sampling method. The correlation coefficients found that farmers having higher social participation were actively adopting cultivation practices in groundnut. The results from multiple regression found that the nine independent variables together have contributed 61.10 percent of the variance in the consequent variable, adoption of groundnut cultivation practices and revealed that socio-economic attributes such as extension contact, social participation, holding size and education found to be positively and significantly influence the adoption rate in groundnut cultivation.

**Keywords:** Adoption; education; extension contact; groundnut cultivation; land holding; social participation.

## 1. INTRODUCTION

The farm diaspora across India is undergoing generational change with the introduction of groundbreaking technologies to assist farmers in the cultivation of crops. This has contributed to achieving the food surplus stature for the country.

Along with the dominating share of cereals and pulses in the cropping system, oilseeds also play a substantial role in supplementing the income and livelihood of the farmers. According to estimates, the nation would produce 413.55 lakh tonnes of oilseeds in 2022–2023—a 33.92 lakh tonnes increase over 2021–2022 production. Moreover, the 2022–2023 oilseed production is 73.33 lakh tonnes greater than the 340.22 lakh tonnes average oilseed production. The total production of Groundnut is expected to be 102.97 Lakh tonnes [1].

In the coastal state of Odisha, major oilseeds like Groundnut, Niger, Sesame and Mustard are grown. During the triennium ending (TE) 2017–18, groundnut cultivation in the state accounted for over 68% of all oilseed production and occupied around 34% of the total oilseed area. Between TE 1995–96 and 2017–18 (25 years), the area planted to groundnut decreased from 318,000 ha to 210,000 ha [2].

Its cropped area has shown a negative annual growth rate of 0.93%. In the same time frame, production fell from 466,000 tonnes to 374,000 tonnes. However, because of the introduction of contemporary high-yielding cultivars, groundnut production showed an increase, rising from 1465 kg/ha to 1783 kg/ha. Both the Kharif (rainy) and Rabi (post-rainy) seasons are used to grow groundnuts. Rabi groundnuts are grown mostly in residual moisture conditions, making up 67% of the total groundnut area [3].

The variety Devi had the most area allocations among the districts under study in Bolangir (50%) followed by Kalahandi (45%), Puri (31%), and Khordha (27%). Due to the district's significant concentration of groundnut seed growers, Puri district was chosen above other types. Gujarati kinds purchased from mandis (APMC market yard) were discovered to be in the majority in the Jajpur district. The majority of the groundnut seeds in Cuttack came from local seed dealers, whereas native varieties dominated the Nuapada district. Similar to this, Smruti, a native cultivar, was cultivated primarily due to its eye-catching color, premium price, and substantial production [4].

However, groundnut cultivation also faces modern issues including irrigation, climate change, good seed selection, and land preparation techniques have a big impact on groundnut farming and necessitate the implementation of new technologies [5]. Thus, there is a need to improve the production and productivity of the oilseeds through the adoption of suitable technologies and assist the farmers in attaining sustainable livelihood. With this background, the study aimed to estimate the inter and intra-level interaction between sets of dependent variables, adoption of practices in groundnut cultivation, and independent variables ( $X_1-X_9$ ).

## 2. MATERIALS AND METHODS

### 2.1 Research Design

To conduct the study, *ex post facto* research design was employed for the study.

### 2.2 Sampling Design

To conduct the study, the district Balasore is a potential district where groundnut has been

cultivated on large acres since the early seventies. Hence, the district Balasore has been purposively selected for the study. Since the respondents are groundnut growers, it was proposed to include three major groundnut growing blocks i.e. Basta, Baliapal, and Jaleswar block (Table 1). The framed questionnaire was personally presented before the selected groundnut growers to collect the desired information for the study. The list of groundnut growers in the selected three blocks was collected from the block extension officials. From each block, four *Gram Panchayats* were randomly selected. Thus, all the 120 groundnut growers were randomly selected for the study.

### 2.3 Pilot Study

Before the selection of the variables and preparation of the interview schedule, the researcher visited the district of the study. Discussions and interactions were made with the extension officials of the Agriculture Department and farmers adopting groundnut cultivation practices. In due course of discussions and interactions with them regarding the objectives of the study, the reactions, and suggestions, were recorded. The collected information helped the researcher select and finalize the variables for the development of the interview schedule.

### 2.4 Selection of Variables and Statistical Tools

The variables were selected after suitable operationalization and measurement which is listed as follows:

- I) Independent Variables (Table 2)
- II) Dependent Variables

Dependent variable selected for the study was adoption of practices for groundnut cultivation

(y). It refers to the extent of practices adopted by the respondents on groundnut cultivation particularly nutrient management, cultural practices, disease and pest attack. There were three columns against each of the practices representing “fully adopt”, “partially adopt” not “not adopt” with score of 3, 2 and 1 respectively. For data analysis, IBM SPSS v26.0 was used to carry out Correlation analysis and Multiple regression analysis.

### 2.5 Pre-testing of Interview Schedule

To test the reliability and validity of the schedule, pre-testing of the interview schedule was done. The respondents who are being questioned following the pre-test are excluded from the final sample. The respondents were selected at random with 10 percent of the respondents other than the selected sample respondents of the study. This helps in creating a more appropriate schedule for obtaining relevant information for the study.

### 2.6 Method of Data Collection

The respondents were personally interviewed by the researcher with the use of a structured interview schedule. The interview was conducted at the respondent's residence mostly in an informal manner. Before the interview, a good rapport was established among the respondents and the researcher. The interview was done during the 1st week of May to 4th week of May 2023. The purpose of the study was explained to the respondent before receiving the responses. The interview schedule was read out to the respondents in their local language for easy understanding of the respondents and to obtain their responses. The data thus collected was tabulated for empirical measurements and analysis.

**Table 1. Sampling design for the study**

SI No.	Block	Gram panchayat	Respondents selected
01	Basta	Paunsakuli	10
		Kadhrain	10
		Raghunathpur	10
		Vacera	10
		Dagara	10
02	Baliapal	Chaunukh	10
		Kaladiha	10
		Betagadia	10
		Rarapur	10
03	Jaleswar	Lokhnath	10
		Paikashidha	10
		Kutsahee	10
			10
Total	03		120

**Table 2. List of Independent variables selected for the study**

SI No.	Independent Variables	Measurement
1	Age ( $x_1$ )	The chronological age is measured in terms of three columns against age of every farmer representing "Up to 35 years", "36-55 years" and "above 55 years" with score of 1,2 and 3 respectively.
2	Education ( $x_2$ )	Measured in five columns to know the extent of literacy or number of years of formal education of every farmer representing "Illiterate", "Primary school", "Secondary school", "High school" and "College and above" with score of 1,2,3,4 and 5 respectively.
3	Housing pattern ( $x_3$ )	Measured in terms of three columns in which type of dwellings of the respondents representing "Hut", "Thatched" "Semi-pucca" and "Pucca" with score of 1,2,3 and 4 respectively.
4	Holding size ( $x_4$ )	Measured in five columns to calculate the Possession of land of the respondents in acre covered under irrigated rainfed and fallow land of every farmer representing "Landless", "Up to 1 acre", "1.1-2.0 acre", "2.1-4.0 acre" and "4.0-10.0 acre" with score of 1,2,3,4 and 5 respectively.
5	Family type ( $x_5$ )	The family type is dichotomized to "nuclear" and "joint" family measured with a score of 1 and 2 respectively.
6	Family size ( $x_6$ )	Family size denotes the number of family staying in a common kitchen and measured in four columns representing "Up to 5 members", "6 to 8 members", "9 to 10 members" and "Above 10 members" with score of 1,2,3 and 4 respectively.
7	Social participation ( $x_7$ )	It refers to the extent of involvement of the individuals in various organization and functioning in their locality and measured in terms of three columns against age of every farmer representing "Regularly", "Occasionally" and "Never" with score of 3,2 and 1 respectively.
8	Extension contact ( $x_8$ )	Extension contact in the study denotes the extension contact of the farmers with the functionaries of various developmental organization in the district in connection with Farm activities and measured in terms of three columns against age of every farmer representing "Always", "Sometimes" and "Never" with score of 3, 2 and 1 respectively.
9	Sources of information ( $x_9$ )	It refers to the study extent of exposure of the respondents to different sources for seeking technological information on farm activities and measured in terms of three columns against age of every farmer representing "Regularly", "Occasionally" and "Never" with score of 3, 2 and 1 respectively.

### 3. RESULTS AND DISCUSSION

Following data analysis, the following results were obtained.

#### 3.1 Coefficient of Correlation (r): Socio-economic Attributes (x<sub>1</sub>-x<sub>9</sub>) Influencing Adoption of Practices in Groundnut Cultivation

From Table 3, the coefficient of correlation between Socio-economic attributes of groundnut growers (x<sub>1</sub>-x<sub>9</sub>) and 24 independent variables.

It has been found that the following variables viz. Education (x<sub>2</sub>), social participation (x<sub>7</sub>), and extension contact (x<sub>8</sub>), have recorded a positive significant correlation with the dependent variable whereas the variable holding size (x<sub>4</sub>) has a negative but significant correlation with the dependent variable. The correlation coefficients reveal that respondents having higher levels of education (x<sub>2</sub>) have exhibited a stronger association with the consequent variable,

adoption of practices in groundnut cultivation. This might be due to the better access to knowledge and information gained by the educated respondents which makes them adopt innovative and profitable practices to grow groundnut as part of their farm enterprises. The respondents having higher social participation (x<sub>7</sub>) enables them to conceive a wide range of information from different sources. Similarly, the farmers who have better extension contact (x<sub>8</sub>) give them timely and relevant assistance required to adopt various practices. On the contrary, the variable holding size showcased a negative relationship which indicates that the farmers having larger size of land may be skeptical towards the adoption of new practices due to the uncertainty in farm practices.

Similar studies have found that education, land holding, annual income, extension participation, source of information, and scientific orientation were positively and highly significantly associated with the extent of adoption of plant protection measures [6,7,8].

**Table 3. Coefficient of Correlation (r): Socio-economic attributes (x<sub>1</sub>-x<sub>9</sub>) influencing adoption of practices in groundnut cultivation (n=120)**

Sl. No.	Socio-economic attributes	'r' Value	't' value
1	Age (x <sub>1</sub> )	-0.159	0.161
2	Education (x <sub>2</sub> )	0.183*	2.022
3	Housing pattern (x <sub>3</sub> )	-0.053	0.576
4	Holding size (x <sub>4</sub> )	-0.250**	2.806
5	Family type (x <sub>5</sub> )	0.030	0.326
6	Family size (x <sub>6</sub> )	0.080	0.872
7	Social participation (x <sub>7</sub> )	0.173*	1.908
8	Extension contact (x <sub>8</sub> )	0.276**	3.120
9	Sources of information (x <sub>9</sub> )	-0.172	1.776

\*Correlation is significant at the 0.01 level

\*\*Correlation is significant at the 0.05 level

**Table 4. Multiple regression analysis: Socio-economic attributes (x<sub>1</sub>-x<sub>9</sub>) influencing adoption of practices in groundnut cultivation (n=120)**

Sl No.	Socio-economic attributes	Unstandardized coefficient		Standardized coefficient	't' value	Probability
		Beta	Std. error	Beta		
1	Age (x <sub>1</sub> )	-2.133	1.526	-0.126	-1.397	0.165
2	Education (x <sub>2</sub> )	3.247	1.165	-0.148	2.152	0.025*
3	Housing pattern (x <sub>3</sub> )	-0.669	0.583	-0.047	-0.524	0.601
4	Holding size (x <sub>4</sub> )	-0.127	0.805	-0.193	-2.098	0.038*
5	Family type (x <sub>5</sub> )	-0.286	0.989	0.016	0.173	0.863
6	Family size (x <sub>6</sub> )	0.530	0.660	-0.073	-0.787	0.433
7	Social participation (x <sub>7</sub> )	3.373	0.874	0.042	2.605	0.014*
8	Extension contact (x <sub>8</sub> )	3.103	0.631	0.158	2.747	0.008**
9	Sources of information (x <sub>9</sub> )	-1.134	0.673	-0.150	-1.685	0.095*

R<sup>2</sup>=0.611

Adjusted R<sup>2</sup>=0.074

Std. error=10.2164

### 3.2 Multiple Regression Analysis: Socio-economic attributes ( $x_1-x_9$ ) Influencing Adoption of Practices in Groundnut Cultivation

Table 4 presents the full model of regression analysis between exogenous variable adoption of practices in groundnut cultivation (y) vs. 9 socio-economic attributes. The best-fitted regression equation was able to explain 61.10 percent of the variance in consequent variable adoption of practices in groundnut cultivation (y). It was found that out of nine attributes, extension contact, social participation, holding size, education and sources of information had exhibited significant influence in the adoption of various practices in groundnut cultivation. Thus, farmers having higher level of education tend to showcase higher level of adoption which also correlates to having access to various sources of information and active social participation. The policymakers can infer the fact that these significant variables are indicating together towards better decision-making by the farmers due to adequate and timely information.

The studies conducted by [9] among tribal farmers of Arunachal Pradesh, found that extension contact was one of the significant variables contributing towards adoption obtained through multiple regression analysis. Similarly, the study conducted by [10] concerning adoption in potato growers also found similar results.

#### 4. CONCLUSION

The productivity of Groundnut in Odisha is not encouraging and deteriorating year after year. The groundnut growers across the state were found to lack knowledge and skill competency as well as adoption of recommended Practices on a large scale. The present study made with correlation coefficient and multiple regression analysis concluded that the socio-economic attributes such as extension contact, social participation, holding size, and education were the pertinent variables in influencing the adoption of various recommended practices in groundnut cultivation. These variables may be taken into consideration while organizing various extension activities by the extension officials for better adoption of practices in groundnut cultivation. This will help in fostering a better livelihood for the farmers as well as attaining food security across the state and the country at large. The

changing climatic patterns require the adoption of a dynamic cropping pattern and make the farmers economically resilient for the future.

#### 5. RECOMMENDATIONS

After analysis of the collected data the following suggestive measures can be elucidated from the findings and recommended for future course of action:

- i. Organizing the growers for team work
- ii. Promoting Participatory decision making among the groundnut growers.
- iii. Motivating growers for timely operation of activities.
- iv. Deep ploughing with good soil tilth.
- v. Facilities for custom hiring service.
- vi. Adequate training for knowledge and skill enrichment.
- vii. Exposure Visit to ideal places to gain experience and confidence by the growers.
- viii. Pre-arrangement of input and materials
- ix. Sprinkling water after sowing on moisture stress.
- x. Use of recommended dose of fertilizer.
- xi. Easy availability of credit facility.
- xii. Diseases and pest management particularly Cercospora leaf spot, termite and red hairy caterpillar.
- xiii. Developing community drying yard.
- xiv. Cleaning unnecessary plant parts before bagging.
- xv. Guiding growers to collect market information.
- xvi. Liaisoning for immediate disposal of the produce.
- xvii. Fixing reasonable minimum support price.
- xviii. Checking exploitation by the traders and businessmen.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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