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# Impact of Jharkhand Department of Agriculture on Knowledge, Attitude and Adoption of the Farmers

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**ABSTRACT**

The responsibility of transfer of technology lies with the State Department of Agriculture which undertakes a number of activities aiming at changing the behavior of the farmers. In recent past, there have been a lot of questions on the performance of Department of Agriculture. In this backdrop, a study was conducted to assess the impact of Jharkhand Department of Agriculture on the farmers. One district each from the five divisions of the state was randomly selected. Similarly, two blocks from each district were selected randomly. Twenty participant farmers and twenty non-participant farmers were selected randomly from each block making the sample size of 400 farmer respondents. The findings revealed that the participant farmers had higher mean values in knowledge, attitude and adoption and differed significantly from non-participant farmers. The variable extension contact had contributed significantly towards variability in knowledge, attitude and adoption. It could be concluded that the efforts of Jharkhand Department of Agriculture has yielded results which is reflected in the behavior of participant farmers.

**Keywords:** Impact, Knowledge, Attitude, Adoption, Agriculture.

## INTRODUCTION

Agriculture development is an outcome of the efforts of the farmers supported by the extension system in transfer of the technology from research system to the farmers. Jharkhand Department of agriculture undertakes the activities like training, demonstration, exposure visit and input supply under various state and central 14 sponsored schemes. The impact of Jharkhand Department of Agriculture could be manifested in the increase of knowledge, change in attitude and adoption of improved farm practices. In this background a study was conducted to assess the impact of Jharkhand Department of Agriculture on knowledge, attitude and adoption of the farmers.

## METHODOLOGY

The study was conducted in purposively selected state of Jharkhand, India. Five districts, one each from the five divisions i.e. Godda from Santhal Pargana, Hazaribagh from North Chhotanagpur, Palamu from Palamu, Ranchi from South Chhotanagpur and Saraikela-Kharsawan from Kolhan were randomly selected.

The multistage random sampling technique was adopted. Two blocks were selected randomly from each selected district. From each block 20 farmers each from participant and non-participant groups were randomly selected for this research study as presented in Table 1. Altogether 400 farmer respondents constituted the whole sample.

The study aimed at evaluating performance of public extension system in Jharkhand. The impact of interventions of Jharkhand Department of Agriculture on participant farmers vis-à-vis non-participant farmers has been measured. In knowledge test one score was given for each right answer and zero for incorrect answer. A five-point scale was used for calculation of attitude of farmers towards improved agricultural technology and the scores were assigned as 5, 4, 3, 2 and 1 for strongly agree, agree, neutral, disagree and strongly disagree respectively for positive statements and in reverse order for negative statements. Adoption was operationalized here as application of improved practices in the field. Farmers adopt them either fully or partially or do not adopt at all. Score 2, 1 and 0 was given for full, partial and non- adoption

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**Table 1: Sampling design of the study**

| Sl. No. | Name of Division | Name of District | Name of Block | Farmer Respondent | | |
|---|---|---|---|---|---|---|
| | | | | Participant | Non- participant | Total |
| 1 | Santhal Pargana | Godda | Pathargama | 20 | 20 | 40 |
| | | | Sunderpahari | 20 | 20 | 40 |
| 2 | North Chhotanagpur | Hazaribagh | Sadar | 20 | 20 | 40 |
| | | | Barkagaon | 20 | 20 | 40 |
| 3 | Palamu | Palamu | Lesliganj | 20 | 20 | 40 |
| | | | Chattarpur | 20 | 20 | 40 |
| 4 | South Chhotanagpur | Ranchi | Namkum | 20 | 20 | 40 |
| | | | Chanho | 20 | 20 | 40 |
| 5 | Kolhan | Saraikela - Kharsawa | Rajnagar | 20 | 20 | 40 |

respectively. In order to interpret collected data and to draw meaningful conclusions, data were statistically analyzed by using t-test, correlation and regression using SPSS software ver. 16.

## RESULTS AND DISCUSSION

Knowledge, attitude and adoption of participant and non-participant farmers are presented in table 2. The perusal of the table indicated that the mean value of knowledge of participant farmers was higher than that of non- participant farmers as revealed by the score values of 48.85 and 26.32, respectively. Similarly the participant farmers had higher mean value in attitude towards modern agriculture as depicted by the value 26.75 and 17.97, respectively. As far as adoption of modern agro- techniques is concerned, again the participant farmers fared better than that of non-participant farmers as indicated by the score value of 32.91 and 21.74, respectively. The statistical differences between participant and non-participant were found in knowledge, attitude and adoption at 1 per cent level of probability.

**Table 2: Knowledge, attitude and adoption of participant and non-participant farmers**

| Sl. No. | Attribute | Participant farmers | Non-participant farmers | t value |
|---|---|---|---|---|
| 1 | Knowledge (Max. score -84) | 48.85 | 26.32 | 14.005** |
| 2 | Attitude (Max. score -50) | 26.75 | 17.97 | 8.585** |
| 3 | Adoption (Max. score -56) | 32.91 | 21.74 | 10.538** |

**Significant at the 0.01 level of probability

### Association between knowledge and socio-psycho-personal characteristics of participant and non-participant farmers

Correlation coefficients of association between knowledge and socio-psycho-personal characteristics of participant and non-participant farmer respondents are presented in table 3. It is revealed by the table that variables like social participation, annual income and exposure to mass media and IT had positive and significant correlation with knowledge at 5 per cent level of probability whereas extension contact and farming system had positive and highly significant correlation with knowledge at 1 per cent level of probability in case of participant farmers. However, the age had negative and significant correlation with knowledge in case of participant farmers. The variables like size of holding, annual income, extension contact and exposure to mass media and IT had positive and highly significant correlation with knowledge at 1 per cent level of probability whereas there was non- significant association with age, educational attainment, social participation and farming system in case of non-participant farmers.

**Table 3: Correlation co-efficients of knowledge of participant and non-participant farmers with their socio-psycho-personal characteristics**

| Sl. No. | Independent variable | Correlation co-efficient | |
|---|---|---|---|
| | | Participant farmers | Non-participant farmers |
| 1 | Age | -0.141* | 0.093 |
| 2 | Educational attainment | 0.018 | 0.109 |
| 3 | Size of holding | 0.089 | 0.660** |
| 4 | Social participation | 0.167* | 0.110 |
| 5 | Annual income | 0.144* | 0.283** |
| 6 | Extension contact | 0.933** | 0.343** |
| 7 | Exposure to mass media & IT | 0.179* | 0.264** |
| 8 | Farming system | 0.184** | -0.020 |

*Significant at the 0.05 level of probability
**Significant at the 0.01 level of probability

Prakash and De (2008) reported that due to technological interventions through ATMA, majority of respondents had medium knowledge about bee-keeping and a significant association between knowledge and independent variables *viz*., age, education, family type, family size and sources of information utilized was observed.

It could be made out from the table that farmer with higher size of holding, annual income, extension contact

and exposure to mass media and IT had higher level of knowledge. Annual income, extension contact and exposure to mass media and IT might have facilitated the farmers in acquiring knowledge about improved agricultural technologies.

**Association between attitude and socio-psycho-personal characteristics of participant and non-participant farmer respondents**

Association of attitude with socio-psycho-personal characteristics of participant and non-participant farmer respondents is presented in table 4.

**Table 4: Correlation co-efficients of attitude of participant and non-participant farmers with their socio-psycho-personal characteristics**

| Sl. No. | Independent variable | Correlation co-efficient | |
|---|---|---|---|
| | | Participant farmer | Non-participant farmer |
| 1 | Age | -0.089 | 0.057 |
| 2 | Educational attainment | -0.029 | 0.101 |
| 3 | Size of holding | 0.027 | 0.695** |
| 4 | Social participation | 0.208** | 0.086 |
| 5 | Annual income | 0.160* | 0.334** |
| 6 | Extension contact | 0.876** | 0.215** |
| 7 | Exposure to mass media & IT | 0.133 | 0.192** |
| 8 | Farming system | 0.126 | 0.058 |

* Significant at the 0.05 level of probability
** Significant at the 0.01 level of probability

Perusal of the table indicated that the variables like social participation and extension contact had positively significant correlation at 1 per cent level of probability whereas annual income had positive and significant correlation at 5 per cent level of probability with attitude towards modern agro-techniques in case of participant categories of farmers. The variables like size of holding, annual income, extension contact and exposure to mass media and IT had exhibited highly significant positive association in case of non-participant farmers. It could be inferred from the findings that the variables *viz.* social participation, annual income and extension contact played significant role in changing the attitude of the farmers. Social participation and extension contact facilitate interaction which might have created favorable attitude towards modern agro-techniques. Annual income and size of holding increase risk bearing ability and in the event of successful result of technology, favorable attitude is developed.

**Association between adoption and socio-psycho-personal characteristics of participant and non-participant farmers**

Correlation coefficients of association between adoption and socio-psycho-personal characteristics of participant and non-participant farmers are presented in table 5.

**Table 5: Correlation co-efficients of adoption of participant and non-participant farmers with their socio-psycho-personal characteristics**

| Sl. No. | Independent variable | Correlation co-efficient | |
|---|---|---|---|
| | | Participant farmer | Non-participant farmer |
| 1 | Age | -0.161* | -0.013 |
| 2 | Educational attainment | 0.025 | 0.047 |
| 3 | Size of holding | 0.126 | 0.870** |
| 4 | Social participation | 0.135 | 0.171* |
| 5 | Annual income | 0.184** | 0.374** |
| 6 | Extension contact | 0.881** | 0.276** |
| 7 | Exposure to mass media & IT | 0.268** | 0.132 |
| 8 | Farming system | 0.213** | 0.241** |

* Significant at the 0.05 level of probability
** Significant at the 0.01 level of probability

It is indicated by the table that annual income, extension contact, exposure to mass media and IT and farming system had positive and highly significant correlation and age had negative significant correlation with adoption of improved farm practices in case of participant farmers whereas in case of non-participant farmers, the variables like size of holding, annual income, extension contact and farming system correlated positively at 1 per cent level of probability. The social participation had positive and significant correlation with adoption at 1 per cent level of probability.

Lynne *et al.* (1995) reported that socio-economic factors like age, education and years of farming (experience) influenced the adoption of new technology by the farmers who grow strawberry in their fields. Similarly, Rutatora and Rutachokzibwa (1995) studied that age, educational level; farm size and the farming experience of the farmer are related to adoption decisions, as younger farmers have been found to be more knowledgeable about new practices.

The landowners with small holdings had lower minimum tillage adoption rates on cultivated cropland than to part owners or tenured owners (Lee and Stewart, 1983). Rao (1988) concluded in his studies that a well organized training course with adequate learning facilities and trainees' active participation could help the trainees to gain more knowledge from the training course and induce confidence to solve the field problems.

It could be concluded from the findings that annual income, extension contact and farming system had effect

on adoption of the technology in both categories of farmers. It is quite natural that the farmers with higher resources in the form of higher size of holding and income as well as knowledge input through extension contact and exposure to mass media and IT are more likely to adopt the modern agro-techniques as these factors enhance the confidence and risk bearing ability.

**Relative contribution of socio-psycho-personal attributes of participant and non-participant farmers towards variability in knowledge**

Relative contribution of independent variables towards variability in knowledge of participant and non-participant farmers is presented in table 6. It is revealed by the table that the selected variables taken together explained the variability in knowledge to the extent of 87.30 per cent ($R^2$=0.873) and 55.10 per cent ($R^2$=0.551) in case of participant and non-participant farmers respectively. As indicated by coefficient 'b' value that extension contact (10.074) had highly significant positive contribution and exposure to mass media & IT (0.437) had significant positive contribution in case of participant farmers. But annual income (0.741) and farming system (0.564) had showed significant negative contribution. In case of non-participant farmers, the variables like age (0.205), educational attainment (0.391), social participation (1.172), annual income (2.371), extension contact (2.095) and exposure to mass media & IT (0.472) contributed positively and significantly at 5 per cent level of probability as indicated by coefficient 'b' values while size of holding (11.982) had significant positive contribution and farming system (2.907) had significant negative contribution at 1 per cent level of probability.

As far as strategic interventions with regard to improvement in knowledge is concerned, extension functionaries are required to be motivated to reach as many farmers as they can so that maximum number of farmers could derive benefit from government programmes. ICT tools like info-kiosk and mobile-based services should be promoted.

**Relative contribution of socio-psycho- personal attributes of participant and non-participant farmers towards variability in attitude**

Relative contribution of independent variables towards variability in attitude of participant and non-participant farmers is presented in table 7. It is apparent from the

**Table 6: Linear regression analysis of knowledge of participant and non-participant farmers with independent variables**

| Sl. No. | Independent variable | Participant farmers | | | Non-participant farmers | | |
|---|---|---|---|---|---|---|---|
| | | Coeff. 'b' value | Std. Error | t value | Coeff. 'b' value | Std. Error | t value |
| 1 | Age | 0.039 | 0.043 | 0.899 | 0.205* | 0.080 | 2.574 |
| 2 | Educational attainment | 0.122 | 0.291 | 0.420 | 0.391* | 0.470 | 0.831 |
| 3 | Size of holding | 0.371 | 0.632 | 0.588 | 11.982** | 1.033 | 11.603 |
| 4 | Social participation | -0.036 | 0.405 | -0.089 | 1.172* | 1.258 | 0.931 |
| 5 | Annual income | -0.741* | 0.780 | -0.950 | 2.371* | 1.135 | 2.090 |
| 6 | Extension contact | 10.074** | 0.297 | 33.941 | 2.095* | 0.676 | 3.101 |
| 7 | Exposure to mass media & IT | 0.437* | 0.495 | 0.884 | 0.472* | 0.753 | 0.627 |
| 8 | Farming system | -0.564* | 0.426 | -1.326 | -2.907** | 0.642 | -4.527 |
| | | | $R^2$ =0.873 Adj $R^2$ =0.868 | | | $R^2$ =0.551 Adj $R^2$ =0.532 | |

*Significant at the 0.05 level of probability

**Significant at the 0.01 level of probability

**Table 7: Linear regression analysis of attitude of participant and non-participant farmers with independent variables**

| Sl. No. | Independent variable | Participant farmers | | | Non-participant farmers | | |
|---|---|---|---|---|---|---|---|
| | | Coeff. 'b' value | Std. Error | t value | Coeff. 'b' value | Std. Error | t value |
| 1 | Age | 0.064* | 0.040 | 1.591 | 0.070* | 0.042 | 1.645 |
| 2 | Educational attainment | -0.243* | 0.271 | -0.896 | 0.026 | 0.250 | 0.105 |
| 3 | Size of holding | -0.257* | 0.589 | -0.437 | 6.759** | 0.550 | 12.293 |
| 4 | Social participation | 0.367* | 0.378 | 0.972 | 0.096 | 0.670 | 0.143 |
| 5 | Annual income | 0.357* | 0.727 | 0.492 | 1.615** | 0.604 | 2.673 |
| 6 | Extension contact | 6.796** | 0.277 | 24.564 | 0.089 | 0.360 | 0.248 |
| 7 | Exposure to mass media & IT | 0.555* | 0.461 | 1.203 | 0.440* | 0.401 | 1.098 |
| 8 | Farming system | -0.741* | 0.397 | -1.866 | -1.029* | 0.342 | -3.012 |
| | | | **$R^2$ = 0.783 Adj $R^2$ =0.774** | | | **$R^2$ =0.533 Adj $R^2$ =0.514** | |

*. Significant at the 0.05 level of probability

**. Significant at the 0.01 level of probability

table that the selected variables taken together explained the variability in attitude to the extent of 78.30 per cent ($R^2$=0.783) and 55.30 per cent ($R^2$=0.553) in case of participant and non-participant farmers respectively.

The variable extension contact had highly significant contribution whereas age, exposure to mass media and IT and annual income showed significant positive contribution while educational attainment, and farming system had significant negative contribution in case of participant farmers as indicated by their coefficient 'b' values. Similarly, in case of non-participant category of farmers, the variables *viz.* age and exposure to mass media and IT exhibited significant positive contribution at 0.05 level of probability whereas size of holding and annual income showed significant positive contribution at 0.01level of probability and farming system had showed significant negative contribution at 0.05 level of probability.

Extension contact has emerged as the most important variable through which favorable attitude amongst the farmers can be developed. Hence, strategy should be formulated to increase contact of extension functionaries with the farmers. The system of contact as practiced in T&V system could be thought of.

**Relative contribution of socio-psycho- personal attributes of participant and non-participant farmers towards variability in adoption**

Relative contribution of independent variables towards variability in adoption of participant and non-participant farmers is presented in table 8.

It is apparent from the table that variability in adoption had been explained by the selected variables to the extent of 78.30 per cent ($R^2$=0.783) and 77.10 per cent ($R^2$=0.771) in case of participant and non-participant farmers respectively. The variable extension contact had highly significant contribution whereas exposure to mass media and IT showed significant positive contribution in case of participant farmers as depicted by their 'b' values of 6.852 and 1.010 respectively. In case of non-participant farmers, the variables like size of holding (8.287) had contributed positively and highly significantly while age, social participation, annual income, exposure to mass media and IT and extension contact had significant positive contribution whereas educational attainment and farming system had significant negative contribution towards variability in adoption.

It could well be inferred from the findings that while extension contact and exposure to mass media and IT played important role in adoption in case of participant farmers, the variables like social participation and annual income had important role. It seems that participant farmers had more of cosmopolite sources of information and take their adoption decision based on that. It is experience of the researcher that even for promotion of Kisan Call Centre and Farmer' portal personal contact by extension functionary is necessary. Therefore, it is essential that to facilitate adoption of improved farm practices, maximum personal contact supplemented by IT should be undertaken.

## CONCLUSION

It could very well be concluded that the Jharkhand Department of Agriculture has statistically significant impact on knowledge, attitude and adoption of the farmers. The variables like extension contact and exposure to mass media and IT have emerged as the most significant variables which could be promoted through appropriate extension strategies by Jharkhand Department of Agriculture.

**Table 8: Linear regression analysis of adoption by participant and non-participant farmers with independent variables**

| Sl. No. | Independent variable | Participant farmers | | | Non-participant farmers | | |
|---|---|---|---|---|---|---|---|
| | | Coeff. 'b' value | Std. Error | t value | Coeff. 'b' value | Std. Error | t value |
| 1 | Age | -0.011 | 0.042 | -0.258 | 0.025* | 0.029 | 0.853 |
| 2 | Educational attainment | 0.020 | 0.286 | 0.072 | -0.161* | 0.174 | -0.926 |
| 3 | Size of holding | 0.106 | 0.621 | 0.170 | 8.287** | 0.382 | 21.697 |
| 4 | Social participation | -0.187 | 0.398 | -0.471 | 0.718* | 0.465 | 1.542 |
| 5 | Annual income | 0.173 | 0.766 | 0.225 | 0.828* | 0.420 | 1.973 |
| 6 | Extension contact | 6.852** | 0.292 | 23.496 | 0.432* | 0.250 | 1.728 |
| 7 | Exposure to mass media & IT | 1.010* | 0.486 | 2.078 | 0.222* | 0.278 | 0.797 |
| 8 | Farming system | -0.113 | 0.418 | -0.269 | -0.164* | 0.237 | -0.689 |
| | | | $R^2$ = 0.783 Adj $R^2$ =0.774 | | | $R^2$ = 0.771 Adj $R^2$ =0.762 | |

* Significant at the 0.05 level of probability
** Significant at the 0.01 level of probability

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