



## Adoption behavior of goat farmers about improved technologies in semi-arid zone of Uttar Pradesh

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### ABSTRACT

Average meat yield of goat in India is lower than many developing countries because of under feeding and faulty management practices. There are different improved technologies and practices recommended by experts for goat farmers to get better production and productivity. Present study was conducted in Mainpuri and Firozabad district of Uttar Pradesh among 240 goat farmers to ascertain their adoption behaviour about improved technologies of goat husbandry. Reproduction and health care practices had lowest mean score of adoption, kid management practices had highest mean followed by feeding practices whereas mean score of general management practice fall in between kid and feeding management. Majority of goat farmers were partial adopters of all the management practices. Education of farmers and their family education status had positive correlation ( $p < 0.05$ ) whereas flock size had negative correlation with adoption index of many management practices. Age, flock size and family size contribute negatively whereas farmer's education, family education status and land holding contribute positively to adoption index of many management practices.

**Key words:** Adoption behaviour, Goat farmers, Improved technologies

India with 154 million goats is one of the largest goats owing country in the world and playing a significant role in livelihood and nutritional security as well providing supplementary income to nearly five lakhs of remote villages (CIRG 2013). Uttar Pradesh has third highest goat population (10.47%) in the country after Rajasthan (15.3%) and West Bengal (10.72%) (Livestock Census 2007). Productivity of Indian goats is comparatively lower than many other developing countries mainly because of under feeding (Singhal 1999). Average meat yield of goat in India is only 10 kg against about 20 kg in Sri Lanka and 17 kg in Pakistan (FAO 2013). To successfully transfer the goat husbandry technologies, it is necessary to take stock of the felt factors restraining in the adoption of scientific goat farming (Mohan *et al.* 2009). There are different improved technologies and practices recommended by experts for goat farmers to get better production and productivity. A farmer is a final decision maker who normally selects the technologies and practices according to their need, awareness, knowledge, availability and social and cultural compatibility to accomplish their goal. Small ruminants

contribute about 10% to the total value of livestock sector, which is around ₹ 24,000 million annually (Birtal and Taneja 2003). The small ruminants contribute 15 to 27% of family income of smallholders and provide gainful employment of 180 to 330 man-days per annum depending on the size of the flock (Misra *et al.* 2000). Although the economic contribution of goat husbandry seems to be quite substantial in the agricultural and national economy, the farmers who raise goats are yet ignorant of scientific management practices. If feeding, breeding and other management practices fit in the proper operation, it would be possible to reach the desired level of milk and meat production (Meena *et al.* 2011). Considering the vitality of above stated facts, the present study was carried out to know the adoption behaviour of goat farmers about improved technologies in semi-arid zone of Uttar Pradesh.

### MATERIALS AND METHODS

For the present study two districts (Firozabad and Mainpuri) of semi-arid zone of Uttar Pradesh were selected on the basis of highest goat population. Further, four blocks of each district and from each block three villages were selected with same criteria of goat population. Further, ten respondents, owning five or more goats, from each village were selected randomly to make the sample size of 240 respondents. For the present study, a set of 10 most important recommended/standardized practices in each aspect (kid management, feeding management, general and

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housing management, reproduction and breeding management and health care practices) were selected based on merit and their score were allotted 2 for regular adopter, 1 for partial adopter and 0 for non adopter. The adoption index was calculated by the method used by Verma *et al.*

$$\text{Adoption index} = \frac{\text{Respondents' total score}}{\text{Total possible score}} \times 100$$

2012 as

Depending upon the extent of adoption of improved technologies, the respondents were categorized into low adopters (0–33.3%), partial adopters (33.3–66.6%) and high adopters (66.6–100%). The data were collected personally by administering semi structured interview schedule developed for the study. Data were analyzed by appropriate statistical methods. Multiple regression models for different management practices were obtained based on highest  $R^2$  of different combinations of independent variables.

## RESULTS AND DISCUSSION

**Kid management:** Partial adopters were dominated followed by high and low adopters for the practices presented in table 2. Majority of goat farmers belonged to landless (56.5%) and small and semi medium (54.2%) categories were high adopter of kid management practices, whereas majority of respondents belonged to marginal category (65.4%) were partial adopter. Low adopters were found very few in all the class. Similar finding was reported by Thombre *et al.* (2010). Lahoti and Chole (2010) reported that hundred percent of farmers were providing colostrum within stipulated time of kids' birth and only 10 % of farmers were fully adopting castration to male kid at proper time. Average adoption indexes of kid management practices were 67.9, 60.8, 64.7 and 63.7 for landless, marginal, small and semi medium and overall categories of farmers, respectively (Table 1). Table 3 reveals that age and farming experience had negative and significant correlation with practices. There was inconsistent evidence

about the relationship of age and innovativeness of the farmers (Rogers 2003). Table 4 shows that age of farmers, their flock size and family size contribute negatively to the kid management whereas education contribute positively. It may be due the reason that more aged farmers might be reluctant to adopt new technologies and they may not able to take care of goat properly.

**Feeding management:** Majority of all type of respondents belonged to partial adopter category followed by high adopter and low adopter, respectively. Similar finding was reported by Rashmi (2012) and Thombre *et al.* (2010). Further, Lahoti and Chole (2010) reported that majority of goat farmers do not provide extra ration to pregnant does as per required and they had low level of adoption of improved feeding practices. Average adoption indexes of feeding management practices were 65.7, 57.1, 65 and 60.9 for landless, marginal, small and semi medium and overall categories of farmers, respectively (Table 1). Table 3 reveals that farming experience and family size had negative and significant correlation with feeding management practices whereas, education has positive and significant correlation. It might be due to that member of larger family size have dependency on each other for doing various works. Satyanarayan and Jagadeeswary (2010) found that adoption of improved sheep and goat management practices are positively and significantly correlated with family type, social participation and flock size. Table 4 shows that age of goat farmers and their flock size contribute negatively to the feeding management whereas land holding contributes positively. It may be concluded that farmers having more age and large flock size are not able to feed properly to their goats.

**Housing and general management:** Majority of respondents were partial adopters followed by high adopters. Average adoption indexes of general and housing management practices were 63.6, 60.8, 66.19 and 62.62 for landless, marginal, small and semi medium and overall categories of farmers, respectively. The small and semi medium farmers had significantly higher level of adoption than that of others. This finding was found similar to the finding of Rashmi (2010) and contrary to the findings of Lahoti and Chole (2010) who reported that majority of the respondents (62%) had low level of adoption, while 25% and 13% had medium and high level of adoption of improved goat management practices, respectively. Farming experience had negative correlation ( $P < 0.01$ ) with these practices. These practices were based on input. Housing required land and money to construct and other practices required money to perform. Data in Table 3 shows that the age of goat farmers and their flock size contribute negatively whereas education of goat farmers contributes positively to these practices. It may be concluded that farmers having more age and large flock size are not able to manage properly to their goats.

**Reproduction and breeding management:** Data (Table 2) revealed that 81.2 % of goat farmers were adopting breeding and reproduction management practices partially

Table 1. Mean adoption index of different management practices for all categories of goat farmers

| Management practices      | Farmers categories |                    |                       |         |
|---------------------------|--------------------|--------------------|-----------------------|---------|
|                           | Landless           | Marginal           | Small and semi-medium | Overall |
| Kid management            | 67.9 <sup>a</sup>  | 60.8 <sup>b</sup>  | 64.7 <sup>ab</sup>    | 63.47   |
| Feeding                   | 65.7 <sup>a</sup>  | 57.1 <sup>b</sup>  | 65 <sup>a</sup>       | 60.91   |
| General and housing       | 63.6 <sup>ab</sup> | 60.8 <sup>b</sup>  | 66.19 <sup>a</sup>    | 62.62   |
| Reproduction and breeding | 41.4 <sup>b</sup>  | 40.12 <sup>b</sup> | 44.3 <sup>a</sup>     | 41.19   |
| Health care               | 45.9 <sup>a</sup>  | 40.5 <sup>b</sup>  | 47.7 <sup>a</sup>     | 43.33   |
| Overall                   | 56.9 <sup>a</sup>  | 51.9 <sup>b</sup>  | 57.6 <sup>a</sup>     | 54.33   |

Figures bear different superscript in a row differ significantly ( $P < 0.05$ ).

Table 2. Distribution of respondents according to extent of adoption of different management practices

| Category                    | Management practices |            |                     |                           |             |           | Chi-square |
|-----------------------------|----------------------|------------|---------------------|---------------------------|-------------|-----------|------------|
|                             | Kid management       | Feeding    | Housing and general | Reproduction and breeding | Health care | Overall   |            |
| Low adopter (<33.3)         | 12 (5)               | 5 (2.1)    | -                   | 32 (13.3)                 | 22 (9.2)    | 4 (1.7)   | 224.2**    |
| Partial Adopter (33.3–66.6) | 127 (52.9)           | 160 (66.7) | 145 (60.4)          | 195 (81.2)                | 214 (89.2)  | 192 (80)  |            |
| High adopter (>66.6)        | 101 (42.1)           | 75 (31.2)  | 95 (39.6)           | 13 (5.4)                  | 4 (1.7)     | 44 (18.3) |            |

\*\*P&lt;0.01.

Table 3. Spearman's correlation coefficient of adoption index of different management practices with selected variables

| Independent Variables         | Management practices |          |                     |                           |             |         |
|-------------------------------|----------------------|----------|---------------------|---------------------------|-------------|---------|
|                               | Kid management       | Feeding  | Housing and general | Reproduction and breeding | Health care | Overall |
| Age                           | -0.137*              | -0.113   | -0.117              | -0.011                    | -0.037      | -0.071  |
| Education                     | 0.086                | 0.128*   | 0.095               | 0.185**                   | 0.02        | 0.14*   |
| Caste categories              | 0.105                | -0.016   | -0.011              | 0.103                     | 0.041       | 0.115   |
| Farming Experience            | -0.175**             | -0.242** | -0.194**            | 0.008                     | -0.035      | 0.062   |
| Family Type                   | 0.053                | 0.106    | 0.03                | 0.06                      | 0.227*      | 0.034   |
| Family Size                   | -0.105               | -0.187** | -0.107              | -0.113                    | -0.179**    | -0.024  |
| Family Education Status (FES) | 0.073                | 0.034    | 0.089               | 0.07                      | 0.142*      | 0.136*  |
| Flock size                    | -0.096               | -0.112   | -0.063              | -0.005                    | -0.1        | -0.137* |
| Total annual Income           | 0.061                | 0.122    | 0.099               | 0.005                     | -0.054      | -0.002  |

\*P&lt;0.05 and \*\*P&lt;0.01.

followed by low adopters (13.3%) and high adopters (5.4%). Similar finding was reported by Thombre *et al.* (2010). Average adoption index of reproduction and breeding management practices were 41.4, 40.12, 44.3 and 41.19 for landless, marginal, small and semi medium and overall categories of farmers, respectively. Mean adoption index among small and semi-medium goat farmers was significantly higher than other categories of farmers. Table 3 revealed that farmers' education has positive and significant correlation with these practices. It might be due to the educated people who know the importance of breeding and their positive impact on production. They might know the importance of purity of breed. Table 4 shows that education status of goat farmers and land holding contribute positively and significantly whereas family size contributes negatively and significantly to these practices. It might be due to more members in a family make dependency on each other in taking decision regarding practices to be followed.

**Health management:** Average adoption indexes of health management practices were 45.9, 40.5, 47.7 and 43.33 for landless, marginal, small and semi medium and overall categories of farmers, respectively as shown in Table 1. The marginal farmers had significantly lower level of adoption than that of others. Table 2 also showed that majority of respondents was partial adopters followed by low and high adopters. Similar finding was reported by Kumar (2012) whereas Lahoti and Chole (2010) reported

that majority of goat farmers were low adopters followed by partial and high adopters. Table 3 revealed that family size had negative and significant correlation with health management practices. Family education status has positive and significant relation with health management. It might be due to the educated farmers' family which knows the importance of good health care and their positive impact on production. Venkatasubramanian (1997) reported that farmers' knowledge about an enterprise was an important factor affecting production and disease incidence. Table 4 showed that education of farmers, family education status and land holding of goat farmers contribute positively and significantly whereas family size contributes negatively to these practices. It might be due to more family members in a family were dependent on each other to take decision and action.

**Overall management:** Eighty per cent of the respondents belonged to partial adopter followed by high and low adopter. Average adoption indexes of all the management practices were 56.9, 51.9, 57.6 and 54.33 for landless, marginal, small and semi medium and overall categories of farmers, respectively. The marginal farmers had significantly lower level of adoption than that of others. Table 3 depicted that education and family education status have positive and significant relation with overall management practices. It might be due to educated people who know the importance of good managerial practices and their positive impact on productivity of animals. Flock

Table 4. Multiple regressions for adoption index of different management practices with selected independent variables

| Management practice       | Independent Variables | Unstandardized coefficients |            | Standardized coefficients | t       | Sig.  | R <sup>2</sup> |
|---------------------------|-----------------------|-----------------------------|------------|---------------------------|---------|-------|----------------|
|                           |                       | B                           | Std. Error | Beta                      |         |       |                |
| Kid management            | (Constant)            | 74.88                       | 4.62       |                           | 16.22   | 0.000 | 0.51           |
|                           | Education             | 1.92                        | 0.76       | 0.16                      | 2.53**  | 0.012 |                |
|                           | Age                   | -0.20                       | 0.07       | -0.17                     | -2.78** | 0.006 |                |
|                           | Flock size            | -0.16                       | 0.07       | -0.14                     | -2.26** | 0.025 |                |
|                           | Family size           | -0.63                       | 0.31       | -0.12                     | -2.00*  | 0.047 |                |
| Feeding                   | (Constant)            | 73.18                       | 3.29       |                           | 22.28   | 0.00  | 0.53           |
|                           | Flock size            | -0.30                       | 0.07       | -0.261                    | -4.25** | 0.00  |                |
|                           | Age                   | -0.22                       | 0.07       | -0.198                    | -3.24** | 0.001 |                |
|                           | Land                  | 0.27                        | 0.14       | 0.123                     | 1.99*   | 0.047 |                |
| General and housing       | (Constant)            | 67.58                       | 3.77       |                           | 17.92   | 0.00  | 0.46           |
|                           | Education             | 1.42                        | 0.68       | 0.14                      | 2.07*   | 0.039 |                |
|                           | Flock size            | -0.14                       | 0.07       | -0.14                     | -2.18*  | 0.03  |                |
|                           | Age                   | -0.14                       | 0.06       | -0.14                     | -2.13*  | 0.034 |                |
| Reproduction and breeding | (Constant)            | 38.85                       | 2.22       |                           | 17.48   | 0.00  | 0.61           |
|                           | Education             | 2.66                        | 0.54       | 0.30                      | 4.94**  | 0.00  |                |
|                           | Family size           | -0.63                       | 0.23       | -0.17                     | -2.78** | 0.006 |                |
|                           | Land                  | 0.25                        | 0.10       | 0.15                      | 2.42*   | 0.016 |                |
| Health care               | (Constant)            | 38.81                       | 2.98       |                           | 13.04   | 0     | 0.64           |
|                           | Education             | 1.36                        | 0.53       | 0.16                      | 2.55*   | 0.011 |                |
|                           | Land                  | 0.34                        | 0.10       | 0.21                      | 3.48**  | 0.001 |                |
|                           | Family size           | -0.66                       | 0.22       | -0.18                     | -2.97** | 0.003 |                |
|                           | Family Education      | 2.30                        | 1.03       | 0.14                      | 2.23*   | 0.027 |                |
|                           | Status (FES)          |                             |            |                           |         |       |                |
| Overall                   | (Constant)            | 61.32                       | 3.33       |                           | 18.40   | 0.00  | 0.57           |
|                           | Education             | 1.38                        | 0.56       | 0.16                      | 2.45*   | 0.02  |                |
|                           | Flock size            | -0.13                       | 0.05       | -0.15                     | -2.41*  | 0.02  |                |
|                           | Age                   | -0.14                       | 0.05       | -0.17                     | -2.73** | 0.01  |                |
|                           | Land                  | 0.25                        | 0.10       | 0.15                      | 2.45*   | 0.02  |                |
|                           | Family size           | -0.46                       | 0.23       | -0.12                     | -2.02*  | 0.04  |                |

\*P&lt;0.05 and \*\*P&lt;0.01.

Table 5. Comparative study of all management practices

| Management practice                  | Mean±SE                  | Skewness | Rank |
|--------------------------------------|--------------------------|----------|------|
| Kid management                       | 63.47±0.99 <sup>a</sup>  | -0.37    | 1    |
| Feeding management                   | 60.91±0.97 <sup>b</sup>  | -0.1     | 3    |
| General and housing management       | 62.62±0.87 <sup>ab</sup> | -0.06    | 2    |
| Reproduction and breeding management | 41.31±0.73 <sup>c</sup>  | 0.57     | 5    |
| Health care management               | 43.33±0.70 <sup>c</sup>  | 0.29     | 4    |
| Over all                             | 54.33±0.47               | 0.13     |      |

Figures bearing same superscript do not differ (P&lt;0.05).

size has negative and significant correlation with overall management practices. It might be due to the reason that farmers were unable to manage large flock properly. Table

4 showed that education and land holding of goat farmers contribute positively whereas age, family size and flock size of goat farmers contribute negatively to the overall management practices.

There were 5 different practices studied and their mean scores are presented in Table 5. Reproduction and health care practices had lowest mean score of adoption and on that basis it can be concluded that both practices were poorly followed than that of other practices. The kidding practice was best adopted followed by feeding practices in the study area. The general management practice fall in between kid management and feeding management. Skewness of kid management, feeding management and general management was found negative and rest other practices had positive skewness.

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