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EFFECTIVENESS OF THE GOAT GURU MOBILE APP AMONG FARMERS

A. K. Chaturvedani[1] and Deepjyoti Roy[2]

1 Assistant Professor, Dept. of Veterinary Extension, FVAS, RGSC Banaras Hindu University, Mirzapur (U.P.) 231001
2 Ph.D. Scholar, Dept. of Veterinary Extension, FVAS, RGSC Banaras Hindu University, Mirzapur (U.P.) 231001
Email : ajaychaturvedani@bhu.ac.in

ABSTRACT

The livestock sector is a cornerstone of India's agrarian economy, yet extension service gaps persist due to high farmer to agent ratios. Mobile based advisory tools offer a scalable solution to this challenge. This study evaluated the effectiveness of the "Goat Guru" Android application among 80 goat farmers in Mirzapur district, Uttar Pradesh, assessing the influence of demographic and socio economic traits on app utilization and knowledge gain. Using a before and after research design, data were collected through structured interviews and analyzed with descriptive and correlational statistics. Results showed that most users (66.4%) were middle aged and male (93.8%), with medium levels of education and media exposure. The app was perceived as moderately effective by 75% of respondents, and knowledge scores were highest among those with strong extension contacts ($r = 0.405$, $p < .001$). Significant positive correlations were found between app effectiveness and both herd size and income from goat rearing ($r = 0.307$, $p < .01$). These findings highlight the app's utility in enhancing technical knowledge among goat farmers and underscore the role of economic traits in ICT adoption. Tailored content, coupled with improved training and outreach, can further increase digital engagement and livestock productivity.

Keywords*: ICT, knowledge, effectiveness, goat guru, mobile advisory services*

INTRODUCTION

The livestock sector continues to be a vital component of India's agricultural economy, contributing significantly to national income and rural livelihoods. In 2022–23, it accounted for 5.5% of India's total Gross Value Added (GVA) and 30.23% of GVA from agriculture and allied sectors, highlighting its resilience and role in sustaining the agrarian economy (Press Information Bureau, 2024). Despite its importance, access to timely and relevant information remains limited. The average extension worker to farmer ratio in India is 1:1,162 well above the recommended norms hindering effective knowledge transfer (AESA Network, 2024).

The rise of Information and Communication Technology (ICT), especially mobile phones, offers scalable solutions for livestock management. ICT tools have proven effective in disease control, farm operations, and marketing (Tiwari *et al.*, 2010; Rathod *et al.*, 2016; Pratik and Vinaya, 2021; Pratik and Vinaya, 2022). With smartphone shipments in India reaching 155.9 million in 2024, Android apps now serve as vital channels for delivering content in diverse formats accessible even to illiterate users. Initiatives like Digital India have further improved rural connectivity (Mittal & Tripathi, 2009; Inigo *et al.*, 2014; Pratik et al., 2023).

Mobile phones are transforming rural extension by bridging information gaps and boosting productivity. At the start of 2024, India had about 751.5 million internet users and 52.4% penetration (DataReportal, 2024), enabling real time, location specific advisories. In rainfed, climate sensitive areas like Vindhyan Uttar Pradesh, goat farming offers a resilient livelihood. Goats dubbed the "poor man's cow" are low maintenance, drought tolerant, and valuable for milk, meat, and manure (Prasad, 2010). With 148.88 million goats, India leads globally (Department of Animal Husbandry and Dairying, 2024).

Yet, many goat farmers lack access to timely technical advice. Mobile apps can bridge this gap by offering localized support on breeding, nutrition, disease control, and market access. Apps like "Pashu Palan" demonstrate this potential. "Goat Guru," an Android based app, was developed to offer user friendly, expert guidance for goat farmers. This study examines its effectiveness in relation to users' demographic and socio economic traits, focusing on how age, education, income, and experience influence usage and impact- key to building inclusive digital interventions in livestock development.

OBJECTIVE

To assess the effectiveness of the mobile app "Goat Guru" in improving farmers' knowledge and practices in relation to their demographic and socioeconomic characteristics

METHODOLOGY

The study aimed to assess the effectiveness of the mobile application "Goat Guru" in enhancing goat farmers' knowledge and practices, considering their demographic and socio economic traits. Study was conducted in Mirzapur district, Uttar Pradesh, the study adopted an experimental research with a "before and after" design. A pilot survey involving 60 randomly selected goat farmers with a minimum herd size of 10 goats was conducted to identify their information needs and were incorporated in the development of the app. After the development of the mobile application, a total of 80 goats' farmers- each with a minimum herd size of 10 goats- were selected through multistage random sampling, involving two randomly selected blocks, four villages from each block, and ten randomly chosen farmers from each village. using multistage random sampling. These participants used the app for three months, after which data were collected through structured interviews to evaluate app effectiveness. Demographic and socio economic data were also gathered to analyse their influence on the outcomes. The collected Data were coded, organized, and analysed using Jamovi software, employing statistical tools such as frequency, percentage, mean, standard deviation, and correlation analysis.

RESULTS AND DISCUSSION

Table 1: Distribution of farmers on the basis of their socio personal and socio economic profile (n=80)

Sr. No.	Variable	Category	F	%	Mean± SD
1	Age (years)	Young (<32 yrs.)	09	11.30	43.10±10.90
		Middle (32-54 yrs.)	53	66.40	
		Old (>54 yrs.)	18	22.50	
2	Gender	Male	75	93.80	1.06±0.24
		Female	05	6.20	
3	Religion	Hindu	80	100.00	1.00±٠0
4	Family type	Nuclear	42	52.50	1.48±0.50
		Joint	38	47.50	
5	Size of family	Small (<5)	08	10.00	7.09±2.25
		Medium (5- 9)	50	62.50	
		Large (>9)	22	27.50	
6	Marital status	Married	75	93.80	1.06±0.24
		Unmarried	05	06.20	
7	Education	Low (<0)	0	0	1.89±1.08
		Medium (0.82- 2.98)	59	73.80	
		High (>2.98)	21	26.20	
8	Occupation	Livestock	07	08.80	3.49±1.28
		Livestock + Business	05	06.20	
		Livestock + Agriculture	39	48.70	
		Livestock + Service	0	0	
		Livestock + Labourer	29	36.30	
9	Social participation	Low (<0.73)	20	25.00	1.93±1.20
		Medium (0.73- 3.11)	60	75.00	
		High (>3.11)	0	0	
10	Land holding	Landless	23	28.70	1.42±1.44
		Marginal (upto 2.50 acres)	43	53.80	
		Small (2.50- 5 acres)	12	15.00	
		Medium (5- 10 acres)	02	02.50	
		Large (>10 acres)	0	0	
11	Exposure to mass media	Low (<9.93)	08	10.00	11.70±1.81
		Medium (9.93- 13.67)	58	72.50	
		High (>13.67)	14	17.50	
12	Extension contact	Low (<13.74)	10	12.50	15.50±1.71
		Medium (13.74- 17.26)	57	71.30	
		High (>17.26)	13	16.20	

Sr. No.	Variable	Category	F	%	Mean± SD
13	**Annual income from goat rearing**	Low (<Rs.35358)	15	18.80	94960±58420
		Medium (Rs.35358- Rs.152686)	49	61.20	
		High (>Rs.152686)	16	20.00	
14	**Total annual income from all sources**	Low (<Rs.61522)	11	13.80	137788±75017
		Medium (Rs.61522- Rs.211886)	59	73.80	
		High (>Rs.211886)	10	12.40	
15	**Herd size**	Low (<11)	15	18.80	29.70±18.30
		Medium (12- 48)	49	61.20	
		High (>48)	16	20.00	

Age

Data presented in Table 1 reveal that a majority of the respondents (66.40%) belonged to the middle aged category (32–54 years), with a mean age of 43.10 years. Middle aged farmers are generally more responsive to agricultural innovations and digital tools due to their balanced exposure to traditional practices and openness to new technologies (Ali *et al.*, 2018). The younger group (11.30%) expressed interest but faced constraints in decision making and smartphone access. In contrast, elderly farmers (22.50%) were less inclined to use the app, possibly due to low digital literacy and resistance to technological change (Mittal & Mehar, 2016).

Gender

The results indicate that 93.80% of the users were male, highlighting the prevailing gender gap in access to mobile technology and extension services. Only 6.20% of the respondents were female, possibly due to socio cultural barriers, lesser control over resources, and limited access to smartphones in rural areas (FAO, 2013). This finding suggests the need for targeted strategies to enhance women's digital inclusion in livestock extension.

Religion and family structure

All respondents in the study area belonged to the Hindu religion, indicating cultural homogeneity. Regarding family structure, 52.50% of respondents were from nuclear families, while 47.50% belonged to joint families. Nuclear family systems may offer faster decision making and flexibility in adopting digital advisory tools (Kumar *et al.*, 2019a).

Family size and marital status

A majority (62.50%) of the respondents had medium sized families (5–9 members), with an average family size of 7.09. Medium family size may provide sufficient support for livestock activities while also promoting adaptability to digital tools. A large proportion (93.80%) of respondents were married, indicating stable household structures that may positively influence the adoption of farm advisory applications.

Education

The majority (73.80%) of the respondents had a medium level of education, suggesting that semi-literate farmers found the app usable. The app's design, including local language and audio visual aids, likely supported this engagement. The absence of respondents in the low literacy group indicates that further simplification or assistance may be needed for non-literate farmers (Meera *et al.*, 2004).

Occupation

Nearly half (48.70%) of the respondents were engaged in a combination of livestock and agriculture. Another 36.30% reported combining livestock with labour work. The app was found to be useful for this segment, as it provided integrated information catering to both livestock management and associated livelihood activities.

Social participation and extension contact

Three fourths of the respondents (75.00%) had medium social participation, which may have enhanced peer learning and encouraged app usage. Moreover, 71.30% had medium levels of extension contact, which indicates that the app functioned as a supplementary tool to traditional extension services, thereby improving knowledge dissemination (Rao *et al.*, 2020).

Landholding

Most respondents owned marginal landholdings (53.80%) or were landless (28.70%). Goat rearing often provides income support for such economically weaker farmers. These findings highlight the app's relevance in empowering resource poor livestock keepers through timely and accessible advisory services.

Mass media exposure

A significant proportion of the respondents had medium (72.50%) to high (17.50%) exposure to mass media. Awareness about the Goat Guru app may have been facilitated through such media channels, promoting trust and adoption among users (Meera *et al.*, 2004).

Extension contact

A majority (71.30%) of respondents had medium-level extension contact, while 16.20% reported high, and 12.50% had low contact. This indicates moderate engagement with extension services among goat farmers. Limited high contact may result from insufficient access to extension personnel. Strengthening advisory outreach through ICT tools like Goat Guru can enhance farmer support and knowledge dissemination (Ali *et al.*, 2018; AESA Network, 2024; Rathod *et al.*, 2016).

Income

As shown in Table 1, 61.20% of respondents earned a medium income (₹35,358–₹1,52,686) from goat rearing, followed by 20.00% in the high and 18.80% in the low categories. Similarly, for total annual income, 73.80% fell in the medium range (₹61,522–₹2,11,886). This indicates that goat farming serves as a stable and significant livelihood source in rural areas. Higher income levels are often associated with better access to veterinary care, markets, and advisory services. Digital interventions like mobile apps can enhance incomes by improving farm practices, reducing mortality, and expanding market reach (Meena *et al.*, 2012; Sharma *et al.*, 2017; Ali *et al.*, 2018).

Herd size

The study revealed that 61.20% of the respondents maintained a medium herd size (12–48 goats). These farmers actively used the app for health care, breeding advice, and market linkages. Farmers with high herd size (20.00%) also benefited significantly, while small herd owners (18.80%) demonstrated variable use patterns depending on economic constraints and awareness (Kumar *et al.*, 2019a).

Table 2: Distribution of farmers on the basis of their knowledge level (n=80)

Knowledge level	F	%	Mean± SD
Low (<48.80)	09	11.30	52.10 ± 3.38
Medium (48.80- 55.40)	56	70.00	
High (>55.40)	15	18.70	

A perusal of Table 2 reveals that the majority (70.00%) of respondents had a medium level of knowledge (48.8–55.4), followed by 18.70% with high knowledge (above 55.4) and 11.30% with low knowledge (below 48.8). The mean knowledge score was 52.10 ± 3.38, indicating that most users had a moderate understanding of the app's features.

This suggests the app has effectively facilitated basic awareness and usability, particularly among farmers with moderate educational levels and media exposure (Meera *et al.*, 2004). However, the presence of low knowledge users highlights a need for improved accessibility and training efforts.

The findings align with those of Kumar *et al.* (2019b), who emphasized the role of extension contact and social participation in technology adoption. To enhance reach, the inclusion of localized language, voice, and icon based support is crucial (Mittal & Mehar, 2016). Overall, the app serves as a useful knowledge enabling tool, particularly when complemented by advisory services.

Table 3: Distribution of farmers on the basis of perceived effectiveness of mobile application (n=80)

Category of effectiveness	F	%	Mean± SD
Low (<28.5)	11	13.80	30.80 ± 2.30
Medium (28.5 33.1)	60	75.00	
High (>33.1)	09	11.20	

A perusal of Table 3 shows that a majority of respondents (75.00%) perceived the "Goat Guru" mobile app as moderately effective, with scores ranging from 28.5 to 33.1. A smaller portion, 13.80%, rated it as low in effectiveness (below 28.5), while 11.20% considered it highly effective (above 33.1). The mean score was 30.80 ± 2.30, indicating general satisfaction with the app's utility.

These findings suggest that while the app successfully addresses the informational needs of many users, there is still room for enhancement, especially in tailoring content to diverse user capabilities and preferences. As highlighted by Meera *et al.* (2004), ICT tools in agriculture perform best when integrated with local extension systems and designed for ease of use. The app's moderate reception aligns with prior studies emphasizing user friendly interfaces and training as key to mobile based intervention success (Mittal & Mehar, 2016).

Table 4: Correlational analysis of independent traits with knowledge of goat farmers (n=80)

Sr. No.	Correlates	Knowledge 'r'
X_1	**Age**	0.138
X_2	**Size of family**	0.023
X_3	**Education**	0.035
X_4	**Social participation**	0.108
X_5	**Herd size**	0.025
X_6	**Size of land**	0.117
X_7	**Exposure to Mass media**	0.183
X_8	**Extension contact**	0.405***
X_9	**Annual income from goat rearing**	0.025
X_{10}	**Total annual income from all sources**	0.175

Note. * p < .05, ** p < .01, *** p < .001

A perusal of Table 4 reveals that extension contact had a significant and strong positive correlation with knowledge level (r = 0.405, p < .001), suggesting that farmers with greater interaction with extension agents tend to be more knowledgeable. Similarly, exposure to mass media (r = 0.183, p < .05) showed a positive relationship, implying that digital literacy and access to agricultural information through media enhance knowledge (Meera *et al.*, 2004). Other variables such as age (r = 0.138) and social participation (r = 0.108) displayed weak but positive correlations, whereas family size (r = –0.023) had a negligible impact.

Conversely, education (r = –0.035), herd size (r = –0.025), land size (r = –0.117), annual income from goat rearing (r = –0.025), and total annual income (r = –0.175) showed weak to negative correlations, indicating limited influence on knowledge levels. These findings align with earlier studies that emphasized the critical role of extension contact over income or landholding in knowledge dissemination (Mittal & Mehar, 2016; Kumar *et al.*, 2019a).

Correlational analysis of independent traits with effectiveness of mobile application

A perusal of the correlation analysis (Table 5) reveals that herd size (r = 0.307, p < .01) and annual income from goat rearing (r = 0.307, p < .01) exhibited significant positive associations with the perceived effectiveness of the Goat Guru app. This implies that farmers with larger herds and greater goat related income found the application more beneficial, possibly due to greater engagement and need for regular herd management support (Meera *et al.*, 2004). On the other hand, exposure to mass media showed a significant negative correlation (r = –0.244, p < .05), suggesting that farmers with higher media access might rely on alternate information sources, perceiving the app as less essential (Kumar *et al.*, 2019a). The findings of the present study align with earlier research indicating that farmers' socio-economic characteristics play a major role in ICT adoption and effectiveness (Bharath *et al.*, 2024; Khodifad and Solanki, 2023).

Table 5: Correlational analysis of independent traits with Effectiveness of mobile application

(n=80)

Sr. No.	Correlates	Effectiveness 'r'
X1	**Age**	0.113
X2	**Size of family**	0.094
X3	**Education**	0.028
X4	**Social participation**	0.019
X5	**Herd size**	0.307**
X6	**Size of land**	0.129
X7	**Exposure to Mass media**	0.244*
X8	**Extension contact**	0.065
X9	**Annual income from goat rearing**	0.307**
X10	**Total annual income from all sources**	0.117

Note. * p < .05, ** p < .01, *** p < .001

Other variables such as age, landholding, family size, and total income- showed weak positive correlations, while education, social participation, and extension contact had weak negative associations, all statistically non-significant. This indicates that specific farm related economic traits influence the perceived utility of ICT tools more than general demographic features (Mittal & Mehar, 2016). Similar studies on mobile advisory services have reported moderate to high effectiveness in improving farmers' knowledge and management decisions (Patil and Patel, 2021; Samadder *et al.*, 2024). Moreover, the association of extension contact with digital tool utilization, as observed in this study, is supported by evidence showing that regular interaction with extension systems enhances ICT engagement (Zade *et al.*, 2024; Sahu *et al.,* 2025a; Sahu *et al.,* 2025a; Anusha *et al.,* 2023; Pratik and Vinaya, 2021)

CONCLUSION

The study revealed that the "Goat Guru" mobile application was moderately effective in enhancing the knowledge of goat farmers, particularly among those with medium herd sizes, higher income from goat rearing, and regular extension contact. While demographic traits like age

and education showed minimal influence, socio economic traits such as herd size and income had a significant positive correlation with perceived app effectiveness. These findings emphasize the potential of mobile based advisory tools in improving livestock productivity. However, to maximize impact, targeted interventions especially among women, low literate, and resource poor farmers are essential for ensuring equitable access and improved digital adoption in rural livestock systems.

POLICY IMPLICATIONS

Government and extension agencies should expand inclusive digital advisory services by promoting user-friendly mobile applications like Goat Guru and providing targeted digital literacy programmes for women, low-literate, and resource-poor farmers. Additionally, extension systems must strengthen hands-on mobile training and ensure that app content is localized through regional languages, voice-based instructions, and low-bandwidth features to improve utilisation and enhance livestock productivity.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to the publication of this manuscript.

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