



E-readiness Evaluation and Training Needs Assessment among Goat Bank Pashusakhis in Maharashtra

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ABSTRACT

ICTs and e-readiness assessments guide organisations in maximizing their digital potential, ensuring a competitive edge in a dynamic economy. In line with this, a study was carried out in 2023 to assess the e-readiness index of Pashusakhis (Livestock para-extension professionals) working for the goat bank in five districts of Maharashtra. Pashusakhis serve as intermediaries between beneficiaries and the goat bank. Six out of 15 ICT-related indicators influencing e-readiness were selected, applying the Principal Component Analysis (PCA) based on rank scores. The analysis revealed a calculated index of 0.34, indicating a relatively lower level of e-readiness among Pashusakhis. Logistic regression identified three determinants, including experience, innovativeness, and economic motivation; which significantly influenced the Pashusakhis' e-readiness. Additionally, the study identified the training requirements of Pashusakhis based on the significance they attributed to job-related areas. Credit and marketing management, kid management, and digital literacy emerged as the most important areas requiring training. These findings highlighted the importance of targeted training in areas such as credit and marketing management, and digital literacy to enhance the e-readiness of Pashusakhis to improve their efficiency as intermediaries in the goat bank ecosystem.

INTRODUCTION

Multiple aspects of animal husbandry procedures can significantly be improved and optimised using digital tools and technologies, including better health monitoring (Fuentes et al., 2022), precision livestock farming (Groher et al., 2020), market access and traceability (Asfarian et al., 2020), and mobile applications for farmer education (Singh et al., 2022), etc. Digital potential is seen as the promise of technology-driven benefits, while electronic readiness is the groundwork needed to harness these benefits effectively (Vilani & Chandra, 2021). In the present text, the e-readiness of the goat bank Pashusakhis is considered for evaluation. The Goat Bank of Karkheda, an Agri Producer Co.

Ltd. (Reg. No. MH35E0005027) established at village Sangavi (Mohadi) in Akola district of Maharashtra in July 2018, operates a goat banking model where the willing SHG women members recommended by the Community Managed Resource Centre (CMRC) invest Rs. 1100 to receive an insured and pregnant Osmanabadi goat on loan. The beneficiaries are then required to rear the goat on their own and return four goat kids to the bank in 40 months, after which they retain the original goat and any additional kids (Singh, 2021; Agrowon, 2022). The bank so far has distributed 1000 goats to the women beneficiaries in five districts (Akola, Palghar, Nagpur, Jalgaon, and Dhule) of Maharashtra state as a part of the 'Stree-dhan distribution scheme' until Oct. 2023. Mahila Arthik Vikas Mahamandal (MAVIM), Maharashtra through

her CMRC, UMED-MSRLM, and the Chaitanya (NGO) acted as the promoters of women's SHG for the goat bank, on a pilot basis. Sixty (60) beneficiaries from the villages Sangavi (Mohadi) and Hingna (Tamaswadi), Taluka and Dist. Akola has successfully returned four (4) goat kids as per the agreement to the bank so far and started continuing their own.

A *Pashusakhi* is a salaried employee of the goat bank who works as a field functionary and acts as a bridge between the beneficiaries and the goat bank. *Pashusakhis* empower goat bank beneficiaries by timely sharing goat care and management-related technical information, and advice free of cost through personal visits and monitoring. *Pashusakhis* are selected from the local village of the goat bank's branch through interviews, focusing on the candidates who demonstrate a willingness to serve, possess strong communication skills, and have completed a minimum of high school education. Post-selection, *Pashusakhis* receive scientific goat production training from the constituent institute/s of MAFSU, Nagpur, and the goat bank-mediated resource persons through offline and online modalities. Overall, ten *Pashusakhis* were actively engaged in delivering services to a group of 1000 women beneficiaries across five districts, serving in the capacity of field functionaries for the goat bank. To ensure the effective delivery of services and satisfactory resolution of goat-related queries, *Pashusakhis* need to be digitally prepared, electronically ready, and well-trained in technical aspects. The study posits that the e-readiness level of *Pashusakhis* at the goat bank is a key determinant in their ability to effectively facilitate the goat banking model and enhance the chances of success for its beneficiaries. Therefore, efforts were directed towards evaluating the e-readiness and conducting a training needs assessment for the *Pashusakhis* of the goat bank.

METHODOLOGY

The data were collected by direct and personal interviews using a pre-tested semi-structured interview schedule from all ten (10) *Pashusakhis* acting as the field functionaries for the goat bank. The e-readiness index was developed to assess the e-readiness level of *Pashusakhis*. The study intricately links ICT to e-readiness through ICT-related fifteen indicators, illustrating its pivotal role in shaping and defining the dimensions of digital readiness (Luyt, 2006). Fifteen potential ICT-related indicators (Table 1) were identified through a literature review (Raksha et al., 2015) and consultations with the experts. Each indicator was measured with the *Pashusakhi*'s response to a set of statements. The obtained rank scores were subjected to Principal Component Analysis, which has revealed that out of the total fifteen ICT-related indicators selected for the study, six indicators viz., skill, ownership, accessibility, frequency of use and willingness contributed together for approx. 60 per cent of the total variability. Their factor loadings were determined using PCA (Rabii & Abdelaziz, 2015). The values obtained from this analysis were subsequently used as weights to construct the e-readiness index. The index comprised 81 statements, with values that varied between 0 and 1. The respondents were classified into five categories according to their index values. Vankudothu & Padaria (2018) utilised a comparable approach to evaluate the level of e-readiness among farmers of nine districts in three states using different ICT models. Further,

binary logistic regression was used to identify the determinants of e-readiness among the *Pashusakhis*. The e-readiness score was substituted by 1 for above-average, and 0 for below-average readiness. The regression analysis helped identify the factors influencing the e-readiness levels of the *Pashusakhis* (Vankudothu & Padaria, 2018). Identifying e-readiness determinants through regression analysis logically progressed to develop a focused training needs assessment addressing specific needs in digital literacy and e-readiness.

The training needs assessment (Table 5) was conducted to identify the specific requirements of the *Pashusakhis*. The training needs were classified into seven broader areas (Table 5). Under each major area, relevant practices comprising five to seven components in five continua were included, with the scores of 5, 4, 3, 2, 1 respectively. Thus, a total of 38 training needs were included. The *Pashusakhis* were requested to tick one of the responses based on their perceived needs viz., the most important, more important, important, less important and the least important provided against the specific components under each major category. Ranking was done for each category based on total weighted mean score (TWMS) (Sangameswaran et al., 2022). The summation of the score constituted the rank of the perceived training needs. The ranking of the responses from the *Pashusakhis* was based on the total weighted mean score, providing a detailed understanding of their training needs (Singh et al., 2021; Sangameswaran et al., 2022 & Wason et al., 2012).

$$\text{Total weighted Mean score} = \frac{\text{Total no. of MN} + \text{MoN} + \text{N} + \text{LN} + \text{Least N}}{(\text{No. of MN} \times 5) + (\text{No. of MoN} \times 4) + (\text{No. of N} \times 3) + (\text{No. of LN} \times 2) + (\text{No. of Least N} \times 1)}$$

Where, MN: Most needed; MoN- More needed; N- Needed; LN- Less needed; Least N- Least needed

$$\text{Training need index (TNI)} = \frac{\text{Total obtained score}}{\text{Maximum obtainable score}} \times 100$$

Furthermore, the extent of the training needs of the respondents was calculated based on the training need index (TNI) as described by Patil and Kokate (2011).

RESULTS

Construction of the e-readiness index

The PCA revealed that six out of 15 ICT-related indicators viz., awareness, skill, ownership, accessibility, frequency of usage, and willingness to use - contributed to approx. 60 per cent (59.54%) of the variance; interpreting that, these six indicators hold the most significance in determining the e-readiness index. By assigning appropriate weights to these indicators based on their contribution to the variance, a weighted average index score was computed, providing a comprehensive measure of e-readiness.

The factor loadings for each indicator were calculated by determining the percentage of variance explained by the initial eigen values (Table 2). This value was then considered as the weighted score for the corresponding indicators.

The factor loading values were indicated as W_i , and used to construct the e-readiness index using the formula:

Table 1. Eigen values and variance analysis of indicators in principal component analysis

Indicators for ICT	Initial eigenvalues			Extraction sum of square loadings		
	Total	Percentage of variance	Cumulative (%)	Total	Percentage of variance	Cumulative (%)
Skill	2.415	16.100	16.100	2.415	16.100	16.100
Accessibility	1.758	11.719	27.819	1.758	11.719	27.819
Willingness	1.493	9.950	37.769	1.493	9.950	37.769
Ownership	1.228	8.187	45.956	1.228	8.187	45.956
Frequency of usage	1.110	7.397	53.354	1.110	7.397	53.354
Awareness	0.928	6.188	59.543	0.928	6.188	59.543
Content	0.619	4.127	63.670	0.619	4.127	63.670
Infrastructure	0.544	3.627	67.297	0.544	3.627	67.297
Problems	0.419	2.791	70.088	0.419	2.791	70.088
Stakeholders	0.311	2.072	72.160	0.311	2.072	72.160
Policy environment	0.250	1.668	73.828	0.250	1.668	73.828
Cost-effectiveness	0.188	1.253	75.081	0.188	1.253	75.081
Attributes of ICT	0.134	0.895	75.976	0.134	0.895	75.976
Permanency	0.102	0.678	76.654	0.102	0.678	76.654
Skill gap	0.063	0.418	77.072	0.063	0.418	77.072

Table 2. Total variance and factor loadings for e-readiness indicator

Index	ICT-indicators	Initial eigen values	Percentage of variance	Cumulative variance	Factor loadings
E-readiness index	Skill in using ICT	2.415	16.100	16.100	0.200
	Accessibility of ICT	1.758	11.719	27.819	0.166
	Willingness to use ICT	1.493	9.950	37.769	0.150
	Ownership of ICT equipment/s	1.228	8.187	45.956	0.138
	Frequency of ICT usage	1.110	7.397	53.354	0.127
	Awareness of ICT benefits and uses	0.928	6.188	59.543	0.120

$$\text{E-readiness index} = \frac{\sum_{i=1}^n W_i X_i}{\sum_{i=1}^n W_i}$$

$$= \frac{(W_1 X_1) + (W_2 X_2) + (W_3 X_3) + (W_4 X_4) + (W_5 X_5) + (W_6 X_6)}{W_1 + W_2 + W_3 + W_4 + W_5 + W_6}$$

Where, W_i = Weights corresponding to the X_i indicator; & X_i = Value of the sub-index for the specific indicator

$$= \frac{(0.20 \times 0.33) + (0.16 \times 0.35) + (0.15 \times 0.35) + (0.13 \times 0.33) + (0.12 \times 0.37) + (0.12 \times 0.32)}{(0.20 + 0.16 + 0.15 + 0.13 + 0.12 + 0.12)}$$

$$= \frac{0.30}{0.88}$$

$$= 0.34$$

The e-readiness index evaluated a score of 0.34 for all ten *Pashusakhis*. The respondents were categorised into five categories based on the obtained e-readiness index values as the least e-ready (R_1) 0.0-0.20, less e-ready (R_2); 0.21-0.40, e-ready (R_3) 0.41- 0.60, highly e-ready (R_4) 0.61-0.80, and very highly e-ready (R_5) 0.81-1.0.

The analysis indicated that nine *Pashusakhis* were identified in the less e-ready category, whereas only one was identified as electronically ready.

It was revealed (Table 4) that in the present model, three out of fifteen independent variables viz. experience, innovativeness,

and economic motivation showed significant and positive effects on the e-readiness of the *Pashusakhis*.

Training Needs Assessment of *Pashusakhis*

The results on training needs in different areas of goat rearing are presented in Table 5. It was observed from Table 5 that among the seven major training areas, followed by credit and marketing, and goat kid management; the majority of the *Pashusakhis* had shown their preference for digital literacy and e-readiness, with its components such as financial literacy and digital payments (TNI 74), access to information and resources (66), community engagement and networking (58), digital literacy and skills (50), and goat management software (48).

DISCUSSION

In assessing the digital preparedness of *Pashusakhis*, the e-readiness index score stood at a concerning 0.34. This index underscores a prevalent gap, indicating that most *Pashusakhis* were not fully equipped for the digital age. Specifically, a significant respondent proportion fell into the 'less e-ready' category, with only one *Pashusakhi* emerging as 'e-ready'. The results agreed with those reported by Vankudothu & Padaria (2018); Mohamed et al., (2015); Koyu et al., (2018). Vankudothu & Padaria (2018) conducted a study in nine districts of three states viz., Madhya Pradesh, Karnataka, and Andhra Pradesh, and found a low e-readiness index of 0.33 among farmers - both the users and non-

Table 3. Categorisation of *Pashusakhis* based on their e-readiness score

Least e-ready (R_1)	Less e-ready (R_2)	e-ready (R_3)	Highly e-ready (R_4)	Very highly e-ready (R_5)
(0.0-0.20)	(0.21-0.40)	(0.41- 0.60)	(0.61-0.80)	(0.81-1.0)
—	09 <i>Pashusakhis</i>	01 <i>Pashusakhi</i>	—	—

Table 4. Binary logistic regression analysis for identifying the determinants of e-readiness of *Pashusakhis*

Parameter	B	SE	Wald	Sig.	Exp (B)
Constant	1.196	0.598	4.000	0.05	3.31
Age	-0.145	0.354	0.168	0.168	0.865
Formal education	0.080	1.500	0.003	0.957	1.083
Experience as a <i>Pashusakhi</i>	0.928	0.400	5.400	0.020*	2.53
Occupation as a <i>Pashusakhi</i>	-0.500	3.250	0.0237	0.350	0.607
Annual income as a <i>Pashusakhi</i>	0.001	0.330	0.0001	0.992	1.001
Social participation	0.100	1.900	0.003	0.955	1.105
Extension contacts	-0.819	1.170	0.490	0.490	0.441
Mass media participation	0.076	0.322	0.056	0.065	1.079
Innovativeness	1.035	0.500	4.300	0.038*	2.816
Economic orientation	1.200	0.600	4.000	0.046*	3.32
Risk orientation	0.096	0.187	0.264	0.264	1.101
Decision-making behaviour	-0.114	0.407	0.078	0.078	0.892
Self-confidence	0.005	0.165	0.0001	0.991	1.005
Information networking	0.000	0.215	0.00001	0.995	1.000
Market orientation	0.050	0.450	0.012	0.912	1.051

* $p \leq 0.05$ **Table 5.** Training needs assessment of *Pashusakhis* in scientific goat management and the job role

Training need area	TWMS*	TNI**	Rank
Credit and marketing management	3.08	61.6	1
Sale of goats	3.50	70.00	I
Profitable goat rearing	3.40	68.00	II
Marketing of goat milk and goat manure	3.10	62.00	III
Institutional credit facilities	2.70	54.00	IV
Value addition of meat and packaging	2.70	54.00	IV
Goat kid management	3.00	60.00	2
Management of kids immediately after birth	3.50	70.00	I
Deworming of kids	3.10	62.00	II
Feeding schedule of kids	3.00	60.00	III
Nutrient requirements of kids	2.70	54.00	IV
Diseases affecting kids	2.40	48.00	V
Digital literacy and E-readiness	2.96	59.20	3
Financial literacy and digital payments	3.70	74.00	I
Access to information and resources	3.30	66.00	II
Community engagement and networking	2.90	58.00	III
Digital literacy and skills	2.50	50.00	IV
Goat management software	2.40	48.00	V
Health Management	2.78	56.00	4
Disinfection of goat shed	3.5	70.00	I
Prevention of bacterial/viral diseases	3.1	62.00	II
Disposal of a dead carcass	2.5	50.00	III
Vaccination schedule for goats	2.2	44.00	IV
Deworming schedule for goats	2.2	44.00	IV
Feeding management	2.76	55.2	5
Mineral mixture supplementation	3.10	62.00	I
Fodder preservation techniques	3.00	60.00	II
Fodder varieties and their cultivation	2.80	56.00	III
Feeding schedule	2.50	50.00	IV

Training need area	TWMS*	TNI**	Rank
Balance feeding using locally available ingredients	2.40	48.00	V
Breeding management	2.75	54.85	6
Infertility problem identification	4.10	82.00	I
Methods of heat detection	3.70	72.00	II
Pregnancy diagnosis	3.40	68.00	III
Identification of pregnant goats	3.00	60.00	IV
Breeding performance	1.80	36.00	V
Region-specific breeds	1.70	34.00	VI
Indian goat breeds	1.60	32.00	VII
Care and general management	2.55	51.00	7
Management during summer	3.30	66.00	I
Different goat-rearing methods	2.80	56.00	II
Maintenance of records	2.80	56.00	II
Care and management of buck	2.80	56.00	II
Management of pregnant goats	1.80	36.00	III
Culling of goats	1.80	36.00	III

*TWMS – Total Weighted Mean Score,**TNI – Training Need Index

users of ICT-based extension services. Mohamed et al., (2015) studied and found an overall low e-readiness score of 0.45 in 117 extension personnel in Assiut Governorate, Egypt. The study attributed the low score to inadequate scores in three key areas including infrastructure, affordability, and ICT skills. Koyu et al., (2018) in their study evaluated the e-readiness of farmers in Umiet village, Ri-Bhoi district of Meghalaya, using metrics like elementary ICT expertise, internet expertise, and software literacy. The recorded mean scores were 14, 17, and 40 respectively, indicating an overall low level of e-readiness. The studies collectively indicated a pressing need for better infrastructure, affordability, and ICT

skill training to improve low e-readiness in agricultural communities, essential for the effective use of ICT-based services. Accordingly, strengthening organisational support and e-culture readiness was realised as crucial, complementing existing strengths in strategy, technology, and human resources (Sondarva et al., 2023).

A deeper investigation using logistic regression analysis highlighted the significant factors influencing the e-readiness of *Pashusakhis*. Experience emerged as a prominent influencer, which might be traced back to *Pashusakhis* encountering a diverse range of challenges and opportunities in their goat-banking roles. Through these experiences, *Pashusakhis* seem to have realised the invaluable potential of electronic resources for efficient information dissemination, streamlined market access, and informed decision-making. The results differed from Vankudothu and Padaria's (2018) study, which found age, zaid crops, and risk orientation as key factors influencing mobile advisory farmers' e-readiness.

Discussing training needs, the analysed data revealed a proclivity towards credit and marketing management practices. This inclination can likely be attributed to the tangible and immediate economic rewards linked with efficient goat sales, which are deemed important for the goat bank clientele. The overall results observed from the training needs assessment was in line with those reported by Sinha, et al., (2017); Sangameswaran, et al., (2022); whereas differing from Jena et al., (2018); Meena & Singh et al., (2015). Sinha et al., (2017) assessed the training needs of the goat farmers in the Mathura district of Uttar Pradesh and found that the marketing and financial activities were expressed as the needed and important training area. Sangameswaran et al., (2022) identified the training needs and knowledge level of goat farmers in the Tirunelveli district of Tamil Nadu and found that credit and marketing management was the most needed training area, with the sale of goats as the most needed training sub-component. Jena et al., (2018) in the study on TNA in goat farming found that healthcare was the most important area, whereas Meena & Singh (2015) studied the training needs of goat keepers in the Marwar region of Rajasthan and observed that goat care and management (39.16%) was the most important training need area.

CONCLUSION

The study assessed the electronic readiness of *Pashusakhis*, evaluating the e-readiness index score of 0.34, indicating a relatively lower level of readiness for digital transformation. Determinants of e-readiness were analysed using the logistic regression, revealing that experience, innovativeness, and economic motivation significantly influenced the *Pashusakhis*' e-readiness. These findings underscore the importance of prioritising training and support programs to enhance education, social participation, and decision-making skills among *Pashusakhis* to foster greater e-readiness for sustainable goat development through goat banking. The training needs assessment highlighted critical areas for improvement, with credit and marketing management, kid management, and digital literacy emerging as the top priorities. To promote digital transformation in goat farming, tailored training programs and resources should address these identified needs. This research contributes valuable insights into the field of agricultural

development and digital readiness among extension functionaries, offering guidance for targeted interventions and policy formulation.

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