



*Original Research*

## Develop and Evaluate Use of Mobile Application for Cattle Farming: A New Generation Technology Transfer for Sustainable Dairy Production

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### Abstract

The present study on development of mobile App was conducted in Karnataka state, covering all four divisions, carried out in steps, viz., repository preparation and evaluation, development of “Android dairy App” and effectiveness of the App in terms of knowledge gain and adoption of management practices. Within one month the effectiveness of dairy App in terms of knowledge gain and adoption was studied and was found to be satisfactory. Highest knowledge gain was found in feeding management (59.7%) followed by general care & management (56.5%), housing (51.05%), breeding (47.36%) and disease management (44.52%). Within a short period of 25-35 days of exposure, 16.88 per cent had adopted scientific breeding practices, followed by increased adoption level in disease management (19.38%) and general care and management (19.38%). This mobile App is an important tool in diffusing the scientific developments and also acts as a ready reckoner to refer through the information at any time.

**Key words:** Adoption, ICT Application, Mobile App, Management, Knowledge

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### Introduction

Livestock sector plays a multi-faceted role in socio-economic development of rural households and contributes about 4.2 percent to the Gross Domestic Product and 25.6 percent to the Agricultural Gross Domestic Product in the country. Empirical evidences indicate that livestock is an important component of the agriculture system, providing an additional source of income and nutritional cover to a large section of the rural population, particularly the disadvantaged and poor households (Rao *et al.*, 2003; Birthal and Ali,

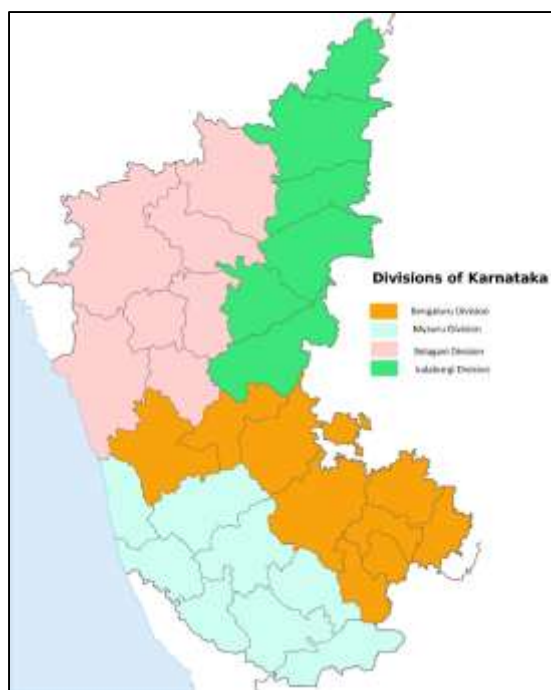


2005; Ravikumar and Chander, 2006; Singh *et al.*, 2007). The distribution of livestock, as a liquid asset to poor families, is more egalitarian as compared to land (Taneja and Birthal, 2004). However, the recent trend in livestock sector growth suggests that in order to meet the emerging demand for livestock based products, both in domestic and global markets, there is a need to reorient the production system by enhancing the efficiency and creating quality consciousness. Adhiguru *et al.* (2009) argued that farmers are not only looking for various information sources for carrying out their production and marketing tasks efficiently but also for ensuring delivery of safe and quality products to the consumers. Information and Communication Technology (ICT) has potential to change the economy of livestock, agriculture and rural artisans in India. ICT based information delivery to livestock sector can significantly improve the quality of decision-making in livestock farming system (Tiwari *et al.*, 2010)

Mobile phones have been one of those successful systems which benefit a large number of people in the developing world. And as mobile phones have evolved, their acceptance has only improved among all users and hence this can be used as a major tool for dissemination of information for quality decision making. With this background the following objectives were set for the study. The primary objective is to use the mobile as a primary tool of intervention to empower the farmers with knowledge on cattle farming. Development of mobile App with an audio-visual Application in regional language will be designed in most comprehensive yet most simple way to deliver the information while breaking literacy barrier. Mobile App will be developed on; cattle specific audio visual content, end to end information on cattle husbandry and guide to cattle production. The specific objectives were the preparation of the technical repository on dairy farming, evaluation of the technical repository through subject matter specialist, development of mobile Applications on dairy farming and evaluate the knowledge gain and adoption level.

### Materials and Methods

The present study was conducted in Karnataka state, covering all four divisions. The study was carried out in steps, viz. repository preparation for Dairy App, development of “Android Dairy App” and evaluation of knowledge gain. This App was made available for downloading in Google’s Playstore and could be transferred to others using “Shareit” and “Bluetooth” Applications. Knowledge gain and adoption was assessed among a total of 320 dairy farmers who were selected randomly for the present study, from four divisions of Karnataka viz., Mysuru, Bengaluru, Kalburgi and Belagavi (Fig. 1).



**Fig. 1:** Map of Karnataka state showing four divisions

## Result and Discussion

### Preparation and Evaluation of the Technical Repository on Dairy Farming

Information regarding different aspects of management were compiled using various sources of published literature, books, journals, internet, online articles and discussion with experts. The technical repository was evaluated by the subject matter specialists. The documented information was in English and Kannada languages.

### Development, Testing and Launching of Mobile Application on Dairy Farming

According to the repository, the relevant pictures were taken from various dairy farms, institutes, and Veterinary colleges. Further the contents were sequenced with the corresponding images. Audio recording of all documented information was done using recoding software in appropriate speed flow so that the farmers can easily understand the information and necessary editions like noise reduction and amplification was made using software to have fine and clear audible quality. Relevant images selected were edited using various softwares like paint, PPT (Power Point Presentation) and free image converter. To draw clear picture to livestock farmers, the appropriate edited images were sequenced to audio flow. “Android Eclipse software” including others like Java and Xml was used to design Dairy App showing appropriate recognisable main and sub icons, which farmers can easily recognise and operate it. The main icon consists of ‘General Information’, ‘Important cattle and Buffaloes breeds’, ‘Breeding Management’, ‘Selection of

dairy animal', 'Housing Management', 'Feeding Management', 'General care and management of calves, milch animal' varieties', 'Diseases', 'Clean milk production', 'Economic dairying', 'Vaccination', 'Feed calculator' and 'Record Keeping'(Fig. 2).



**Fig. 2:** Dairy mobile app with its icons

By selecting any of icons, farmers can access information in audio format with visual background. The developed information module was named as “Dairy Kannada” and “Dairy English: and was tested among dairy farmers and extension professionals for refinement in the content and quality of the App. This “Dairy Kannada” App was released by Minister of Animal Husbandry, Government of Karnataka (Fig. 3).



**Fig. 3:** Dairy App released by Shri. A. Manju, Honourable Minister of Animal Husbandry, Government of Karnataka

The mobile App was shared to other android mobiles through Shareit and Bluetooth applications and also made available in play store for downloads.

### Conducting Bench Mark Survey and Dissemination of the Mobile Application to Identified Dairy Farmers of Karnataka

The Dairy App has been individually disseminated for more than 350 dairy farmers and bench mark survey of dairy farmers was conducted. Through Google's Play store thousands of people downloaded the application.

### Effectiveness in Terms of Knowledge Gain

Using pre-tested interview schedule, data was collected from the respondents at two stages (pre and post exposure of dairy App) by leaving a gap of 25 to 35 days. Percentage knowledge level regarding breeding management (Table 1), feeding management (Table 2), housing management (Table 3), disease management (Table 4) and general care and management (Table 5) among selected dairy farmers at pre and post App exposure were collected and the difference between these two stages is represented as change in percentage of knowledge level.

**Table 1:** Knowledge on breeding management practices at pre and post exposure stage

S. No.	Practices	Knowledge percentage	
		Pre-exposure	Post-exposure
<b>Breeding Management Practices</b>			
1.	The maximum milk yields by dairy cows are noticed during the first 4-5 lactations. So cattle with 2-4 pair teeth and cattle during First or Second lactation that too few month after calving are preferred	36.56%	74.68%
2.	During selection of dairy animal, Milk vein should be visible prominently and all four quarters of the udder should be well demarcated with equally placed teats.	22.50%	84.06%
3.	If the animal is pregnant during selection of dairy animals, it should be confirmed by veterinarian	7.18%	41.25%
4.	Recording the dates of cows in heat and dates of services is necessary to predict future heat or calving dates and to manage the cows accordingly.	11.87%	48.75%
5.	Identification of oestrus of the animals by the signs of bellowing, vaginal discharge and mounting	42.50%	94.06%
6.	Insemination of animal within 8-12 hours of onset of heat signs	31.87%	87.81%
7.	60- 90 days after AI, the animal is to be examined for pregnancy confirmation by veterinarian.	29.37%	82.21%
<b>Breeding management knowledge level</b>		<b>25.97%</b>	<b>73.26%</b>

**Table 2:** Knowledge on feeding management practices at pre and post exposure stage

S. No.	Feeding Management	Knowledge percentage	
		Pre-exposure	Post-exposure
1	Cattle ration should consist of green fodders, dry fodder and concentrates.	8.12%	88.43%
2	To manage the dairy farm effectively, fodders should be grown	15.31%	68.87%
3	Provide the chopped green fodder to avoid feed wastage and for better digestibility	41.25%	93.00%
4	Additional quantity of 1.5 kg concentrates per day is provided for pregnant animals from the 7 <sup>th</sup> month of gestation.	3.43%	61.56%
5	Surplus green fodder can be conserved in the form of 'hay' or 'silage'	27.18%	86.87%
6	Additional 1 kg concentrate mixture is required for every 2.5 kgs of milk for cattle and for every 2.0 kg of milk in case of buffaloes.	31.87%	87.18%
7	Urea treatment of dry fodder	19.91%	79.06%
	<b>Feeding management knowledge level</b>	<b>21.01%</b>	<b>80.71%</b>

**Table 3:** Knowledge on housing management practices at pre and post exposure stage

S. No.	Housing management practices	Knowledge percentage	
		Pre-exposure	Post-exposure
1	Sufficient space is provided for animals by ensuring adequate light and ventilation	14.06%	62.81
2	Hygienic measures like disposal of dung, urine and other waste material are properly done and dung pit is placed preferably at 20 feet away from shed	21.25%	61.87
3	During summer, sprinkling of water on the animal at a regular interval to reduce heat stress.	8.12%	66.56
4	Brush the utensils using detergent and rinse with fresh water followed by keeping them upside down	18.43%	85.31%
5	Stagnation of water surrounding the shed is avoided	22.81%	43.72
6	Painting with lime to food, water managers and side walls regularly	5.62%	48.75%
7	Milking area is hygienically maintained	25.21%	58.12%
	<b>Housing management knowledge level</b>	<b>16.50%</b>	<b>61.02%</b>

The effectiveness of dairy App in terms of knowledge gain was found to be satisfactory. Highest knowledge gain was found in feeding management (59.7%) as the App provides information on balanced ration and proportion of green fodder, dry fodder and concentrate needed as per milk yield. This was followed by, knowledge gain regarding general care & management (56.5%), housing management (51.05%), breeding management (47.36%) and disease management (44.52%).

**Table 4:** Knowledge on disease management practices at pre and post exposure stage

S. No.	Disease Management practices	Knowledge percentage	
		Pre-exposure	Post-exposure
1	Vaccination and deworming schedule are followed regularly	47.81%	97.50%
2	Isolation of the diseased animal and provision of treatment by veterinarian	19.07%	72.00%
3	Few symptoms of FMD are known and consult veterinarian immediately for treatment	12.18%	67.81%
4	Anthrax infected carcasses should not be opened and should dispose by deep burial	5.31%	30.62%
5..	Isolate sick animals and milk them last (milk should not be mixed with good milk)	12.81%	75.31%
6	To reduce the incidence of mastitis, dipping of teats with KMnO <sub>4</sub> after milking is done.	15.31%	79.06%
7	Naval card treatment in calf	21.88%	76.12%
	<b>Disease management knowledge level</b>	<b>19.17%</b>	<b>71.20%</b>

**Table 5:** Knowledge on general care and management practices at pre and post exposure stage

S. No.	General Care and Management	Knowledge percentage	
		Pre-exposure	Post-exposure
1	Colostrum (1/10 <sup>th</sup> of calf's body weight) is fed within 15-30 minutes of calf birth	8.12%	72.18%
2	Milkman should be healthy and free from diseases, before milking washing his hands and legs is done. Smoking and tabacoo chewing during milking is avoided	41.25%	93.12%
3	Wash the udder, teats and flank of the animal with clean water preferably by adding the disinfectant (KMNO <sub>4</sub> ). Wipe with a clean dry cloth	15.31%	61.56%
4	Practice of "full hand" milking and completion of milking process within 7 minutes.	11.87%	74.06%
5	First few drops of milk during milking is discarded.	21.25%	86.87%
6	Get animal insured to avoid losses from sudden deaths	31.87%	74.06%
7	The cattle is dried 8 weeks before the expected calving (7 <sup>th</sup> month of pregnancy)	23.49%	73.30%
	<b>General care &amp; management knowledge level</b>	<b>21.88%</b>	<b>76.45%</b>

Overall knowledge gain was found to be 54.57 per cent and could be understood that developed dairy App was effective in terms of knowledge gain (Table 6). The findings were in consonance with the findings of Pavan *et al.*, 2016, in their study on effectiveness of fodder App in Karnataka, who reported high (50.00%) and medium (37.50%) levels of knowledge gain at post exposure stage. Also similar findings were reported by Meena *et al.* (2014) and SangAppa (2015) in their respective studies.

**Table 6:** Percentage knowledge gain among the dairy farmers

S. No.	Parameters	Knowledge Percentage		Percent of knowledge gain
		Pre-exposure	Post- exposure	
1.	Breeding Management	25.97%	73.26%	47.29%
2.	Feeding Management	21.01%	80.71%	59.70%
3.	Housing Management	16.50%	61.02%	44.52%
4.	Disease management	19.17%	71.20%	52.03%
5.	General care and management	21.88%	76.45%	54.57%

### Effectiveness of Dairy App in Terms of Adoption of Scientific Dairy Practices

After the dissemination of the App, more number of livestock farmers started adopting different scientific dairy practices. Within a short period of 25-35 days exposure towards the App, 16.88 per cent had already adopted scientific breeding practices. The most common breeding management practices adopted were identification of heat symptoms, artificial insemination in time and pregnancy diagnosis at appropriate time. Among the other dairy practices, adoption level increased more in disease management (19.38%) and general care and management (19.38%). With respect to feeding practices, 17.50 per cent have changed their feeding pattern. Some started practicing silage making to combat inadequate fodder availability in lean season and dry fodder enrichment using urea. Among all, improvement in adoption of practices on housing management was found to be low (6.25%) and this can be attributed to fact that, most farmers had already established sheds for their animals and not easy to alter due to space shortage. The most common housing management practices adopted were regular cleaning and usage of disinfectants. Overall it could be concluded that the dairy App improved the adoption of various scientific dairy practices among the dairy farmers to a considerable extent in future (Table 7).

**Table 7:** Percentage adoption among the dairy farmers

S. No.	Parameters	Adoption level (N-320)				Percentage adoption level increased
		Pre-exposure		Post- exposure		
		f	%	f	%	%
1.	Breeding Management	102	31.87%	156	48.75%	16.88
2.	Feeding Management	67	20.93%	123	38.43%	17.5
3.	Housing Management	58	18.12%	78	24.37%	6.25
4.	Disease management	91	28.43%	153	47.81%	19.38
5.	General care and management	183	57.18%	245	76.56%	19.38

### Conclusion

Extension is to bring about planned changes in behavioural complex of farmers i.e. creating awareness, improving knowledge and finally making them to adopt scientific practices for a profitable venture. To a considerable extent, dairy App made the farmers to know, remember and to recollect the things learnt &

experienced and finally seek knowledge on the practices. This mobile App is an important tool in diffusing the scientific developments in the field of dairy production and management and also acts as a ready reckoner to refer through the information at any time.

## References

1. Adhiguru, P., Birthal, P. S., & Ganesh Kumar, B. (2009). Strengthening Pluralistic Agricultural Information Delivery Systems in India. *Agricultural Economics Research Review* 22 (1): 71-79.
2. Anand Babu, (2015). A Mobile App that provides complete information on 15 crops, *The Hindu*, October.
3. Birthal, P. S., & Ali, J. (2005). Potential of livestock sector in rural transformation. In: Rural Transformation in India: The Role of Non-farm Sector (Rohini Nayyar and A.N. Sharma, eds): Institute for Human Development and Manohar Publishers and Distributors, New Delhi.
4. Meena B.S., Ranjithkumar and Amitsingh, (2014). Effectiveness of multimedia digital video disk on knowledge gain of improved dairy farming practices. *Indian Journal Dairy Science*. 67(5): 441-445.
5. Pavan Belakeri, Satyanarayan, K., Jagadeeswary V., Yathiraj S., Veeranna, K. C., and Rajeshwari, Y. B., (2017). Effectiveness of Mobile App on Fodder Production in Terms of Knowledge Gain among Livestock Farmers of Karnataka. *Indian Research Journal of Extension Education*. 10-15.
6. Rao, K. P. C., Bantilan, M. C. S., Rao, Y. M., & Chopde, V. K. (2003). *Strategic Assessments and Development Pathways for Agriculture in the Semi-Arid Tropics*. Policy Brief No. 4, International Crops Research Institute for the Semi-Arid Tropics, Patancheru, Andhra Pradesh, India.
7. Ravikumar, R. K., & Mahesh, C. (2006). Extension educational efforts by State Department of Animal Husbandry (SDAH), Tamil Nadu: SWOT Analysis. *Livestock Research for Rural Development*. Volume 18. Retrieved from <http://www.lrrd.org/lrrd18/9/ravi18126.htm>
8. SangAppa, (2015). *Development of Web-enabled Interactive Information Delivery System (WIIDS) for Dairy Stakeholders*. Ph.D. thesis, National Dairy Research Institute, Deemed university, Karnal, India
9. Singh, J., Erenstein, O., Thorpe, W., & Varma, A., (2007). *Crop–livestock interactions and livelihoods in the Gangetic Plains of Uttar Pradesh, India*. Crop–livestock interactions scoping study - Report 2. Research Report 11. ILRI (International Livestock Research Institute), Nairobi, Kenya. 88 pp.
10. Sotiris Karetsos, Constantina Costopoulou, Alexander Sideridis, (2014). Developing a smartphone App for m-government in agriculture, *Journal of Agricultural Informatics*, 5(1):1-8
11. Tanja, V. K., & Birthal, P. S. (2004). Role of Buffalo in Food Security in Asia, *Asian Buffalo Magazine*, 1: 4-13.
12. Tiwari R, Shahaji Phand & Sharma M. C., (2010). Status and scope of information and communication technology for livestock and poultry production in India– A review. *Indian Journal of Animal Sciences*, 80 (12): 1235–1242.