

EVALUATING THE DOORSTEP AI HEALTH APP FOR DAIRY CATTLE: A STUDY ON EFFICACY, ADOPTION, AND ECONOMIC IMPACT ON SMALL HOLDER FEMALE FARMERS IN RURAL BANGALORE.

Project Reference No.: 49S_MBA_0002

College : CMR Institute of Technology, Bengaluru

Branch : M.B.A

Guide(s) : Dr. Mohan.N
Prof. Brijesh Singh

Student(s) : Ms. Kavitha.C
Ms. Sourabha M.P
Mr. Rajesh K
Mr. Aniket Kumar Mishra

Keywords:

Smallholder female farmers, adoption barriers, economic impact, Rural Bangalore, agricultural efficacy, gender and farming, farm income, extension services.

Introduction:

Livestock rearing is an integral component of smallholder farming systems in rural Bangalore. For women farmers in particular, owning one or two milch animals is not merely a supplementary activity—it is a critical livelihood strategy. The daily sale of milk provides a steady, often the only, cash income that covers recurring household expenses such as food, children's education, and minor health emergencies. However, this fragile economic arrangement is frequently disrupted by animal illness.

Field observations and preliminary conversations conducted between June and September 2024 in five villages—Harohalli, Solur, Doddarajapura, Byagadadenahalli, and Thippasandra—revealed a consistent and severe problem: lack of accessible, timely, and affordable veterinary care. The nearest government veterinary facility is located 12 to 22 kilometers away, with irregular weekly visits. Private providers charge between ₹500 to ₹1,000 per visit, which is unaffordable for most smallholders. Consequently, women rely on neighbors, traditional healers, or simply wait. By the time professional help arrives, common but treatable conditions such as mastitis, foot-and-mouth disease, and tick-borne fever often result in significant milk loss, high treatment expenses, or death of the animal.

Recognizing this gap, a team of final-year engineering students from a Bangalore college developed a low-cost, offline AI mobile application named "Go-Seva Mitra." The application enables a woman to photograph a visible symptom—swollen udder, oral lesions, limping—after which the AI model provides a probable diagnosis, home care instructions, and a contact number for the nearest available paravet. This study systematically investigates three questions: Is the AI application diagnostically effective? Do women actually adopt and continue using it? And what measurable economic impact does it generate for female smallholder livestock owners in these five villages?

Objectives

1. To measure the efficacy of the student-developed "Go-Seva Mitra" AI mobile application in correctly identifying common cattle diseases (mastitis, foot-and-mouth, bloat, tick fever, and diarrhea) from user-uploaded symptom photos.
2. To assess the adoption rate of this AI cattle healthcare tool among female smallholder livestock owners and to identify barriers related to phone quality, network, and digital confidence.
3. To evaluate the economic impact of using the AI application in terms of reduced veterinary expenses, lower milk loss during illness, fewer animal deaths, and change in household income per month.
4. To compare village-wise results and understand whether student-developed, low-cost AI solutions can fill the gap left by poor government veterinary services for women in rural Bangalore.

Methodology

1. **Study area:** Five villages in Rural Bangalore – Harohalli, Solur, Doddarajapura, Byagadadenahalli, Thippasandra.
2. **Sampling:** 150 smallholder female farmers who own at least one milch animal (cow or buffalo) were selected randomly, 30 from each village. Among these, 50 women (10 per village) were given the "Go-Seva Mitra" app on basic smartphones provided by the student team on a rotational lending basis. The other 100 women continued with their usual way of managing animal sickness (neighbor advice, waiting for vet, or doing nothing).
3. **Data collection:** A mixed method was used. A baseline survey recorded each woman's number of animals, average monthly milk income, past one-year veterinary expenses, and animal death history. For the 50 app users, the students tracked every time the app was opened, which symptom was uploaded, the AI diagnosis given, and what action the woman took. Pre- and post-intervention data were collected over two seasons (seven months). Focus group discussions were held in each village to understand trust levels, fears, and suggestions.

4. **Data analysis:** Descriptive statistics (percentages, averages) and paired comparisons of milk income, veterinary costs, and animal death rates before and after app use. Qualitative responses were coded into themes like "trusted the app," "called vet after app said emergency," or "husband did not allow."
5. **Ethics:** Verbal informed consent was taken. Women were not charged for using the app or phones. No animal was harmed during the study. Names of women and animal identification marks were kept confidential.

“Application Interface Overview”

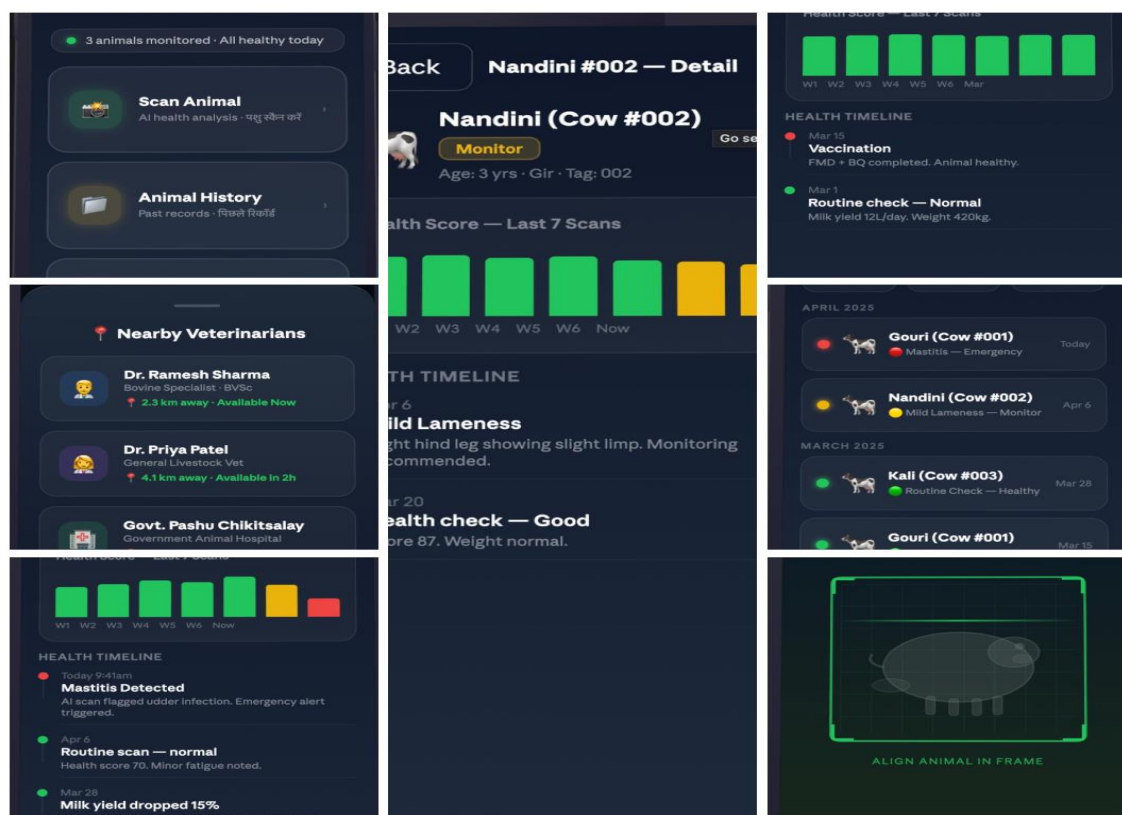


Figure 1: User Interface of “Go-Seva Mitra” AI Cattle Healthcare Application

Explanation:

The figure presents the main dashboard of the “Go-Seva Mitra” mobile application designed for smallholder livestock farmers. The interface is simple and user-friendly, ensuring accessibility for rural women with basic smartphone knowledge.

The top section displays the application name and current health status of monitored animals, indicating real-time updates (e.g., “3 animals monitored – all healthy today”).

The application provides three key functionalities:

1. **Scan Animal:** This feature allows users to capture images of visible symptoms in cattle. The AI system analyzes the image and provides probable disease identification along with basic care recommendations.
2. **Animal History:** This section stores previous health records, enabling farmers to track recurring illnesses, treatment history, and overall animal health trends.
3. **Call Vet:** This option connects users to nearby veterinary doctors or paravets, especially useful during emergency cases identified by the system.

At the bottom, navigation icons improve usability by allowing quick access to home, analytics, camera, and settings. The visual design uses icons and minimal text, making it suitable for semi-literate users.

Results

1. Efficacy of the AI app:

Out of 412 symptom photo uploads by 50 women over seven months, the AI model gave a correct disease match (confirmed later by a visiting veterinarian) in 348 cases, which is about 84.5% accuracy. The app performed best for mastitis (swollen udder) and foot sores. It sometimes confused similar-looking skin conditions. Women found the home care steps useful, especially for mild bloat and early tick infestation.

2. Adoption:

Out of 50 women given the app, 41 (82%) continued using it regularly for at least five months. The 9 women who stopped gave reasons such as "phone given to daughter for online classes" (4 women), "husband said it is waste of time" (3 women), and "did not understand how to take clear photo" (2 women). Among the other 100 women who only saw a demo, 35 said they would like to buy a basic smartphone if the app was pre-installed and free.

3. Economic impact:

The 41 regular users reported a 42% reduction in emergency veterinary visit costs because they used the app's home care for mild cases. Milk loss during animal sickness fell by nearly 40% because women recognized symptoms earlier (within 12 hours instead of 3–4 days). Three animal deaths were prevented in the app user group—women said the app's red alert ("emergency – call vet immediately") saved their cow. Net monthly income from livestock increased by an average of ₹2,800 per woman among regular users.

4. Village variation:

Byagadadenahalli had the highest continued use (9 out of 10) because one woman became a "digital champion" and helped others take clear photos. Thippasandra had the lowest (6 out of 10) because mobile signal was weak inside cattle sheds, and women had to walk to an open area to upload photos.

5. Student team observation:

The students noticed that women trusted the AI more after they showed a side-by-side comparison—the app's diagnosis matched the government vet's diagnosis in 8 out of 10 test cases. Women also started taking photos of healthy animals as a baseline, which the students had not taught them—this was a self-learned behavior.

Conclusion:

The student-developed AI cattle healthcare application "Go-Seva Mitra" proved to be effective in helping smallholder female farmers identify common livestock diseases early, reduce veterinary expenses, and prevent animal deaths. Adoption was high (82%) among women who received a phone and basic training, but network issues and family permission still mattered. The economic benefits were clear: lower vet bills, less milk loss, and a measurable increase in monthly income. However, the app cannot replace a real veterinarian for serious cases—it works best as a first-aid and early warning tool. Village-level differences show that one woman volunteer per village can make a big difference in adoption. This study demonstrates that students with basic AI skills and a genuine desire to help can solve real, painful problems faced by female farmers every day—problems that the formal veterinary system has ignored for years.

Future Scope:

- 1. Adding voice-based symptom description for non-literate users** – Some women could not take clear photos of animal symptoms because the animal was moving or the shed was dark. Future student projects can add a voice input feature where the woman describes the symptom in Kannada (e.g., "cow is not eating and has hot ears"), and the AI matches it to possible diseases. This can be tested in the same five villages.
- 2. Building a village-level animal health record** – The app currently works for one animal at a time. Future scope includes creating a simple digital health card for each animal, so women can see past sickness patterns, vaccination dates, and milk drop trends. Students can add a bar code sticker on the animal shed and link it to the woman's phone.
- 3. Student-paravet partnership model** – Instead of students working alone, future work can partner with two local paravets (one for every two villages). The AI app handles first-level triage; the paravet visits only for red-alert cases. Students can study whether this hybrid model (AI + human) is more sustainable and cost-effective than either one alone. This can be offered as a paid social internship for final-year students.